RIPE Network Coordination Centre

Internet Delay Measurements using Test Traffic

Status Report

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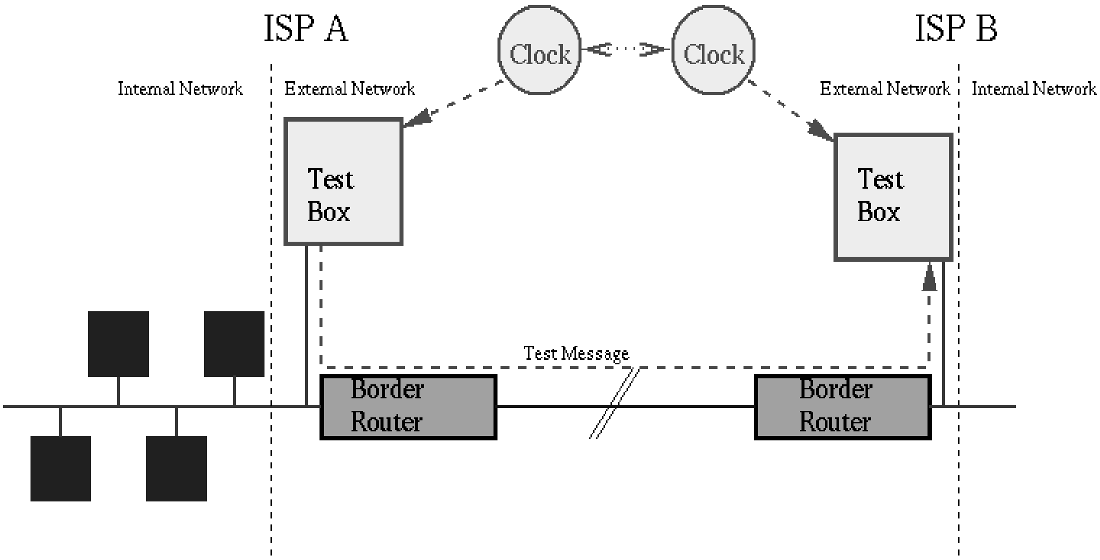
RIPE Network Coordination Centre

Overview

- Project presented at RIPE-27
- Goal: Independent measurement of the delays in the network using test traffic
- Active measurements
- Start with
  - 1 way delay measurements
  - Routing Information
- Brief Status Report
  - Demonstration outside with more details.
  - http://www.ripe.net/test-traffic

Delay Measurements



- Test boxes send and receive messages from each other.
- From the global clock, one can determine the delays
- Implementation
  - GPS clock. Gives a PPS that can be used to synchronize the clocks
  - ntp with kernel level pll
  - BPF to capture the incoming packets

