

Sky Link Indoor User Manual

AMN0504PBLR

Tx - AMN35223_PM & Rx - AMN36254_PM

Tx without enclosure



Rx without enclosure



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FCC Warning

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not in-stalled and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

General Warning

This system must be used indoors only!

Revision History

Version	Date	Description
1.0	05 May 2013	Initial Draft
1.1	07 May 2013	Initial Draft
1.2	18/08/2013	Changed the input voltage value
1.3	29/10/2013	Fixed the product number
1.4	28/11/2013	Add registration with button, Update the Equipment list
1.5	31/12/2013	General overhaul
1.6	20/1/2014	Inserting notice in French and FCC Warning
1.7	19/2/2014	Supports MAC 30.0
1.8	23/02/2014	Added more detail
1.9	25/02/2014	New design

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Safety Instructions

- When operating this equipment, read and follow all the instructions in this manual.
- Do not open unit.
- Do not block the air ventilation openings.
- Use only accessories specified or recommended by Amimon.
- When devices are switched on keep away at least 20 cm from your body.
- Do not expose to moisture or excessive heat.
- Keep away from water
- Use the mains plug to disconnect the apparatus.
- Clean with a dry cloth only.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- To reduce the risk of fire or electric shock, refer servicing to qualified service personnel.
- Keep these instructions in a safe and accessible place for future use.

Explanation of graphical symbols:

High Voltage Sign: warns the user of the presence of uninsulated "dangerous voltage" within the product enclosure, which may be of sufficient magnitude to constitute a risk.



General Warning Sign: warns the user of the presence of important operating and maintenance (servicing) instructions in the product manual.



Caution

The AMN35223_PB supports two types of power input connection:
One will be the 2-pin generic connector and the second should be soldering the 2 cables directly to the LEMO holes, **but do not connect them together.**



Overview

The HD SkyLink system was designed to establish wireless HD video signal transmission without any latency over large distances. Amimon finally made this possible with revolutionary technology!

The HD SkyLink is a lightweight but still very powerful wireless HD system, which is the perfect solution for live streaming from your multicopter or from a steadycam system.

The HD SkyLink transmits encoded but uncompressed signals. Broadcasting is therefore possible without any delay (latency less than 1ms). This is the ideal live streaming equipment for sports events, movies and TV productions and also industrial and inspection and monitoring related applications.

Multicasting is supported - the signal of one transmitter can be received by multiple receivers at the same time, which allows parallel streaming and live preview for the camera operator during recording.

You have the possibility to set the used frequencies (according to the planned usage and the frequencies assigned by the Federal Network Agency) on location via USB port. The system allows you to have full control and you can follow the legal regulations of your country or region.

Package Contents

Please verify the following items are in the shipping box, prior to installation of the - AMN35223_PB transmitter and Amimon-AMN36254_PR2 receiver:

ITEM	DESCRIPTION	QUANTITY
	HD wireless video transmitter	1
	HD-SDI wireless video receiver	1
	12V Power Supply (optional) (optional)	2
	SDI cable (optional)	1
	HDMI cable (optional)	1
	Remote Control (optional)	1
	USB to mini USB cable (optional)	1
	2/5dbi (depending on region) OMNI directional antennas for Transmitter (optional)	2
 z	IR Receiver (optional)	1
	2dbi OMNI directional antennas for Receiver (optional)	5
	Cylindrical DC power cable(optional)	1
	LEMO power cable(optional)	1

