



**GLOBAL LEADER IN
BROADCAST QUALITY
LIVE VIDEO OVER IP**

Zixi Receiver User Guide

Software Version 14
Document Version DOC16-90-0022
Copyright © Zixi 2020
All Rights Reserved

Legal Notice

This document contains proprietary and confidential material of Zixi LLC. Any unauthorized reproduction, use, or disclosure of this material, or any part thereof, is strictly prohibited. This document is solely for the use of Zixi employees and authorized Zixi customers.

The material furnished in this document is believed to be accurate and reliable. However, no responsibility is assumed by Zixi LLC. for the use of this document or any material included herein. Zixi LLC. reserves the right to make changes to this document or any material included herein at any time and without notice.

For more information visit: www.zixi.com.

Copyright © Zixi 2020 Waltham, MA U.S.A.

All Rights Reserved.

** See back for additional licensing information*

Table of Contents

Legal Notice.....	2
Introduction to Zixi Receiver.....	5
Zixi Platform - Architecture.....	5
Receiver Latency Considerations.....	6
Receiver Multicast Options.....	7
Zixi Receiver Supported Protocols.....	7
Zixi Transport Stream Technology.....	7
Logging in to Receiver.....	9
Activating Your Zixi Receiver License.....	10
Activating the Zixi Receiver - Online Activation.....	10
Loading Receiver License File - Offline Activation.....	10
Reloading the Receiver License.....	11
Viewing Current Receiver License Information.....	11
Viewing Status in Receiver.....	12
Adding Input Streams to Receiver.....	14
Adding Pull Streams to Receiver.....	14
Input Stream Parameters Table.....	15
Adding UDP Streams to Receiver.....	16
Input Stream Parameters Table.....	17
Adding File Streams to Receiver.....	17
Input Stream Parameters Table.....	18
Adding Failover Streams to Receiver.....	18
Input Stream Parameters Table.....	20
Adding HTTP Streams to Receiver.....	20
Input Stream Parameters Table.....	21
Searching for Input Streams in Receiver.....	21
Viewing Existing Input Streams in Receiver.....	22
Viewing Stream Statistics in Receiver.....	23
Receiver Actions on Input Streams.....	25
Stopping/Starting Incoming Streams in Receiver.....	25
Editing Input Settings in Receiver.....	25

Legal Notice

Zixi Platform - Architecture

Deleting Input Streams from Receiver.....	25
Duplicating an Input Stream in Receiver	25
Creating Outputs in Receiver	27
Managing Sources for High Availability	27
Creating UDP Outputs in Receiver	27
Receiver Outputs Parameters Table	28
Creating File Outputs in Receiver	29
Receiver Outputs Parameters Table	30
Creating ASI Outputs in Receiver	31
Receiver Outputs Parameters Table	31
Viewing Existing Outputs in Receiver	32
Searching for Outputs in Receiver	33
Receiver Actions on Outputs	34
Stopping/Starting an Output in Receiver.....	34
Editing an Output in Receiver	34
Deleting Outputs from Receiver	34
Duplicating an Output in Receiver	34
Adding Output Sources.....	35
Receiver Settings.....	36
General Receiver Settings	36
Network Settings.....	36
ZEN Master in Receiver.....	38
SSH Tunnel in Receiver.....	39
Adding Reverse Tunnels to Receiver	40
Logging in Receiver	41
Viewing Events Log in Receiver.....	42
Searching for Log Events.....	42
Clearing the Log	42
Refreshing the Screen.....	42
Saving the Log as a File	42

Introduction to Zixi Receiver

Zixi Receiver is a lightweight software tool that runs on standard PC hardware or can be embedded into a wide variety of professional decoders and mobile devices as part of the growing Zixi EcoSystem. When combined with Zixi Feeder and Zixi Broadcaster, Zixi Receiver delivers the quality and reliability that enables professional broadcasters, sports networks, and service providers to adopt IP networks for primary contribution, ENG backhaul, satellite backup, disaster recovery, OTT and broadcast distribution.

Zixi Receiver offers the following features:

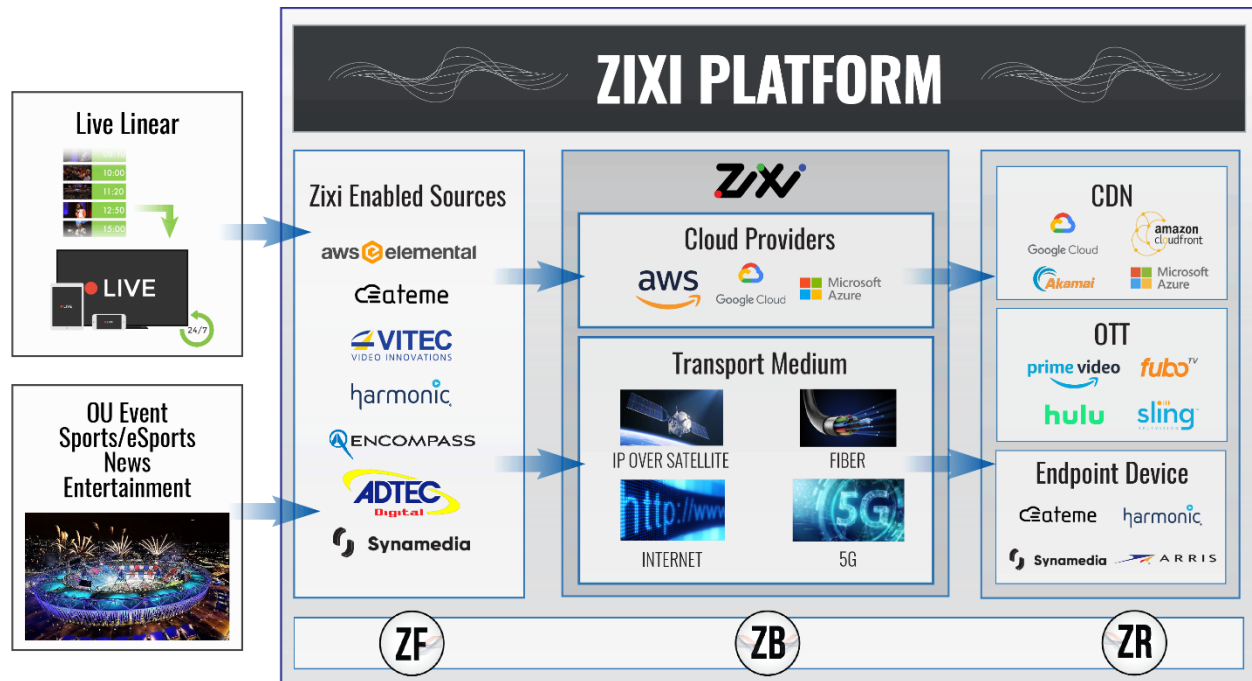
- **Robust content delivery over IP** - Accepts input from Zixi Broadcaster via standard IP networks (including the public Internet).
- **Professional quality outputs** - Outputs professional-quality video to a broad range of Integrated Receiver- Decoders (IRDs), and to file system.
- **Supports standard PCs** - Zixi Receiver software runs on standard PC hardware (Zixi Appliance) lowering costs and facilitating simple integration into the network.
- **Embedded options** - Zixi Receiver software can also be embedded into decoders, set-top boxes, PCs, mobile devices, smart TVs, web, and apps.

Zixi Platform - Architecture

The Zixi platform architecture shows how a live linear broadcast or event is ingested through a Zixi Feeder (ZF) or Zixi embedded device running Zixi Feeder at acquisition. Zixi Feeder encapsulates the stream in the Zixi transport protocol and delivers point to point or point to multi-point over standard IP connections to Zixi Broadcaster (ZB). Zixi Broadcaster can be deployed on premise or in the cloud with the ability to monitor streams anywhere along the path. For management, processing and larger scale distribution capabilities, Zixi can support complex production workflows for live events, including transcoding, recording, and more, all in a clustered environment that supports reliability and scalability. The stream is distributed through a CDN, OTT, or endpoint device, running Zixi Receiver (ZR) to any device.

