# $\mu$ARM, Interrupt e Device

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April 1, 2015

# Device

- Dischi
- Nastri / USB
- Interfacce di rete
- Stampanti
- Terminali

8 x [  ,  ,  ,  ,  ]

# Dove sono i Device

base address: (0x40 + *dev_type* * 256 + *dev_num* * 32) ...

arch.h: `DEV_REG_ADDR(line, dev)` !

Device Register Generali:

| Fileld n. | Address | Field Name |
|---|---|---|
| 0 | (base) + 0x0 | **STATUS** |
| 1 | (base) + 0x4 | **COMMAND** |
| 2 | (base) + 0x8 | **DATA0** |
| 3 | (base) + 0xC | **DATA1** |

Device Register Terminali:

| Fileld n. | Address | Field Name |
|---|---|---|
| 0 | (base) + 0x0 | **RECV_STATUS** |
| 1 | (base) + 0x4 | **RECV_COMMAND** |
| 2 | (base) + 0x8 | **TRANSM_STATUS** |
| 3 | (base) + 0xC | **TRANSM_COMMAND** |

# Interrupts

Iterrupt vector:

| | |
|---|---|
| 0x6FE0 | Disks |
| 0x6FE4 | Tapes |
| 0x6FE8 | Network |
| 0x6FEC | Printers |
| 0x6FF0 | Terminals |

e.g. Terminals:

0x0000.6FF0 {


se (t5 == 1) => interrupt pendente sulla linea del terminale 5

# Altre aree interessanti

| Address | Function |
|---|---|
| 0x00000020 | Installed Devices Vector |
| | |
| 0x000002DC | Time of Day (Hi) |
| 0x000002E0 | Time of Day (Low) |
| 0x000002E4 | Interval Timer |
| | |
| 0x00007000 | Exception States Vector |

Exception States Vector: (uARMconst.h)

| | | |
|---|---|---|
| 0x7000 | INTERRUPT_OLD | INTERRUPT_NEW |
| 0x70B0 | TLB_OLD | TLB_NEW |
| 0x7160 | PGMTRAP_OLD | PGMTRAP_NEW |
| 0x7210 | SYSBP_OLD | SYSBP_NEW |

# Lavorare con Interrupt e Device

Proviamo a scrivere una funzione di stampa che sfrutti gli interrupt...

# Riferimenti

Riferimento principale:

- $\mu$ARM Informal Specifications (`http://mellotanica.github.io/uARM/uarmdoc.pdf`)

Per i dettagli sui device:

- $\mu$MPS Principles of Operation (`http://www.cs.unibo.it/~renzo/so/princOfOperations.pdf`)

Funzioni e strutture di supporto:

- `arch.h`, `uARMconst.h`, `uARMtypes.h`, `libuarm.h`

# Domande?

Contattatemi tranquillamente via mailing list (SO) o per email:
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