

1 DESCRIPTION

The ASI2816 is a multi-channel streaming radio tuner packaged in a 1U form factor. It can be configured with up to four modules. Each module contains four radio tuners for a total of up to 16 tuners per ASI2816. The ASI1471 module contains four AM/FM/WeatherBand (WB) tuners. The ASI1472 module contains four AM/AM-HD/FM/FM-HD tuners.

Up to sixteen ICY encoded audio streams can be sent from the ASI2816. The format of the streams is selectable as mono or stereo 44.1kHz AAC-LC.

The ASI2816 contains an OLED front panel display showing current configuration and status of all tuners including band, frequency, signal strength and HD status.

Each tuner module also includes balanced stereo audio outputs on a StudioHub compatible RJ-45 connector with a software adjustable level of 0 to +24dBu

2 MODULES

ASI2816	Base streaming tuner unit
ASI1471	4 tuner AM/FM/WB module
ASI1472	4 tuner AM/FM/AMHD/FMHD module

3 FEATURES

- Up to 16 channels of AM/FM HD Radio audio capture
- Up to 16 channels of analog AM/FM audio capture
- Up to 16 channels of Weather Band capture
- Antenna connector on each module or chainable across multiple modules
- Audio monitoring of all tuners simultaneously using RJ-45 StudioHub analog outputs
- Gb Ethernet interface
- 100 to 240VAC universal power supply with IEC-320 receptacle
- Internet streaming: One ICY encoded, mono or stereo, AAC-LC stream @ 44.1kHz per tuner
- HTML based web UI for configuring tuners and streaming parameters
- Front panel display shows tuner status and audio metering
- SNMP support for network monitoring applications



4 SPECIFICATIONS

ASI1471 AM/FM/WB TUNER MODULE

Connector	Dual F type 75 ohms, on module bracket
AM	
Frequency range	520kHz-1720kHz, 1kHz channel spacing
Sensitivity	30dBuV for -30dB THD+N
Input Level	90 dBuV Maximum
THD+N	-50dB @ 60dBuV RF Level, 1kHz sinewave, 75% modulation, A-weighting, 2kHz bandwidth
De-emphasis	None or 50us (software selectable)
Audio bandwidth	100Hz - 2kHz (+/-3dB)
FM	
Modes	Mono or Stereo
Frequency range	64MHz - 108MHz, 50kHz channel spacing
Sensitivity	15dBuV for -30dB THD+N
Input Level	90 dBuV Maximum
THD+N	-55dB @ 60dBuV RF Level, 1kHz sinewave, mono, 75kHz deviation, A-weighting
De-emphasis	50us or 75us (software selectable)
Audio bandwidth	30Hz-15kHz (+/-3dB)
WB	
Frequency range	162.400 – 162.550MHz, 25kHz channel spacing
Sensitivity	0dBuV for 12dB S/N
THD+N	-40dB @ 60dBuV RF Level, 1kHz sinewave
Audio bandwidth	300Hz - 2kHz (+/-3dB)

ASI1472 AM/AM-HD/FM/FM-HD TUNER MODULE

Connector	Dual F type 75 ohms, on module bracket
AM	
Frequency range	520kHz-1720kHz, 1kHz channel spacing
Sensitivity	30dBuV for -30dB THD+N
Input Level	90 dBuV Maximum
THD+N	-50dB @ 60dBuV RF Level, 1kHz sinewave, 75% modulation, A-weighting, 2kHz bandwidth
De-emphasis	None or 50us (software selectable)
Audio bandwidth	100Hz - 2kHz (+/-3dB)
AM-HD	
Modes	Auto or Analog only
Frequency Range	520kHz-1720kHz, 1kHz channel spacing
Input Level	90 dBuV Maximum
FM	
Modes	Auto or Mono
Frequency range	76MHz - 108MHz, 50kHz channel spacing
Sensitivity	15dBuV for -30dB THD+N
Input Level	90 dBuV Maximum
THD+N	-55dB @ 60dBuV RF Level, 1kHz sinewave, mono, 75kHz deviation, A-weighting
De-emphasis	50us or 75us (software selectable)
Audio bandwidth	30Hz-15kHz (+/-3dB)
FM-HD	
Modes	Auto or Analog only
Frequency Range	76MHz – 108MHz
Input Level	90 dBuV Maximum