Introduction to Zixi Receiver

Receiver Latency Considerations



Receiver Latency Considerations

Latency defines the delay in which the video stream will be delivered to the end point. This delay is essentially a buffer that is used for additional processing, thereby improving the quality of video stream. The latency should be considered based on the importance of immediacy. For example, if the video requires interaction (e.g. between a reporter in the field and an anchor in the studio), the latency should be set to a minimum so that the interaction does not suffer from any delay.

Latency can vary from tens of milliseconds to several seconds.

Zixi protocol can be beneficial in as little as one frame (30ms), while increasing the latency will provide more robustness for the error-recovery.

In low latency (below 1500ms) the error recovery is based on a hybrid approach of FEC and ARQ. FEC will add overhead of up to 30%(adaptive–without congesting the network).

For getting sufficient error-recovery we recommend setting the latency at least 3 times greater than the RTT (i.e Latency $\geq 3 * RTT$).

Latency can be set to any value, we recommend two common modes:

1. Interactive mode – 500ms
2. Non-interactive mode – 4000ms

Latency below 1500ms will add an FEC overhead of up to 30%.

Receiver Multicast Options

Multicast streams can be received or sent by the Zixi Receiver. Zixi Receiver serves as a gateway between Unicast and Multicast streams, while allowing reliable streaming over multicast.

Zixi Receiver Supported Protocols

Input:

- Zixi protected transport
- MPEG-TS over UDP and/or RTP with SMPTE-2022
- Transport stream files from local file system

Output:

- UDP
- Output to compatible ASI cards
- MPEG transport stream output to local file system
- File output segmented by user-selected time interval
- Re-multiplex output streams to strict CBR for extensive compatibility with Integrated Receiver- decoders (IRDs)

Zixi Transport Stream Technology

Zixi's transport stream protocol is a content and network-aware protocol that dynamically adjusts to varying network conditions and employs error correction techniques for error-free video streaming over IP. With minimum overhead to physical bandwidth, this dynamic mechanism provides low end-to-end latency, removes jitter, recovers and re-orders packets, smooths video delivery and regenerates video to its original form, *all in real-time*.

Zixi delivers outstanding performance (at low predictable latency), superior reliability (no packet loss) and broadcast-grade video quality (SD, HD, and UHD) with no tradeoffs to delay, resolution or stutter.

Streaming from one Zixi-enabled device/server to another Zixi-enabled device/server protects the stream from quality degradations along the path. It enables the streaming of high-quality video over any distance, while overcoming the varying network conditions of the public Internet, where the amount of network errors, packet loss, jitter and out-of-order packets fluctuate "every second".

The Zixi transport stream protocol can also be deployed on parts of the path. For example, from a Zixi Feeder to a Zixi Broadcaster (Zixi protected path) and on to the end user through UDP or RTMP. In this case, the path that has challenging conditions (e.g. long distance or unstable wireless conditions) will be protected by Zixi and then delivered on to the end-user on a standard UDP or RTMP protocol.

Introduction to Zixi Receiver

Zixi Transport Stream Technology

Zixi's transport stream technology includes the following features for ultimate quality and security:

- Network sensing
- Dynamic de-jitter
- MPEG specific optimizations
- Z-ARQ error recovery
- Z-FEC - Dynamic content aware forward error correction
- Active multi-path error recovery
- Adaptive bitrate over UDP, unicast or multicast
- Rate control and congestion avoidance
- 256-bit AES transport encryption

Logging in to Receiver

➔ To Log in to Zixi Receiver:

1. In your web browser, navigate to: <http://localhost:4300>.
A user authentication window opens.
2. In the **User Name** field, type 'admin' and in the **Password** field, type '1234'.
3. Click **OK**.

Activating Your Zixi Receiver License

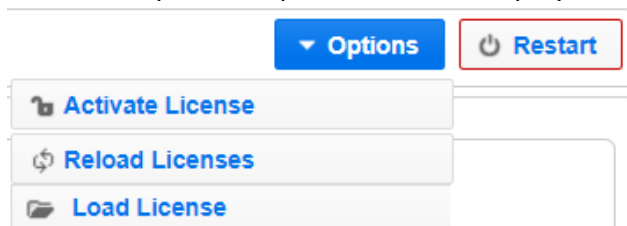
In order to start using Zixi Receiver, you must first activate your license. Zixi Receiver and its optional features are activated by license files. Before you first use Zixi Receiver and when you wish to add optional features, you will need to activate the appropriate license.

Activating the Zixi Receiver - Online Activation

When logging in for the first time to a Zixi Receiver, you must activate the Zixi license.

➔ To Activate the License using a License Key:

1. In the **Status** page of the Zixi Receiver, click **Options** in the menu bar. The drop-down options menu is displayed.



2. Click **Activate License**. The **Activate License** window appears.



3. Enter your **Activation Key** and click **Activate**. Once entered, the Zixi Receiver, has been licensed.

Loading Receiver License File - Offline Activation

If you want to activate your license without an internet connection, you can upload a license file. To obtain a license file, please contact Zixi support.

➔ To Load the License File:

1. In the **Status** page of the Zixi Receiver, click **Options** in the menu bar. The drop-down options menu is displayed.
2. Click **Load License**. The directory of the local drive opens.
3. Select the license file and click **Open**.

Activating Your Zixi Receiver License

Reloading the Receiver License

4. A prompt window instructs you to **Reload** the license to activate the license. See [Reloading the Receiver License](#).

Reloading the Receiver License

In the event that your license expires, you must re-enter a new Zixi license file.

➔ To Reload the Receiver License:

1. In the **Status** page of the Zixi Receiver, click **Options** in the menu bar.
The drop-down options menu is displayed.
2. Click **Reload**.
The license has been reloaded.

Viewing Current Receiver License Information

You can view the current license information on the **Status** page in the **License Info** section. See [VIEWING STATUS IN RECEIVER](#).

Viewing Status in Receiver

Viewing Current Receiver License Information

Viewing Status in Receiver

The Status screen shows statistics of all the input and output streams as well as license info.

➔ To View the Status of the Streams:

In the Zixi Receiver **Status** page, the **Receiver Status** and **License Information** are displayed.

Receiver Status		
Receiver ID: ip-172-31-3-171.us-east-2.compute.internal	In Bitrate [kbps]: 0	License Info
Host ID: 02508ff3b066	Out Bitrate [kbps]: 0	
Start Time: 2019-Aug-29 10:00:35		Product: Receiver
Uptime: 1658:48:28		Activation Key: Activation Key
In Streams: 2	Kbytes Sent: 0	Expiration: 29-Aug-2020
Out Streams: 0	Kbytes Received: 736658723	

The Information shown on the Status page is described in the following table:

Field	Description
Receiver Status	
Receiver ID	The Zixi Receiver ID. Default is the name of host machine.
Host ID	Displays the ID of Zixi Receiver host. (of host machine)
Start Time	Displays the time and date of the Zixi Receiver last initialization.
Uptime	The duration of time that the Zixi Receiver is running.
In Streams	The number of currently active inputs.
Out Streams	The number of currently active outputs.
In Bitrate	The aggregated bitrate of all active input streams.
Out Bitrate	The aggregated bitrate of all active output streams.
Kbytes Sent	The cumulative traffic transmitted (in Kbps).
Kbytes Received	The cumulative traffic received (in Kbps).
License Info	
Product	The product name.
Activation Key	Click on the Activation Key button to show the Activation Key as well as additional license details.

