

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 25 (1990 March 1)

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

(From 1988 January 1, 0h UTC, to 1990 January 1, 0h UTC, TAI-UTC = 24s)
 (From 1990 January 1, 0h UTC, until further notice, TAI-UTC = 25s)

Date 1989/90 (0h UTC)	DEC 29	JAN 8	JAN 18	JAN 28
MJD	47889	47899	47909	47919
Laboratory k	UTC-UTC(k)	(Unit = 1 microsecond)		
AOS (Borowiec)	-2.98	-2.10	-0.88	0.67
APL (Laurel)	0.08	0.11	0.12	0.27
ASMW (Berlin)	0.25	0.27	0.14	-0.07
AUS (Canberra)	-1.01	-1.10	-1.21	-1.27
BEV (Wien)	-	-	-	-
CAO (Cagliari)	12.73	12.96	13.18	13.51
CH (Berne)	-1.04	-1.10	-1.15	-1.19
CRL (Tokyo)	-0.82	-0.76	-0.71	-0.66
CSAO (Shaanxi)	-3.15	-3.38	-3.51	-3.68
DPT (Pretoria)	-17.63	-17.92	-18.25	-18.56
FTZ (Darmstadt)	16.41	16.44	16.44	16.43
IEN (Torino)	-0.30	-0.35	-0.45	-0.55
IFAG (Wetzell)	0.89	0.82	0.61	0.48
INPL (Jerusalem)	147.61	149.10	150.70	152.29
JATC (Xian)	-10.33	-10.60	-10.93	-11.21
KSRI (Taejon)	-8.23	-8.09	-7.86	-7.81
NAOM (Mizusawa) (1)	-35.47	-0.71	-0.91	-1.17
NIM (Beijing)	9.31	9.33	9.36	9.32
NIST (Boulder)	0.19	0.22	0.26	0.32
NPL (Teddington)	-2.11	-2.18	-2.20	-2.25
NPLI (New-Delhi)	-19.67	-20.08	-20.61	-21.15
NRC (Ottawa) (2)	-15.79	-0.79	-0.76	-0.71
NRLM (Tsukuba)	-36.57	-35.51	-34.71	-33.93
OMH (Budapest) (3)	-10.09	0.20	-0.41	-1.62
ONRJ (Rio de Janeiro)	11.32	11.14	11.36	11.70
OP (Paris)	-0.14	-0.22	-0.24	-0.29
ORB (Bruxelles)	4.82	5.05	5.08	5.12
PEL (Lower Hutt)	-	-	-	1.72
PKNM (Warsaw)	-1.66	-1.92	-2.59	-2.89
PTB (Braunschweig)	3.78	3.79	3.78	3.73
RC (Havana)	-2.49	-2.09	-1.94	-1.79
ROA (San Fernando)	9.86	9.88	9.83	9.78
SO (Shanghai)	3.76	3.87	3.96	4.01
STA (Stockholm)	0.33	0.34	0.33	0.32
SU (Moscow)	-	-	-	-
TAO (Tokyo)	-4.81	-4.86	-4.92	-4.95
TL (Taiwan) (4)	1.22	1.16	0.90	0.83
TP (Praha)	1.48	1.66	1.54	1.45
TUG (Graz) (5)	4.46	4.70	-4.04	-3.77
USNO (Washington) (USNO MC)	-1.01	-1.10	-1.21	-1.27
VSL (Delft)	2.20	2.30	2.37	2.42
YUZN (Beograd)	19.18	18.39	17.83	17.58
ZIPE (Potsdam)	0.19	0.26	0.15	0.02

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

Computed values of TAI-TA(k)

Date 1989/90 (0h UTC)	DEC 29	JAN 8	JAN 18	JAN 28
MJD	47889	47899	47909	47919
Laboratory k	TAI-TA(k) (Unit = 1 microsecond)			
APL (Laurel)	-1.26	-1.23	-1.22	-1.07
AUS (Canberra)	-25.52	-25.67	-25.88	-25.96
CH (Berne)	-62.44	-62.68	-62.92	-63.14
CRL (Tokyo)	-2.04	-1.96	-1.90	-1.84
CSAO (Shaanxi)	35.25	34.92	34.69	34.42
DDR (Berlin)	-27.91	-27.61	-27.44	-27.31
F (Paris)	76.56	76.87	77.20	77.51
JATC (Xian)	-1.41	-1.47	-1.47	-1.45
NIM (Beijing)	-10.47	-10.58	-10.65	-10.80
NISA (Boulder) (6)	-45061.62	-45061.83	-45062.03	-45062.22
NIST (Boulder)	-45135.38	-45135.87	-45136.36	-45136.85
NRC (Ottawa)	15.28	15.28	15.31	15.36
PTB (Braunschweig)	-359.62	-359.61	-359.62	-359.67
RC (Havana)	-6000259.20	-6000259.56	-6000260.16	-6000260.77
SO (Shanghai)	-43.84	-43.77	-43.69	-43.63
SU (Moscow)	-	-	-	-
USNO (Washington) (7)	-34591.96	-34592.63	-34593.31	-34594.00

