BIPM

BUREAU INTERNATIONAL DES POIDS ET MESURES

Circular T 20 (1989 October 2)

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 (0h UTC)	JUL 22	AUG 1	AUG 11	AUG 21	AUG 31
MJD	47729	47739	47749	47759	47769
Laboratory k	UTC-UTC(k)	(Unit = 1 microsecond)			
AOS (Borowiec)	10.74	12.18	13.68	14.39	16.13
APL (Laurel)	-1.75	-1.82	-1.84	-2.05	-2.03
ASMW (Berlin)	-0.41	-0.31	-0.25	-0.25	-0.19
AUS (Canberra)	-0.98	-0.99	-1.00	-0.99	-0.97
BEV (Wien)	0.83	-0.67	-1.65	-2.97	-4.16
CAO (Cagliari)	9.45	9.49	9.59	9.73	9.79
CH (Berne)	0.00	-0.05	-0.14	-0.22	-0.29
CRL (Tokyo)	-1.36	-1.32	-1.28	-1.22	-1.15
CSAO (Shaanxi)	-0.43	-0.53	-0.95	-0.95	-1.07
DPT (Pretoria) (1)	-14.45	-14.48	-14.61	-14.78	-14.87
FTZ (Darmstadt)	17.16	17.25	17.21	17.05	16.83
IEN (Torino)	-0.38	-0.32	-0.10	0.13	0.37
IFAG (Wettzell)	-2.26	-2.57	-2.44	-2.24	-2.04
INPL (Jerusalem)	125.70	127.06	128.41	129.78	131.19
JATC (Xian)	-3.95	-4.15	-4.90	-5.20	-5.57
KSRI (Taejon)	-9.91	-9.86	-9.85	-9.70	-9.64
NAOM (Mizusawa)	-35.75	-35.66	-35.48	-35.33	-35.20
NIM (Beijing)	5.36	6.45	7.31	8.79	10.08
NIST (Boulder)	-0.46	-0.46	-0.42	-0.38	-0.32
NPL (Teddington)	-0.93	-0.95	-0.95	-0.98	-1.02
NPLI (New-Delhi)	-13.52	-13.81	-14.10	-14.19	-14.44
NRC (Ottawa)	-14.25	-14.39	-14.50	-14.63	-14.75
NRLM (Tsukuba)	-41.58	-42.07	-42.54	-43.00	-43.45
OMH (Budapest)	-9.32	-9.13	-9.26	-9.31	-9.15
ONRJ (Rio de Janeiro)	15.11	14.76	13.94	13.24	12.63
OP (Paris)	-1.26	-1.15	-1.07	-0.98	-0.85
ORB (Bruxelles)	3.22	1.17	1.35	1.59	1.87
PEL (Lower Hutt)	2.24	2.01	1.85	1.81	1.62
PKNM (Warsaw)	4.43	3.97	3.58	3.03	2.82
PTB (Braunschweig)	4.09	4.09	4.02	4.01	4.02
ROA (San Fernando)	8.00	8.28	8.51	8.57	8.70
SO (Shanghai)	2.62	2.66	2.57	2.64	2.67
STA (Stockholm)	1.03	0.82	0.56	0.32	0.21
SU (Moscow)	-	-	-	-	-
TAO (Tokyo)	-3.59	-3.68	-3.80	-3.88	-3.97
TL (Taiwan)	2.82	2.69	2.59	2.47	2.37
TP (Praha)	-1.14	-0.97	-0.87	-1.01	-0.81
TUG (Graz)	0.76	1.01	1.26	1.51	1.78
USNO (Washington) (USNO MC)	-0.98	-0.99	-1.00	-0.99	-0.97
VSL (Delft)	1.33	1.45	1.51	1.59	1.70
YUZM (Beograd)	14.19	14.98	16.17	17.69	18.74
ZIPE (Potsdam)	-0.45	-0.33	-0.22	-0.10	-0.02

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

Computed values of TAI-TA(k)