Viewing Status in Receiver

Viewing Current Receiver License Information

Expiration	The expiration date of the license.
-------------------	-------------------------------------

Adding Input Streams to Receiver

Input streams to the Zixi Receiver can be added using one of the following sources:

- **Pull stream** – The source is a Zixi Broadcaster. In this case the stream will be protected by the Zixi protocol.
- **UDP streams** - the source is a UDP or RTP stream, over unicast or multicast.
- **File** - the source is an MPEG-TS file that is located on the machine.
- **Failover** – creates a hitless failover group that uses two or more binary-identical streams to ensure an uninterrupted stream.
- **HTTP pull** - the source is a Transport Stream over HTTP, which is pulled by the Zixi Receiver.

Adding Pull Streams to Receiver

This enables pulling a Zixi transport stream from a Zixi Broadcaster. The output stream is configured automatically in the Zixi Broadcaster.



Stream names are case sensitive and must be identical.

➔ To Add a Pull Stream:

1. In the Zixi Receiver **Inputs** page, click the **+ New Input** button in the Menu bar.

Adding Input Streams to Receiver

Adding Pull Streams to Receiver

The **Stream details** screen is displayed.

Stream details

Input Name:

Pull UDP File Failover HTTP

Stream parameters

Host: +

Port:

Stream:

Password:

Latency [ms]:

Local interface: ▼

Min. bitrate [kbps]:

Ignore TLS certificate:

Decryption type: ▼

Decryption key:

Ok Cancel

2. Ensure that **Pull** is selected for the Input stream (default).
3. Enter the unique **Input Name** (an internal name) for the Receiver.



This must be identical (case sensitive) to the stream name configured in the Zixi Broadcaster.

4. Enter the **Stream Parameters** (see Input Stream Parameters Table below).
5. Click **OK**.

The “Input added” message appears on the top of the screen. The Pull Stream is added to the Zixi Receiver and is now displayed in the list of Input streams available.

Input Stream Parameters Table

Parameter	Description
Input Name	Specify the unique Input Name (an internal name) for the Receiver.

Adding Input Streams to Receiver

Adding UDP Streams to Receiver

Host	Specify the source hostname or IP address of the stream. Optional - If you would like to add an Alternative host (as a backup), click '+' next to the Host field.
+ Alt. Host	In the Alt. Host field specify a backup URL (similar to the primary URL). In case the primary host is faulty, Zixi Receiver will switch and pull the stream from the alternative host.
Port	Specify the connection port of the host. Default: 2077.
Stream	Specify the input stream name as it is defined in the Zixi Broadcaster (source).
Password (optional)	If desired, enter the string for authentication. It must be identical to the string configured on the source Zixi Broadcaster.
Latency [ms]	Latency creates a buffer for improved performance. Higher latency may be required when the network experiences high packet loss percentage and high jitter. This setting affects memory usage as higher levels of protection require more buffering. Default: 8000.
Local Interface	Specify the local IP address that will be used for the connection with the Zixi Broadcaster. Or select <i>Any</i> to enable connecting through any available IP address.
Min. Bitrate [kbps]	Specify the minimum bitrate for the connected input stream.
Ignore TLS certificate	Select this option when connecting to a trusted server that does not have a valid certificate. When this option is selected, Zixi Receiver will ignore the TLS certificate errors.
Decryption type	Specify the type of encryption used in the stream
Decryption key	Enter the decryption key to decrypt the received encoded stream.

Adding UDP Streams to Receiver

By adding a UDP input stream, the Receiver can receive UDP/RTP/RTP + SMPTE 2022 FEC streams.

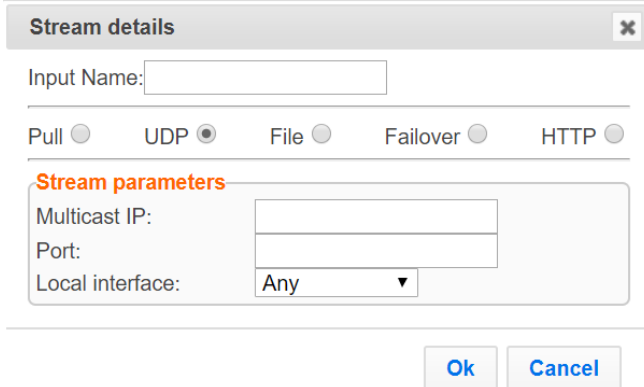
➔ To Add a UDP Stream:

1. In the Zixi Receiver **Inputs** page, click the **+ New Input** button in the Menu bar.

Adding Input Streams to Receiver

Adding File Streams to Receiver

The **Stream details** screen is displayed.



2. Select **UDP** for the Input stream.
3. Enter the unique **Input Name** (an internal name) for the Receiver.
4. Enter the **Stream Parameters** (see Input Stream Parameters Table below).
5. Click **OK**.

The “Input added” message appears on the top of the screen. The UDP Stream is added to the Zixi Receiver and now appears in the list of Input streams available.

Input Stream Parameters Table

Parameter	Description
Input Name	Specify the internal name for the input stream.
Multicast IP	Specify the multicast address when the input stream is transmitted over multicast. Leave blank if Unicast.
Port	Specify the port to listen on. This port must be open on all firewalls between the Zixi Receiver and other devices it is communicating with.
Local Interface	Specify the local IP address. Or select Any to enable connecting through any available IP address.

Adding File Streams to Receiver

The File Stream input creates a .ts file input for the Receiver from a local or mounted disk. The Zixi Receiver will access the file located in the specified path.

➔ To Add a File Stream:

1. In the Zixi Receiver **Inputs** page, click the **+ New Input** button in the Menu bar.

Adding Input Streams to Receiver

Adding Failover Streams to Receiver

The **Stream details** screen is displayed.

The screenshot shows a dialog box titled "Stream details". It has a close button (X) in the top right corner. Below the title bar, there is a text input field labeled "Input Name:". Below that is a row of radio buttons for "Pull", "UDP", "File", "Failover", and "HTTP". The "File" radio button is selected. Below the radio buttons is a section titled "Stream parameters" in orange text. This section contains a text input field labeled "Path:" followed by a browse button (three dots). At the bottom of the dialog are two buttons: "Ok" and "Cancel".

2. Select **File** for the **Input Source**.
3. Enter the unique **Input Name** (an internal name) for the Receiver.
4. Specify the **Path** on the local machine where the file is located.
5. Click **OK**. The "Input added" message appears on the top of the screen.
The File Input from the Zixi Receiver now appears in the list of streams available in the Zixi Receiver inputs screen.

Input Stream Parameters Table

Parameter	Description
Input Name	Specify the unique identifier for this stream.
<i>Stream Parameters</i>	
Path	Specify the location of the file

Adding Failover Streams to Receiver

This enables the Feeder to use two or more binary-identical streams for hitless failover.

➡ To Add a Failover Stream:

1. In the Zixi Receiver **Inputs** page, click the **+ New Input** button in the Menu bar.

Adding Input Streams to Receiver

Adding Failover Streams to Receiver

The **Stream details** screen is displayed.

Stream details

Input Name:

Pull UDP File Failover HTTP

Stream parameters

Search windows [ms]:

Max bitrate[kbps]:

Source Backup +

Ok Cancel

2. Select **Failover** for the Input stream type.
3. Enter the unique **Input Name** (an internal name) for the Receiver.
4. Enter the **Stream Parameters** (see Input Stream Parameters Table below).
5. Click the button to add streams as sources in the hitless failover group.

The **Source** field is shown with a dropdown list of available Sources.

Stream details

Input Name:

Pull UDP File Failover HTTP

Stream parameters

Search windows [ms]:

Max bitrate[kbps]:

Source Backup +

Ok Cancel

6. Select a Source from the list of Sources.
7. Repeat steps 5 and 6 for each Source that you would like to add to this group (min. 2 Sources).
8. You can configure one or more of the streams as *Backup*, by selecting the **Backup** checkbox next to the relevant stream. (Backup streams are used only when all the *Primary* streams are down.)
9. Click **OK**.

