HiQnet AVB device behavior

A couple of HiQnet basics

- Assumes offline design capability
- Assumes full discoverability of venue
- HiQnet address
  - Upperlayer unique identifer
  - Independent of physical layer
  - Used instead of HiQnet name and the unique key

A couple of HiQnet basics

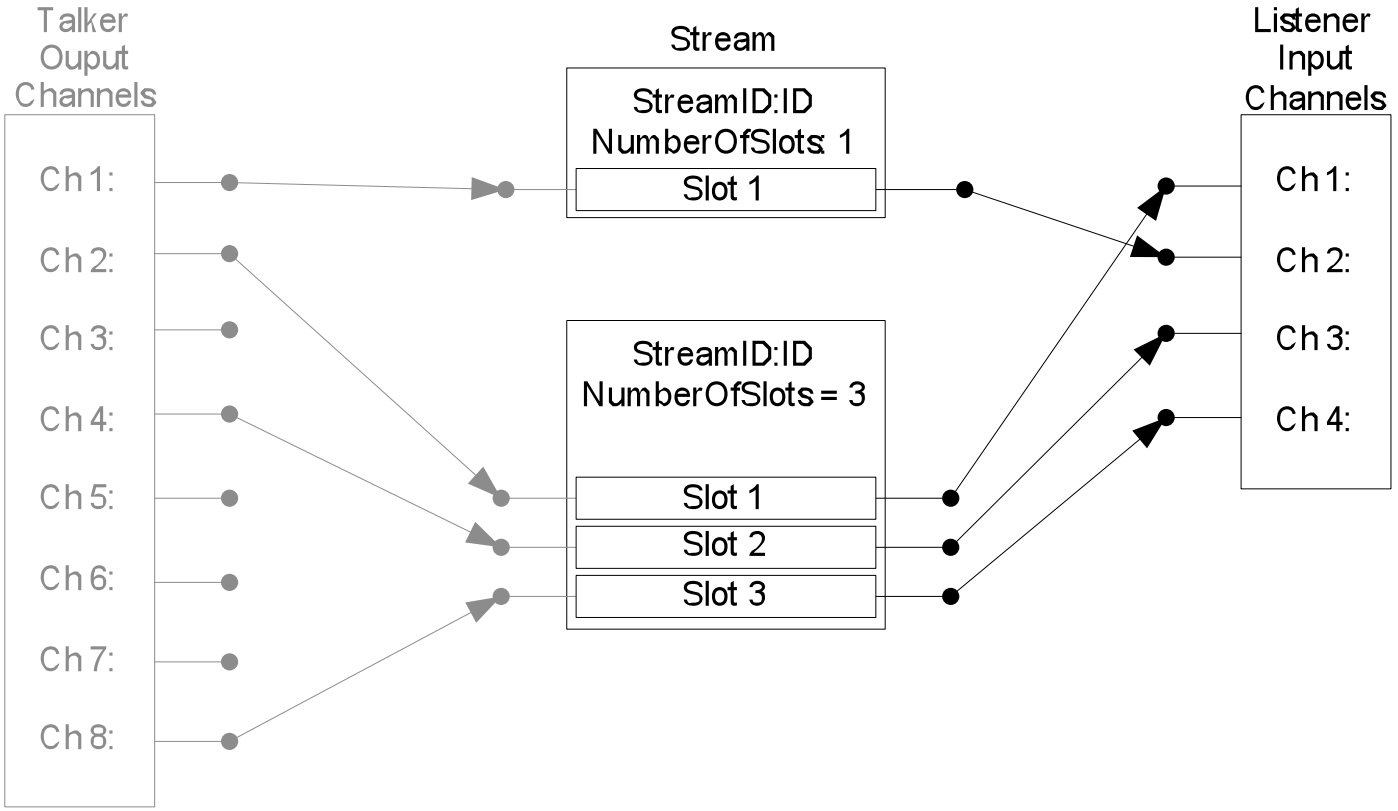
- HiQnet disco –
  - Somewhere in-between Bonjour and UPnP
- Sequence
  - Broadcast or unicast DiscoQuery
  - Respond with network info for each interface

MacAddr	6 bytes	MAC address
DHCP/AutoIP	UBYTE	1 = DHCP/AutoIP 0 = Static Addr
IPAddr	ULONG	IP address
SubnetMask	ULONG	Subnet mask
Gateway	ULONG	Gateway address

