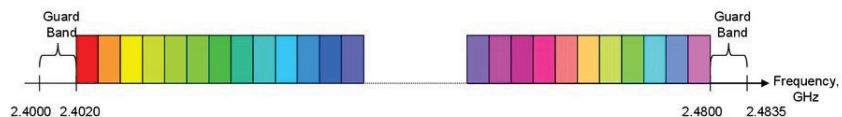### Frequency Hopping:

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The piconet channel is represented by a pseudo-random hopping sequence (through 79/23 RF frequencies)

The hopping sequence is exclusive for the piconet and is decided by the device address of the master of the Piconet. The phase is decided by the master clock.

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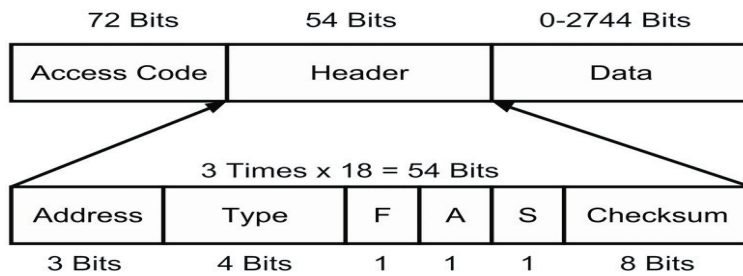Packet start aligned with slot start

Physical Link:

- **Synchronous Connection Oriented (SC0) Link**: - classical Telephone (voice))
  - Symmetric point-to-point link between m and s
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- Mainly for audio/voice
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Bluetooth Frame Format

Header:

➢ Addressing   (3) : Max 7 slaves per piconet

➢ Packet type   (4) : 13 packet types (some unused)

➢ Flow control (1)

➢ 1-bit ARQ   (1) : Broadcast packets are not Acknowledge

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       Total   = 18 bits
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Data Rates on ACL:

TYPE	SYMMETRIC (Kbps)	ASYMMETRIC (Kbps)	
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- The access code is used for timing synchronization, query and paging. There are three types of access codes

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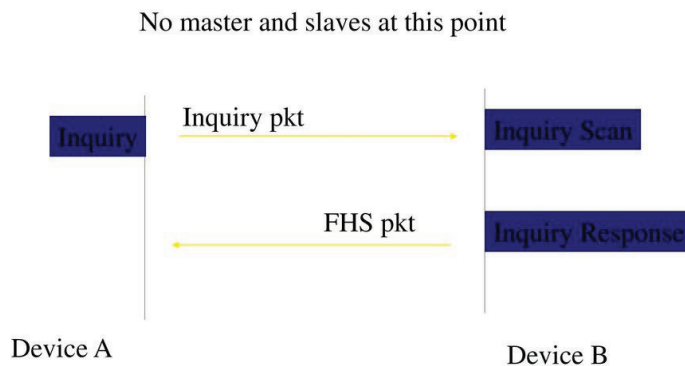
Two-step process: **query-**get device address

Paging-Synchronization

Query: Use query hopping sequence and IAC (DIAC or GIAC). If the device is to establish a piconet, the user of the device has to scan for other devices within the radio range. The device initiates the inquiry process by sending an inquiry access code (IAC) common to all Bluetooth devices, and the IAC is broadcast in turn on 32 so-called wake-up carriers. A device that is in the standby state and periodically monitors may enter the query mode periodically to search for IAC messages on the wake-up carrier. Once the device detects the query, it will return a data packet that contains its device address and timing information required by the host to initiate a connection. From that moment on, the device acts as a slave device. If the query is successful, the device enters page mode.

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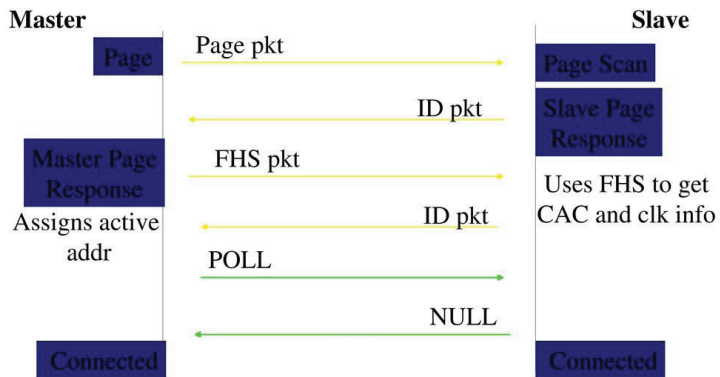
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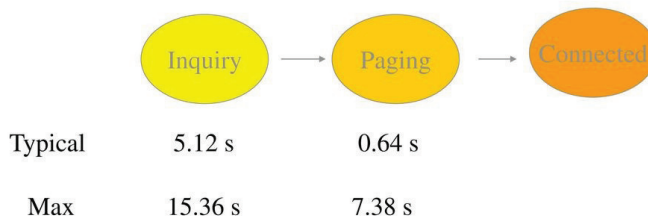