The “Input added” message appears on the top of the screen. The Failover Stream is added to the Zixi Receiver and now appears in the list of Input streams available.

Adding Input Streams to Receiver

Adding HTTP Streams to Receiver

Input Stream Parameters Table

Parameter	Description
Input Name	Specify the unique Input Name (an internal name) for the Receiver.
Search window [ms]	Specify the time frame in which the system searches for the relevant packets in a matching stream. If there is a latency difference between the streams in the group, the Search Window value should be higher than the latency difference between the streams.
Max bitrate [kbps]	Specify the maximum bitrate of the stream. Default: 8000. This is used for internal memory allocation and will not affect the transmitted bitrate. Recommended: double the bitrate of the highest bitrate stream.
Source	Specify each Source that you would like to add to this Failover group.
Backup (checkbox)	Select the Source/s that you would like to designate as a backup. Backup streams are used only when all the Primary streams are down.

Adding HTTP Streams to Receiver

This enables the Receiver to receive an HTTP Pull stream.

➔ To Add an HTTP Stream:

1. In the Zixi Receiver **Inputs** page, click the **+ New Input** button in the Menu bar. The **Stream details** screen is displayed.

Stream details

Input Name:

Pull UDP File Failover HTTP

Stream parameters

URL:

Smoothing(ms):

Ok Cancel

2. Select **HTTP** for the Input stream type.
3. Enter the unique **Input Name** (an internal name) for the Receiver.
4. Enter the **Stream Parameters** (see Input Stream Parameters Table below).

Adding Input Streams to Receiver

Searching for Input Streams in Receiver

5. Click **OK**.


The “Input added” message appears on the top of the screen. The HTTP Stream is added to the Zixi Receiver and now appears in the list of Input streams available.

Input Stream Parameters Table

Parameter	Description
Input Name	Specify the unique Input Name (an internal name) for the Receiver.
URL	Specify the URL of the Transport Stream.
Smoothing latency [ms]	The Smoothing feature uses a buffer to time packets according to the stream's clock. This is useful when there are bursts in the rate in which the stream arrives. The smoothing features creates a queue in the buffer, allowing smoother entry into the Receiver. The Smoothing parameter defines the size of the buffer in Milliseconds. A larger buffer will enable smoother entry, however may influence the latency rate.

Searching for Input Streams in Receiver

➔ To Search for an Input Stream:

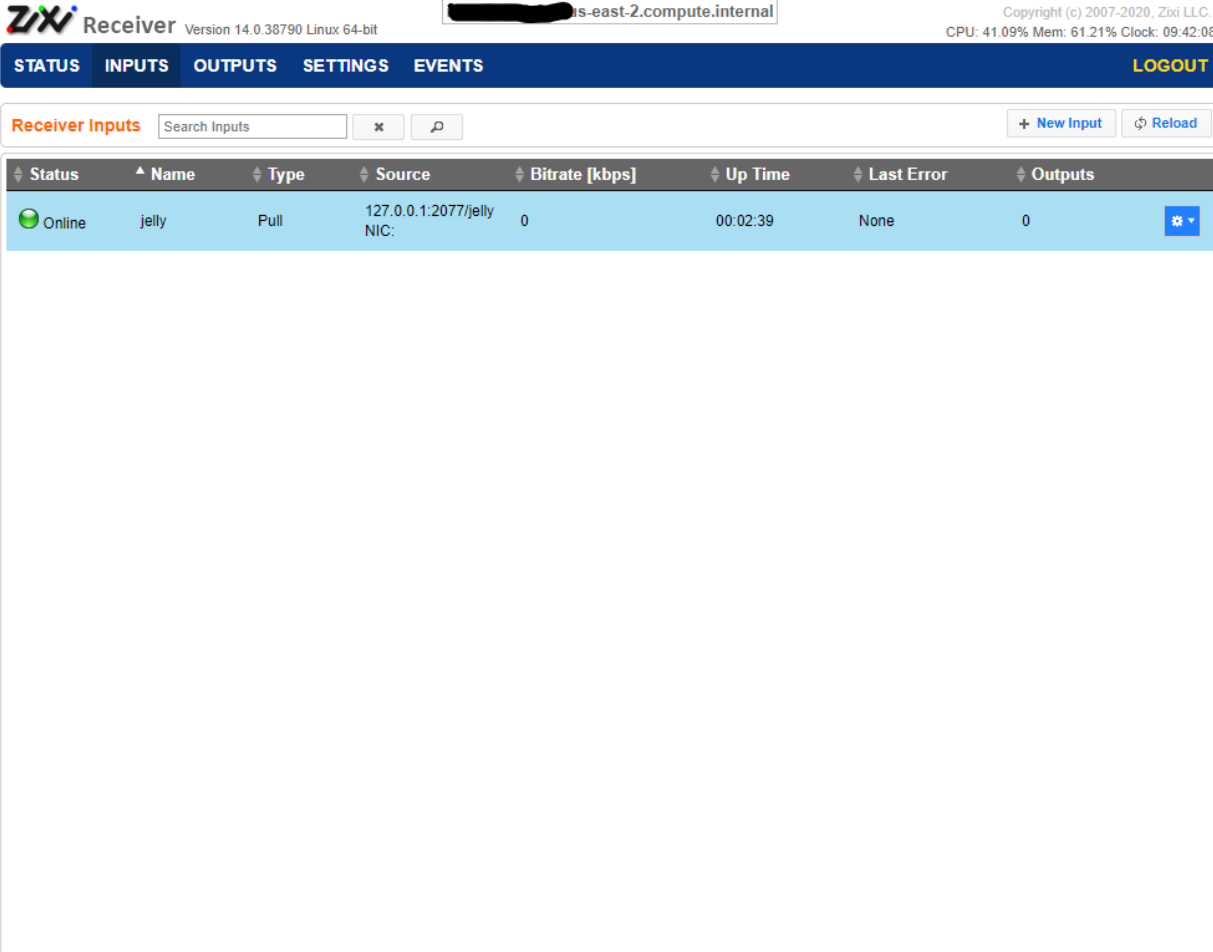
1. In the Zixi Receiver **Inputs** page, enter the specific input stream name in the search text box, and click . The **Input** screen displays the input stream(s) that match the search query.

Adding Input Streams to Receiver

Viewing Existing Input Streams in Receiver

Viewing Existing Input Streams in Receiver

The **Inputs** screen displays all the input streams that have been created. At the bottom of the screen you can also view accumulative utilization statistics for any connected streams selected. Hovering the cursor on the status indicator of a stream shows the stream configuration information and basic utilization statistics, where applicable.



Receiver Inputs

Status	Name	Type	Source	Bitrate [kbps]	Up Time	Last Error	Outputs
Online	jelly	Pull	127.0.0.1:2077/jelly NIC:	0	00:02:39	None	0

Status

Data Bitrate [kbps]: 0	Total Packets: 67357	FEC Packets: 86
Network bitrate[kbps]: 5065	Packet Rate: 570	FEC Recovered: 0
Up time: 00:02:39	Network Dropped: 5063	ARQ Resent: 27923
RTT[ms] / Jitter[ms]: 5 / 2	Recovered Packets: 5063	ARQ Recovered: 5063
Latency[ms]: 8000	Not Recovered Packets: 0	ARQ Duplicates: 0

Any of the columns in the following table can be sorted in ascending/descending order by clicking on its heading. The Search text box in the upper left-hand side of the screen can be used to search for a specific input stream by entering the desired Stream ID.

