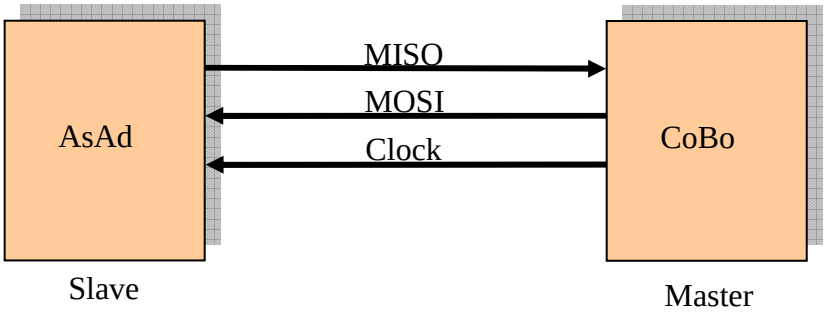
4.7 Slow Control

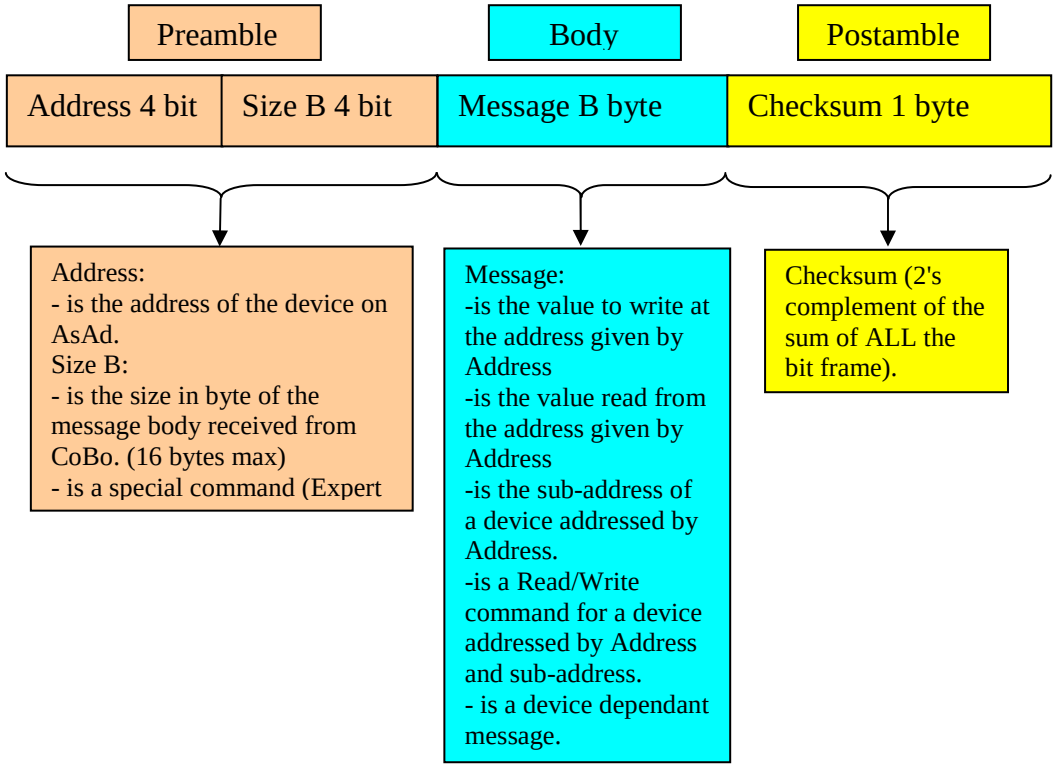
AsAd slow control is used to configure (Write) and check (Read) the functionalities and status of the card, i.e. the functionalities and status of all programmable components, except AGET which is configured and monitored by the “Fast control” protocol.