General goals

- Under real-time control, the user is able to route AVB from one HiQnet device to another
- Devices are powered down and then restarted. With no user intervention, streaming connections are resumed
- A venue file is designed offline, the device files are sent to the devices and streaming starts. *According to our current SA design, there can be no dependency on MAC address, only HiQnet address in device files.*
- A control surface be it System Architect or a Console, with no foreknowledge of the system or its behavior, is able to discover active streams/routes
- The user is notified should there be a clock error in the system and can check the clock status of any AVB node
- The user is notified should there be a 1722 error and can check the status of the 1722 streams
- The user is notified of any SRP errors and can check the status of stream reservations

Mapping of channels to slots

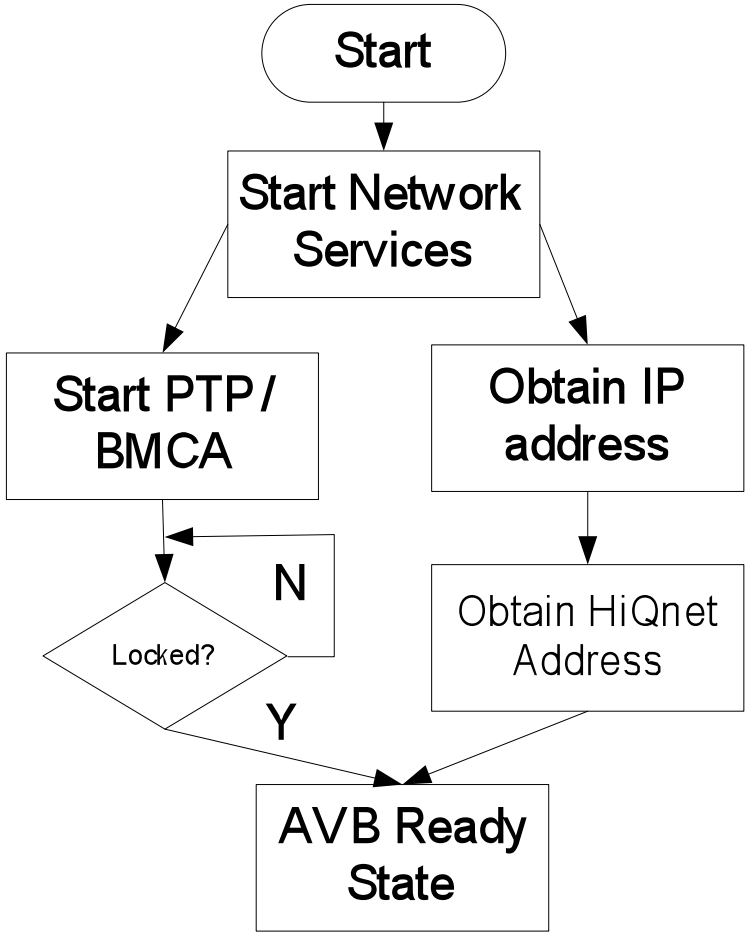


Stream listener object

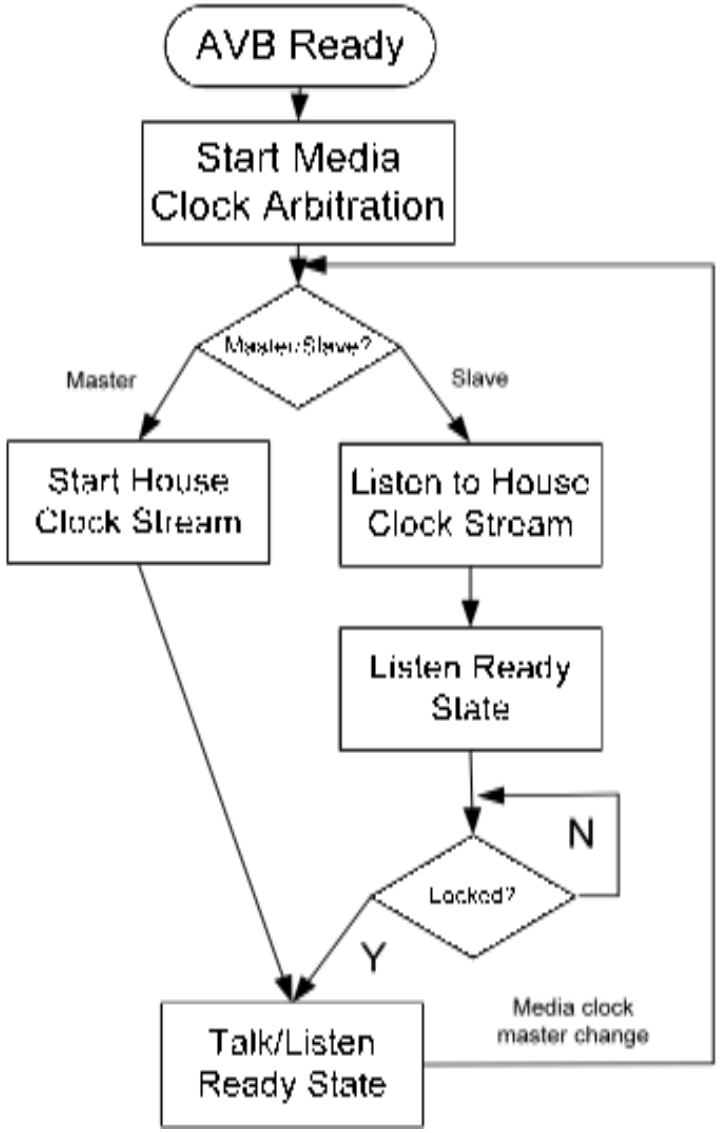
StreamID	ULONG64	Debug	Talker Mac Addr : ID
StreamDA	ULONG64	Debug	Multicast Address – debug only
TalkerAddress	UWORD		HiQnet Address
Audio/Video Format	UBYTE		STRING(Enumerated)
MediaClockDomainID	UBYTE		
Name	STRING		Networked ordered uni-code
Slots	UWORD	Debug	
Mapping	UWORD	Debug	The size of this is determined by the number of slots.

