SH-3 WinCE engine

Jan Beutel, Tobias Bösch
Electronics Laboratory, ETH Zürich
Phone: +41-1-632 51 44
FAX: +41-1-632 12 10
e-mail: jbeutel@ife.ee.ethz.ch

3rd February 1999

Abstract

A low power multichip module based on Hitachis Super-H architecture SH-3 processor and Microsofts Windows CE operating system is developed. The platform is targeted as a PDA for operation with the GPS-MS1 platform supplied by µ-blox AG.

ETH Zürich
Electronics Laboratory (IfE)

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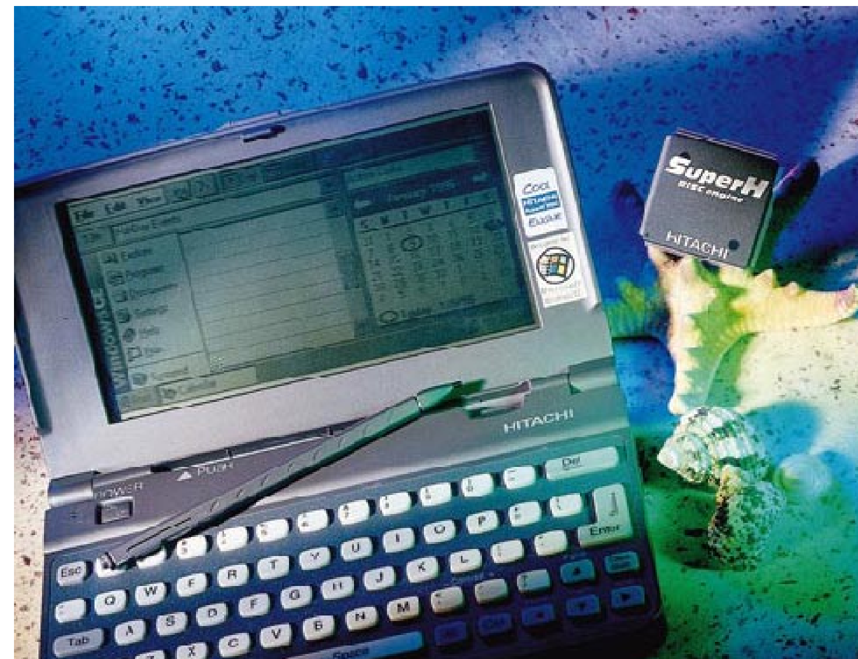
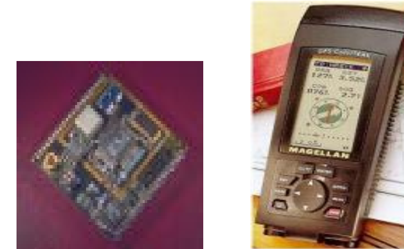


