Debugging Electronics for the Software Engineer
rdl = 00000000000401284
qword ptr [rbp-152] = [00007fff78730228] = 0000000000000001
What will you learn here?

- No basic electronics
  - You know what a resistor is
  - You have a hardware guy to support you
- No advanced electronics either
  - That what you have the hardware guy for
- Just a couple of tricks your hardware guy should have told you a long time ago
Halbleiterschaltungstechnik
Mit DVD
14. Auflage
<table>
<thead>
<tr>
<th>Signal</th>
<th>Wire Status</th>
<th>Wire ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>XTAL1</td>
<td>L</td>
<td>CLK1</td>
</tr>
<tr>
<td>PSEN</td>
<td>H</td>
<td>D28</td>
</tr>
<tr>
<td>ALE</td>
<td>H</td>
<td>D21</td>
</tr>
<tr>
<td>RD</td>
<td>H</td>
<td>D23</td>
</tr>
<tr>
<td>WR</td>
<td>L</td>
<td>D22</td>
</tr>
</tbody>
</table>

- **Latched A[7..0]**
  - A7
  - A6
  - A5
  - A4
  - A3
  - A2
  - A1
  - A0
  - RST1
  - INT0
  - INT1

- **A[15..8]**
  - A15
  - A14
  - A13
  - A12
  - A11
  - A10
  - A9
  - A8

**AD[7..0]**

**LogicPort**
34 CHANNEL LOGIC ANALYZER
pcitestinstruments.com

**LogicPort**

Running in Software Demo mode
Acquisition: 1, sampler: 6.81K
D28 Freq: 4.096,000Hz
CLK1 Period: 10ns
CLK1 Cycle: A->T: 5
D7 Transition: C->D: 5
PRELIMINARY RESULTS INDICATE THESE CRASHES ARE LINKED TO THE SAME ELECTRONIC COMPONENTS...

CELLPHONES.
THE 6500 MICROPROCESSOR FAMILY CONCEPT —

The 6500 Series Microprocessors represent the first totally software compatible microprocessor family. This family of products includes a range of software compatible microprocessors which provide a selection of addressable memory range, interrupt input options and on-chip clock oscillators and drivers. All of the microprocessors in the 6500 group are software compatible within the group and are bus compatible with the M6800 product offering.

The family includes six microprocessors with on-board clock oscillators and drivers and four microprocessors driven by external clocks. The on-chip clock versions are aimed at high performance, low cost applications where single phase inputs, crystal or RC inputs provide the time base. The external clock versions are geared for the multi-processor system applications where maximum timing control is mandatory. All versions of the microprocessors are available in 1 MHz, 2 MHz ("A" suffix on product numbers), 3 MHz ("B" suffix on product numbers), and 4 MHz ("C" suffix on product numbers) maximum operating frequencies.

FEATURES OF THE 6500 FAMILY

• Single ±5 volt supply
• N channel, silicon gate, depletion load technology
• Eight bit parallel processing
• 56 Instructions
• Decimal and binary arithmetic
• Thirteen addressing modes
• True indexing capability
• Programmable stack pointer
• Variable length stack
• Interrupt capability
• Non-maskable interrupt
• Use with any type or speed memory

• 8 BIT Bi-directional Data Bus
• Addressable memory range of up to 65K bytes
• "Ready" input (for single cycle execution)
• Direct memory access capability
• Bus compatible with M6800
• Choice of external or on-board clocks
• 1 MHz, 2 MHz, 3 MHz and 4 MHz operation
• On-the-chip clock options
• External single clock input
• RC time base input
• Crystal time base input
• Pipeline architecture

MEMBERS OF THE 6500 MICROPROCESSOR
(CPU) FAMILY

<table>
<thead>
<tr>
<th>Microprocessors with On-Chip Clock Oscillator Model</th>
<th>Addressable Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>R6502</td>
<td>65K Bytes</td>
</tr>
<tr>
<td>R6503</td>
<td>4K Bytes</td>
</tr>
<tr>
<td>R6504</td>
<td>8K Bytes</td>
</tr>
<tr>
<td>R6505</td>
<td>4K Bytes</td>
</tr>
<tr>
<td>R6506</td>
<td>4K Bytes</td>
</tr>
<tr>
<td>R6507</td>
<td>8K Bytes</td>
</tr>
</tbody>
</table>

Microprocessors with External Two Phase Clock Inputs

<table>
<thead>
<tr>
<th>Model</th>
<th>Addressable Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>R6512</td>
<td>65K Bytes</td>
</tr>
<tr>
<td>R6513</td>
<td>4K Bytes</td>
</tr>
<tr>
<td>R6514</td>
<td>8K Bytes</td>
</tr>
<tr>
<td>R6515</td>
<td>4K Bytes</td>
</tr>
</tbody>
</table>

ORDER NUMBER

MKS 65SS

FREQUENCY RANGE
NO SUFFIX = 1 MHz
A = 2 MHz
B = 3 MHz
C = 4 MHz

MODEL DESIGNATOR
XX = 02, 04, ... 15

PACKAGE DESIGNATOR
C = CERAMIC
P = PLASTIC
DISORIENTED  BEWILDERED