Start up

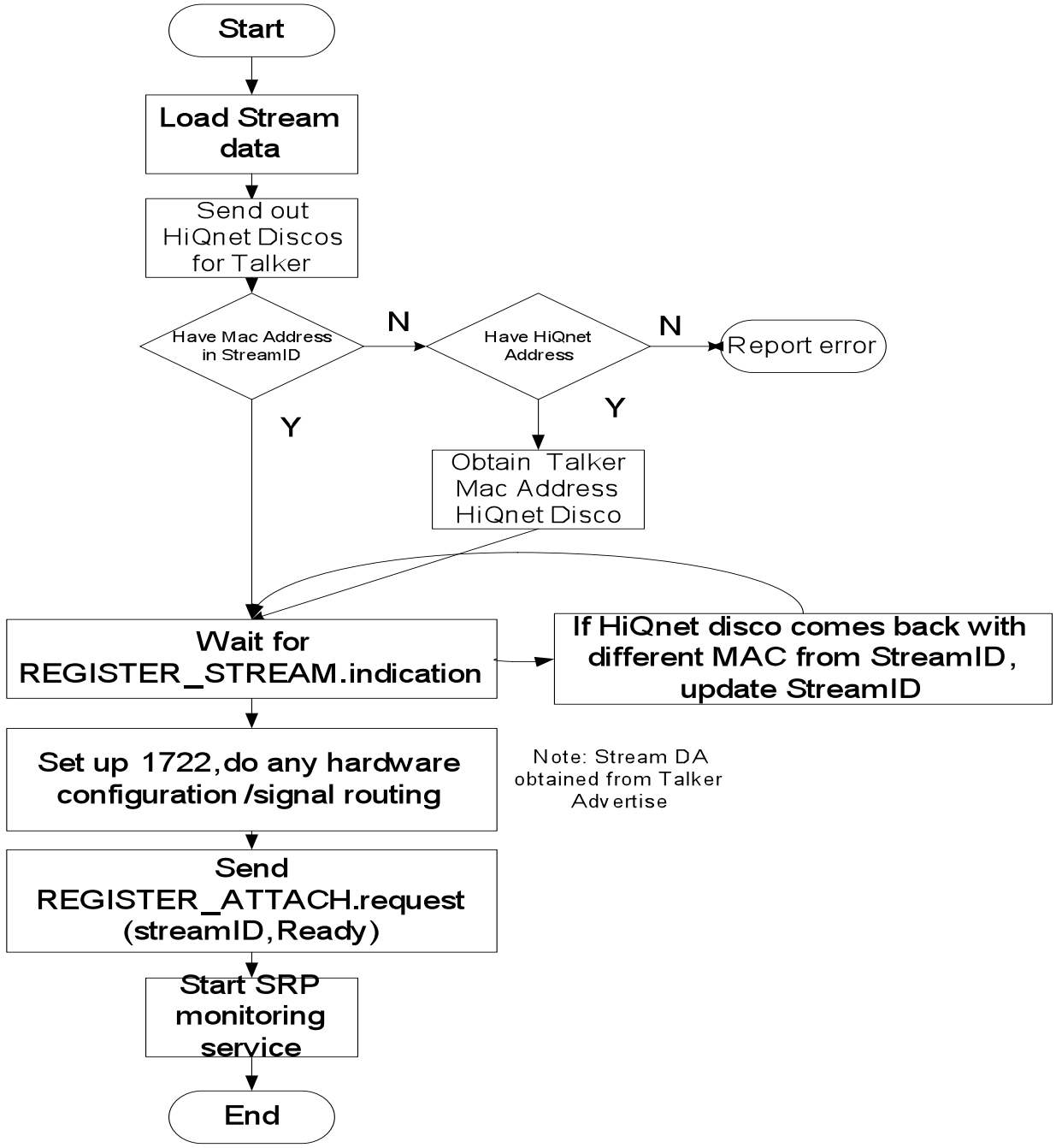
- The device upon boot-up will start up PTP service. In parallel the device will obtain an IP and HiQnet address as per normal device behavior.
- Once the device is locked to PTP and obtained an IP and HiQnet address then it is ready to begin media clock arbitration.