Product Description

1.1.1 AMN35223 - General Guidelines (Tx)

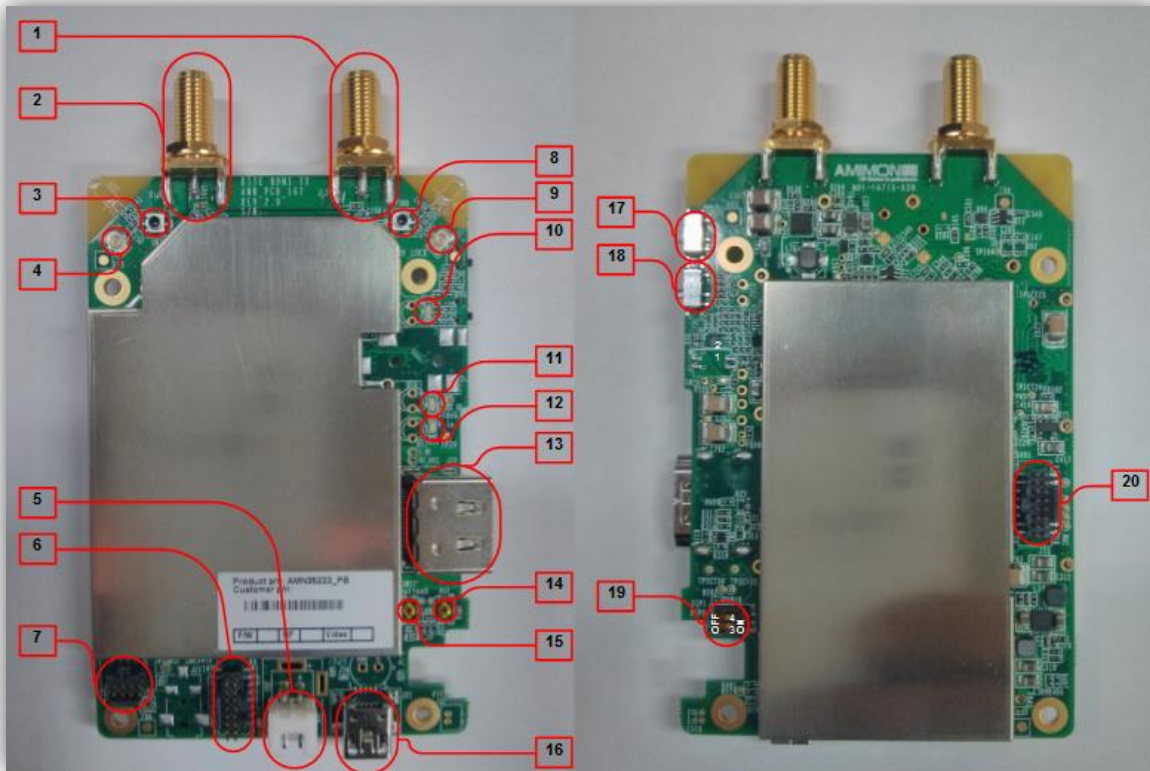


Figure 1 - Tx AMN35223

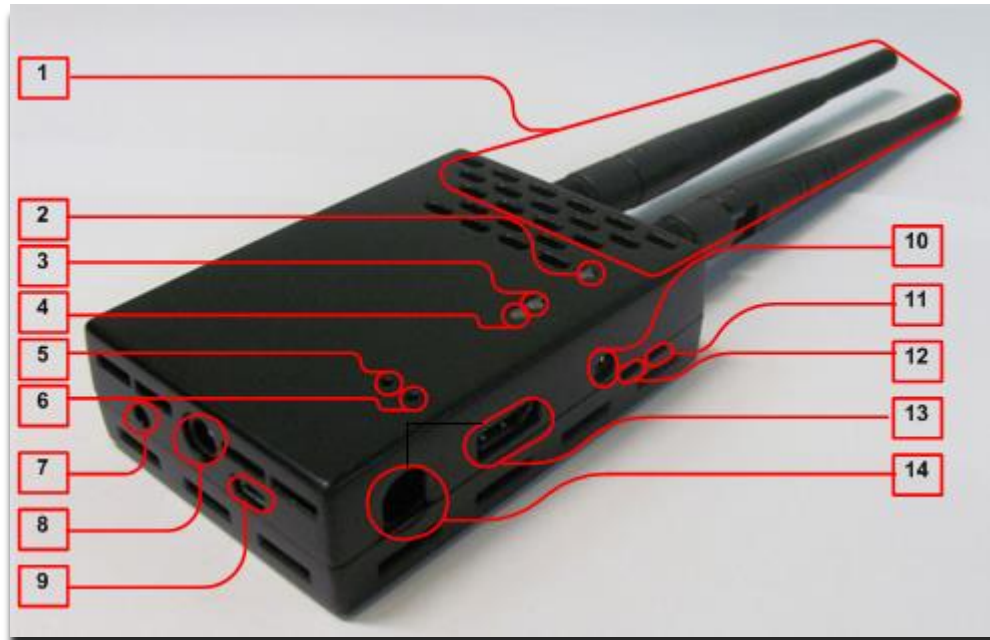
Description of all connectors and their functionality including USB, Pass through, power conn pin out debug connectors,

