

# *Nintendo DS Wireless Communication*

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# *Nintendo DS Wireless Communication Overview*

- Modes
  - Local game mode
    - Unique Protocol for low latency communication with up to 16 DS systems
  - Wireless download play mode
    - Download software from parent DS with card to child DS systems without card
  - Infrastructure mode
    - Connect to HotSpot for internet browsing and etc.
- Hardware Spec.
  - IEEE 802.11 Wireless LAN system; Short Preamble (11b); Nintendo Low Latency Protocol, "MP Sequence"
  - 2 or 1 Mbps @ 2.4GHz
  - Communication distance: About 10m (inside)



## *Local Game Mode - Features*

- Star type network; one parent and fifteen children
- Nintendo Low Latency Protocol “MultiPoll (MP) Sequence” @ 2Mbps
- Automatic V blank synchronization
- Communication types
  - MP Sequence is minimum communication unit.
  - V blank synchronized communication
    - MP Sequence synchronized with V blank
    - Power-saving operation
    - Data Sharing (Key Sharing) function
  - Block transfer
    - Continuous MP Sequence
    - Fast data transfer
- Simplified authentication and association

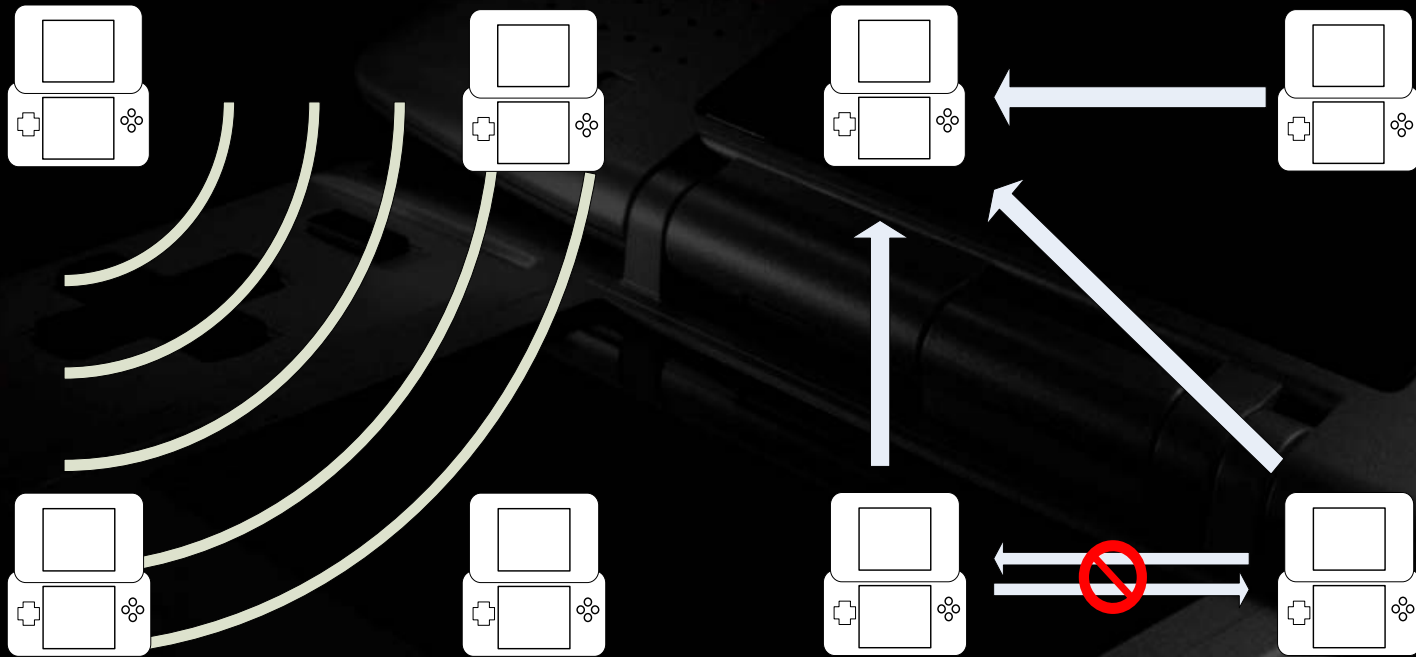


## Local Game Mode - MP Sequence (1)

1) Parent broadcasts data to Children

2) Child sends data back to parent in order.

