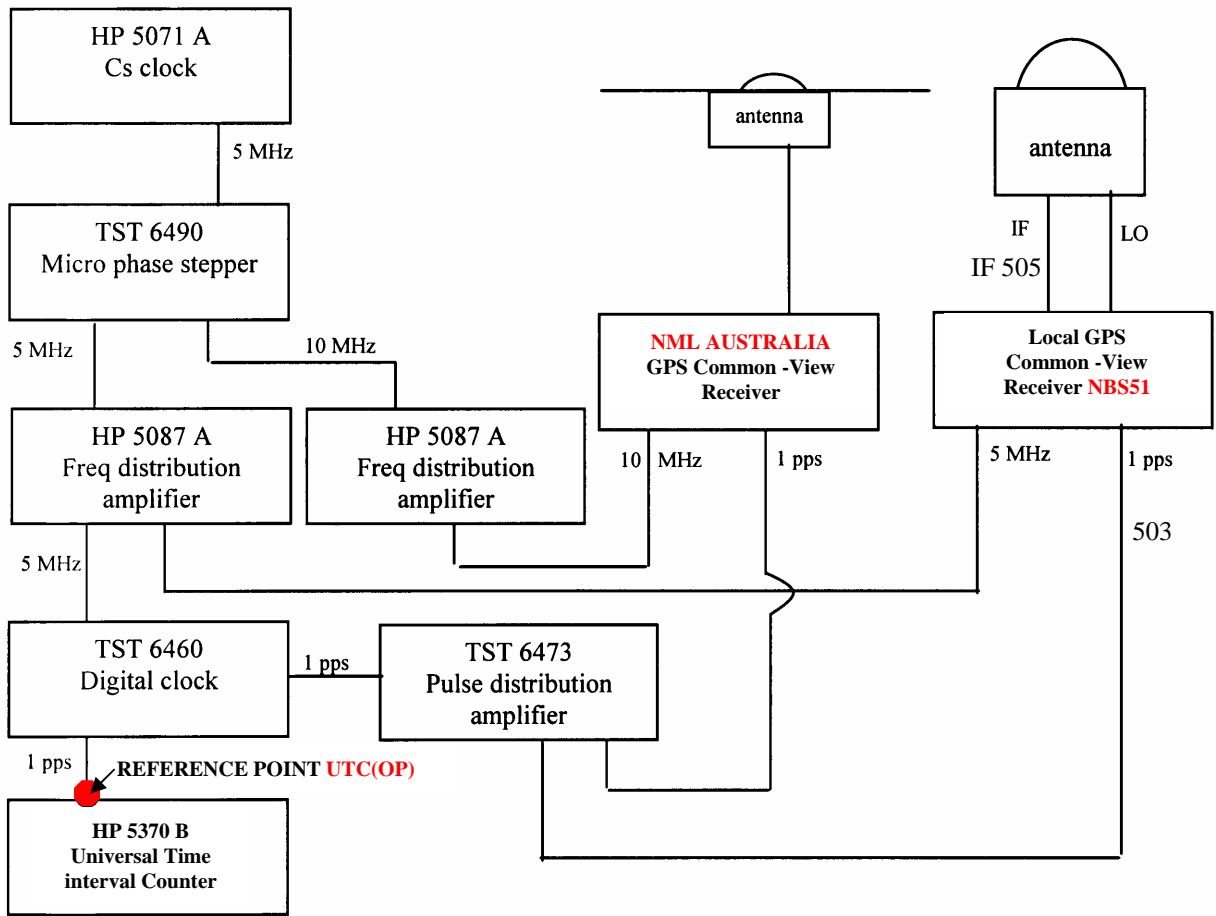# BIPM GPS calibration information sheet
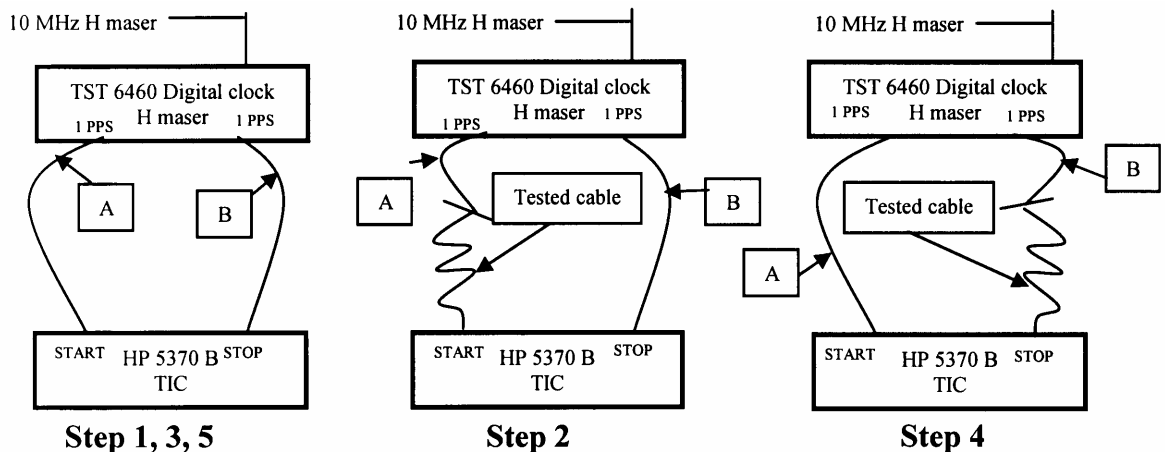
Laboratory:	BNM – SYRTE , Observatoire de Paris
Date and hour of the beginning of measurements:	2004/February/27 (MJD:53062) at 10h10 (UTC)
Date and hour of the end of measurements:	2004/March/10 (MJD:53074) at 23h59 (UTC)