Connection Establishment - Inquiry

<u>Connection Establishment – Paging:</u>

Connection Establishment - Paging

Connection Establishment times:

Connection Establishment times

	Inquiry	Paging
Typical	5.12 s	0.64 s
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Active mode: The device actively participates in the energy-saving mode of the piconet channel

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Intra-piconet communication:

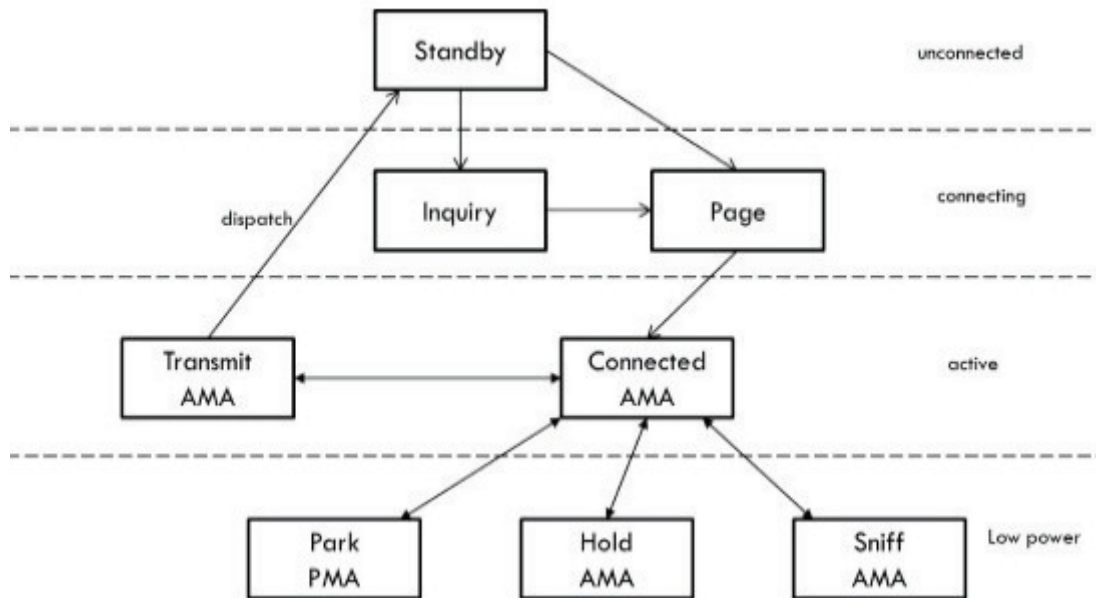The host controls all traffic on the piconet

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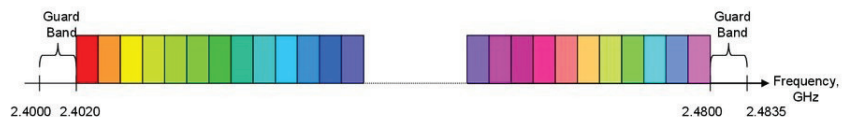
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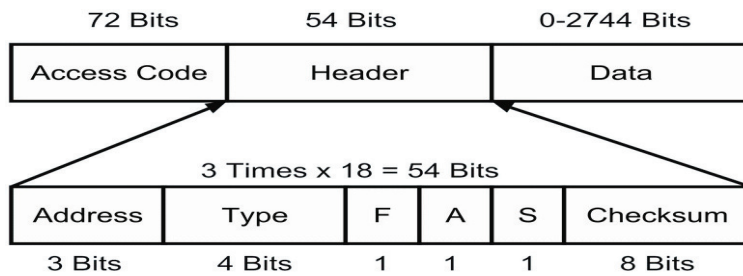Packet start aligned with slot start