3 - NOTES ON SECTIONS 1 AND 2

(1) NAOM. Time step of UTC(NAOM) of -35000 ns on MJD = 47891.99

(2) NRC . Time step of UTC(NRC) of -15000 ns on MJD = 47892

(3) OMH . Time step of UTC(OMH) of -10000 ns on MJD = 47893.625

(4) TL . Change of master clock on MJD = 47894.083

(5) TUG . Time step of UTC(TUG) of +9000 ns on MJD = 47903.508

(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 (until 1990 January 1, 0h UTC)

UTC-GPS TIME = -6 seconds + Co (from 1990 January 1, 0h UTC)

TAI-GPS TIME = 19 seconds + Co.

Co is obtained from measurements made at Paris Observatory, usually corrected for the measured ionospheric delay, and from 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, $C = Co + DC$.

Date		Co (ns)	DC(ns)						
			PRN13 NAV 9	PRN 3 NAV11	PRN11 NAV 8	PRN14 NAV14	PRN 6 NAV 3	PRN 9 NAV 6	PRN12 NAV10
1989/90	MJD	0hUTC	23h20m	0h44m	11h56m	14h20m	18h36m	21h32m	22h20m
DEC 29	47889	-472	0	-1	3	8	-2	-4	10
DEC 30	47890	-484	-12	6	-7	1	2	-8	0
DEC 31	47891	-495	3	5	0	-	8	-6	2
JAN 1	47892	-505	8	2	-1	-	4	-15	19
JAN 2	47893	-514	2	5	4	-	4	-14	-5
JAN 3	47894	-528	16	4	2	-	1	-12	5
JAN 4	47895	-542	-10	10	-3	-	1	-5	-1
JAN 5	47896	-559	1	4	2	-	7	0	-9
JAN 6	47897	-575	-9	5	8	-	-3	-10	9
JAN 7	47898	-590	11	-8	2	26	13	-3	-8
JAN 8	47899	-607	5	-	7	-2	-1	1	24
JAN 9	47900	-621	-3	0	-3	8	2	-2	1
JAN 10	47901	-634	-6	4	-3	26	3	-11	-15
JAN 11	47902	-642	5	1	3	17	19	1	-3
JAN 12	47903	-655	-7	2	-1	-4	1	-14	-3
JAN 13	47904	-673	0	3	0	8	0	-16	-3
JAN 14	47905	-684	-1	2	15	-	5	-6	-13
JAN 15	47906	-687	-5	1	18	-	-1	0	0
JAN 16	47907	-686	-5	-5	-2	-	1	-8	1
JAN 17	47908	-684	-4	-1	8	-	8	-1	-8
JAN 18	47909	-681	-17	0	12	-	-2	-11	6
JAN 19	47910	-682	1	1	13	-	1	-11	-6
JAN 20	47911	-684	-8	-5	13	-	-	-9	-8
JAN 21	47912	-687	-2	-3	11	9	3	-7	-3
JAN 22	47913	-694	-9	-2	11	10	3	-12	-3
JAN 23	47914	-704	-8	-4	10	0	16	-16	-4
JAN 24	47915	-717	6	-5	10	19	-3	-11	-5
JAN 25	47916	-733	-12	-2	12	-	0	-1	7
JAN 26	47917	-750	-16	-4	14	-	-1	-15	-7
JAN 27	47918	-761	5	8	5	-	11	0	4
JAN 28	47919	-766	15	3	-9	-	5	19	3

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

D and its standard deviation s are expressed in 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 D for the measurement interval, as computed by BIPM (the BIPM uncertainty may be larger than the reported uncertainty on account of the time comparisons);
- the BIPM evaluation from all available measurements (from CRL, NIST, NRC, PTB, SU), with the uncertainty based on those of individual measurements, as reported.

Standards,	Interval(MJD)	D	s
NRC-CsV	47859-47919	+33.0	10.0
PTB-CS1	47859-47919	+1.1	3.0
PTB-CS2	47859-47919	+2.7	1.5
BIPM estimate	47859-47919	+3	2