APMP Technical Committee on Time and Frequency Round-robin GPS Common-View Time Transfer Receiver Calibration Experiment

Introduction

The purpose of this experiment is to measure the intrinsic time delays of GPS Common-View (GPS-CV) time transfer receivers operating in the Asia-Pacific region. This will be achieved by circulating a travelling Allen-Osborne TTR6 receiver with known internal delays around laboratories in the region, and comparing the data recorded at each laboratory by the travelling receiver with data recorded at the same time by the local receiver(s).

The following parameters are obviously important to this experiment:

1. The coordinates of the antenna of the travelling receiver should be known, if possible, with the same accuracy as the coordinates of the local receiver.

2. The cable delay between the 1 pps local timing reference and the rear panel of the travelling receiver should be known with the same accuracy as it is known for the local GPS-CV receiver.

A form (designed by Mr W. Lewandowski of BIPM, and used with his permission) in which to write this and other information regarding the installation of the travelling GPS-CV receiver and also the local receiver is provided with the equipment, and has also been emailed to all participants with these instructions. Please email the form to Peter.Fisk@tip.csiro.au, or fax the form to Peter Fisk at +61 2 9413 7383 when you ship the receiver to the next laboratory on the schedule, which is included at the end of this message.

If you do not have enough time to determine the coordinates of the travelling TTR6 antenna, please measure the direction, distance (horizontal and vertical) from your existing time transfer antenna, and email these values, together with the coordinates of your existing antenna to Peter Fisk. NML will then calculate the coordinates of the travelling TTR6 antenna.

When you ship the receiver to the next laboratory on the schedule, please use the fastest shipping method possible. In addition, please include the information in "Customs Declaration" at the end of this document.

If you have any problems, please email or fax Peter Fisk as above, or telephone him on: +61 2 9413 7221 .

TTR6 Hardware Setup

A diagram of the connections to be made to the TTR6 is included in this document. For correct operation, the receiver requires the antenna to be connected (2 cables) and 5 MHz and 1 pps from the reference Cesium standard to be applied. See the TTR6 Operation Manual, pages 2-3 to 2-7. Cables for the antenna are supplied.

Computer Setup

The computer is loaded with the LINUX operating system. If you are unfamiliar with this system, do not worry; you will only need to use a few commands, which are explained in this document.

1. Connect the computer power supply to the computer and apply power. A set of adaptors for the Australian mains plug is supplied.
2. Connect the data cable supplied between the "MODEM" port on the receiver (the lower of the 2 DB-25 connectors) and the computer serial port.
3. Switch on computer (switch is on left side of computer towards rear – slide forwards).
4. To log on to the computer type "cvgps". When prompted for a password type "cvgps" again. At this point you will be able to run the software mentioned later in this documentation.

Important: Before powering down the computer, type "halt". Wait until the message "system halted" appears on the screen before switching off (with switch on left side of computer – slide forwards).

TTR6 Configuration

There are 2 stages to configuring the TTR6. These are:

1. Setting station specific parameters, such as latitude, longitude, height etc.
2. Entering a common-view tracking schedule. This will only need to be done if the schedule has been lost due to battery back-up failure, or if a new schedule needs to be entered.

To set up the TTR6, type “ttr6_setup.prl”, and answer the questions. If a parameter is already correct, just hit the <ENTER> key to keep it.

When the program asks if you want to enter a new schedule, you should be able to answer “no”, since the schedule should be maintained in the TTR6 in non-volatile memory. If you find that the TTR6 does not generate data according to the East-Asia schedule # 34, re-run ttr6_setup.prl, and say “yes” when asked about entering a new schedule, and the East-Asia schedule will be loaded into the receiver. This could take ten minutes or more, and it is normal to see several timeout errors, which are due to the strange behaviour of the TTR6 internal software.

Downloading data

Data should be downloaded from the TTR6 either daily, or once every two days. To download the data, take the following steps:

1. Place a DOS/Windows formatted floppy disk into the floppy disk drive.
2. Type “ttr6_dump.prl”. The data will be written to the screen, the hard disk of the computer, and to the floppy. If the data file appears too short, repeat the procedure.

Please carefully check the data after the first day to ensure that the receiver is following the East-Asia tracking schedule correctly. Please also email the data to peter.fisk@tip.csiro.au.

Inventory

Please check that all of these items are present on arrival, and on departure.

Box 1

TTR6 antenna
LO cable
IF cable
Antenna mounting clips

Box 2

TTR6 time transfer receiver
TTR6 operation manual

Box 3

Laptop computer

Computer power supply

Power supply cable

Serial cable

Mains plug adaptors

Computer carrying case

Customs Declaration

To Whom It May Concern:

This equipment belongs to the CSIRO National Measurement Laboratory, and is consequently the property of the Australian Government.

