**SYNC 4.1 supplement – what believe is supported feature wise for SYNC 4.1)**:

• Resource\_Client – Cluster, RACM (rear seat controller) and SYNC 4.1 for internal AHU items (currently that is all I can think off – Remote CD told not supported so won’t request).

For SYNC 4.1 internal functions don’t need to send the Audio Request and Audio Response and would be considered a black box from a system perspective on how this is done internal to SYNC 4.1 (ex below Resource Server, Audio Switch etc all SYNC internal). The internal sequence diagram without CAN signal do not need to follow the logical internal to SYNC. Still can be referenced though to make sure no issues with implementing. For example may want to reference mute/unmute in sequence diagram to avoid any audio blips with external souces.

• Resource\_Server – SYNC 4.1

• Audio Resource Server – SYNC 4.1

• Audio Prioritiser – SYNC 4.1

• Audio Switch – SYNC 4.1

• Audio Settings – SYNC 4.1

• Audio I/O Controller – SYNC 4.1

### For the ResourceUpdate.St message many modules look at it and more than just the Cluster and RACM (ex WACM, DSP AMP, HUD some EFP and probably a few others)

### MD-REQ-274886/A-AudioRequest

**Message Type**: Request

This method is used by a client to request/release audio resources from the Audio Resource Server. It is also used to poll the current status of a request (Resource Update).

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| OperationType | RequestAudioResource | 0x1 | Request an audio source |
| ReleaseAudioResource | 0x2 | Release a request (granted or stacked) |
| ReleaseALLAudioResources | 0x3 | Stack will be emptied, default audio source will NOT be allocated |
| GetResourceUpdate | 0x4 | Polls the status of a specific stack entry (specified by Requester System, Requested Source, and Requester Priority) |
| GetALLResourceUpdate | 0x5 | Used to poll the entire audio stack |
| RequesterSystem | Front Requester | 0x0 |  |
| Rear Requester | 0x1 | N/A - Not currently used |
| RequestedAudioSource | AM/FM Radio | 0x0 | Applies (Cluster, RACM) |
| Frond Disc | 0x1 | N/A – Per Ron Zlotnik no Remote CD as of now. If I was the SYNC 4.1 team I would probably build this in your software in case this ever changed in the future for a particular program but up to the SYNC 4.1 software team. |
| SDARS / DAB | 0x2 | Applies (Cluster, RACM) |
| In Dash CD Changer | 0x3 | N/A – Per Ron no CD as of now |
| Voice Recogniser | 0x4 | N/A – I don’t think any other module other than SYNC can request VR but someone would need to verify |
| Telematic Unit | 0x5 | TBD – N/A don’t think it is used by anyone but not 100% sure. Someone verify with TCU team |
| Bluetooth Phone | 0x6 | TBD – don’t think it is used by anyone. SYNC team to confirm |
| Rear Disc | 0x7 | N/A |
| APIM | 0x8 | TBD Applies - If Cluster selecting an APIM source is this used? |
| Front Aux Input | 0x9 | TBD – Don’t think this is used at this time. Core Audio Team to confirm |
| Navigation | 0xA | TBD – Don’t think is used at this time. SYNC team to confirm. |
| Rear Aux | 0xB | TBD – Don’t think is used |
| Not Requested | 0xC |  |
| BTAudio | 0xD | TBD – Don’t think this is used at this time. Core Audio Team to confirm |
| USB | 0xE | TBD – Don’t think this is used at this time. Core Audio Team to confirm |
| iPod | 0xF | TBD – Don’t think this is used at this time. Core Audio Team to confirm |
| RequesterPriority | Priority Service | 0x0 |  |
| Telephony Service | 0x1 |  |
| Auto Answer | 0x2 |  |
| TA | 0x3 |  |
| PTT Mute & Voice | 0x4 |  |
| Nav. User Voice Cmd | 0x5 |  |
| Nav. System Voice Cmd | 0x6 |  |
| Radio | 0x7 |  |
| Disc | 0x8 |  |
| Alarm | 0x9 |  |
| PTY/NEWS | 0xA |  |
| Aux\_ExtSource | 0xB |  |
| Mobile Nav/Tel Mute | 0xC |  |
| Manual Audio Mute | 0xD |  |
| Not Requested | 0xE |  |

### Should show ResourceUpdate Status for any source

### MD-REQ-274910/A-ResourceUpdateStatus

**Message Type**: Status

This method is used to inform clients/requesters what the current status is of a request and/or status of the audio stack.