Adding Input Streams to Receiver

Viewing Stream Statistics in Receiver

Field	Description
Status	Displays the status of the input stream. The following colored indicators are displayed: <ul style="list-style-type: none">• Green = Connected• Yellow = Connecting• Red = Disconnected with an error condition• Blue = Offline with no connection attempts• Grey = Offline and stopped
Name	Displays the unique ID of the stream, as defined in the Zixi Receiver.
Type	The type of input (Pull/UDP/File).
Source	Displays the source host and port number.
Bitrate [kbps]	Displays bitrate of the connected input stream.
Up Time	The amount of time that the stream is live.
Last Error	Displays the last error that has been generated for the stream.
Outputs	The number of outputs associated to this stream.

Viewing Stream Statistics in Receiver

You can view all the cumulative statistics for a connected input stream in real-time.

➔ To View Stream Statistics:

- In the Zixi Receiver **Inputs** page, click the desired incoming stream for which you want to view statistics.
The stream's statistics are displayed at the bottom of the screen.

Field	Description
Data Bitrate (kbps)	Displays the current bitrate of the input stream.
Network Bitrate (kbps)	
Up time	Displays the amount of time the stream has been active.
RTT (ms)/Jitter (ms)	Displays the Round Trip Time (RTT) from the source (in milliseconds). Displays the current Jitter, measured in milliseconds.
Latency (ms)	Displays the stream latency configured on the Receiver.
Total Packets	Displays the total number of packets that have been transmitted.

Adding Input Streams to Receiver

Viewing Stream Statistics in Receiver


Packet Rate	Displays the current number of packets per second.
Network Dropped %	Displays current percentage of the packets that were dropped en route from the source.
Recovered Packets	Displays the number of dropped packets that have been recovered since the beginning of the stream.
Not Recovered Packets	Displays the number of non-recovered packets.
FEC Packets	Displays the number of FEC packets transmitted.
FEC Recovered	Displays the number of FEC packets recovered.
ARQ Resent	Displays the number of requests for retransmission of dropped packets made with ARQ.
ARQ Recovered	Displays the number of dropped packets recovered via ARQ.
ARQ Duplicates	Displays the number of duplicate recovery packets received via ARQ.

Receiver Actions on Input Streams

Every stream has a shortcut button that can be used to perform relevant actions on the stream. The following actions can be performed through the Actions button:

Stopping/Starting Incoming Streams in Receiver


➔ To Stop/Start Input Streams:

1. In the Zixi Receiver **Inputs** page, click the Actions  button for the incoming stream that you want to start or stop.
2. In the dropdown menu, click **Start/Stop** (depending on the activity of the stream). The Input stream in that row is either started or stopped.
To continue the stream, click again.

Editing Input Settings in Receiver


You can edit an input stream which has been previously configured.

➔ To Edit Input Settings:

1. In the Zixi Receiver **Inputs** page, click the **Actions**  button for the incoming stream that you want to edit.
2. In the dropdown menu, click **Edit**.
The stream details window of the input selected is displayed.
3. Make the necessary modifications and click **OK**.
The newly modified input takes effect.

Deleting Input Streams from Receiver

➔ To Delete Input Streams from Receiver:

1. In the Zixi Receiver **Inputs** page, click the **Actions**  button for the incoming stream that you want to delete.
2. In the dropdown menu, click **Delete**.
The input stream in that row is deleted.


Duplicating an Input Stream in Receiver

In the event that there are similar channels coming from the same source, you can duplicate the configuration and make minor modifications.

Receiver Actions on Input Streams

Duplicating an Input Stream in Receiver

➔ To Duplicate the Configuration of an Input Stream:

1. In the Zixi Receiver **Inputs** page, click the **Actions**  button for the incoming stream that you want to duplicate.
2. In the dropdown menu, click **Duplicate**.
The Stream details windows opens with similar parameters to the original stream.
3. Type the new **Input Name** and make any additional modifications that you want.
4. Click **OK**.
The duplicate input stream with its new settings is created.

Creating Outputs in Receiver

Zixi Receiver supports the following output types:

- **UDP Output** – Outputs the stream in UDP or RTP format over unicast or multicast.
- **File Output** – Zixi Receiver will record the stream as a file.
- **ASI** – This option can be used when the Zixi Receiver has an ASI card installed in order to transmit the IP-MPEG-TS stream.

Managing Sources for High Availability

To ensure high-availability of input sources, the outputs in Zixi Receiver can be configured to include one or more "Primary Sources" and, in addition, one or more "Fallback Sources".

The behavior of the primary versus the fallback sources is explained below:

- An output must include at least one primary source.
- If the main primary source fails, Zixi Receiver will switch to another primary source (if one exists) or to a fallback source (if a primary source does not exist).
- If all primary sources fail, Zixi Receiver will switch to a fallback source.
- When the main (original) primary source resumes, the following occurs:
 - If the stream was switched to another primary source, the stream will **NOT** switch back to the original primary source. For this reason, when configuring a "backup" primary source, it is recommended to make sure that it streams the same content (as it will not revert back to the original primary source).
 - If the stream was switched to a fallback source, the stream will automatically switch back to the main (original) primary source or to another primary source that becomes available.

Creating UDP Outputs in Receiver

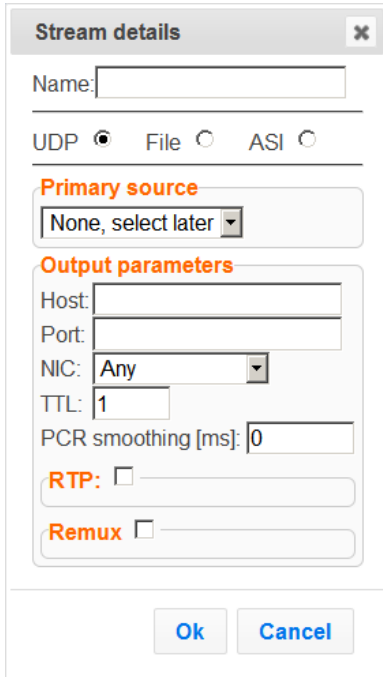
➔ To Create UDP Outputs:

1. In the Zixi Receiver **Outputs** page, click the **+ New Output** button.

Creating Outputs in Receiver

Creating UDP Outputs in Receiver

2. Select **UDP** as the output type (default).
The **Stream details** window is displayed.



3. Enter the unique identifier for this output in the **Name** field.
4. In the **Primary source** dropdown list, select the desired input stream (to learn more about sources see [Managing Sources for High Availability](#)).



The first time an output stream is being configured a Primary source must be selected, on subsequent times a Fallback source can be chosen.

5. Specify the **Output parameters** (see Receiver Outputs Parameters Table).
6. In the **Host** field, specify the IP address of the stream destination.



In the case of multicast specify an address that will identify it as such.

7. In the **Port** field, specify the port of the destination.
8. In the **NIC** field, select the network card from which the stream will be transmitted.
9. Click **OK**.

The new UDP Output with its settings is created and now appears on the Outputs screen.

Receiver Outputs Parameters Table

Parameter	Description
Output Parameters	

Creating Outputs in Receiver

Creating File Outputs in Receiver

Name	Specify the unique name of the stream.
Primary source	Multiple sources are designated for redundancy and can be used by default according to a certain hierarchy. The drop-down list consists of all those previously configured inputs on the Receiver. Select the desired input stream that will be the primary source. To add an additional (fallback) source, see Adding Output Sources .
Host	Specify the IP address of the stream destination.
Port	Specify the ports to listen to for the output streams.
NIC	Specify the Network card used on the Receiver.
TTL	Specify the time-to-live (TTL). Used to limit the range (or “scope”) of a multicast transmission.
PCR Smoothing [ms]	Specify the PCR smoothing latency. This enables transmission of the output at the correct rate. This is required when the receiving device is sensitive and can’t lock on to the stream (in such a case, the recommended latency is 100 - 1000 ms).
RTP	Click the checkbox to enable the Real-time Transport Protocol.
SMPTE 2022 FEC	Specify the FEC (Forward Error Correction) mode. Options are: Disable (default), 1D and 2D. Disables the FEC or specifies the type of FEC matrix to D1/ D2.
Remux	Click the checkbox to enable remuxing to CBR (used for professional IRDs) thus avoiding bandwidth waste.
Bitrate [kbps]	Specify the CBR bitrate to target for a remuxed stream.