PC-Slot



Global Positioning System

LCD & Touchscreen

PDA

Serial & IrDA

V.34bis Modem & Audio

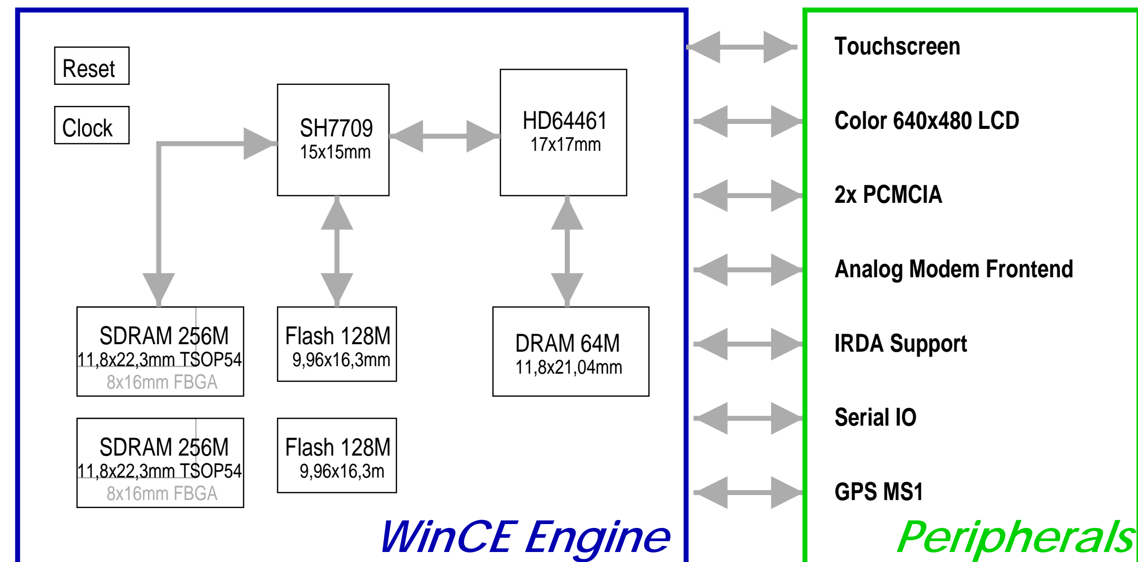
Hitachi Super-H Prerequisites

- WinCE System on SH7709 processor and companion
- Components available in FBGA/CSP packages
- Ready made development platform supplied by Hitachi

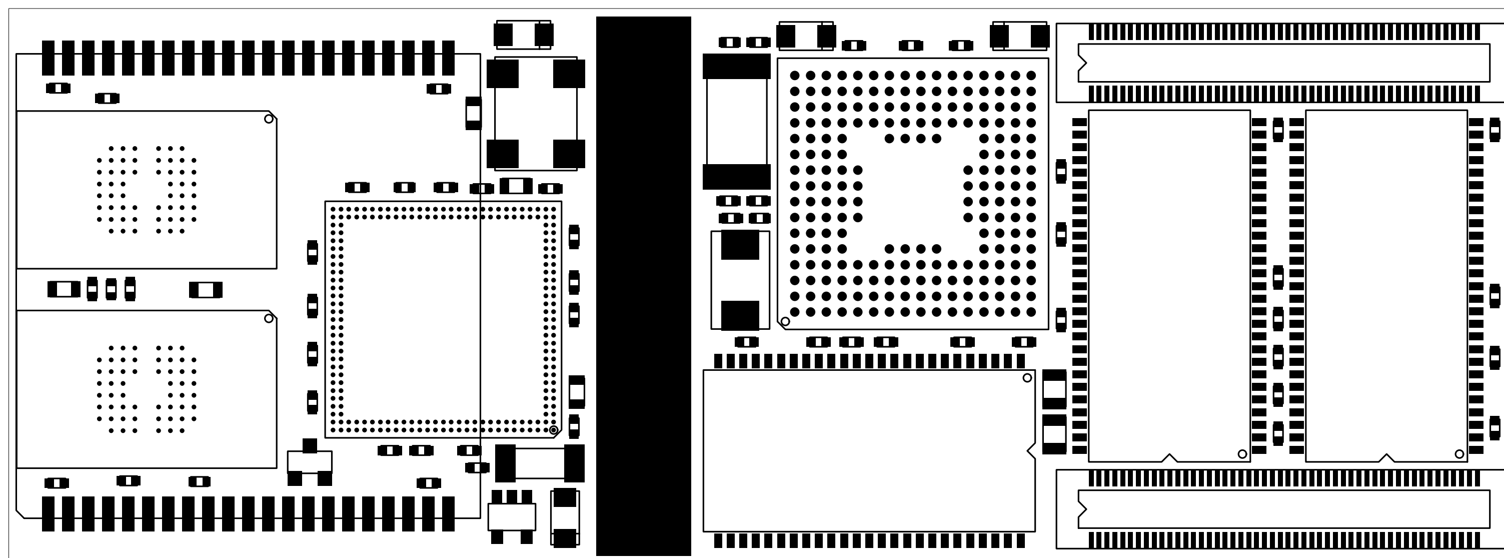
- Flexible system design, supporting SRAM, ROM, EDO/SDRAM
- Companion chip with I/O and display controller
- Only few external components necessary

WinCE Engine Description

- Components
  - SH7709 processor
  - HD64461 companion
  - 2 * 32 MByte SDRAM
  - 2 * 16 MByte Flash
  - 64 MBit display EDO DRAM
  - Clocking
  - Reset chip
- Power supply
  Single 3.3V
- System I/O
  200 pin, 0.5 mm pitch