3) Parent broadcasts ACK to Children

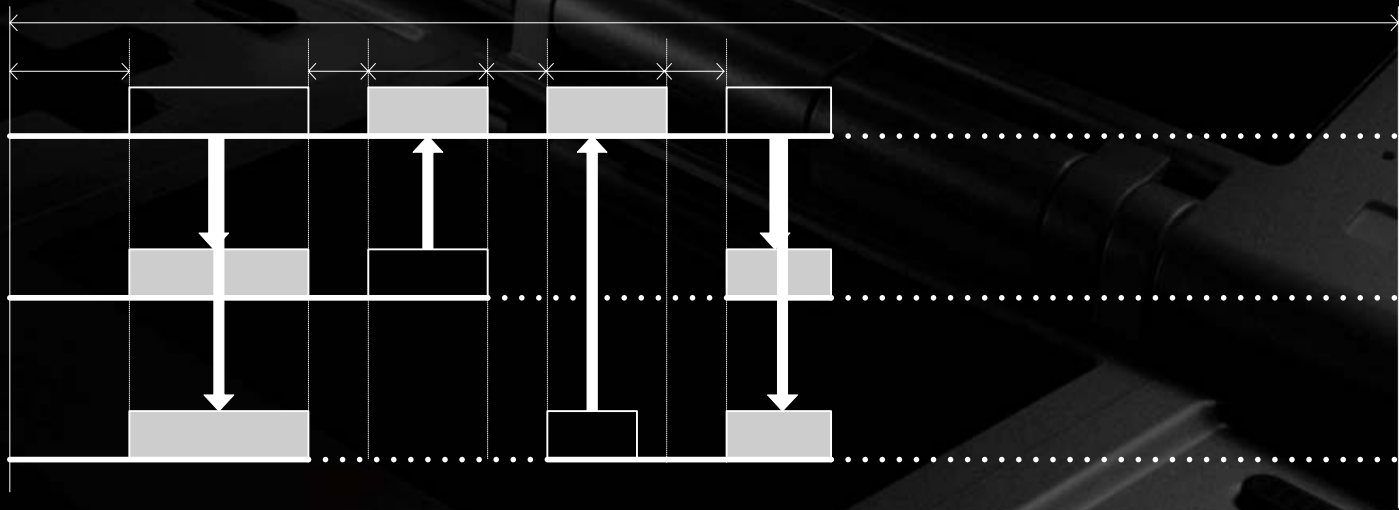


Note: No communication among children



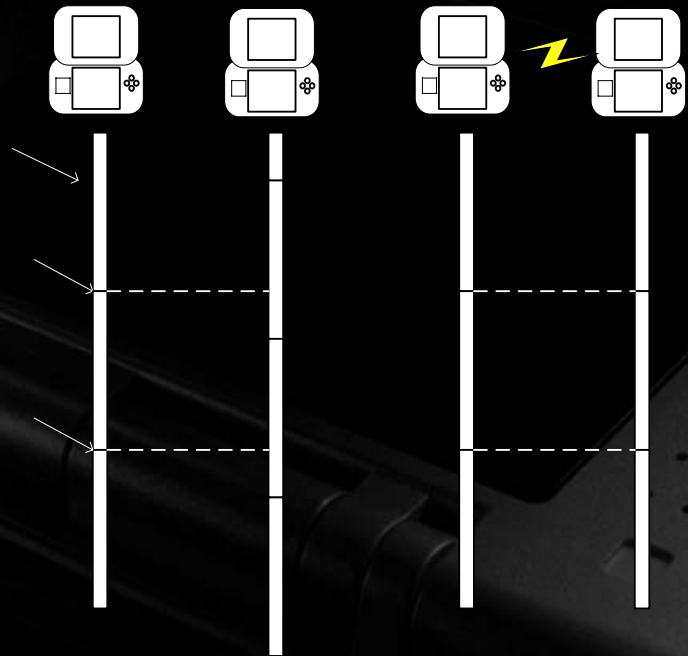
## Local Game Mode - MP Sequence (2)

- MP consists of three types of frames:
  - Parent broadcasts data to all children, MP frame
  - Child sends data and ACK to parent in order, Key/Null Response frame
  - Parent broadcasts ACK to children, MP\_ACK frame
- Time division structure of the frames
- If no ACK from all children, then repeat MP sequence until TMPTT ends.