Creating File Outputs in Receiver

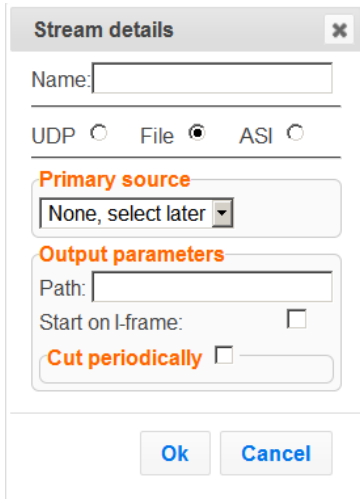
➔ To Create File Outputs:

1. In the Zixi Receiver **Outputs** page, click the **+ New Output** button.

Creating Outputs in Receiver

Creating File Outputs in Receiver

2. Select **File** as the output type.
The **Stream details** window is displayed.



3. Enter the unique identifier for this output in the **Name** field.
4. In the **Primary source** drop-down list, select the desired input stream (to learn more about sources see [Managing Sources for High Availability](#)).



The first time an output is being configured a Primary source must be selected, on subsequent times a Fallback source can be chosen.

5. Enter the **Path** in which the ts file will be saved.
6. Select **Start on I-frame** if you want the first frame of the cut to be an I-frame.
7. Select **Cut Periodically** to avoid creating an exceptionally large file and then specify the time duration of each file of that one stream.
8. Click **OK**. The new File Output with its settings is created and now appears on the Outputs page.

Receiver Outputs Parameters Table

Parameter	Description
Name	Specify the unique name of the stream.
Primary source	Multiple sources are designated for redundancy and can be used by default according to a certain hierarchy. The drop-down list consists of all those previously configured inputs on the Receiver. Select the desired input stream that will be the primary source. To add an additional (fallback) source, see Adding Output Sources .
Path	Specify the location in which the file will be saved.
Start on I-frame	Click this checkbox to start the first frame as an I-frame after the cut.

Creating Outputs in Receiver

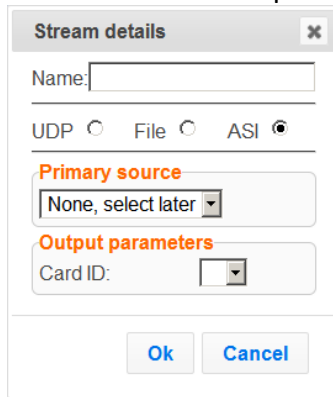
Creating ASI Outputs in Receiver

Cut Periodically	Click this checkbox to cut the stream into smaller segments in order to avoid creating an exceptionally large file.
Period [minutes]	Specify the time duration of each stream segment. Default: 60 minutes.

Creating ASI Outputs in Receiver

➔ To Create ASI Outputs:

1. In the Zixi Receiver **Outputs** page, click **+ New Output** button.
2. Select **ASI** as the output type. The **Stream details** window is displayed.



3. Enter the unique **Name** for the output.
4. In the **Primary source** drop-down list, select the desired input stream to learn more about sources see [Managing Sources for High Availability](#)).



The first time a Primary source must be selected, on subsequent times Fallback source can be chosen.

5. Select the **Card ID** to stream to among those installed on the Receiver.
6. Click **OK**.

The new File Output with its settings is created and now appears on the screen.

Receiver Outputs Parameters Table

Parameter	Description
Name	Specify the unique name of the stream.
Primary Source	Multiple sources are designated for redundancy and can be used by default according to a certain hierarchy. The drop-down list consists of all those previously configured inputs on the Receiver. Select the desired input stream that will be the primary source. To add an additional (fallback) source, see Adding Output Sources .

Creating Outputs in Receiver

Viewing Existing Outputs in Receiver

Card ID Specify the Card ID on the Receiver.

Viewing Existing Outputs in Receiver

The **Outputs** screen displays all the outputs that have been created. If you have configured multiple sources for the same output stream, the sources are displayed in the **Primary sources**, and **Fallback Sources** panes below. To learn more about sources, see [Managing Sources for High Availability](#).

Name	Status	Type	Destination	Bitrate [kbps]	Up Time	Active Source
www	Online	net	10.7.0.150:5555	965	01:05:34	pull: 10.7.0.63:2077/test N...

Source	Status	Last Error	Bitrate [kbps]
pull: 10.7.0.63:2077/test NIC:	Online	None	965

Source	Status	Last Error	Bitrate [kbps]
pull: 10.7.0.63:2077/test2 NIC:	Online	None	965

Any of the columns on the **Outputs** page can be sorted in ascending/descending order by clicking on the heading. The **Search** text box in the menu bar can be used to search for a specific input stream by entering the desired Stream ID.

The parameters shown on the Outputs page are described in the following table.

Parameter	Description
Name	The name of the stream.


Creating Outputs in Receiver

Searching for Outputs in Receiver

Status	Displays the status of output stream. The following colored indicators are displayed: Green = Connected Yellow = Connecting Red = Disconnected with an error condition Blue = Offline with no connection attempts Grey = Offline and stopped
Type	The type of output as defined in the Outputs screen (UDP, File, ASI).
Destination	The IP address and port of the output destination.
Bitrate [kbps]	Displays the bitrate of the connected output stream.
Up Time	The amount of time that the stream is live.
Active Source	The name of the input stream (source) currently associated with the output. For more information about sources, see Managing Sources for High Availability
Actions	Provides access to various actions to be performed on this output stream (see Receiver Actions on Outputs).

Searching for Outputs in Receiver

➔ To Search for an Output Stream:


- In the Zixi Receiver **Outputs** page, enter the specific output name in the search text box in the menu bar and click the **Search**  button. The **Output** screen displays the requested output stream(s).

Receiver Actions on Outputs

Using the Outputs screen as a centralized control of outputs of the Receiver, implement the following actions:


Stopping/Starting an Output in Receiver

➔ To Stop/Start Outputs:

1. In the Zixi Receiver **Outputs** page, click the menu  button for the output stream that you want to start or stop.
2. In the dropdown menu, click **Start/Stop** (depending on the activity of the stream). The output stream in that row is either started or stopped.
To resume the output, click again.


Editing an Output in Receiver

➔ To Edit an Output:

1. In the Zixi Receiver **Outputs** page, click the menu  button for the output that you want to edit.
2. In the dropdown menu, click **Edit**.
The stream details window for that stream is displayed.
3. Make the necessary modifications and click **OK**.
The newly modified output takes effect.


Deleting Outputs from Receiver

➔ To Delete an Output from the Receiver:

1. In the Zixi Receiver **Outputs** page, click the menu  button output that you want to delete.
2. In the dropdown menu, click **Delete**.
The output in that row is deleted.

Duplicating an Output in Receiver

➔ To Duplicate an Output:

1. In the Zixi Receiver **Outputs** page, click the desired output that you want to duplicate.
2. Click the menu  button on the selected row and then choose **Duplicate**.
The stream details window of the selected output is displayed.

