HiQnet AVB Device Behavior - external

Abstract

Document abstract

Versions

Version	Date	Description
0.1	03/15/2009	Created initial document
0.2	03/23/2009	Scheme DA for listener in unicast, talker setup added
0.3	04/01/2009	Changed startup sequence, removed state machine in response to lost 1722 traffic

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1 Overview

1.1 Introduction

The purpose of this document is to describe the high-level device behavior of AVB devices under HiQnet control. This document is meant to describe system level considerations and real-time behavior. This document is not meant to document any final user-interface, just develop the engineering state flows and diagrams to accomplish various important user goals.

1.2 Definitions

Define any specific (new) terminology which is used in the document. In addition, these terms should become the definitions assumed in all communications about this project.

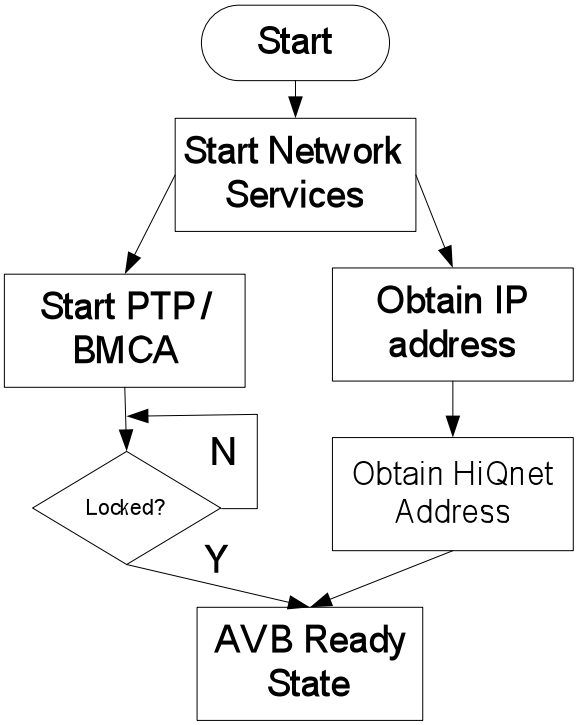
Term	**Definition**
Term	Definition

1.3 User Goal

- 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

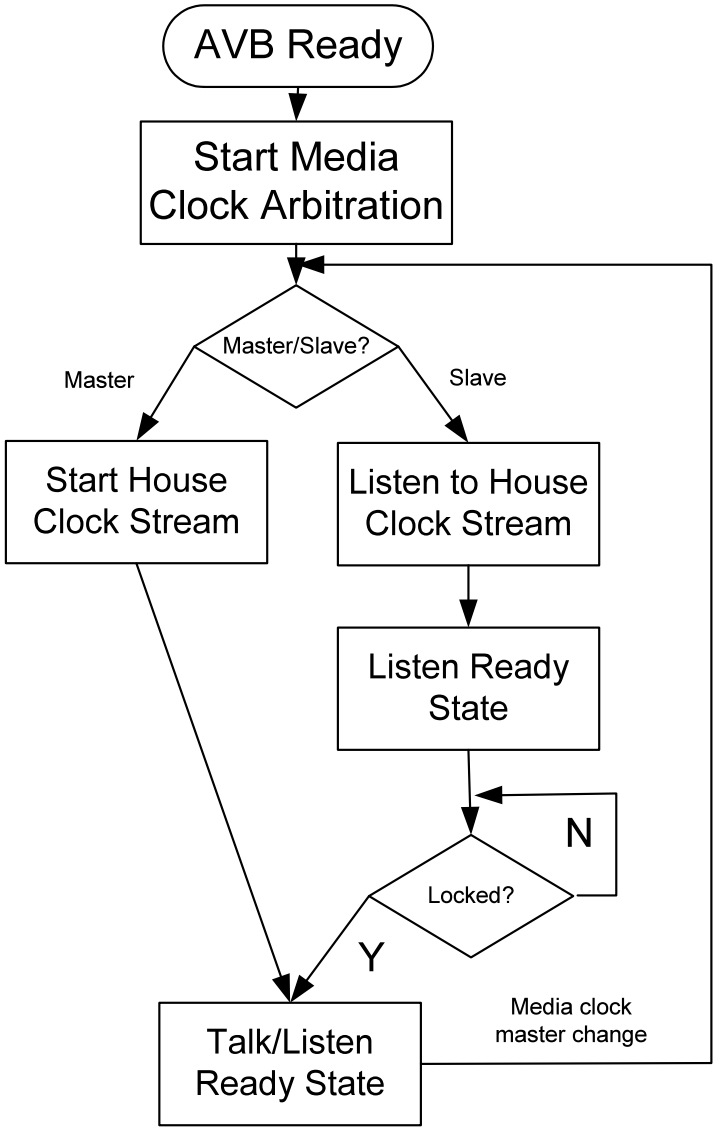
2 Implementation

2.1 General Startup



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.