This method is application event-periodic driven.

When there are no resources allocated, the audio source and priority parameters shall be set to 'Not Requested'.

* ResourceUpdate(Front system, Not Requested, Not requested, De-allocated)

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| RequesterSystem | FrontRequester | 0x0 |  |
| RearRequester | 0x1 | N/A - Not currently used |
| RequestedAudioSource | AM/FM Radio | 0x0 | Indicates the respective audio source  <JM> Items in green could be selected so need to be supported. Not sure about the other items. Item in yellow Ron says no plans to support but up to SYNC team if include software for it in case changes in the future. |
| Front Disc | 0x1 |
| SDARS/DAB | 0x2 |
| In Dash CD Changer | 0x3 |
| Voice Recogniser | 0x4 |
| Telematic Unit | 0x5 |
| Bluetooth Phone | 0x6 |
| Rear Disc | 0x7 |
| APIM | 0x8 |
| Front Aux Input | 0x9 |
| Navigation | 0xA |
| Rear Aux | 0xB |
| Not Requested | 0xC |
| BT Audio | 0xD |
| USB | 0xE |
| iPod | 0xF |
| RequesterPriority | Emergency Service | 0x0 | This parameter indicates the priority associated with the respective audio source  <JM> Note: The items not in green I don’t believe are currently used but up to SYNC 4.1 software team to determine if want to have their AHU software support in case ever used in the future. |
| Telephony Service | 0x1 |
| Auto Answer | 0x2 |
| TA | 0x3 |
| PTT Mute & Voice | 0x4 |
| Nav User Voice Cmd | 0x5 |
| Nav System Voice Cmd | 0x6 |
| Radio | 0x7 |
| Disc | 0x8 |
| Alarm | 0x9 |
| PTY/NEWS | 0xA |
| Aux\_ExtSource | 0xB |
| Mobile Nav/Tel Mute | 0xC |
| Manual Audio Mute | 0xD |
| Not Requested | 0xE |
| ResourceRequestStatus | No Resource Update | 0x0 | The Status of the respective audio source  <JM> All items need to be supported |
| Deallocated | 0x1 |
| Allocated | 0x2 |
| Stacked | 0x3 |
| Granted | 0x4 |
| Granted (no control of audio source) | 0x5 |

##### <JM> The table below has the possible combinations to show in the ResourceUpdate.St message. Below I don’t know all the possible combinations since Audio Management SPSS is just the strategy to use not the implementation for specific features. I listed in the column in yellow some I know are used today

##### AUMGNT-SR-REQ-014570/G-Audio Request - Allowable Combinations (TcSE ROIN-41055-8)

The following are the allowable combinations of the audio request parameters to support the issuance of and AudioRequest.Rq() method. These combinations shall be adhered to by Resource Clients/ Servers classes.

The class deployment table/diagram shall define which physical nodes must implement the required Resource Clients/Servers classes.

Note: The actual usage of the specific audio requests is dependant upon whether the Clients/Servers support the feature of the audio requests. For example, if the AMFM Client/Server does not support the TA feature then the audio request AudioRequest.Rq(RequestAudioResource, Front Requester, AM/FM Radio, TA) would not be utilized.