LINE OUTPUT

Connector	RJ-45 using StudioHub standard
Audio Level	0 – 24dBu in 3dB steps (software selectable)

STREAMING

Audio Formats	One ICY encoded, mono[1] or stereo streams per tuner at 32, 48, 64, 92 or 128kbps MPEG AAC-LC[2] @ 44.1kHz or 48kHz or MP3 at 44.1kHz or 48kHz (firmware 0.11.0 or higher) [1] FM Stereo signals are downmixed to mono [2] MPEG Layer-3 audio coding technology licensed from Fraunhofer IIS and THOMSON multimedia
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GENERAL

Dimensions	1 RU, 19"(482mm) W x 8"(203mm) L x 1.75"(44mm)
Weight	7 lb (3.2kg) max
Operating Temperature	0C to 60C
Power Requirements	100-240VAC, 47-63Hz, 25W max.

5 REVISIONS

Date	Description
Sept 2021	Preliminary
Jan 2022	Added web interface section/front and rear panel sections
Jan 25 2022	Added "Analog Only" info for HD tuners
Aug 16 2022	Updated to include meters and silence detection
Aug 30 2022	Added Specifications page
Aug 18 2023	Added VLC Player monitoring example
Aug 22 2023	Added Module configuration notes
Dec 5 2023	Added note on setting stereo stream (section 10.2.1)
April 25 2024	Updated Tuner page
Aug 27 2024	Added info on SNMP
Jan 20 2014	Updated pictures and specifications

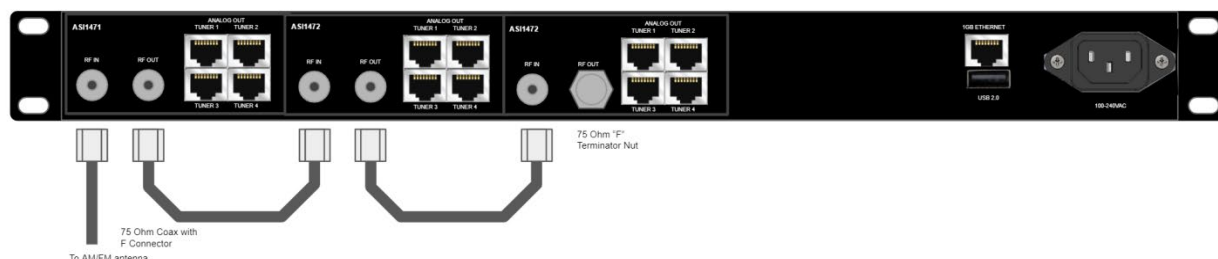
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7 INSTALLATION

7.1 Before Power Up

1. Install the RG-6 jumper cables so that each tuner module has an RF signal feed.



2. Connect the unit to your Ethernet network using the RJ45 connector.
3. Connect power.

7.2 Power Up

The unit may be powered up by plugging AC power into the back of it. The POWER LED on the front panel will initially light up as Orange and then change to Green as the unit boots.

If in standby mode (POWER LED is Orange) the unit may also be powered up by pressing the recessed power button using a paper-clip.

7.3 Power Down

Once powered up, the unit may be powered down by pressing the recessed power button using a paper-clip. The POWER LED will change from Green to Orange indicating the unit is in Standby mode.

7.4 Using the web interface

By default, the ASI2816 will obtain an IP address using DHCP. You can also assign a static IP address if needed (see Web Interface ->IPv4 section below). You can find its IP address looking on the front panel display or by using an IP scanner (such as Angry IP Scanner) to look for devices on the network with port 80 open. The POCs will show up as so:

IP	Hostname	Ports
 192.168.4.204	ASI2801-A0-120374.local	22

8 OPERATION

8.1 Front Panel Display

Model number
Firmware version

Hardware revision / Serial #

Temperature
IP address
(Static or DHCP)

Module 1 model
Station tuning

Module 2 model
Station tuning

Module 3 and 4 empty

9 REAR PANEL

The rear panel will show each of the installed modules starting with module 1 on the left. Each module will have a similar layout. The right side of the rear panel contains the network Ethernet connection and power.

