ISSN 1143-1393

BIPM

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 26 (1990 April 2)

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

(Since 1990 January 1, 0h UTC, TAI-UTC = 25s)

Date 1990 (0h UTC)			JAN 28	FEB 7	FEB 17	FEB 27
MJD			47919	47929	47939	47949
Laboratory k			UTC-UTC(k)	(Unit = 1 microsecond)		
AOS	(Borowiec)		0.67	1.55	1.11	1.07
APL	(Laurel)		0.27	0.38	0.47	0.55
ASMW	(Berlin)		-0.07	-0.25	-0.32	-0.31
AUS	(Canberra)		-1.28	-1.31	-1.35	-1.34
BEV	(Wien)		-	-	-	-10.10
CAO	(Cagliari)	(1)	13.51	-	10.44	11.94
CH	(Berne)		-1.20	-1.15	-1.05	-0.97
CRL	(Tokyo)		-0.66	-0.64	-0.61	-0.58
CSAO	(Shaanxi)		-3.69	-4.16	-4.52	-4.76
DPT	(Pretoria)		-18.56	-18.90	-19.19	-19.46
FTZ	(Darmstadt)		16.42	16.36	16.31	16.34
IEN	(Torino)		-0.55	-0.68	-0.82	-0.96
IFAG	(Wettzell)		0.47	0.47	0.37	0.33
INPL	(Jerusalem)		152.28	-	155.68	157.35
JATC	(Xian)		-11.21	-11.58	-12.03	-12.40
KSRI	(Taejon)	(2)	-7.82	-7.64	-52.86	-53.88
NAOM	(Mizusawa)	(3)	-1.17	-1.95	-2.19	-2.41
NIM	(Beijing)		9.31	9.27	9.19	9.01
NIST	(Boulder)		0.31	0.35	0.35	0.37
NPL	(Teddington)		-2.25	-2.30	-2.31	-2.29
NPLI	(New-Delhi)		-21.15	-21.66	-22.22	-22.79
NRC	(Ottawa)		-0.71	-0.68	-0.64	-0.60
NRLM	(Tsukuba)		-33.93	-33.23	-32.53	-31.99
OMH	(Budapest)		-1.62	-	-	-
ONRJ	(Rio de Janeiro)		11.70	11.89	12.00	11.95
OP	(Paris)		-0.30	-0.33	-0.39	-0.47
ORB	(Bruxelles)		5.12	5.17	5.23	5.33
PEL	(Lower Hutt)		1.72	-	-	-
PKNM	(Warsaw)		-2.90	-3.25	-3.25	-3.51
PTB	(Braunschweig)		3.73	3.77	3.77	3.75
RC	(Havana)		-1.80	-1.82	-1.91	-2.17
ROA	(San Fernando)		9.78	9.66	9.62	9.59
SO	(Shanghai)		4.01	4.10	4.02	3.85
STA	(Stockholm)		0.32	0.29	0.28	0.30
SU	(Moscow)	(4)	-	-	-	-
TAO	(Tokyo)		-4.95	-4.98	-5.01	-5.06
TL	(Taiwan)		0.83	1.02	1.27	1.53
TP	(Praha)		1.45	1.33	0.97	0.98
TUG	(Graz)		-3.77	-3.52	-3.32	-3.14
USNO	(Washington)	(USNO MC)	-1.28	-1.31	-1.35	-1.34
VSL	(Delft)		2.42	2.46	2.44	2.49
YUZM	(Beograd)		17.58	17.62	17.18	17.16
ZIPE	(Potsdam)		0.02	-0.03	-0.07	-0.20

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

Computed values of TAI-TA(k)

Date 1990 (0h UTC)			JAN 28	FEB 7	FEB 17	FEB 27
MJD			47919	47929	47939	47949
Laboratory k			TAI-TA(k)	(Unit = 1 microsecond)		
AOS	(Borowiec)		-	-	1.11	1.07
APL	(Laurel)		-1.07	-0.96	-0.87	-0.79
AUS	(Canberra)		-25.96	-26.13	-26.26	-26.40
CH	(Berne)		-63.14	-63.32	-63.49	-63.66
CRL	(Tokyo)		-1.85	-1.81	-1.78	-1.74
CSAO	(Shaanxi)		34.41	33.84	33.38	33.05
DDR	(Berlin)		-27.31	-27.15	-26.97	-26.84
F	(Paris)		77.51	77.81	78.09	78.38
JATC	(Xian)		-1.45	-1.44	-1.54	-1.59
NIM	(Beijing)		-10.81	-10.89	-11.02	-11.23
NISA	(Boulder)	(5)	-45062.22	-45062.42	-45062.65	-45062.85
NIST	(Boulder)		-45136.86	-45137.36	-45137.89	-45138.41
NRC	(Ottawa)		15.36	15.39	15.43	15.47
PTB	(Braunschweig)		-359.67	-359.63	-359.63	-359.65
RC	(Havana)	(6)	-260.78	-261.51	-261.60	-261.88
SO	(Shanghai)		-43.63	-43.52	-43.61	-43.77
SU	(Moscow)	(4)	-	-	-	-
USNO	(Washington)	(7)	-34594.01	-34594.69	-34595.35	-34596.10