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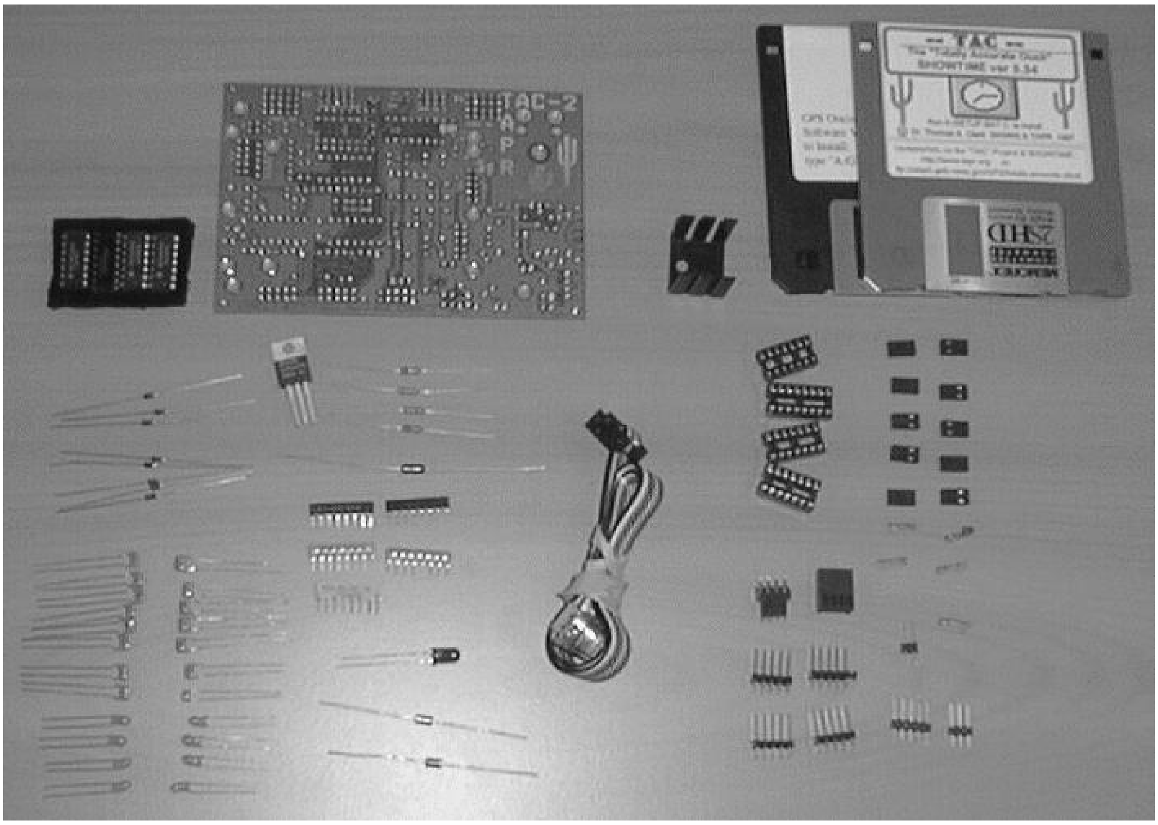
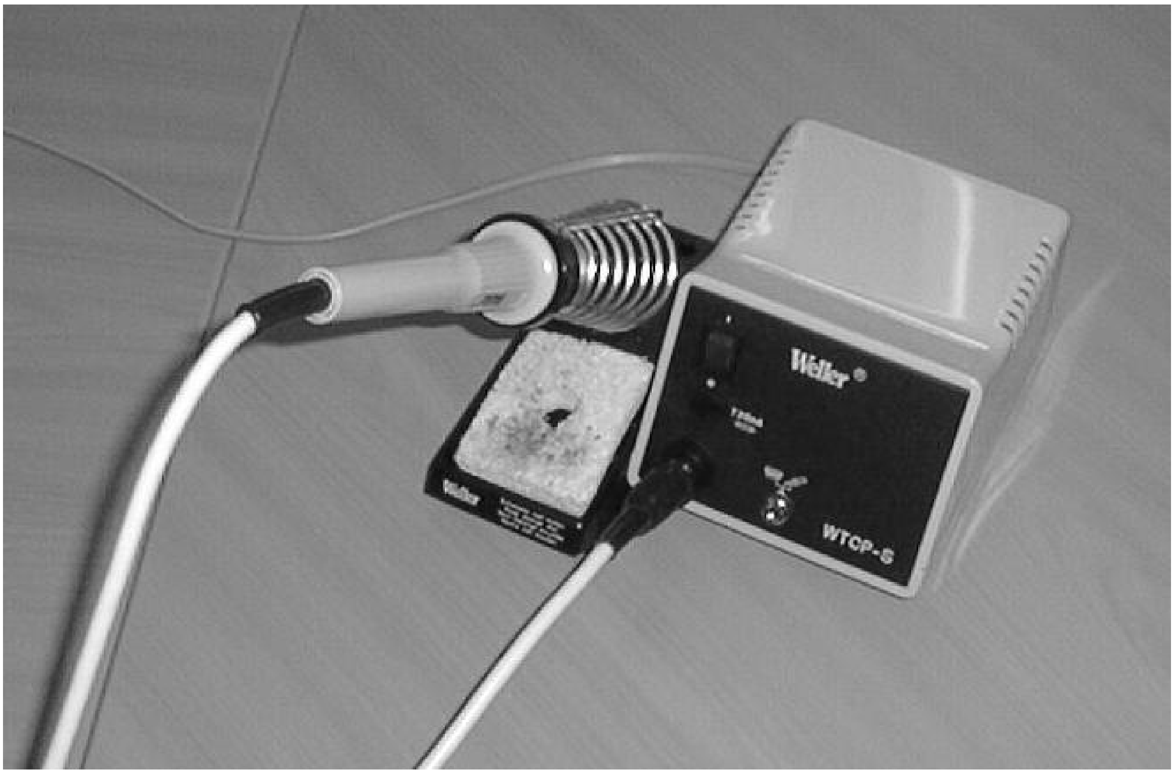
GPS clock