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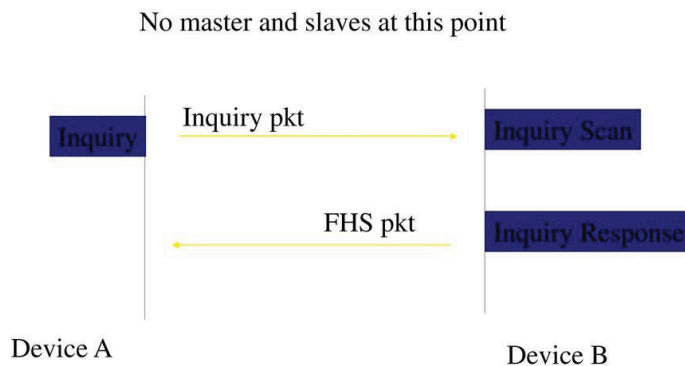
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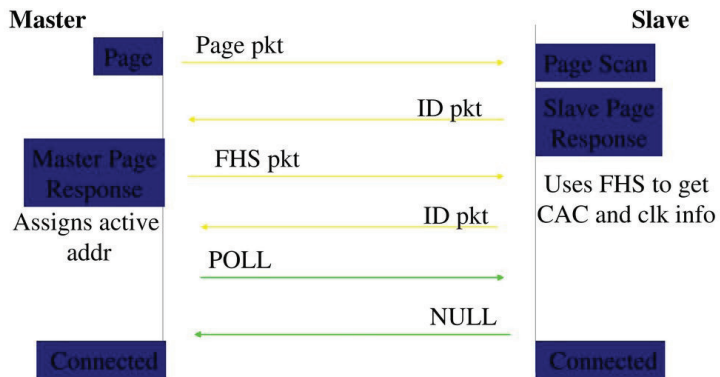
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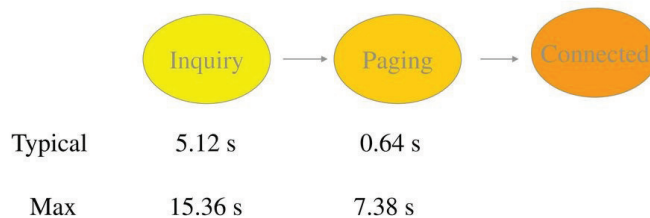

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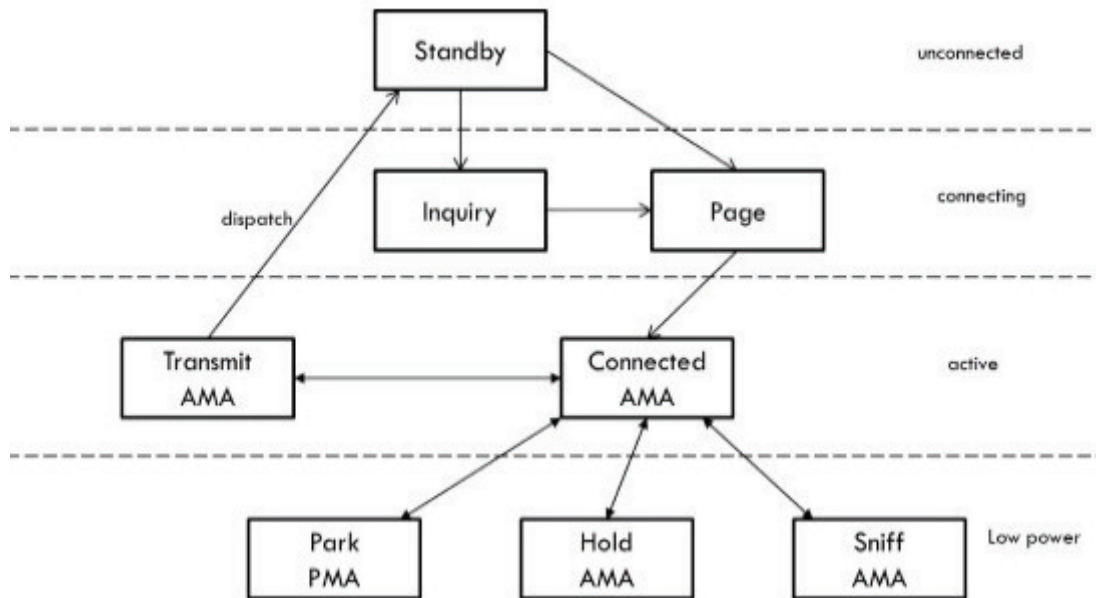The host controls all traffic on the piconet

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