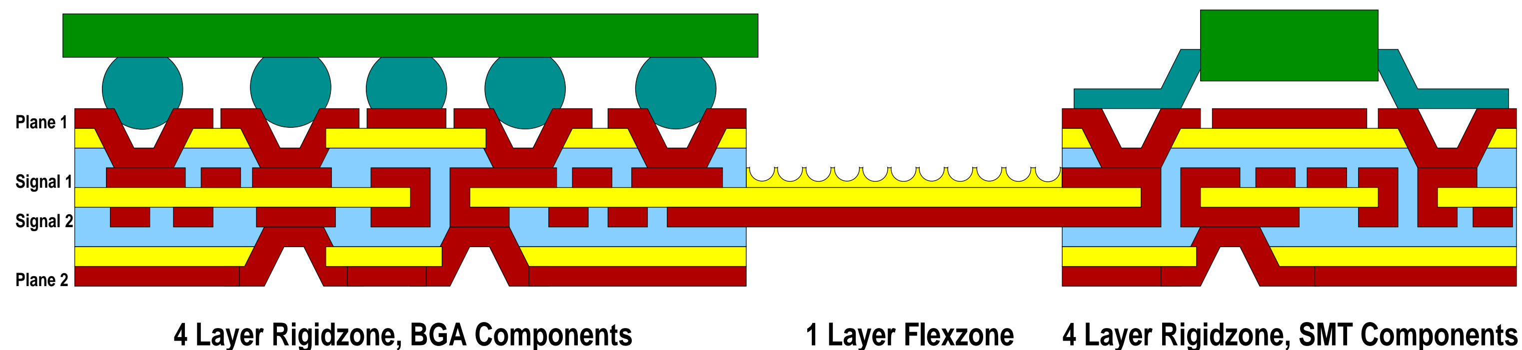


System Layout



Form factor 96 x 35 mm, height 7,45 mm (left), 1.7 mm (right)

HDI Substrate Technology



- DYCOstrate rigid-flex microvia board
- High density build-up technology
- Blind and buried vias
- Exterior planes for stability and EMV
- Via-at-SMD to eliminate soldermask

- 70 µm line/space
- 250 µm outer layer vias
- 200 µm inner layer vias
- 500 µm min. ball/padpitch

DYCOstrate: Flexible Microvia Boards

Inner Layers

	typical	limit	leading edge
conductor spacing	80	70	50
minimum via pad diameter	250	200	150
landing pad diameter	300	225	175

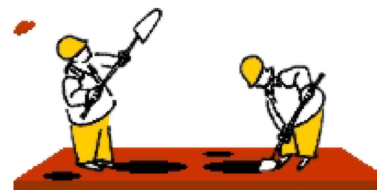
Outer Layers

minimum via pad diameter	300	250	200

Thickness

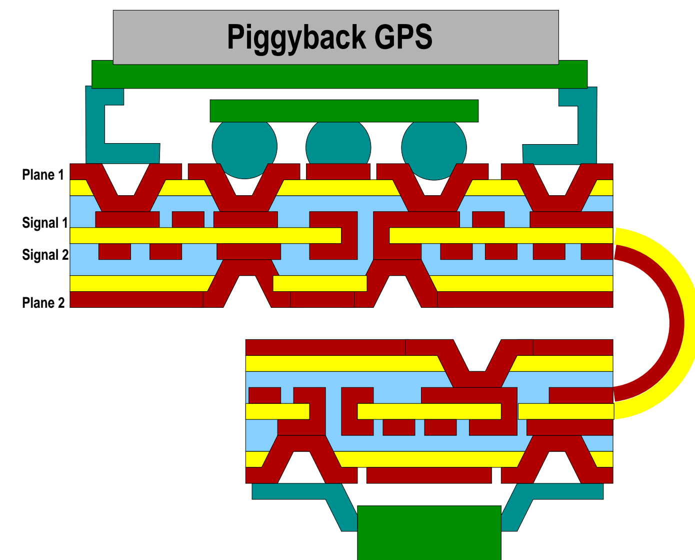
total thickness board	250	175–250	125–250
dielectric separation layer	25–35	25–35	>15

Cost: ++ Amount of layers, feature sizes, overall size
oo Plasma Vias
- - High density