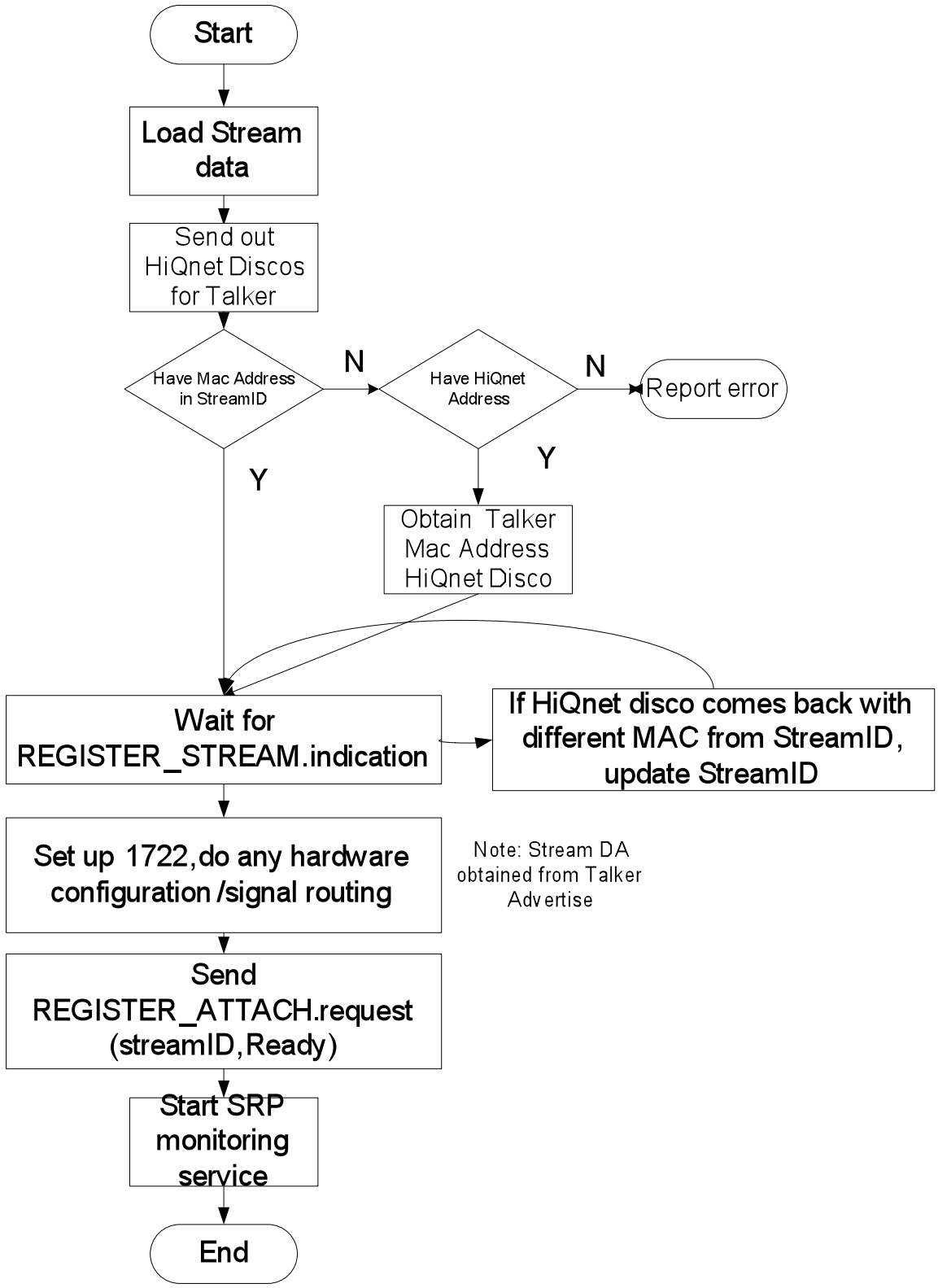


If the device becomes the media clock master, it starts the house clock stream and initializes the MSRP talker and listener processes and is then ready to be an AVB talker or listener. All configured streams will become active.