Receiver Actions on Outputs


Adding Output Sources

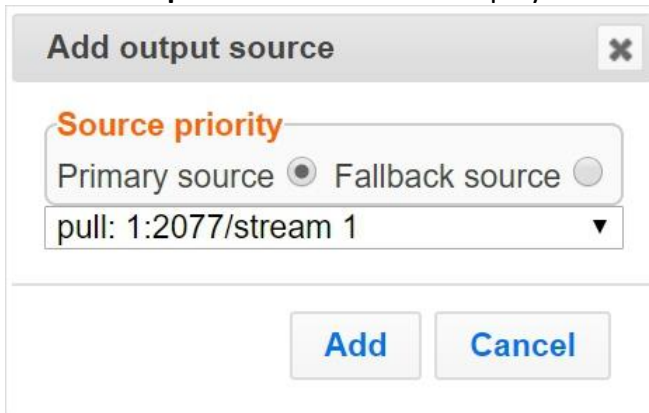
3. Make the necessary modifications and click **OK**.
The newly modified output takes effect.

Adding Output Sources

Through the Actions button you can add primary and/or fallback sources. To learn more about sources, see [Managing Sources for High Availability](#).

➔ To Add an Output Source:

1. In the Zixi Receiver **Outputs** page, click the menu  button for the output to which you want to add a source.
2. In the dropdown menu, click **Add Source**.
The **Add output source** window is displayed.



The screenshot shows a dialog box titled "Add output source" with a close button (X) in the top right corner. Below the title bar, there is a section labeled "Source priority" with two radio buttons: "Primary source" (which is selected) and "Fallback source". Below the radio buttons is a dropdown menu showing the text "pull: 1:2077/stream 1". At the bottom of the dialog, there are two buttons: "Add" and "Cancel".

3. Select the source priority as being a **Primary source** or a **Fallback source**.
4. Select a source from the dropdown list of available sources.
5. Click **Add**.
The source is added and is displayed on the Outputs page.

Receiver Settings

Zixi Receiver is pre-configured with default settings, so generally there is no need to change the server settings. However, some users may want to change specific settings to meet their specific needs.



If you make changes to the settings, you must click **Apply** to save the changes before navigating away from the page.

General Receiver Settings

The General Settings screen includes basic configuration parameters for the server.

The parameters shown on the General Settings page are described in the following table.

Parameter	Description
ID	The unique (alphanumeric) name of the Zixi Receiver. Typically: host name.
Port	The port number of the Receiver administration. You can configure this parameter to any legal port number which is supported by your Firewall. Default: 4300
NIC	The associated IP with Receiver's Network Card ID.
Password	The password of the administrator.
Root folder	Displays the configured root folder. You can modify the root folder in receiver-private-settings.xml
Enable HTTPS	Enables secure HTTPS connection to the server. Enabling HTTPS requires the relevant certificates and private keys. To enable HTTPS, click on the checkbox and upload the required files.

Network Settings

The Network Settings screen includes configuration parameters for the network interfaces in the physical server. There are slight differences in the settings between Linux and Window systems.


Field	Description
Network Settings	

Receiver Settings

Network Settings

	NIC interface configurations. To configure the interface, click the Interface name to open additional settings.
-eth0/-eth1/-eth2/	<ul style="list-style-type: none">• Speed – the network card speed• Duplex – whether the network card is full-duplex or half-duplex
-eth3	<ul style="list-style-type: none">• MTU - the size of the largest protocol data unit (PDU) that can be communicated in a single network layer transaction.
Custom link settings	Select this checkbox to configure different link settings than the default settings.
Addresses	Displays the IP, mask, gateway addresses and if DHCP and VLAN are operative. Displays the current IP address that is configured for the link. You edit these settings by clicking the Edit (pencil icon) button. Click the '+' button to add another link.
DNS Servers	
Use DHCP DNS settings	Select this checkbox to enable DHCP. You can also configure the IP addresses manually.
DNS 1	Specifies the address of the DNS1 server. Available only if the Use DHCP DNS server option is not selected.
DNS 2	Specifies the address of the secondary DNS2 server. Available only if the Use DHCP DNS server option is not selected.

➔ To Display Network Statistics:

1. From the Settings page of the Zixi Receiver, click **Network** on the left-hand side. The various Network settings are displayed.
2. Click  on the right-hand side. The **UDP statistics** window is displayed.

Field	Description
####Packets received	Number of packets on network received.
####packets to unknown port received	Number of packets to unknown port on network received.
####packet receive errors	Number of packets on network which received errors
####packets sent	Number of packets on network sent.

Receiver Settings

ZEN Master in Receiver

#####SndbufErrors Number of Sent buffer errors

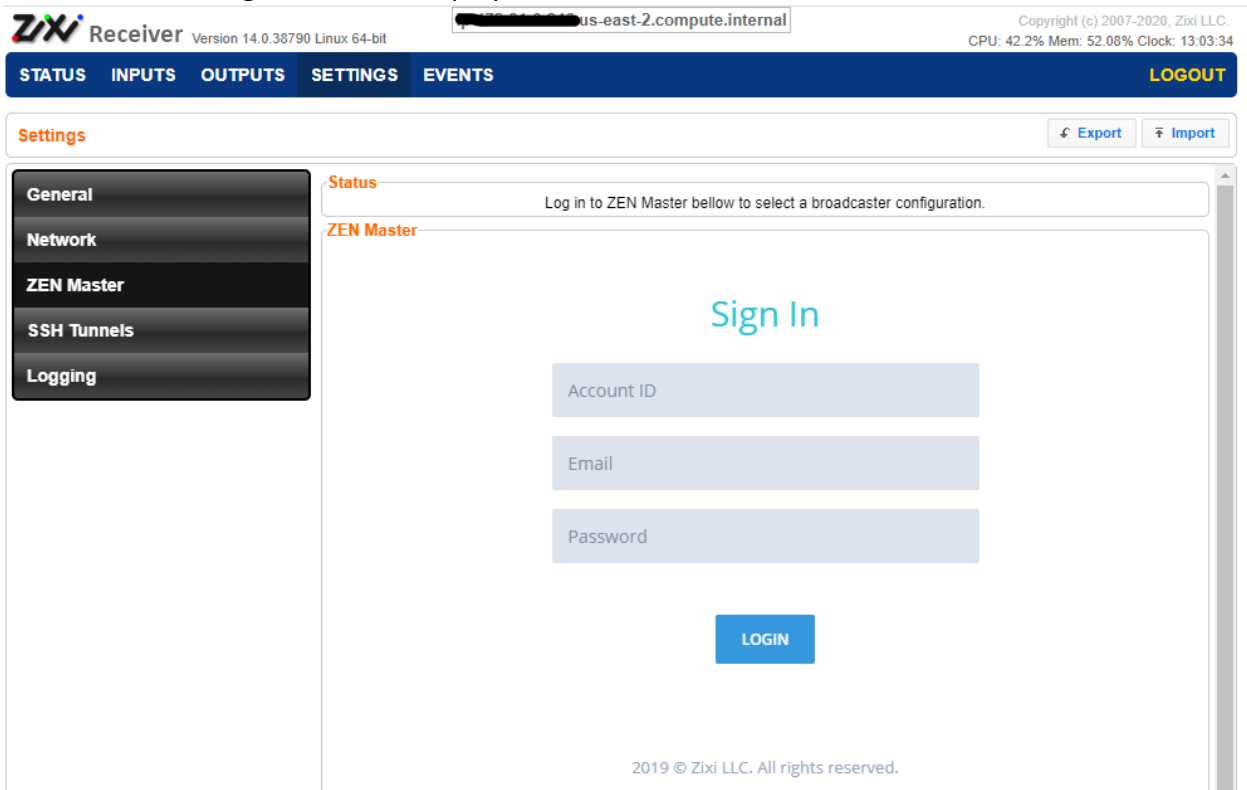
3. Click the **Refresh** button to update the data or **Close** to close the window

ZEN Master in Receiver

Once you have configured a Receiver in ZEN Master, you can automatically connect it through the ZEN Master tab in the Receiver UI.

➔ To connect a Receiver to ZEN Master automatically:

1. In the Receiver UI, go to the **ZEN Master** tab in the main navigation.
2. The ZEN Master login fields are displayed.