The Audio Resource Server shall also support the processing of all possible configurations defined in the table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Resource Class** | **Requester System** | **Requested Source** | **Requested Priority** | **Comment** | **Volume**  **Settings** | **Can be saved as Last Used Source(3)** | **<JM> Combination that is supported in ResourceUpdate.St** |
| AMFM Client  AMFM Server | Front Requester | AM/FM Radio | Radio | Normal Radio Listening | Media | Yes | Supported |
| AMFM Client  AMFM Server | Front Requester | AM/FM Radio | PTY/News | PTY or PTY NEWS interrupt | TA | No | Supported |
| AMFM Client  AMFM Server | Front Requester | AM/FM Radio | TA | Traffic Announcement interrupt. | TA | No | Supported |
| AMFM Client  AMFM Server | Front Requester | AM/FM Radio | Alarm | PTY31 Alarm. | TA | No | Supported |
| SDARS Client  SDARS Server | Front Requester | SDARS | Radio | Normal Radio Listening | Media | Yes | Supported |
| DAB Client  DAB Server | Front Requester | DAB | Radio | Normal Radio Listening | Media | Yes | Supported |
| DAB Client  DAB Server | Front Requester | DAB | PTY News | PTY NEWS interrupt | TA | No | Supported |
| DAB Client  DAB Server | Front Requester | DAB | TA | Traffic Announcement interrupt. | TA | No | Supported |
| DAB Client  DAB Server | Front Requester | DAB | Alarm | PTY31 Alarm. | TA | No | Supported |
| SingleCD Client  SingleCD Server | Front Requester | Front Disc | Disc | Front disc player | Media | Yes | Supported – Again Ron said not supported but I would recommend adding this in just in case added in the future. Should be easy since already have the functionality for how the ResourceUpdate.ST works and this is just an encoding but up to SYNC 4.1 software team |
| RearCD Client  RearCD Server | Front Requester | Rear Disc | Disc | Rear disc player | Media | Yes |  |
| InDashCD Client  InDashCD Server | Front Requester | In-Dash CD Changer | Disc | In-dash CD changer | Media | Yes |  |
| AUX Client  AUX3 Server | Front Requester | Front Aux Input | AUX\_ExtSource | BVC Aux Input | Media | Yes | Not Sure |
| AUX Client  AUX2 Server | Front Requester | Front Aux Input | AUX\_ExtSource | APIM Aux Input | Media | Yes | Supported |
| AUX Client  AUX1 Server | Front Requester | Front Aux Input | AUX\_ExtSource | AHU Aux Input | Media | Yes | Not sure if ever applicable in Europe or not |
| Rear AUX Client  Rear AUX Server | Front Requester | Rear Aux Input | AUX\_ExtSource | Rear Aux Input | Media | Yes |  |
| iPod Client  iPod Server | Front Requester | iPod | AUX\_ExtSource | Other external sources | Media | Yes |  |
| USB Client  USB Server | Front Requester | USB | AUX\_ExtSource | Other external sources | Media | Yes |  |
| BT\_Stereo Client  BT\_Stereo Server | Front Requester | BT\_Stereo | AUX\_ExtSource | Other external sources | Media | Yes |  |
| APIM Client  APIM Server | Front Requester | APIM | Priority Service |  | Phone | No | Supported |
| APIM Client  APIM Server | Front Requester | APIM | Auto Answer |  | Phone | No |  |
| APIM Client  APIM Server | Front Requester | APIM | Telephony Service |  | Phone | No | Supported |
| APIM Client  APIM Server | Front Requester | APIM | Mobile NAV and Tel Mute | Mobile Navigation | Prompt  (Not Mixed) | No |  |
| APIM Client  APIM Server | Front Requester | APIM | Alarm |  | TA | No |  |
| APIM Client  APIM Server | Front Requester | APIM | TA |  | TA | No |  |
| APIM Client  APIM Server | Front Requester | APIM | PTY/NEWS |  | TA | No |  |
| APIM Client  APIM Server | Front Requester | APIM | Aux\_ExtSource |  | Media | Yes | Supported – What APIM currently using for internal media source (ie USB, CarPlay, BT Audio etc) |