9.1 Modules

Module model #

RF connectors

Analog outputs
StudioHub RJ-45
compatible
(local monitoring)

9.2 Power and Ethernet

1GB Ethernet

USB 2.0
(future use)

Power connector

10 NETWORK USAGE NOTE

The ASI2816 is intended for use within internal networks (local or VPN intranet). Direct exposure to the public internet may result in security risks and performance issues due to traffic overload. The ASI2816 is not designed to stream to an arbitrary number of destinations.

For public network access or multiple external streaming connections, we recommend setting up an Icecast proxy to manage traffic securely.

Recommended Setup:

ASI2816 <--INTERNAL NETWORK--> PROXY <--INTERNET--> Streaming clients

11 WEB INTERFACE

To access the unit's web interface, enter its IP address in your web browser of choice (Chrome, Firefox, Edge, etc.) and you should see the page below.

11.1 Device tab

The Device tab displays information about your hardware and also allows you to customize its name.



[Device](#) · [Tuners](#) · [Settings](#) · [IPv4 Config](#)



Device Information

Rename Label: [Apply](#)

Current Label: ASI2816 Streaming Tuner

Model Name: ASI2816

Model Number: ASI2816

Hardware Revision: B0

Serial Number: 122047

Primary MAC Address:

Firmware: 0.11.0-rc2

Modules Information

Slot 1: ASI1471 - H/W Rev: B/C

Slot 2: ASI1472 - H/W Rev: B/C

Slot 3: -

Slot 4: -

Device Status

System Status: ● ok

Temp: ● 57.9 °C

11.2 Tuners tab

The Tuners tab is where you set the band, station, levels and streaming options for each tuner.

The screenshot displays the Tuners tab interface for the ASI2816, showing eight tuners (Tuner 1 to Tuner 8) arranged in a grid. Each tuner has a customizable label, model and position, a Stream button, a Monitor button, a Settings button, and a Silence detection section. Below these are streaming output meters, a Tuner status light, a Set Band/Set Frequency section, a Current station tuned and signal strength section, and a Set output level section. The interface is annotated with callouts explaining various features.

Customizable label
Tuner model and position on each module.

The "Monitor" button opens up an m3u file that you can listen to locally on your PC

The "Settings" button opens up a window that lets you set the network streaming parameters. (See below)

Silence detection: Green when enabled and signal is below threshold.

Settings button for silence detection.

Streaming output meters. Shows the signal level that is being sent to the stream for each channel.

Tuner status light. Green station tuned, Gray no station tuned

Set Band Set Frequency

Current station tuned and signal strength.

Set output level
Current output level in dbu (applies to local monitoring only)

HD status, CNDR signal quality and channel select (HD cards only)

11.2.1 Streaming settings

Clicking the “Settings” button allows you to enter the parameters you will use to be able to stream your tuners to external devices over the network/IP port.

Mount Point Settings

Set parameters for your IP streaming station.
(See below)

Mount Point Settings

Enabled: ☐

Hostname:

Port:

Mount point:

User name:

Password:

Local Monitoring URL: <http://192.168.86.228:8000/audio-m1-t1.m3u>

Stream Encoding Details

Status: Not Streaming

Channel count:

Sample Rate:

Bit rate:

Algorithm:

Stream Encoding Details

Set channel count to 1 for mono or 2 for stereo*

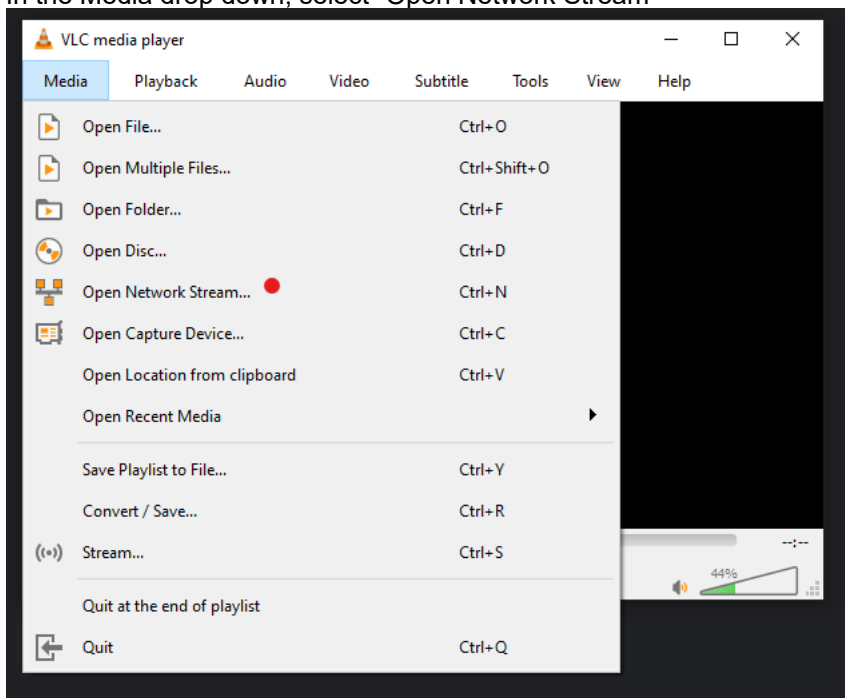
*F/W 0.7.4 or later

To enable IP streaming over the network:

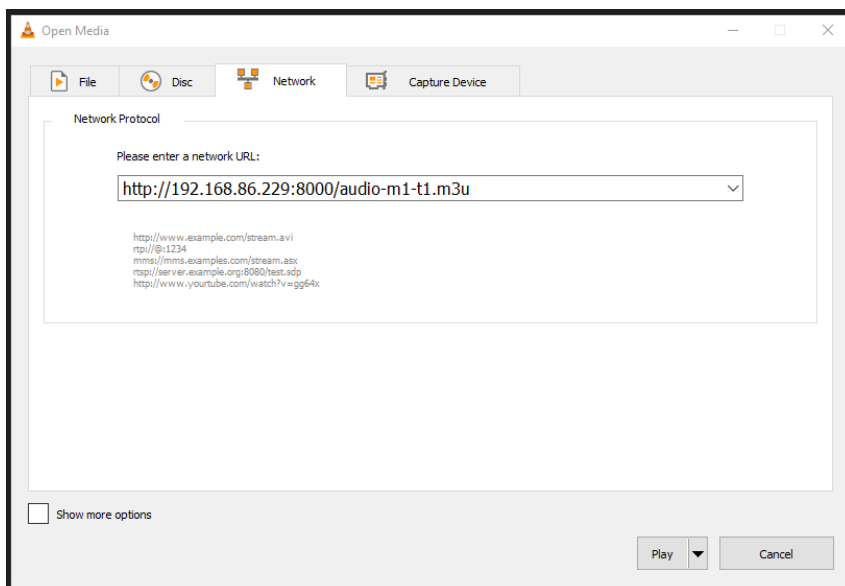
1. Click “Enabled” a check mark appears.
2. Enter the “Hostname” for your website.
3. Enter the network port you want to use (8081 is default)
4. Enter a unique name for your station
5. Enter a User name and Password (if needed)
6. Click “Apply and Close”

An example of monitoring a stream using VLC Player:

1. Open VLC Player
2. In the Media drop down, select “Open Network Stream”



3. Enter the URL for the stream you would like to monitor



4. Press Play. If the stream is live and the URL is correct, you should see and hear the stream playing through your Windows default audio device.

Any audio software that can directly use a URL can be utilized in this way.

11.2.2 Silence detection settings

Silence detection can be used to show an alert when a tuner is offline or no sound is being detected. Click the “Settings” button in the Silence section to customize this for each channel.

1. Observation interval (ms). This is the “how often do you want to check for silence?” setting. Higher numbers mean we check less often, lower numbers we check more often.
2. RMS level threshold (dB). This is the level that will trigger a positive “Silence”. In other words, the level has to dip below this number to trigger a silence alert. In this case lower numbers (since they are negative) will mean less sensitive detection. You can estimate the best numbers to use by watching the meters and the dBFS numbers on the main tuner screen. Observe what a normal signal looks like and then set your RMS level threshold below that to trigger an alert when the signal drops.

Stream Settings

Silence detection Settings

Observation interval (ms):

RMS level threshold (dB):

Silence detection events

Id	Timestamp	Silence
No events		

Cancel
Apply and Close

11.2.3 Analog only option

You can set tuners on HD modules to use ONLY analog signals if you need. In the HD Prog section, click the down arrow to open up the drop box. From here you can set the HD program you want to tune or set it to Analog Only to prevent it from detecting any HD signals on this particular tuner. The status circle will turn black when set to Analog Only.

