Smart IO Interfacing

Ideas for interfacing Smart IO Devices.

A Smart IO Device is a piece of separate and modular hardware that interfaces with the Zalt system. Its data exchange is at a high level of abstraction and does not require the Z80 (program) to do any device specific processing.

For this purpose a generic multi-purpose Stream API is being developed (See File doc). This document details how the data is communicated between the Z80 core and its Smart IO Devices.

## Types of Data communication

There are several different types of data communication between the Z80 and the Smart IO Devices:

* Unbuffered
  + Single Byte  
    A single byte to/from an output/input instruction is an excellent example. Little has to interfere and a direct communication can take place. The initiative lies always with the Z80.
  + Several Bytes  
    More than a single byte but not too many. Other than that same as single byte.
  + Blocks  
    Should really consider making this buffered if the data packets get too large.
* Buffered
  + Blocks  
    Let’s just assume all buffered data traffic is based on blocks. That way it is generic for a wide range of scenarios.
* Notifications (Interrupts)  
  Most of the times the initiative is with the Z80 program that wants to perform an IO operation. However there are times that it would be nice for the Z80 program to be notified when some event on the IO-side has taken place.  
  Most likely these events are communicated using (maskable) interrupts on the Z80 – IM2 to be exact.

## Dual Ported RAM

Using dual ported RAM, the Z80 program can access through one port the IO data that has been prepared by the Smart IO Device through the other port. This will provide very fast access to the RAM for both parties.