- Most critical component
- Several clocks under consideration:
  - TAPR-TAC. 1 running, 1 being built
  - Motorola Oncore VP. 1 running
  - TrueTime. ordered
  - Others?
- In the first tests, we see differences in their behavior
  - Why? The GPS unit is the same!
  - Need to study experimental effects before we decide which unit will be used in the final set-up

Building the clocks



Building the clocks



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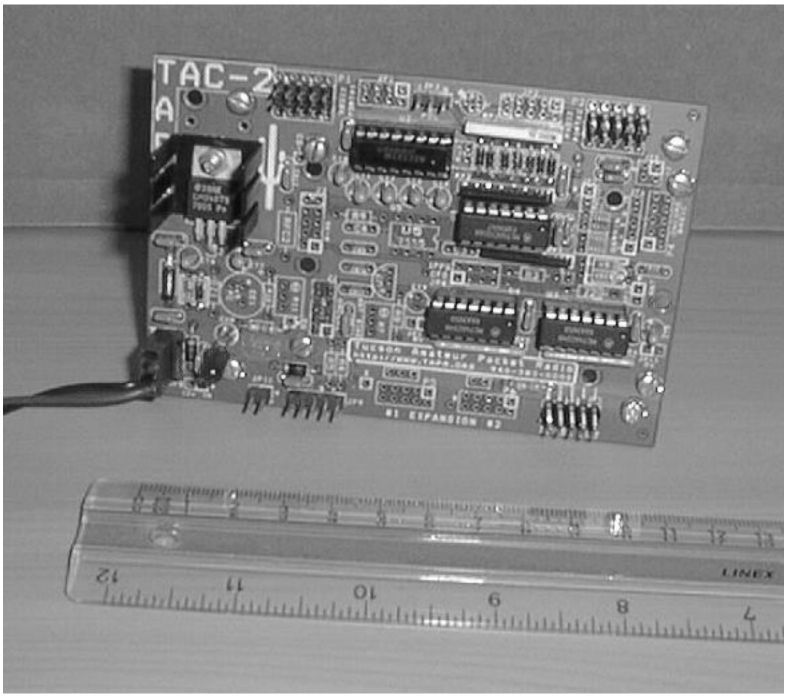
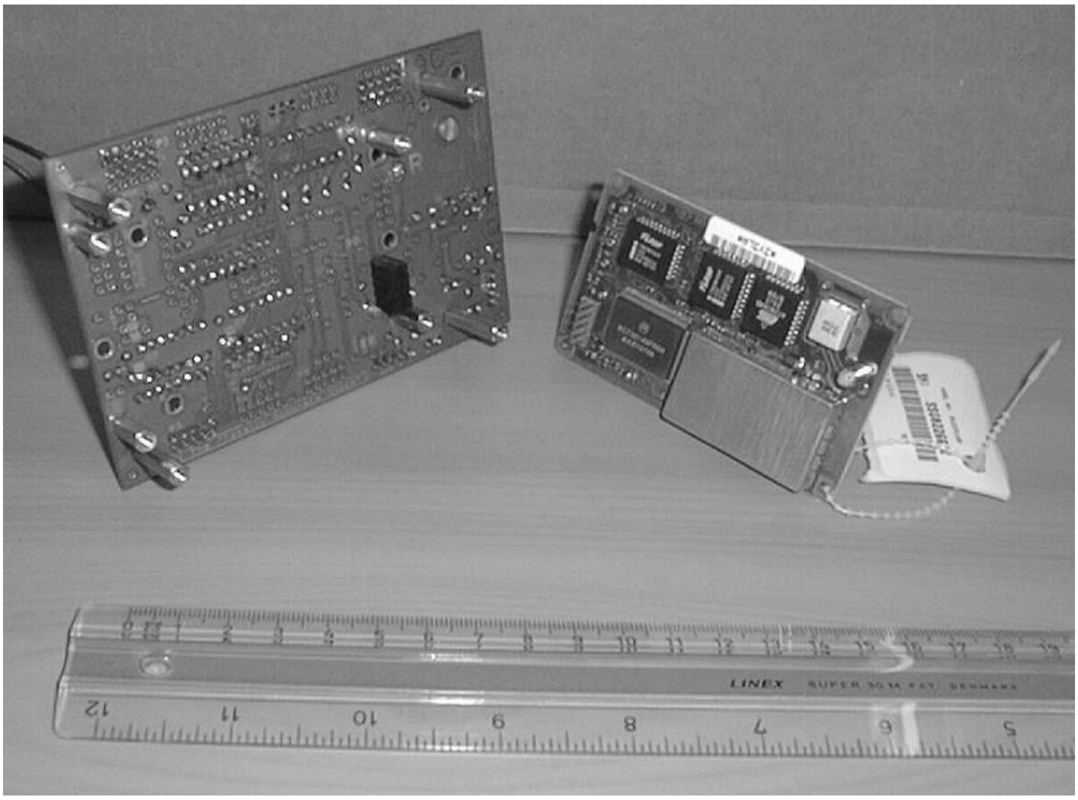
Building the clocks