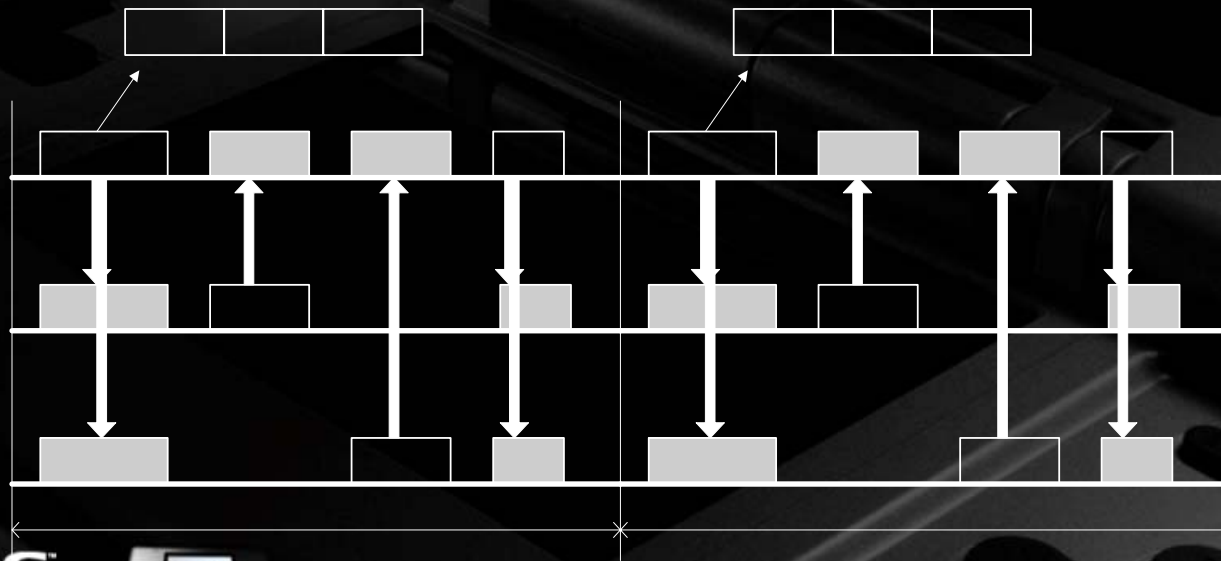
## Local Game Mode – Auto V blank Sync

- Once child is connected to parent, the timing of child's V blank is synchronized with one of parent automatically.
- No need to care much about out of sync.
- Note that V period gets slightly longer than 16.7msec for both parent and child at the moment to adjust the timing.



## Local Game Mode – Data Sharing

- Data Sharing is based on V blank synchronized MP sequence.
- Synchronizing with V blank MP sequence is activated automatically.
- This function is usually used to share key and/or touchscreen data in the network.
- At one MP sequence parent gathers data from all children, then at next MP sequence parents broadcasts the gathered data, in which parent's data is also connected, to all children.
- For example, you can get all key information in one picture frame (16.7msec) delay.