Date 1989 (0h UTC)	JUL 22	AUG 1	AUG 11	AUG 21	AUG 31
MJD	47729	47739	47749	47759	47769
Laboratory k	TAI-TA(k)	(Unit = 1 microsecond)			
APL (Laurel)	-1.35	-1.42	-1.44	-1.65	-1.63
AUS (Canberra)	-21.71	-22.03	-22.33	-22.56	-22.84
CH (Berne)	-58.55	-58.79	-59.06	-59.31	-59.57
CRL (Tokyo)	-2.71	-2.67	-2.61	-2.54	-2.46
CSAO (Shaanxi)	38.55	38.45	38.03	38.03	37.91
DDR (Berlin)	-28.28	-28.34	-28.44	-28.51	-28.55
F (Paris)	71.51	71.84	72.18	72.51	72.87
JATC (Xian)	-0.98	-0.99	-1.21	-1.30	-1.29
NIM (Beijing)	-11.75	-11.25	-10.89	-10.10	-9.49
NISA (Boulder) (2)	-45058.01	-45058.27	-45058.51	-45058.73	-45058.95
NIST (Boulder)	-45128.07	-45128.52	-45128.95	-45129.39	-45129.81
NRC (Ottawa)	16.82	16.68	16.56	16.44	16.32
PTB (Braunschweig)	-359.31	-359.31	-359.38	-359.39	-359.38
SO (Shanghai)	-44.57	-44.58	-44.69	-44.62	-44.61
SU (Moscow)	-	-	-	-	-
USNO (Washington) (3)	-34582.89	-34583.47	-34584.00	-34584.55	-34585.08

3 - NOTES ON SECTIONS 1 AND 2

(1) DPT . Division of Production Technology, CSIR, Pretoria, South Africa.

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

(3) 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 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..).

Date 1989	MJD	Co (ns) 0hUTC	DC(ns) PRN11 NAV 8 22h40m	PRN14 NAV14 1h 8m	PRN 6 NAV 3 4h52m	PRN 9 NAV 6 6h12m	PRN12 NAV10 9h 8m	PRN13 NAV 9 10h12m	PRN 3 NAV11 11h32m
JUL 22	47729	-1413	6	-10	-13	-9	-2	-1	1
JUL 23	47730	-1424	-1	-	6	9	18	8	9
JUL 24	47731	-1432	-8	-	-1	10	-6	-11	-10
JUL 25	47732	-1434	7	-	-6	-8	-4	-12	4
JUL 26	47733	-1433	10	-	-3	5	-17	-3	4
JUL 27	47734	-1428	5	-	6	6	6	6	5
JUL 28	47735	-1423	0	-	-4	6	-4	-1	-2
JUL 29	47736	-1421	5	-	0	-4	-23	-5	-8
JUL 30	47737	-1418	0	0	7	10	-	2	7
JUL 31	47738	-1415	1	-10	-	-6	-11	-12	-5
AUG 1	47739	-1411	-6	4	8	4	6	-7	0
AUG 2	47740	-1407	-1	-	-	-	0	-4	5
AUG 3	47741	-1404	6	1	4	7	11	-4	-2
AUG 4	47742	-1402	12	-12	-6	-1	5	-4	-1
AUG 5	47743	-1401	-7	-2	-5	2	-14	-20	-4
AUG 6	47744	-1401	11	-	11	3	11	2	-1
AUG 7	47745	-1398	2	-	2	-1	2	-19	-4
AUG 8	47746	-1394	-5	-	0	2	1	-6	0
AUG 9	47747	-1387	14	-	4	0	-16	-5	-3
AUG 10	47748	-1378	3	-	-5	4	6	-10	1
AUG 11	47749	-1367	2	-	-1	1	-2	-13	-4
AUG 12	47750	-1358	5	-	-1	4	11	1	1
AUG 13	47751	-1350	3	3	1	4	-	-7	-4
AUG 14	47752	-1343	8	-13	0	11	-15	-13	0
AUG 15	47753	-1338	-5	-1	3	6	-9	-2	-7
AUG 16	47754	-1334	6	4	3	9	16	9	7
AUG 17	47755	-1332	4	-1	2	-18	-4	-12	-10
AUG 18	47756	-1333	-8	5	17	-	-5	11	2
AUG 19	47757	-1333	10	13	-9	-	-	-22	0
AUG 20	47758	-1333	-16	-	-4	13	-3	1	3
AUG 21	47759	-1332	-13	-	-	-13	15	8	6
AUG 22	47760	-1324	-4	-	12	-10	5	-2	-1
AUG 23	47761	-1314	-5	-	23	-9	-15	-13	-1
AUG 24	47762	-1305	-1	-	18	0	-21	3	-1
AUG 25	47763	-1295	1	-	12	0	-4	-16	-6
AUG 26	47764	-1289	6	-	7	3	-6	-5	-7
AUG 27	47765	-1284	-	0	-13	15	-21	9	-14
AUG 28	47766	-1283	12	-14	15	13	2	3	2
AUG 29	47767	-1282	-1	0	-2	-	-14	-18	-5
AUG 30	47768	-1280	-	5	-3	-12	-16	5	0
AUG 31	47769	-1273	17	-15	7	16	-14	10	0

5 - 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	47699-47769	+37.7	10.0
PTB-CS1	47699-47769	+2.9	3.0
PTB-CS2	47699-47769	+5.3	1.5
BIPM estimate	47699-47769	+5	2