Stereo ●

Auto ▾

HD Prog.

2 ▾ ●

15 dBu

Stereo ●

Auto ▾

HD Prog.

A ▾ ●

15 dBu

1

2

15

11.3 Settings tab

From the Settings tab you can reboot the unit or clear the settings and reboot. Clear settings will reset all tuners to factory defaults and remove any streaming settings.

You can also update the unit's firmware on this tab.

Device

Reboot Device

Clear Settings and Reboot

Firmware Update

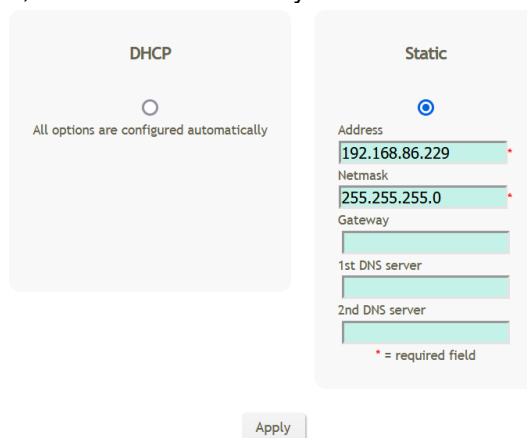
Choose File

No File Selected

Update

11.4 IPv4 Config tab

The IPv4 Config tab is where you set your IP address, you can either use DHCP if your network provides that service or enter a Static IP address, Netmask and Gateway DNS if needed.



The screenshot shows the IPv4 Config tab with two main sections: DHCP and Static. The DHCP section has a radio button that is not selected and the text "All options are configured automatically". The Static section has a radio button that is selected. Below the Static section, there are input fields for Address (192.168.86.229), Netmask (255.255.255.0), Gateway, 1st DNS server, and 2nd DNS server. A red asterisk indicates that the Address, Netmask, and Gateway fields are required. An "Apply" button is located at the bottom of the Static section.

12 RECOVERY MODE

Recovery Mode is used to get the unit back to a known version of its OS and to default settings. These are:

- OS Ver - TBD
- IP Address - DHCP
- Tuner settings: FM - 87.9MHz

To enter Recovery Mode do the following:

1. Unplug power cord
2. Press the SELECT button on the front panel and keep it pressed throughout the following steps.
3. Plug in the power cord
4. Wait until the display shows the recovery has started. This should be less than a minute.
5. Release the SELECT button.
6. The unit will load the Recovery OS, clear its tuner settings and reset its IP back to DHCP

13 APPENDIX

13.1 ASI2816 Module Revisions

The ASI2816 streaming radio tuner is configured with up to 4 tuner modules. There are various revisions of the modules available:

Revision B & C: Use four stereo USB audio recording interfaces

Revision D & E: Use one 8 channel USB audio recording interface

The following guidelines apply when configuring an ASI2816 chassis

1. Revision B & C cannot be mixed with revision D & E, i.e. an ASI2816 chassis needs to be populated with either all revision B & C or all revision D & E.
2. A maximum of two revision B & C modules can be used in one ASI2816 chassis. Any more will cause noise in the audio streams
3. Three or more modules in an ASI2816 chassis require revision D or E modules. If you have purchased an ASI2816 with three or more revision B or C modules then we will replace those modules with revision D or E at no charge - please contact AudioScience technical support.
4. Use of revision D or E modules requires firmware version 0.7.1 or higher.