Flex Circuit Advantages

- Adaptable form factor
- Long and slim vs. square and cube sized
- Bend radius < 2 mm
- Flex zone can be adapted
- Stacked components/modules
- 7.45 mm (bent 9.15 mm) overall height



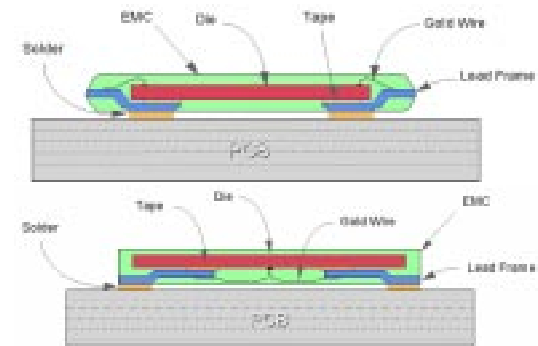
External Connection

- 200 pins necessary for PCMCIA support and system bus
- 0.5 mm vs. 0.635 mm pitch results in double area
- Ultra fine pitch connectors cut down in cost

- Small pitch increses complexity in daughterboard
- Long connectors (> 100 pin) result in planarity problems
- Alignment problem for multiple connectors

- Twin connectors available as mounting bracket assembly

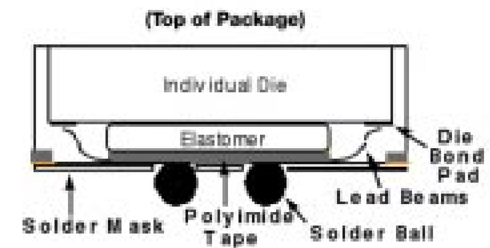
Marketsituation Memory Packaging



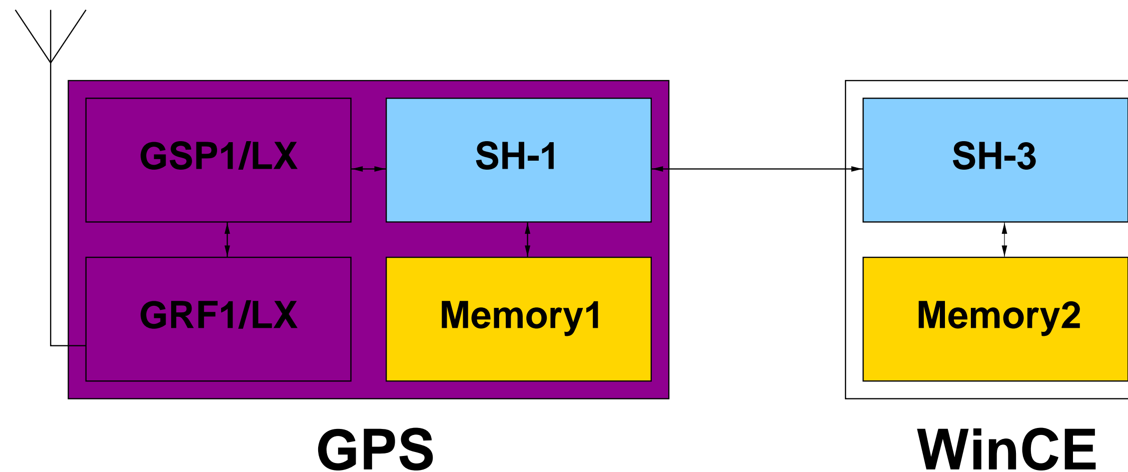
- Market is application/volume driven
- Workstation vendors dictate JEDEC norm for DRAM
- EDO RAM will be discontinued

- Flash and SRAM memory available in FBGA/μBGA

- All vendors have advanced packages available
- New packages are only applied to new products
- Fast RAMBUS, RDRAM, 256 Mbit SDRAM in Q3/Q4/99