| VR Client  VR Server | Front Requester | Voice Recognizer | PTT Mute & Voice | PTT audio mute + voice feedback | VR | No | Supported |
| Telematic Client  Telematic Server | Front Requester | Telematic Unit | Mobile NAV and TEL Mute | Mute speakers for TEL telephony system | N/A | No |  |
| Telematic Client  Telematic Server | Front Requester | Telematic Unit | Priority Service | SOS calls, etc. | Phone | No |  |
| Telematic Client  Telematic Server | Front Requester | Telematic Unit | Auto Answer |  | Phone | No |  |
| BTPhone Client  BTPhone Server | Front Requester | Bluetooth Phone | Telephony Service | Normal Phone Calls | Phone | No |  |
| BTPhone Client  BTPhone Server | Front Requester | Bluetooth Phone | Mobile NAV and TEL Mute | Mute speakers for BT telephony system | N/A | No |  |
| BTPhone Client  BTPhone Server | Front Requester | Bluetooth Phone | Priority Service |  | Phone | No |  |
| Navigation Client  Navigation Server  (Non-APIM) | Front Requester | Navigation | Nav. User Voice Cmd | Mixing request.  Navigation voice command requested by user. | Prompt | No |  |
| Navigation Client  Navigation Server  (Non-APIM) | Front Requester | Navigation | Nav. System Voice Cmd | Mixing Request.  Navigation voice command requested by system. | Prompt | No |  |
| Navigation Client  Navigation Server  (Non—APIM) | Front Requester | Navigation | Mobile NAV and TEL Mute | Mobile Navigation | Prompt (Not Mixed) | No |  |
| System Master | Front Requester | Not Requested | Manual Audio Mute(1) | Mute of the audio system | N/A | No | Supported |
| System Master | Front Requester | Not Requested | Not Requested | Used for "Release All Resources" & "Get ALL resource updates"(2) | N/A | Yes(5) | Supported – for an empty audio stack (ex driving with the audio off) |
| AMFM Client  AMFM Server | Rear Requester | AM/FM Radio | Radio | Normal Radio Listening |  |  | N/A – so far this has never been used for Rear |
| SDARS Client  SDARS Server | Rear Requester | DAB/SDARS | Radio | Normal Radio Listening |  |  | N/A – so far this has never been used for Rear |
| SingleCD Client  SingleCD Server | Rear Requester | Front Disc | Disc | Front disc player |  |  | N/A – so far this has never been used for Rear |
| InDashCD Client  InDashCD Server | Rear Requester | In-Dash CD Changer (not part of the rear system) | Disc | In-dash CD changer |  |  | N/A – so far this has never been used for Rear |
| RearCD Client  RearCD Server | Rear Requester | Rear Disc | Disc | Rear disc player |  |  | N/A – so far this has never been used for Rear |
| AUX Client  AUX3 Server | Rear Requester | Front Aux Input | AUX\_ExtSource | BVC Aux Input |  |  | N/A – so far this has never been used for Rear |
| AUX Client  AUX2 Server | Rear Requester | Front Aux Input | AUX\_ExtSource | APIM Aux Input |  |  | N/A – so far this has never been used for Rear |
| AUX Client  AUX1 Server | Rear Requester | Front Aux Input | AUX\_ExtSource | AHU Aux Input |  |  | N/A – so far this has never been used for Rear |
| Rear AUX Client  Rear AUX Server | Rear Requester | Rear Aux Input | AUX\_ExtSource | Rear Aux Input |  |  | N/A – so far this has never been used for Rear |
| iPod Client  iPode Server | Rear Requester | Front iPod | AUX\_ExtSource | Other external sources |  |  | N/A – so far this has never been used for Rear |
| USB Client  USB Server | Rear Requester | Front USB | AUX\_ExtSource | Other external sources |  |  | N/A – so far this has never been used for Rear |
| BT\_Stereo Client  BT\_Stereo Server | Rear Requester | Front BT\_Stereo | AUX\_ExtSource | Other external sources |  |  | N/A – so far this has never been used for Rear |