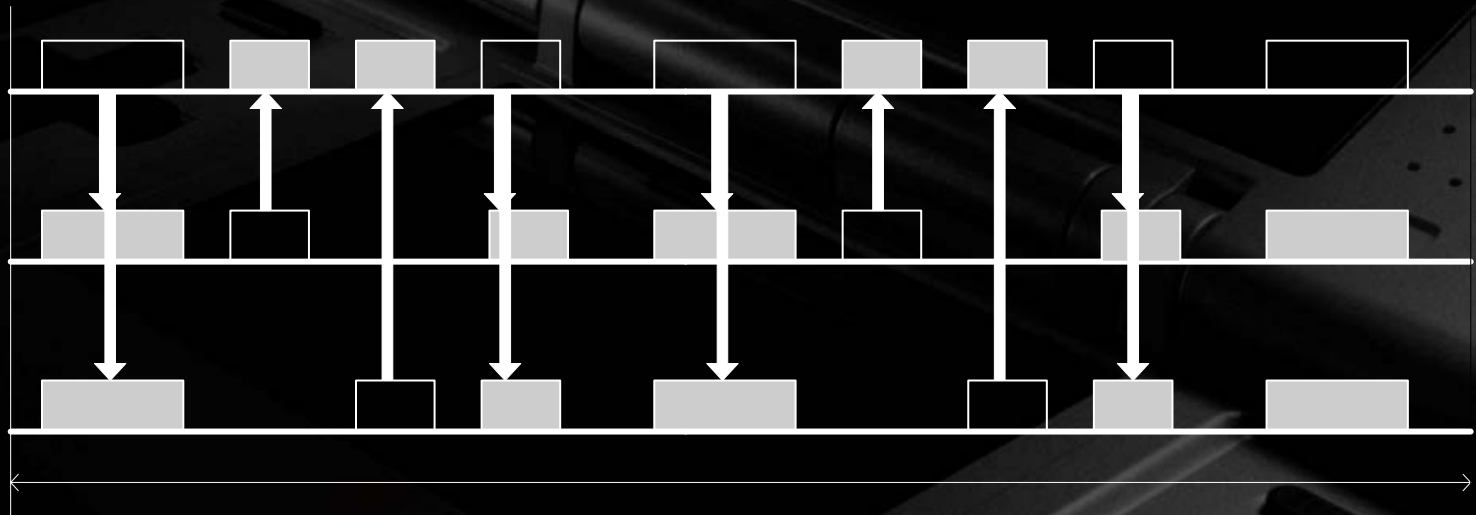




## Local Game Mode – Block Transfer

- Continuous MP sequence
- Faster data transfer
- NI (Numbered Information) transmission
- But power consumption is a lot more than V blank synchronized communication

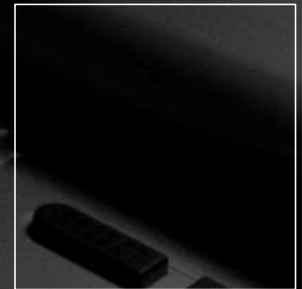
It's recommended to use Block Transfer only in case transfer speed is critical. Otherwise, use normal transfer.





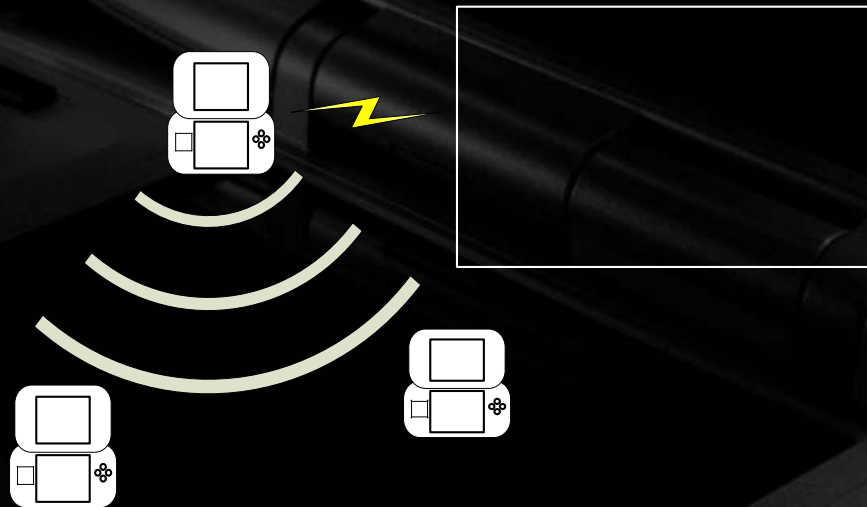
## ***Local Game Mode – Authentication and Association***

- Simplified authentication and association
- Information for authentication and association
  - MAC address:  
Global 6-byte MAC address for each Nintendo DS system
  - BSSID:  
Network address, parent's MAC address
  - GameInfo:  
This is included in Nintendo specific field in beacon, and contains the followings:
    - GGID: Game Group ID, unique ID for each game title or game group
    - User area: you can specify title name, user name etc in your own format.
- Just connect to a parent with the information above.  
Authentication and association are done by library.



## *Download Play Mode*

- Child can download program data from parent with a game card.
- The size of downloadable data is about 2.5M bytes @ 650Kbps
- Download to multiple children at the same time.  
Use Block Transfer



## *Infrastructure Mode*

- Connect to internet through WiFi certified Wireless LAN (IEEE802.11b/g) access point
- The following API will be available at the end of this year:
  - Socket
  - DNS resolver
  - TCP
  - UDP
  - IP
  - DHCP
  - FTP