13.2 SNMP Support

The ASI2816 has support for SNMP network monitoring software. You can download the required MIB file from our website at https://www.audioscience.com/internet/products/tuner_audio/asi2816.htm

To use it, consult your management software on how to load the MIB file and configure your monitoring options. Just about every control you see in the web GUI can be monitored or controlled with SNMP. Below is an example of available controls.

```
$ smidump -f tree ./AUDIOSCIENCE-ASI2816-MIB
# AUDIOSCIENCE-ASI2816-MIB registration tree (generated by smidump 0.5.0)
```

```
---- asiSnm(1.3.6.1.4.1.58172)
+---- asiSnmObjects(24)
| +---- asiSnmDeviceSpecific(2)
| | +---- asiSnmAsi2816(2816)
| | | +---- asi2816ModulesInfo(1)
| | | | +--r- asi2816ModulesCount(1) Integer32
| | | | +---- asi2816ModuleTable(2)
| | | | | +---- asi2816ModuleEntry(1) [asi2816ModuleEntryIndex]
| | | | | | +---- asi2816ModuleEntryIndex(1) AsiModuleEntryIndex
| | | | | | +--r- asi2816ModulePartNumber(2) AsiString
| | | | | | +--r- asi2816ModuleRevision(3) AsiString
| | | | | | +--r- asi2816ModuleSerial(4) AsiString
| | | | | | +--r- asi2816ModuleSlot(5) Integer32
| | | | | | +--r- asi2816ModuleTunerCount(6) Integer32
| | | +---- asi2816CtrlsByType(2)
| | | | +---- tunerCtrl(1)
| | | | | +---- asi2816TunerCtrlTable(2)
| | | | | | +---- asi2816TunerCtrlEntry(1) [tunerCtrlIndex]
| | | | | | | +---- tunerCtrlIndex(1) AsiCtrlIndex
| | | | | | | +--r- tunerCtrlModuleSlot(2) AsiCtrlIndex
| | | | | | | +--r- tunerCtrlTunerNumber(3) AsiCtrlIndex
| | | | | | | +--rw tunerCtrlFreqHz(4) Integer32
| | | | | | | +--rw tunerCtrlBand(5) AsiTunerBand
| | | | | | | +--rw tunerCtrlForceMono(6) TruthValue
| | | | | | | +--r- tunerCtrlStereoStatus(7) AsiTunerStereoStatus
| | | | | | | +--r- tunerCtrlRSSI(8) AsiDBValue
| | | | | | | +--r- tunerCtrlSNR(9) AsiDBValue
| | | | | | | +--r- tunerCtrlStatusOK(10) TruthValue
| | | | | +---- asi2816HDTunerCtrlTable(3)
| | | | | | +---- asi2816HDTunerCtrlEntry(1) [tunerCtrlIndex]
| | | | | | | +--rw tunerCtrlHDProgramIndex(2) AsiCtrlIndex
| | | | | | | +--r- tunerCtrlHDProgramsAvailable(3) AsiString
| | | | | | | +--rw tunerCtrlHDRenderingMode(4) AsiTunerHDRenderingMode
| | | | | | | +--r- tunerCtrlHDRenderingStatus(5) AsiTunerHDRenderingStatus
| | | | | | | +--r- tunerCtrlHDCDNR(6) AsiDBValue
| | | | +---- trimLevelCtrl(2)
| | | | | +---- asi2816TrimLevelCtrlTable(2)
| | | | | | +---- asi2816TrimLevelCtrlEntry(1) [trimLevelCtrlIndex]
| | | | | | | +---- trimLevelCtrlIndex(1) AsiCtrlIndex
| | | | | | | +--r- trimLevelCtrlModuleSlot(2) AsiCtrlIndex
| | | | | | | +--r- trimLevelCtrlTunerNumber(3) AsiCtrlIndex
| | | | | | | +--rw trimLevelCtrlLevel(4) AsiDBValue
| | | | +---- icyStreamCtrl(3)
| | | | | +---- asi2816IcyStreamCtrlTable(2)
| | | | | | +---- asi2816IcyStreamCtrlEntry(1) [icyStreamCtrlIndex]
| | | | | | | +---- icyStreamCtrlIndex(1) AsiCtrlIndex
| | | | | | | +--r- icyStreamCtrlModuleSlot(2) AsiCtrlIndex
| | | | | | | +--r- icyStreamCtrlTunerNumber(3) AsiCtrlIndex