If it becomes a media clock slave, it initializes the MSRP listener process and tries to listen to the house clock stream, at which point it is ready to be an AVB listener and starts all configured listener streams. When a slave successfully listens to the house clock stream, it initializes the MSRP talker process and is then ready to be an AVB talker as well, at which point all configured streams become active.

If the arbitration process signals a change between master and slave modes, the above process is followed again minus any initialization of MSRP or starting of streams that have already happened.

2.2 Listener startup



If the listener gets a fail in the Waiting for talker

A stream ID consists of [Talker MAC address:16bit ID]

A few assumptions went into this flow:

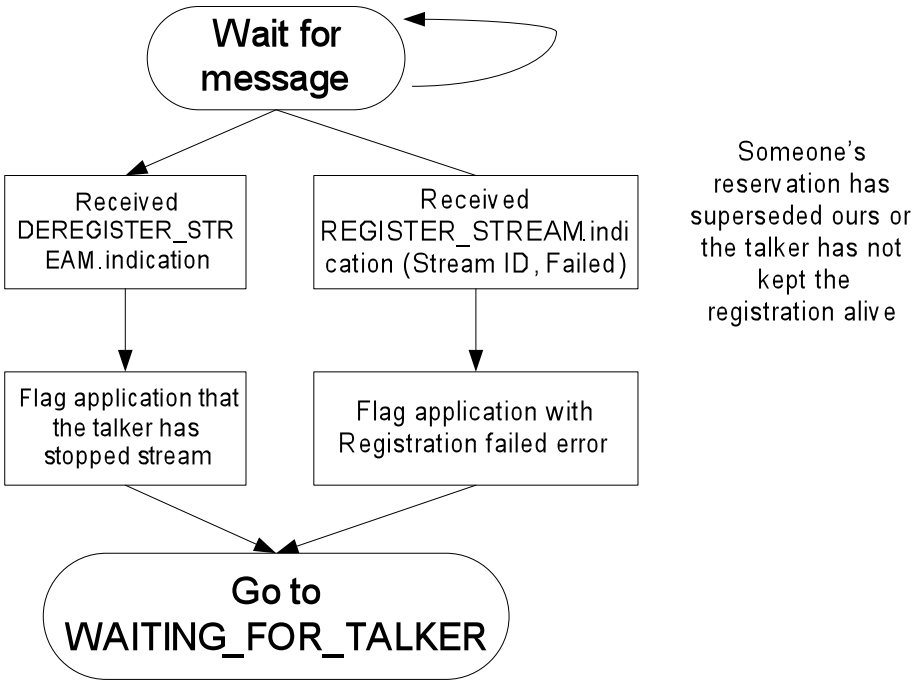
- From an offline configuration, the listener will not have the MAC address of the talker to use in the stream ID. He will need to find that upon a query.
- In normal operation, the listener can assume that the same Talker device he was listening to last time is the person he will be listening to this time. With that in mind, the listener can just start looking for the talker to advertise the old stream.
- Should the talker have been replaced since the last boot, the listener will eventually hear the HiQnet disco of that device and can update his StreamID appropriately.
- Note that if the listener has been booted faster than the replaced talker, the first DiscoQuery from the listener will be missed by the talker. Therefore the talker needs to keep listening for the HiQnet Disco Announce from the talker.

Should we just make our default behavior that we wait until the Listener has found the talker via HiQnet?

Does our MRP stack need to send a LEAVE_ALL to get refreshed on startup?

Listeners wait to receive notification that the talker stream has been registered. In this way the SRP monitoring service is simplified, because the SRP Listener had to at least once see a talker declaration. In the case that the listener is configured or boots from last state faster than talker, it will not receive a failed response from the first bridge.

Listener monitoring service:



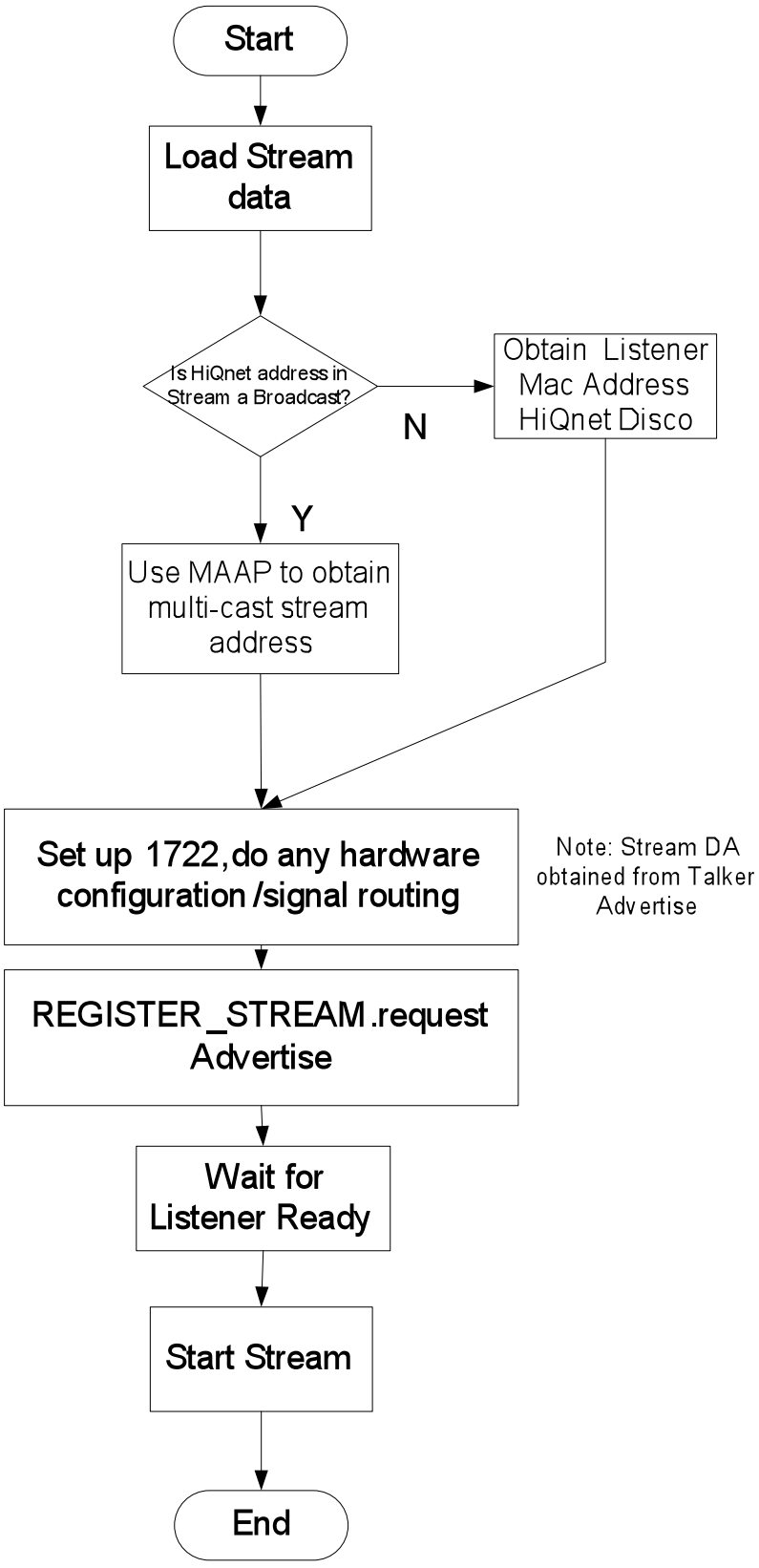
2.2.1 Listener Stream States

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

2.3 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

2.4 Talker startup



Two basic scenarios are envisioned above. In the first one, we are using multi-cast streams – this is indicated to the talker by a 0xFFFF HiQnet address in the Stream configuration data.

Should we need to be using unicast streams, then the talker is set up with the HiQnet address of the listener. He uses HiQnet disco to find out the MAC address to put into the DA for the stream.

Optimization: I have not made this symmetrical with the listener. Should the talker already have the unicast DA from a previous point, he could assume that as I have done in the Listener side. I have not done so because in this case he is sending it directly to the listener, so it make sense to wait for the listener so that the talker does not have to refresh the advertise.

2.4.1 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.

2.5 Stream Interruption

2.5.1 Talker offline

- If a talker goes offline the following conditions occur
    - 1722 under run (this will also occur right before a talker de-registers a stream, so it is not a definitive indication that the talker went offline)
    - MSRP will eventually timeout and the reservation will receive a fail.
- If the talker application restarts before the MSRP timeout, it will be notified by MSRP if there are still active listeners, and should restart 1722. Otherwise,

it needs to re-advertise, at which point the listener will be notified that it is ready again.

2.5.2 Listener offline

- If a listener goes offline, there is difference in indication to the Talker that the listener has stopped listening to the stream or that it has gone offline.

Note: Could add HiQnet data to the Talker side so that it may monitor listeners.