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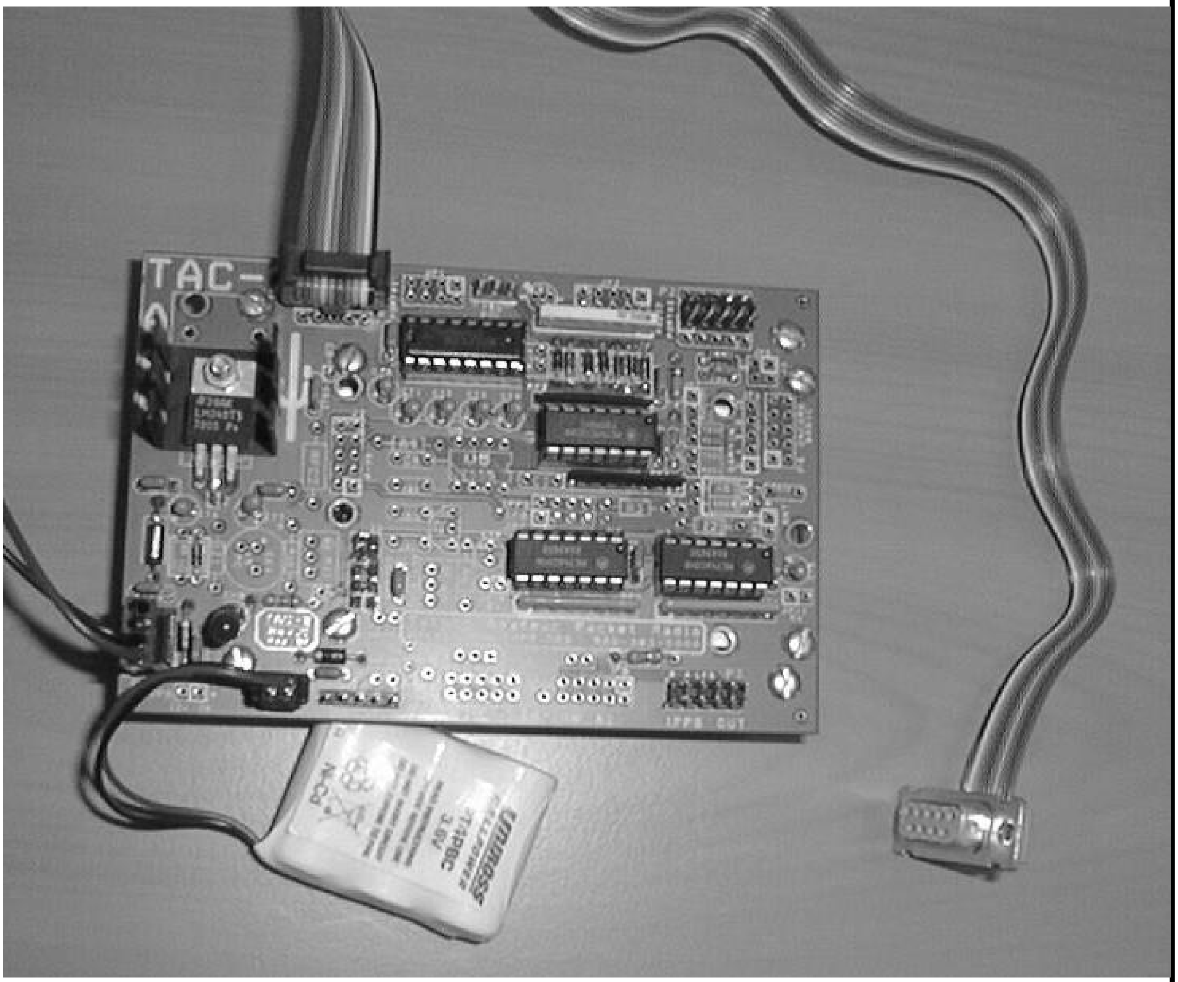
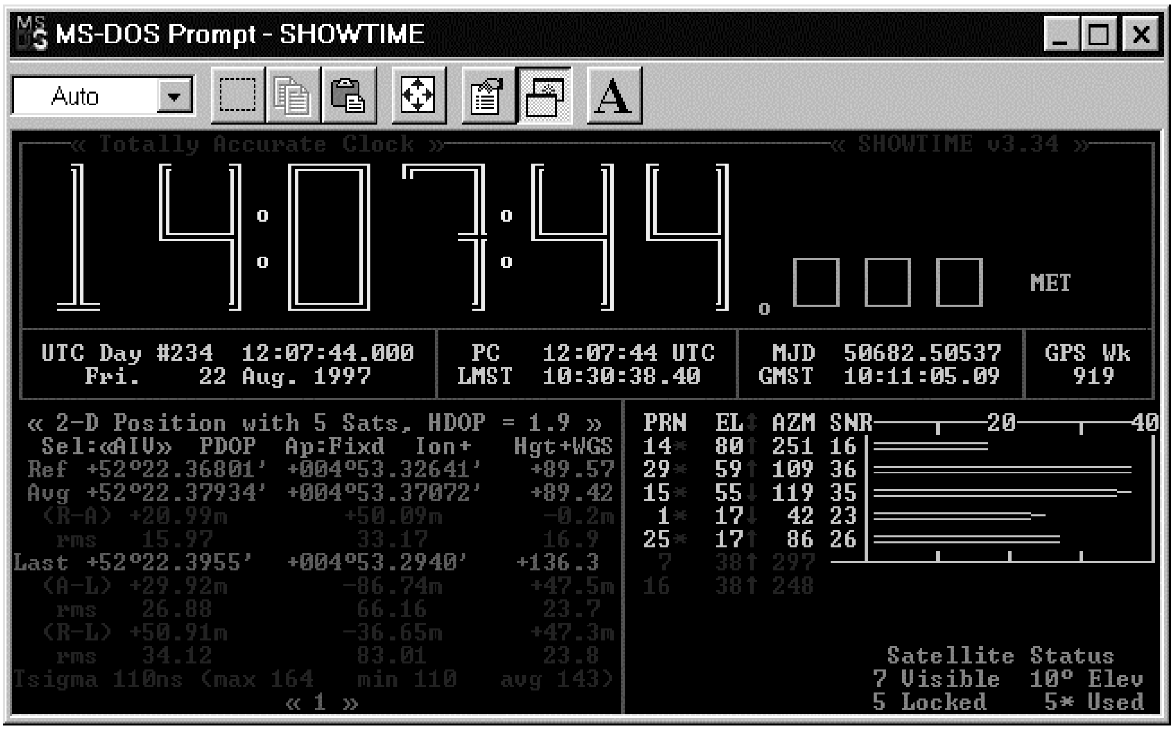
Building the clocks