The equipment is being loaned to the organisation to which it is being sent for a period of between two weeks and four weeks. At the end of the loan period it will be leaving the country, and will eventually be returned to Australia.

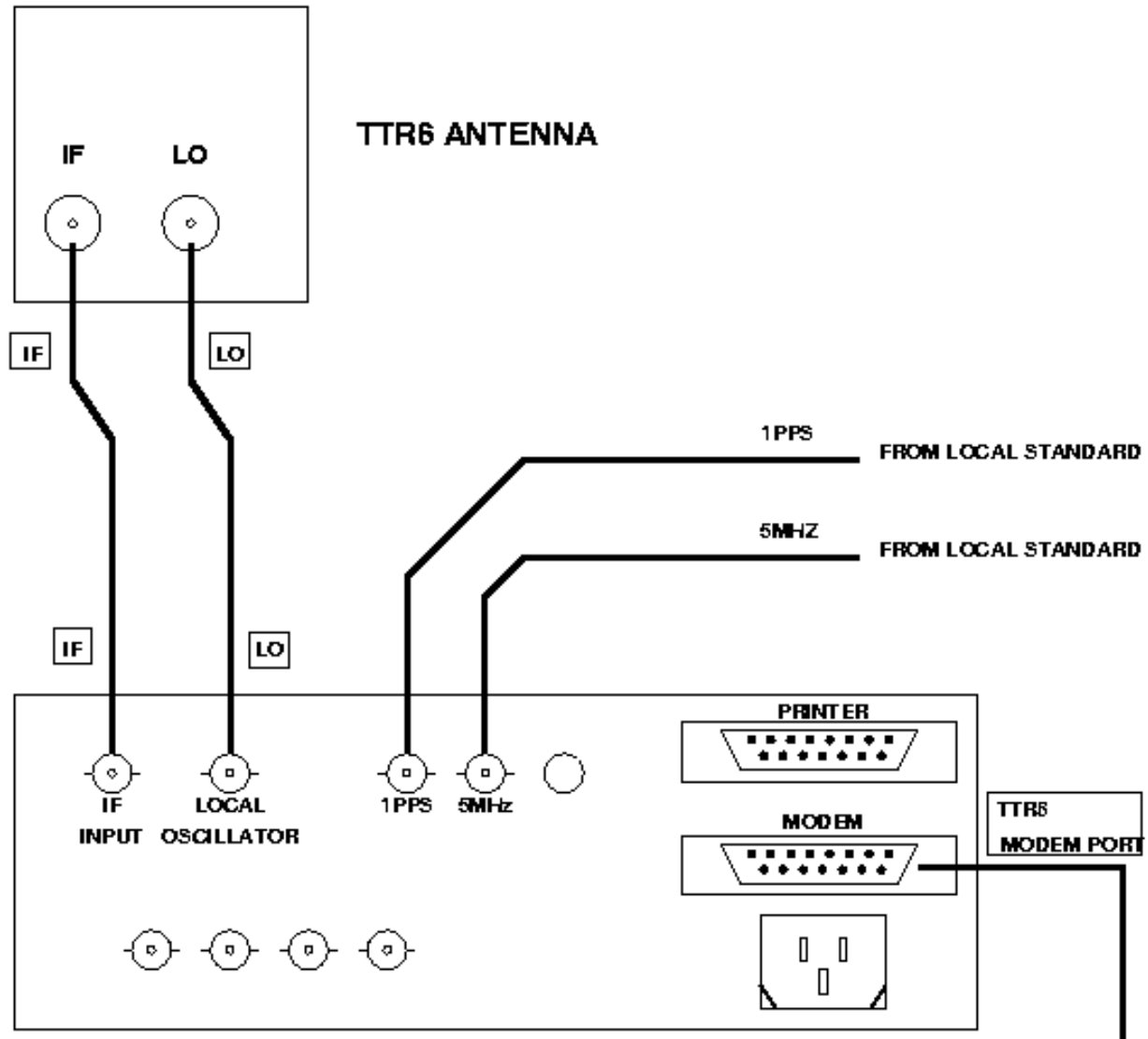
List of equipment:

Box 1: Global Positioning System antenna, serial number 572.

Box 2: Allen-Osborne model TTR6 Global Positioning System receiver, serial number 267.

Box 3: Dell Latitude Xpi portable computer, serial number S43S/7036, cables and accessories.

The total value of the equipment is approximately 10,000 US dollars.



TTR6 RECEIVER - REAR PANEL