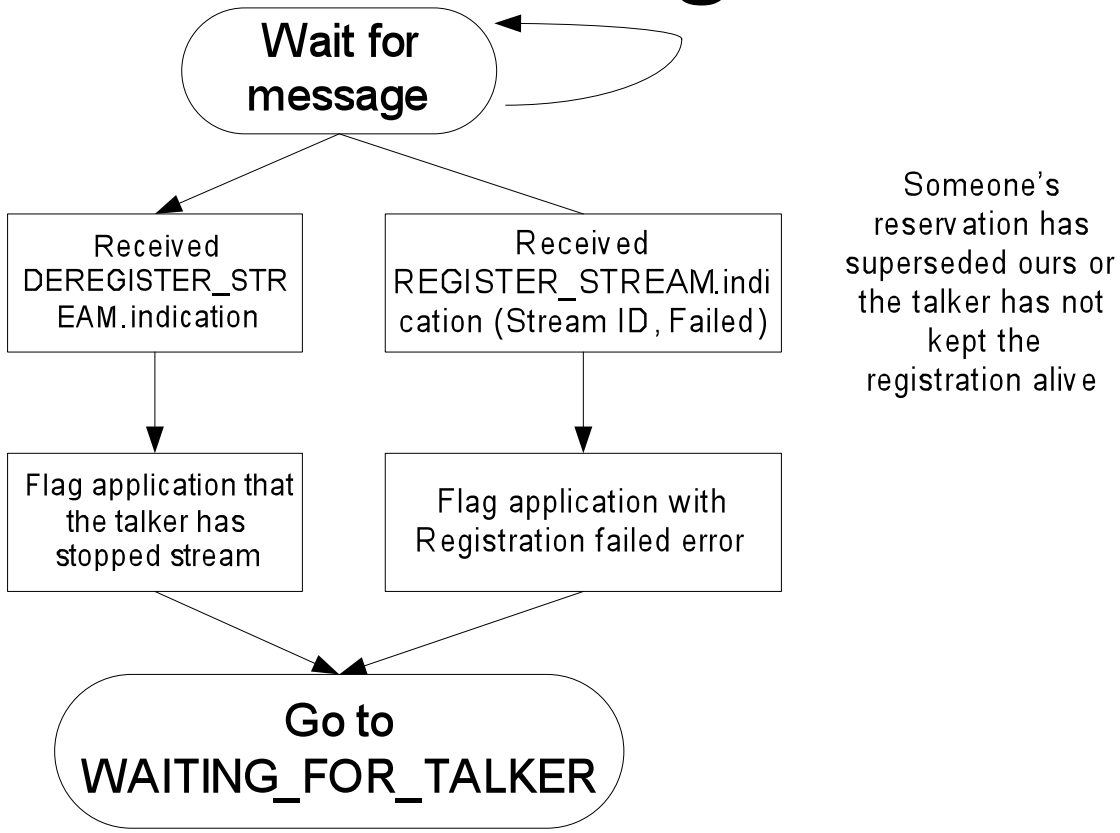
Get media clock



Listener Startup



Listener monitoring state machine



- NOT_CONFIGURED
- WAITING_FOR_TALKER – waiting for the talker to exist
- MONITORING_RESERVATION