The screenshot shows the Receiver UI interface. At the top, there is a header with the Zixi logo, version information (Version 14.0.38790 Linux 64-bit), a hostname (us-east-2.compute.internal), and system statistics (CPU: 42.2% Mem: 52.08% Clock: 13:03:34). Below the header is a navigation bar with tabs for STATUS, INPUTS, OUTPUTS, SETTINGS, and EVENTS, along with a LOGOUT button. The main content area is titled 'Settings' and contains a sidebar with menu items: General, Network, ZEN Master, SSH Tunnels, and Logging. The 'ZEN Master' tab is selected, displaying a 'Sign In' form. The form includes fields for Account ID, Email, and Password, and a LOGIN button. A status message at the top of the form reads: 'Log in to ZEN Master below to select a broadcaster configuration.' At the bottom of the form, it says '2019 © Zixi LLC. All rights reserved.'

3. In the **Account ID** field, enter the customer domain of your ZEN Master account (e.g. if you login to ZEN at *demo.zen.zixi.com* then your Account ID is 'demo').



The user cannot be an SSO (Single Sign-On) user. If you are using an SSO account, you will have to create another user to sign in through this screen.

4. In the **Email** field, enter the username for your ZEN Master account.
5. In the **Password** field, enter the password for your ZEN Master account.

Receiver Settings

SSH Tunnel in Receiver

- Click **Login**.

A list of Receivers that are configured in ZEN Master is displayed.

Status
Log in to ZEN Master bellow to select a broadcaster configuration.

ZEN Master

RECEIVERS ↻

#	Status	Name	IP	CPU	Version	
1	● Pending	New_Receiver_01		-		Select
2	● OK	OBE_RX_LAB	38.111.41.194	26%	1.12.1.31315	Select

- For the Receiver that you are adding, which should be in Pending mode, click **Select**. Details of the ZEN Master connection are shown in the **Status** section.

- Click **Refresh**.

The connection is configured automatically.

- Verify that the Status is shown as **On**.

Status

Host: zixi.io.zixi.com
Port: 2830
Status: On

[Refresh](#)

- In the **ZEN Master UI**, in the main navigation, click **Receivers**.

- Verify that the status of the newly configured Receiver is **OK**.

RECEIVERS + Add Refresh

mini x

<input type="checkbox"/>	Name ▲	Status	IP	CPU	Version	
<input type="checkbox"/>	LabMiniReceiver	✓ Ok	199.188.233.146	12.93%	13.1.36674	Open

« 1 » Showing: 1 - 1 of 1 Rows Auto ▾

SSH Tunnel in Receiver

SSH (Secure Shell) is a network protocol that allows secure access over an encrypted connection. Reverse SSH is a technique that can be used to access systems (that are behind a firewall) from the outside world.

The parameters shown on the SSH Tunnels Settings page are described in the following table.

Parameter	Description
-----------	-------------

Receiver Settings

SSH Tunnel in Receiver

<i>Server connection</i>	
Host	Displays the Host name or IP address for the SSH connection.
SSH Port	Displays the port for the SSH connection. Default: 22
Username	Displays the username. SSH assumes the username on the remote computer is the same as that on the local one.
Key File	Displays the name of the key file. Clicking Upload Key enables you to select a key file to upload to the server.
<i>Reverse Tunnels</i>	
Remote Source Port	Displays the remote source port.
Local Destination IP	Displays the IP address of the local destination.
Local Destination Port	Displays the port number of the local destination.
Status	Displays the status of the SSH tunnel.

Adding Reverse Tunnels to Receiver

➔ To Add a Reverse Tunnel:

1. In the Zixi Receiver **Settings** page, open the **SSH Tunnels** Tab.
2. In the Reverse tunnels pane click the **Add** button.
The **Tunnel details** window opens.

The screenshot shows a dialog box titled "Tunnel details" with a close button (X) in the top right corner. Below the title bar are three input fields: "Remote Source Port" (empty), "Local Destination IP" (containing "127.0.0.1"), and "Local Destination Port" (containing "UI Port"). At the bottom of the dialog are two buttons: "Ok" and "Close".

3. In the **Remote Source Port** field, enter the port.
4. In the **Local Destination IP** field, enter the IP.
5. In the **Local Destination Port** field, enter the port.
6. Click **OK**.

Receiver Settings

Logging in Receiver

The new Reverse tunnel is created and is displayed in the Reverse tunnels pane.

Logging in Receiver

The Logging screen defines a log for debugging purposes.

The parameters shown on the Logging Settings page are described in the following table.

Parameter	Description
Logging	
Logs Path	The log file name and path where the collected event information will be stored.
Log Level	Select the severity Level that will be collected in the log, from Info , Warning , Error , to Fatal . Default: None , since Logging is resource-intensive and only enabled when necessary.
Send Crash Reports	Select this checkbox to automatically send an email to Zixi Support when the Receiver crashes containing the call stack of the event. This simplifies the support process and will eliminate the need to connect remotely to the system or send out log reports. The report is anonymous and does not include any sensitive data (e.g. configuration data, etc.).
Events	Saves the events from the Events tab to a log file.

Viewing Events Log in Receiver

The Events page displays a list of log events in the Zixi Receiver. It shows the time that the event occurred and a brief description of the event. The list of events can be sorted in ascending/descending order by time or event description, by clicking on the headings.

Searching for Log Events

➔ To Search for a Log Event:

- In the Zixi Receiver **Events** page, enter a key word from the event description in the search text box in the menu bar and click . All Logs containing the search text are displayed.

➔ To return to the full list of events:

- Click the **X** next to the text box.

Clearing the Log

➔ To Clear the Log:

- In the Zixi Receiver **Events** page, click the **Clear** button. The events on the log screen are deleted.

Refreshing the Screen

➔ To Refresh the Screen:

- In the Zixi Receiver **Events** page, click the **Refresh** button. The data on the screen is updated.

Saving the Log as a File

➔ To Save the Log as a File:

1. In the Zixi Receiver **Events** page, click the **Save** button.
2. Navigate to the folder location where you would like to save the file.
3. Click **Save**.
A .csv file is created and saved to the local destination.

- License for OpenSSL

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit

(<http://www.openssl.org/>)

THIS SOFTWARE IS PROVIDED BY THE OpenSSL PROJECT ``AS IS'' AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE OpenSSL PROJECT OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim

Hudson (tjh@cryptsoft.com).

Copyright (c) 1998-2017 The OpenSSL Project. All rights reserved.

- License for Libssh2

Copyright (c) 2004-2007 Sara Golemon <sarag@libssh2.org>

Copyright (c) 2005,2006 Mikhail Gusarov <dottedmag@dottedmag.net>

Copyright (c) 2006-2007 The Written Word, Inc.

Copyright (c) 2007 Eli Fant <elifantu@mail.ru>

Copyright (c) 2009-2014 Daniel Stenberg

Copyright (C) 2008, 2009 Simon Josefsson

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met: Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

Neither the name of the copyright holder nor the names of any other contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

- License for DekTec's Linux SDK. Version 1, August 2012

Copyright (C) 2000-2015 DekTec Digital Video B.V.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary format must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation.

THIS SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL DEKTEC DIGITAL VIDEO BV, ITS AGENTS OR ITS EMPLOYEES BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL, OR OTHER DAMAGES (INCLUDING DAMAGES FOR THE LOSS OF USE, INFORMATION, GOODWILL, PROFIT, WORK STOPPAGE, DATA, BUSINESS OR REVENUE) UNDER ANY CIRCUMSTANCES, OR UNDER ANY LEGAL THEORY, WHETHER IN CONTRACT, IN TORT, IN NEGLIGENCE, OR OTHERWISE, ARISING FROM THE USE OF, OR INABILITY TO USE THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.