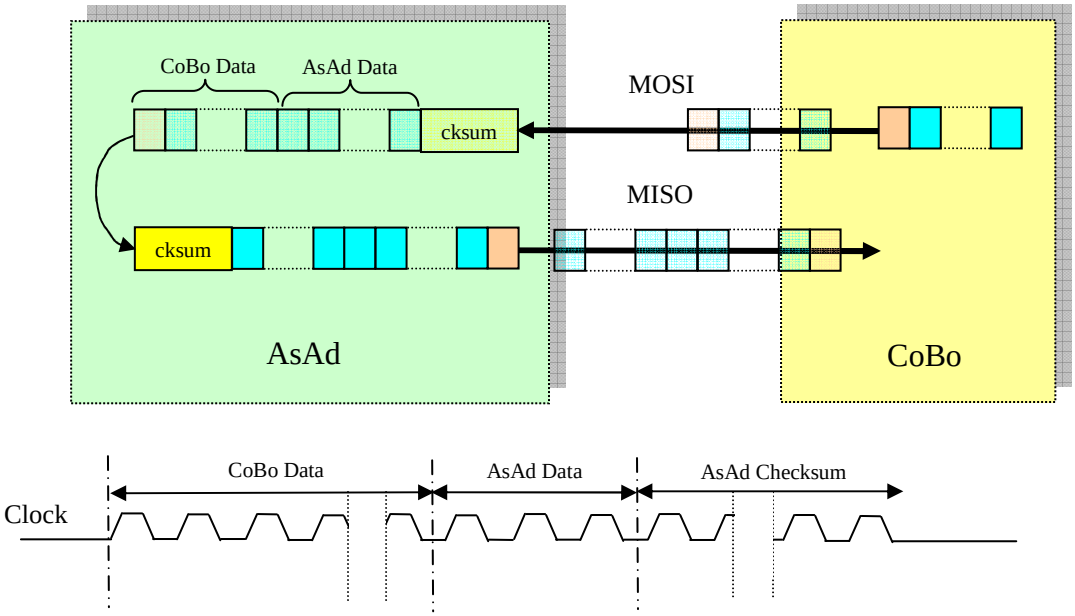
The slow control protocol is a serial protocol, based on the SPI (Serial Peripheral Interface) standard. The standard adopted is a three-wire, full-duplex bus designed for communication and control in integrated circuits mounted on AsAd.

Clock frequency: 10 MHz.



The master and the slave use a protocol based on the following frame structure





4.7.1 AsAd Write

CoBo is the master. When CoBo sends a frame to AsAd, the number of clock periods is :

8	+ 8 * (Size B+1)	+ 8
Preamble	Body	Checksum

AsAd retransmits the full frame to CoBo but whit its calculated checksum.

4.7.2 AsAd Read

CoBo is the master. When CoBo sends a frame to AsAd, the number of clock periods is :

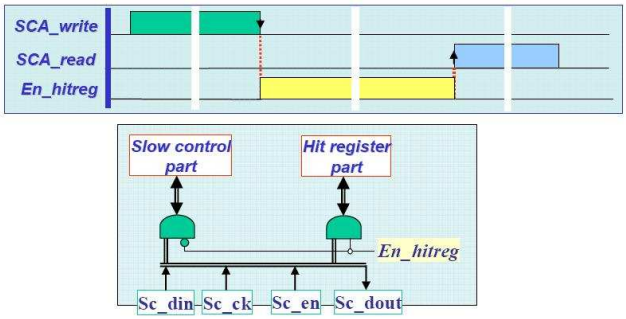
8	+ 8 * (Size B+1)	+ 8
Preamble	Body	Checksum