Receiver setup information

	Local:	Portable: NML
• Maker:	Allen Osborne Associates	Allen-Osborne
• Type:	TTR – 5	TTR6
• Serial number:	051	467
• Receiver internal delay (GPS) :	54 ns	
• Receiver internal delay (GLO) :		
• Antenna cable identification:	505 IF	NML IF
Corresponding cable delay :	168 ns ± 0.3 ns	
• UTC cable identification:	503	
Corresponding cable delay :	/	
Delay to local UTC :	304 ns	306 ns (D. Valat, email)
• Receiver trigger level:	0.5 V	
• Coordinates reference frame:	ITRF 88	
Latitude:	4 202 780 .30 m	
Longitude:	171 370 .03 m	
Height:	4 778 660 .12 m	

Antenna information

	Local:	Portable:
• Maker:	Allen Osborne Associates	Allen Osborne
• Type:		TTR6
• Serial number:		572
If the antenna is temperature stabilised		
• Set temperature value :	/	

Antenna cable information

• Maker:	
• Type:	RG – 58
• Is it a phase stabilised cable:	No
• Length of cable outside the building :	Approximately 6 meters

General information

• Rise time of the local UTC pulse:	4 ns
• Is the laboratory air conditioned:	Yes
• Set temperature value and uncertainty :	(21.5 ± 2) °C
• Set humidity value and uncertainty :	/

Cable delay control

Cable identification	delay measured by NML	delay measured by local method
NML-IF Antenna cable	234.5 ns ± 0.5 ns	NOT MEASURED

Plot of the experiment set-up:
Link to the local UTC of both receivers and Antenna positions

HP 5071 A
Cs clock

5 MHz

TST 6490
Micro phase stepper

5 MHz   10 MHz

HP 5087 A
Freq distribution
amplifier

HP 5087 A
Freq distribution
amplifier

5 MHz

TST 6460
Digital clock

1 pps

TST 6473
Pulse distribution
amplifier

1 pps   REFERENCE POINT UTC(OP)

HP 5370 B
Universal Time
interval Counter

antenna

antenna

IF   LO
IF 505

NML AUSTRALIA
GPS Common -View
Receiver

Local GPS
Common -View
Receiver NBS51

10 MHz   1 pps

5 MHz   1 pps

503

Description of the local method of cable delay measurement:

10 MHz H maser

TST 6460 Digital clock
H maser
1 PPS   1 PPS

A   B

START HP 5370 B STOP
TIC

Step 1, 3, 5

10 MHz H maser

TST 6460 Digital clock
H maser   1 PPS
1 PPS

A   Tested cable   B

START HP 5370 B STOP
TIC

Step 2

10 MHz H maser

TST 6460 Digital clock
1 PPS   H maser   1 PPS

B

Tested cable

A

START HP 5370 B STOP
TIC

Step 4

The method used to calibrate the cables is a double wheight method in five steps as shown above.
At each step (i) the TIC gives the result (R_i)of 100 measurments.
The test cable delay is then obtained by the following formula:

$$\text{Delay} = \frac{R_2 - \left(\dfrac{R_1 + R_3}{2}\right) + \left(\dfrac{R_3 + R_5}{2}\right) - R_4}{2} + \text{corrections}$$

The corrections are the estimated delay introduced by adaptators : - 0,1 ns / adaptator