GPS Integration

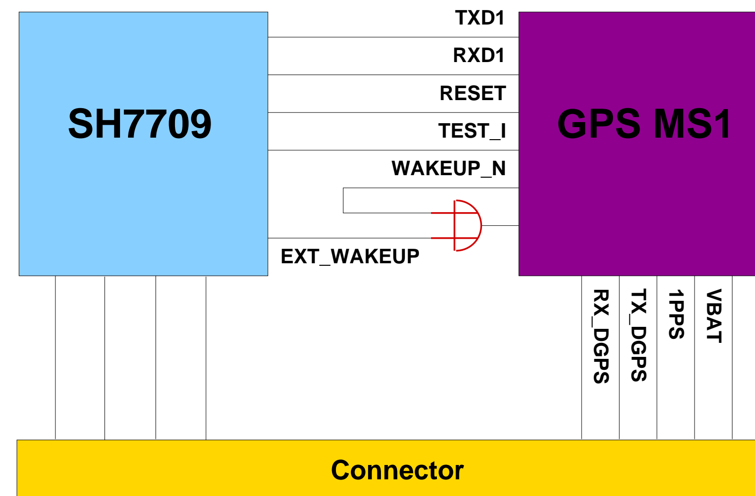


- Two distinct modules
- All GPS functionality runs on the GPS MS1
- Userinterface runs on the SH-3

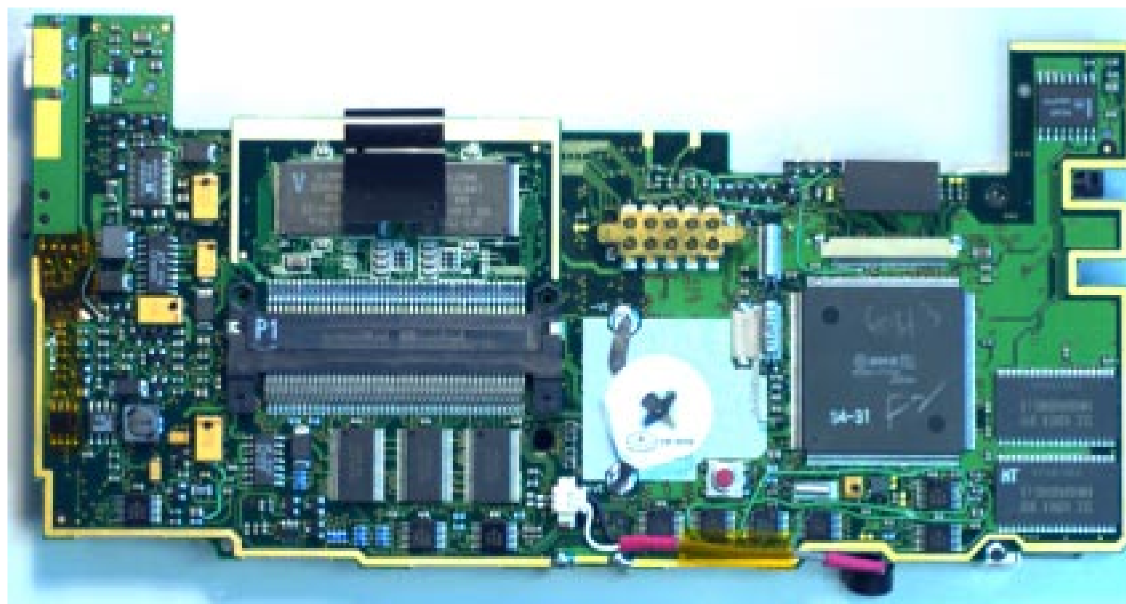
- Future GPS chipset allows for further integration without SH-1

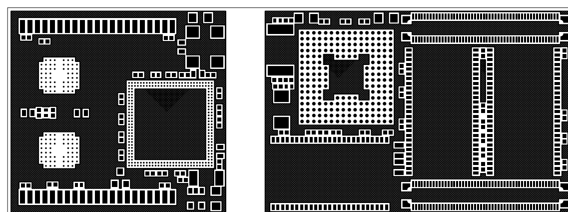
GPS Integration 2

- Query GPS data through serial interface
- Update GPS firmware through SH-7709
- Feed differential GPS data through the connector
- OR-gate allows use of advanced power modes of GPS-MS1
- Individual power down modes



A Typical PDA Board Compared





Outlook

- Components available in sample quantities now
- Production of 20 prototype boards
- Adaption of software from reference platform and test

- Future companion chip will incorporate display memory
- DRAM memory packages will be even smaller (BOC, BLP, FBGA...)
- Next generation Hitachi/GPS chipset allow further integration

- Adaption of form factor and I/O to OEM customer needs
- Series Production