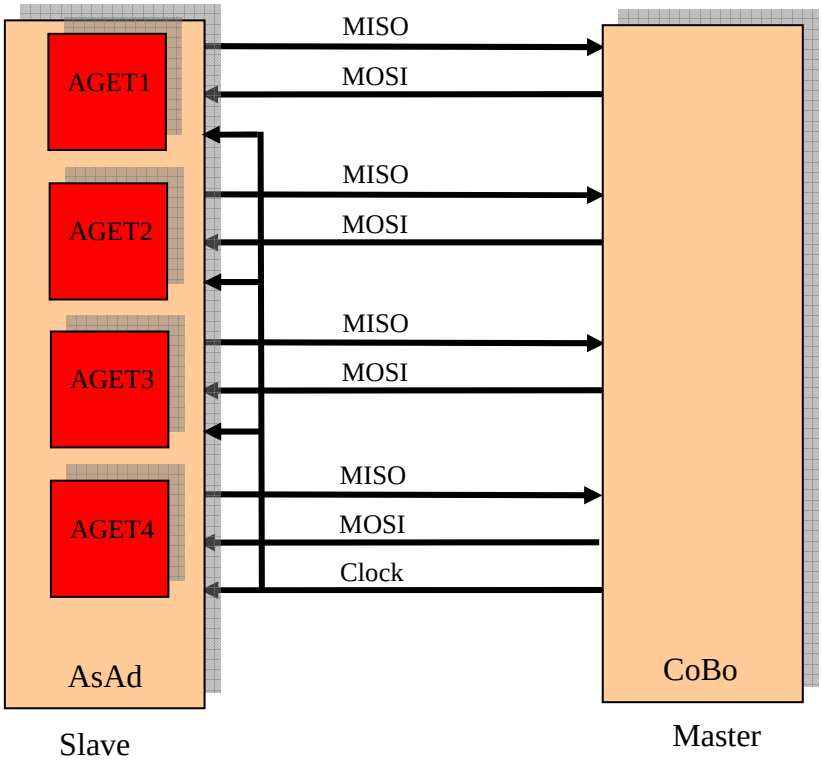
AsAd writes its data in the message body, transmits the full frame to CoBo with its calculated checksum.

4.8 Fast control/Hits

Unlike the slow control, there is no bus concept for the Fast Control / Hits communication. To minimize the time of the extractions of hits and their configuration the transfer can be executed in parallel on the 4 AGETs hosted by AsAd. The fast control/hits protocol is a serial protocol, based on the SPI (Serial Peripheral Interface) standard. The standard adopted is a three-wire, full-duplex bus designed for communication and control in AGET chips mounted on AsAd. Clock frequency: 50 MHz.

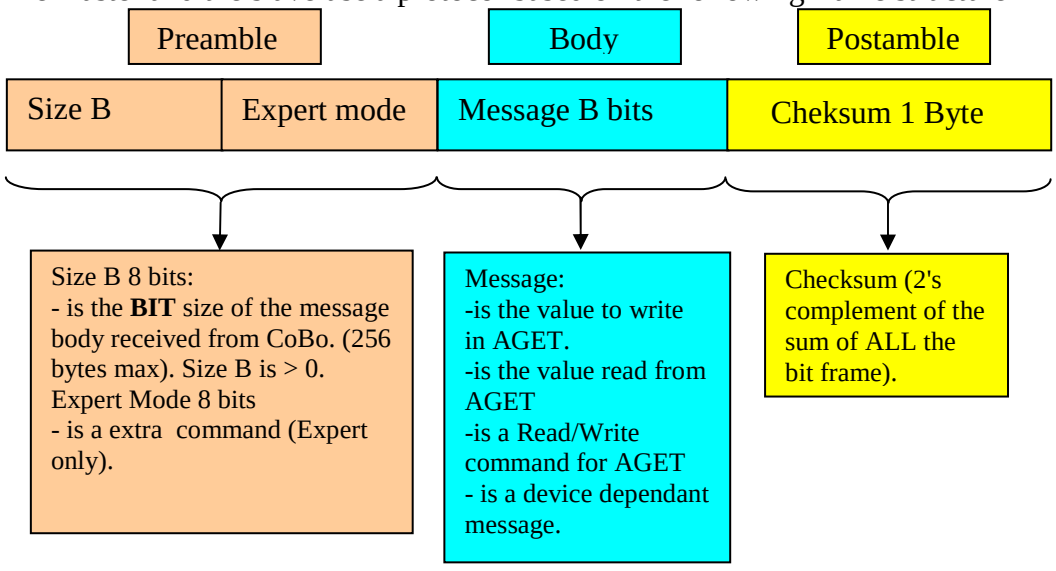
The Fast Control / Hits extraction or writing is done the write/read sequence of the system.