**Note:**

1) "Manual Audio Mute" is used by the front system to mute the audio system. The current source shall be stacked.

2) When the requester wants to release all resources or get resource update for all requests in the stack, there is no specified audio source or priority, so Not Requested will be used in this case.

3) Indicates whether the System Master is allowed to save the combination as the "Last Used Source" during power mode transitions. These source are saveable when either stacked or granted.

4) Volume Settings column Indicates what the volume settings will be once granted in the ResourceUpdate.St

5) The ResourceUpdate.st of (Front Req, Not Req, Not Req, Deallocated) is saved as no audio source (ex Power button turned audio OFF while in Run with HMIAudioMode = ON) but for the system master (ex MFD/APIM..) when starting up and shutting down if there was an active source before the shutdown sequence is started than the system master shall remember that source. See Station Management for details of start-up and shutdown.

<JM> Note from the meeting below the table below would be supported unless noted otherwise somewhere. Someone at the meeting below said VR could not interrupt a phone call per the APIM Phone specs. That is fine and below it doesn’t really contradict it when a separate AHU since SYNC would never send the VR request during a phone call. Now that internal to SYNC still follow the phone specs. That is the only one I am aware of but if anything else doesn’t match below then let me know.

Also note for the items in yellow below (ie Nav User & Nav System) I have never seen them used before and carryover Europe functionality. For SYNC I am not aware of any modules that use these commands.

<JM> Note: A thing to keep in mind that in the Alert section we have Mixable Prompts which use the SYNC\_Alert message instead of the audio management messages for prompts.

##### AUMGNT-SR-REQ-014552/C-Audio Request\_Properties of Priorities\_Overview (TcSE ROIN-40963-2)

The following table shows the properties for different Priorities which must be supported by the Resource Clients, Audio Resource Server and Audio Prioritizer. The requester system and requested source are not shown, since the priority properties of a request are the same regardless of requester systems and source.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Priority Type** | **Priority**  **Level** | **May Interrupt**  **up to Level No.** | **May enter stack**  **below granted entry** | **Stackable** | **Collapses**  **Stack** |
| Priority Service | 9 | 8 | No | No | No6 |
| Auto Answer1 | 9 | 8 | No | No | No |
| Telephony Service | 8 | 7 | No | Yes | No |
| Mobile NAV and Tel Mute | 7 | 6 | No | Yes | No |
| PTT Mute & Voice | 6 | 8 | No | No | No |
| Alarm | 5 | 4 | Yes | No | No |
| TA | 4 | 3 | Yes | No | No |
| PTY/NEWS | 3 | 2 | Yes | No | No |
| Manual Audio Mute | 2 | 4 | No | Yes | No |
| Radio | 1 | 7 | No | Yes | Yes |
| Disc | 1 | 7 | No | Yes | Yes |
| Aux\_ExtSource | 1 | 7 | No | Yes | Yes |
| Nav. User Voice Cmd2 | N/A | 9 (mix)3 | N/A | N/A | N/A |
| Nav. System Voice Cmd2 | N/A | 7 (mix)4 | N/A | N/A | N/A |
| Not Requested5 | N/A | N/A | N/A | N/A | N/A |

Notes:

1) Same priority as emergency service -> same behavior

2) Will be mixed with the current audio source (if accepted/granted):

- Nav \_x\_ Voice Cmd does not have a specific priority level, since it is treated separately due to mixing.

- Incoming Resource Client requests are not evaluated against Nav \_x\_ Voice Cmd requests.

- Nav \_x\_ Voice Cmd priority types do not have properties like “stackable” or “collapses stack” since they do not enter the normal audio stack.

- Incoming Nav \_x\_ Voice Cmd requests do not influence the “normal” stack, except for “Nav. User Voice Cmd” during a PTT & Voice session.

- If there is an incoming “Nav. User Voice Cmd” during an active “Nav. System Voice Cmd”, the Audio Resource Server shall replace the “Nav. System Voice Cmd”with the “Nav. User Voice Cmd” in the “mixing” stack. No other action will be taken.

3) If the current/granted request is “PTT Mute & Voice” then a request for “Nav. User Voice Cmd” will deallocate the “PTT Mute & Voice” request (the one below will remain stacked) and only navigation guidance will be audible in the loudspeakers.

4) System initiated navigation voice guidance will not interrupt PTT MUTE & Voice recognition feedback. Otherwise it is accepted up to the level defined in the column “May interrupt up to level No.”

5) This “Priority Type” is different from others, since it is used for Release ALL (highest priority) and Get ALL Resource Updates (no need for priority, no action taken on stack).

6) If it is called out in the applicable feature specification (ex emergency call SPSS) on what to do when ending a priority service call with Priority Type = Priority Service for collapse stack and if it contradicts what is in this requirement then the feature specifications calling this out take precedent.