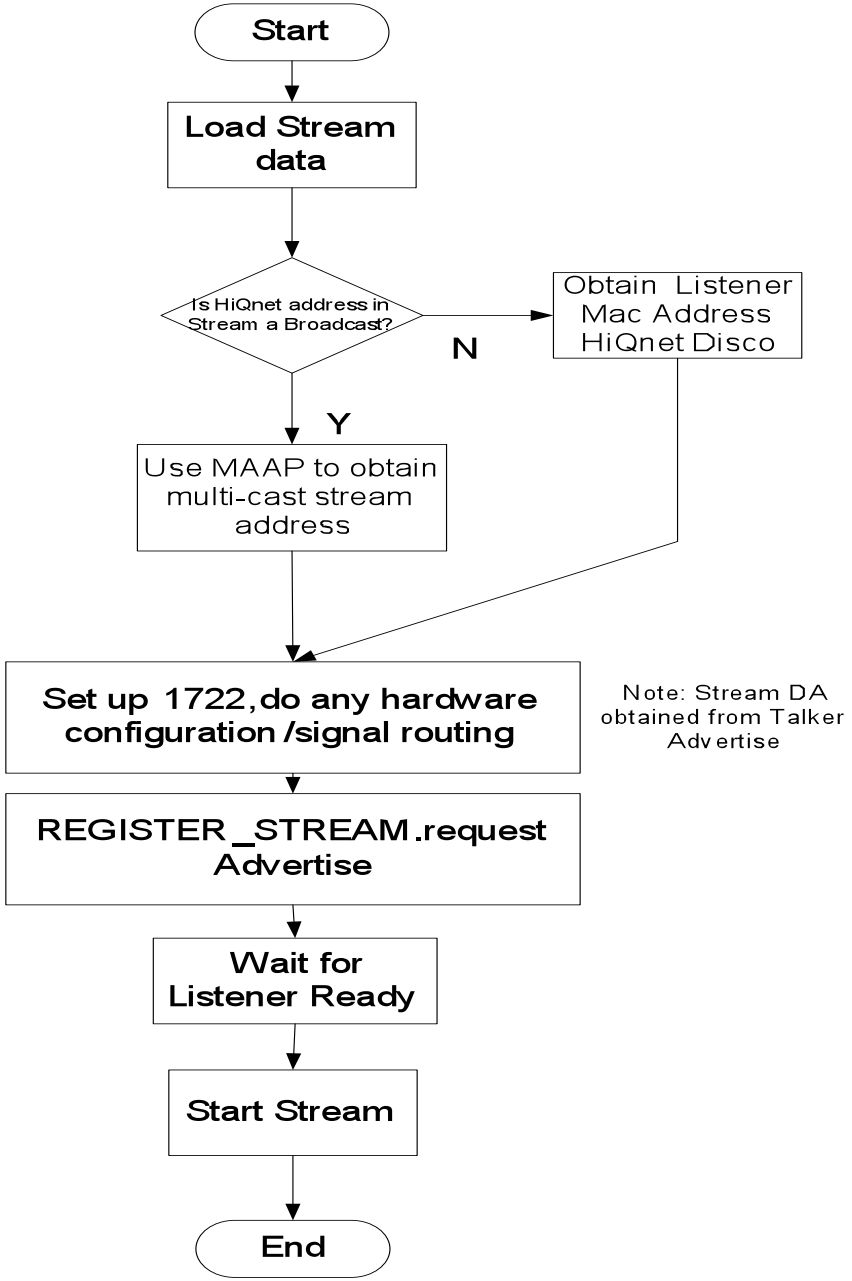
Listener error codes

- Stream Reservation failed
  - Reservation has failed – bandwidth can't be allocated (first time only)
  - A network resource has become oversubscribed and the listener's reservation has been bumped. (after it has been successfully working)
  - Would be nice to track the difference between these two – need to add to 2.2
- Stream reservation ended
  - Talker has stopped the Advertise

Talker object

StreamID	ULONG64	Debug	Talker Mac Addr : ID
StreamDA	ULONG64	Debug	Multicast Address. Populated by talker device.
Talker Presentation Offset	ULONG64		interpreted in nanoseconds - Min 120uSeconds - Max 2mSeconds
Listener HiQnet Address	UWORD		Set to HiQnet broadcast if multicast address
TrafficClass	UBYTE		STRING(Enumerated)
Ranking	UBYTE		
AudioVideoFormat	UBYTE		STRING(Enumerated)
MediaClockDomainID	UBYTE		
Name	STRING		Networked ordered uni-code
Slots	UWORD	Debug	
Map	Array of UWORD	Debug	Size is determined by number of slots

Talker startup



Talker conditions

- NOT_CONFIGURED
- NO_LISTENERS – talker is advertising but no listeners
- READY
- READY_FAILED – one or more listeners
- FAILED
- In the cast of a Stream reservation failed
  - One or more Reservations have failed – bandwidth can't be allocated
  - Would be good to see which devices have a reservation and which have a failed
  - Would be good to see where the reservation failed – long term we identify the switch.

Suggested next steps

- Generalize state machines
- Generalize device/stream parameters
  - Publish HiQnet documentation to 1722.1
- Fit in Bonjour for disco