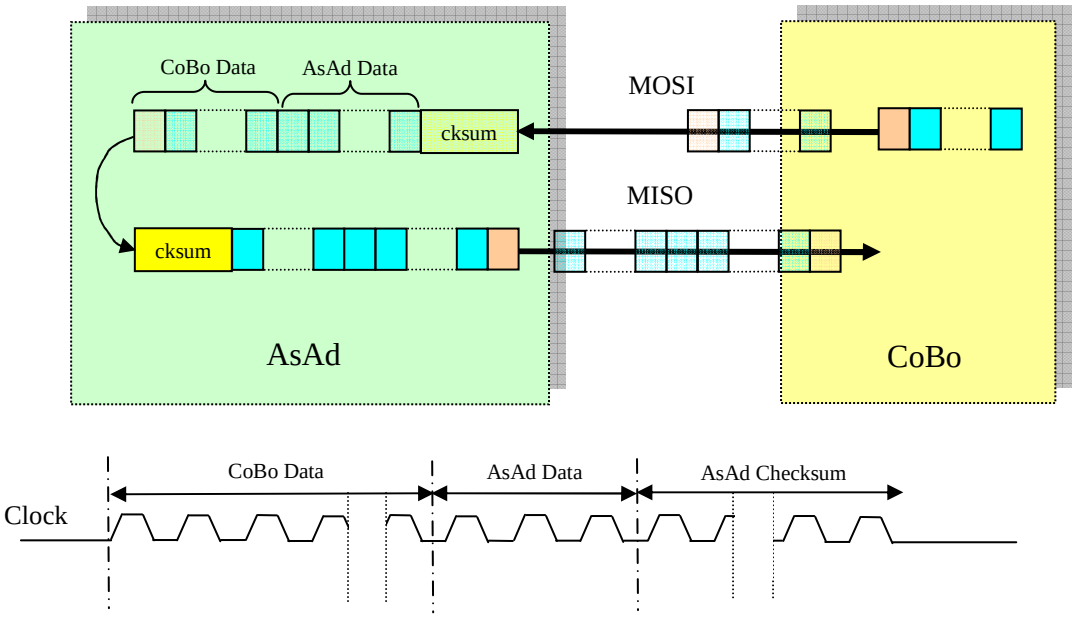




4.8.1 Fast Control protocol

The master and the slave use a protocol based on the following frame structure





4.8.1.1 AsAd Write

CoBo is the master. When CoBo sends a frame to AsAd, the number of clock periods is :

16	+ Size B	+ 8
Preamble	Body	Checksum

AsAd retransmits the full frame to CoBo but whit its calculated checksum.

4.8.1.2 AsAd read

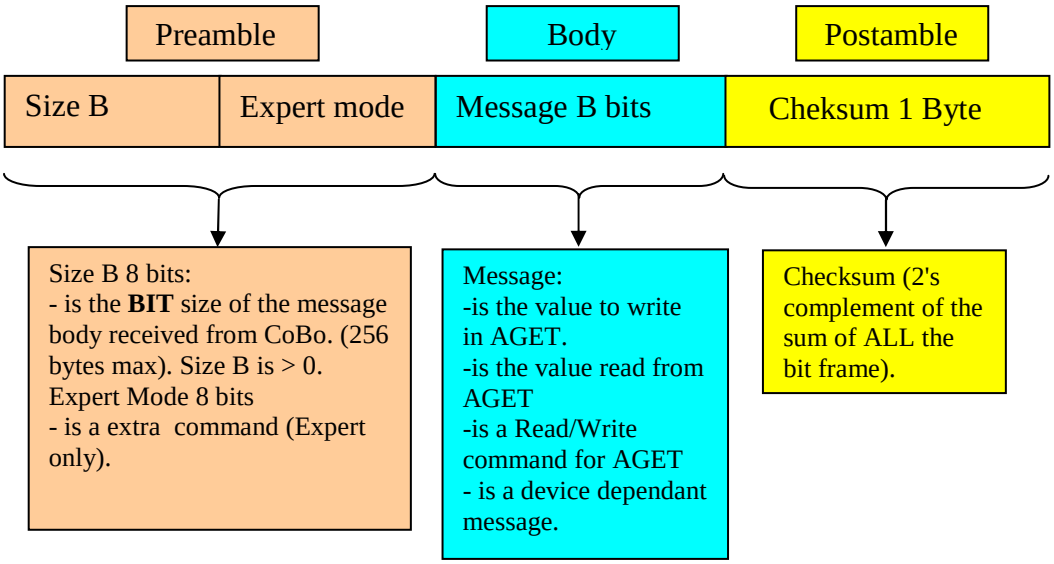
CoBo is the master. When CoBo sends a frame to AsAd, the number of clock periods is :