| | | | | | | +--rw icyStreamCtrlEnabled(4) TruthValue
```

```

| | | +--r- icyStreamCtrlStreaming(5) TruthValue
| | | +---- icyStreamCtrlMountPointTable(3)
| | | | +---- icyStreamCtrlMountPointEntry(1) [icyStreamCtrlIndex]
| | | | | +--rw icyMountPointHost(1) AsiString
| | | | | +--rw icyMountPointPath(2) AsiString
| | | | | +--rw icyMountPointPort(3) Integer32
| | | | | +--rw icyMountPointUsername(4) AsiString
| | | | | +--rw icyMountPointPassword(5) AsiString
| | | +---- icyStreamFormatCtrlTable(4)
| | | | +---- icyStreamFormatCtrlEntry(1) [icyStreamCtrlIndex]
| | | | | +--rw icyStreamChannelCount(1) AsiStreamingFormatChannelCount
| | +---- silenceDetectCtrl(4)
| | | +---- asi2816SilenceDetectCtrlTable(2)
| | | | +---- asi2816SilenceDetectCtrlEntry(1) [silenceDetectCtrlIndex]
| | | | | +---- silenceDetectCtrlIndex(1) AsiCtrlIndex
| | | | | +--r- silenceDetectCtrlModuleSlot(2) AsiCtrlIndex
| | | | | +--r- silenceDetectCtrlTunerNumber(3) AsiCtrlIndex
| | | | | +--rw silenceDetectCtrlMinRMSLevel(4) AsiDBValue
| | | | | +--rw silenceDetectCtrlTriggerInterval(5) Integer32
| | | | | +--r- silenceDetectCtrlSilence(6) TruthValue
| | | | | +--rw silenceDetectCtrlResetInterval(7) Integer32
| | +---- meterCtrl(5)
| | | +---- asi2816MeterCtrlTable(2)
| | | | +---- asi2816MeterCtrlEntry(1) [meterCtrlIndex,meterCtrlChannelIndex]
| | | | | +---- meterCtrlIndex(1) AsiCtrlIndex
| | | | | +---- meterCtrlChannelIndex(2) AsiCtrlIndex
| | | | | +--r- meterCtrlModuleSlot(3) AsiCtrlIndex
| | | | | +--r- meterCtrlTunerNumber(4) AsiCtrlIndex
| | | | | +--r- meterCtrlLevelRMS(5) AsiDBValue
| | | | | +--r- meterCtrlLevelPeak(6) AsiDBValue
| | +---- blockIOInfo(6)
| | | +---- asi2816BlockIOInfoTable(2)
| | | | +---- asi2816BlockIOInfoEntry(1) [blockIOEntryIndex]
| | | | | +---- blockIOEntryIndex(1) AsiCtrlIndex
| | | | | +--r- blockIOIndex(2) AsIOIndex
| | | | | +--r- blockIOType(3) Asi2816BlockIOTypeEnum
| | | | | +--r- blockIODirection(4) Asi2816BlockIODirectionEnum
| | | | | +--rw blockIOLabel(5) AsiBlockIOLabelString
| +---- asi2816CtrlsByLocation(3)
| | +---- asi2816CtrlByLocationTable(2)
| | | +---- asi2816CtrlByLocationEntry(1) [asi2816SlotNumber,asi2816TunerNumber,asi2816CtrlType]
| | | | +---- asi2816SlotNumber(1) AsiCtrlIndex
| | | | +---- asi2816TunerNumber(2) AsiCtrlIndex
| | | | +---- asi2816CtrlType(3) Asi2816CtrlTypeType
| | | | +--r- asi2816CtrlOID(4) ObjectIdentifier
+---- asiSnmpMIBConformance(25)
| +---- asiSnmpMIBCompliances(1)
| | +---- asiDeviceCompliances(2)
| | | +---- asi2816Compliances(1)
+---- asiSnmpMIBGroups(2)
| +---- asi2816Groups(3)
| | +---- asi2816ModuleGroup(1)
| | +---- asi2816ModuleEntryGroup(2)
| | +---- asi2816TrimLevelCtrlGroup(3)
| | +---- asi2816IcyStreamCtrlGroup(4)
| | +---- asi2816IcyStreamMountPointGroup(5)
| | +---- asi2816TunerCtrlGroup(6)
| | +---- asi2816CtrlByLocationGroup(7)
| | +---- asi2816SilenceDetectCtrlGroup(8)
| | +---- asi2816MeterCtrlGroup(9)
| | +---- asi2816HDTunerCtrlGroup(10)

```

+---- asi2816IcyStreamFormatGroup(11)

+---- asi2816BlockIOInfoGroup(12)

<end>