3 - NOTES ON SECTIONS 1 AND 2

(1) CAO . Provisional value for MJD = 47949 .

(2) KSRI. Change of master clock on MJD = 47934.1

(3) NAOM. The apparent time step of UTC(NAOM) of about 500 ns on MJD=47923 results from a change of GPS receiver at NAOM.

(4) SU .

MJD	UTC-UTC(SU)	TAI-TA(SU)
47869	11.75	2827261.75
47879	11.62	2827261.62
47889	11.29	2827261.29

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

(6) RC . For Circulars T 23, T 24 and T 25, add +24 seconds to the published values of TAI-TA(RC).
For the present issue T 26, listed values are TAI-TA(RC) - 18 seconds.

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

4 - UTC-GPS TIME and TAI-GPS TIME

UTC-GPS TIME = -6 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 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 1990	MJD	Co (ns) 0hUTC	DC(ns) PRN13 NAV 9 21h20m	PRN 3 NAV11 22h40m	PRN11 NAV 8 9h56m	PRN14 NAV14 12h20m	PRN 6 NAV 3 16h36m	PRN 9 NAV 6 19h32m	PRN12 NAV10 20h20m
JAN 28	47919	-763	12	0	-12	-	2	16	0
JAN 29	47920	-770	0	-5	-11	-	4	7	-1
JAN 30	47921	-786	-2	4	-10	-	10	1	-15
JAN 31	47922	-799	-	-	-9	-	-	-	-
FEB 1	47923	-805	-11	-8	7	-	15	23	4
FEB 2	47924	-807	7	-1	3	-	19	16	11
FEB 3	47925	-815	-7	-14	1	-	-3	-5	-14
FEB 4	47926	-833	-1	-3	8	27	7	1	35
FEB 5	47927	-855	-9	-1	13	-2	-7	-19	25
FEB 6	47928	-871	11	7	0	9	11	-12	15
FEB 7	47929	-881	-16	0	4	-	-	-13	11
FEB 8	47930	-900	-6	-4	-2	29	-3	-23	-9
FEB 9	47931	-924	-1	7	11	-	2	-11	29
FEB 10	47932	-947	-1	-3	7	25	2	-15	-11
FEB 11	47933	-971	-1	-2	-1	-	2	-12	-9
FEB 12	47934	-991	-6	-3	1	-	6	-30	10
FEB 13	47935	-1011	-5	1	15	-	0	-6	6
FEB 14	47936	-1036	0	-11	9	-	2	-23	-18
FEB 15	47937	-1059	0	-8	21	-	11	-20	1
FEB 16	47938	-1077	13	1	18	-	15	-22	-8
FEB 17	47939	-1094	-10	1	12	-	4	-20	-10
FEB 18	47940	-1117	-5	-5	19	-	1	-13	-10
FEB 19	47941	-1138	-22	-6	25	-	12	-9	3
FEB 20	47942	-1161	-18	-1	20	-	12	-2	-9
FEB 21	47943	-1185	-13	-9	23	-	8	-11	-5
FEB 22	47944	-1212	-	-1	-	-	5	-	-1
FEB 23	47945	-1236	-15	-7	15	-	0	-11	1
FEB 24	47946	-1256	-11	-4	11	-	6	-7	-4
FEB 25	47947	-1276	2	-2	18	11	5	-12	6
FEB 26	47948	-1303	-4	-6	10	11	-1	-3	-10
FEB 27	47949	-1338	-5	-8	6	22	-4	-11	-8

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

Date 1990	MJD	Time comparisons (Unit : 1 microsecond)	uncert.	source	meth. (1)
FEB 1	47923.02	UTC(SU) - UTC(RC) = -13.188	0.025	SU 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 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	47889-47949	+28.4	10.0
PTB-CS1	47889-47949	+0.8	3.0
PTB-CS2	47889-47949	+3.5	1.5
BIPM estimate	47889-47949	+3	2