Building the clocks



First Measurements

- 1 way delays
- Demonstrated outside
  - 2 or 3 prototype test boxes send data to a machine here
  - Measure delays:
- We see effects at the 0.1ms level.
  - These may not be real network effects, but:
- We are confident that we can measure effects with sub-ms resolution

Routing Information

- We have a program that collects routing information between two hosts
  - Controlled by a central machine
    - Useful for delay measurements too
  - Data is transferred and analyzed at a central point
    - Graphical and WWW access to the data
- The software has been running reliably for a couple of months
- Further activities on this have been postponed until we have the 1 way delay measurements up and running

Schedule

- October/November ‘97
  - Hardware
    - Build 2nd TAPR-TAC card, finish s/w interface
    - 4th clock card arrives
    - Extensive study of experimental effects related to the clocks.
  - Software
    - Finalize software design
    - Decide on data-base
    - Write first version of the central control s/w
  - Planning
    - How to build O(25) Test Boxes with GPS receivers?
    - How to control those boxes?

Schedule

- November/December '97
  - Find people interested in hosting a test box
  - Order hardware
  - Gain experience with running test boxes at remote sites
  - Software development
- Early '98
  - Install test boxes
  - Set up control structure
- A tight schedule
  - But building these boxes is a lot of fun

Documents

- Published:
  - RIPE-144, Initial proposal
  - RIPE-158, Design document
- In preparation:
  - Software design document
  - Deployment plan for O(25) test boxes
  - Instructions for hosting a test box.
- Watch the RIPE mailing list for details!

Conclusions & outlook

- We have all the equipment we need to do delay measurements between a few boxes
- First results look promising but
- We still have to do a lot of work in order to understand all experimental effects
- We expect to have O(25) test boxes ready for installation early next year

- More results at RIPE-29