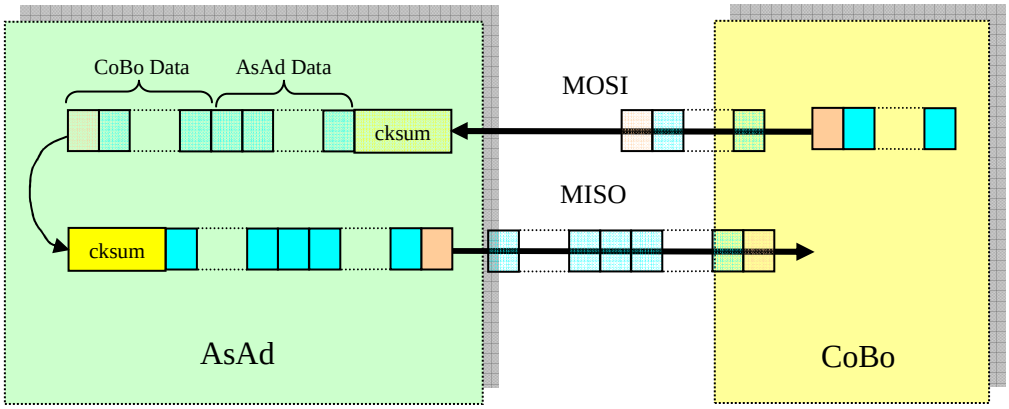
16	+ Size B	+ 8
Preamble	Body	Checksum

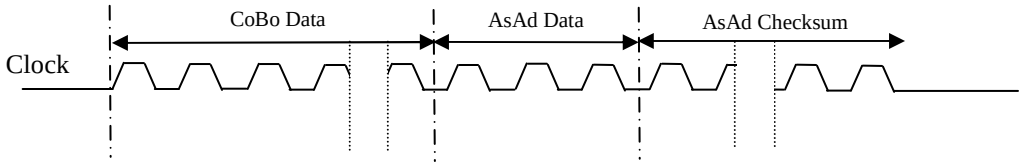
AsAd writes its data in the message body, transmits the full frame to CoBo with its calculated checksum.

4.8.2 Hits Read/Write

This mode is not a hardware configuration or status readout of the system. For this reason the data control transfer could be avoided. But it is quite possible to use the same procedure as the Fast Control.


Preamble
Body
Postamble
Size B
Expert mode
Message B bits
Cheksum 1 Byte
Size B 8 bits:
- is the **BIT** size of the message body received from CoBo. (256 bytes max). Size B is > 0.
Expert Mode 8 bits
- is a extra command (Expert only).
Message:
-is the value to write in AGET.
-is the value read from AGET
-is a Read/Write command for AGET
- is a device dependant message.
Checksum (2's complement of the sum of ALL the bit frame).


CoBo Data
AsAd Data
cksum
MOSI
MISO
cksum
AsAd
CoBo


CoBo Data
AsAd Data
AsAd Checksum
Clock