1.1.1.1 Parts description

01- Ext antenna RP-SMA connector CH#1	11- LED #2 - VIDEO status
02- Ext antenna RP-SMA connector CH#0	12- LED #3 - Low battery LED
03- RF Push coaxial connector CH#0	13- HDMI female connector
04- External antenna UFL connector CH#0	14- Reset Button
05- 7-17v Input Voltage connector (2 Pin)	15- Registration & Boot button
06- APP debug Port	16- USB connector
07- External host connector	17- Slide switch #2 – Operation mode selector
08- RF Push coaxial connector CH#1	18- Slide switch #1 – Operation mode selector

09- External antenna UFL connector CH#1	19- DIP Switch- 1 – BOOT1, 2- DIPA
10- LED #1 - NETWORK status	20- MAC DEBUG Port

Transmitter in enclosure



1 Antenna connectors	8 5V 2pin generic connector
2 Network status LED	9 MiniUSB port - Used for firmware updates
3 Video status LED	10 N/A
4 Power LED - Indicates battery status	11 N/A
5 Registration button	12 Mode slide switch - Switches between Aerial and Multi-monitor mode
6 Reset button	13 HDMI input port - For connecting the HD video source to the HD transmitter
7 N/A	14 DC-in 7-17v LEMO connector/2 cable soldering option, directly to the LEMO holes

Slide switch - operation mode selection



LED behaviors – Transmitter

Network LED

BLINKING MODE	DESCRIPTION
Solid	When a connection to Rx is established
Slow	Device is in listen mode
Normal	During link setup mode/during Registration
Fast	System Error (Video LED flashing as well)

Video LED

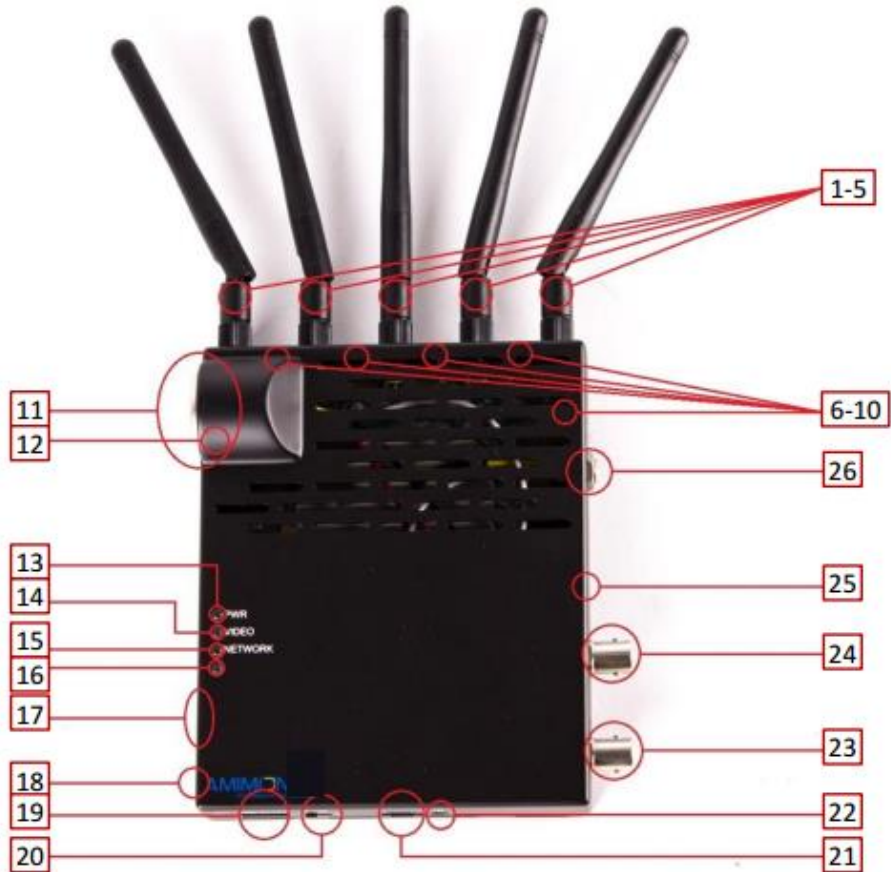
BLINKING MODE	DESCRIPTION
Solid	Video signal is locked
Normal	Video is not supported
Fast	System Error (Network LED flashing as well)

Power LED

BLINKING MODE	DESCRIPTION
---------------	-------------

Solid	Low battery – when voltage is less then 6.5v
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Receiver in enclosure



1-5 External antennas	18 Registration Button/Link quality button
6-10 Internal antennas	19 Input voltage connector 7-17v
11 Power connector 7-17v	20 ON/OFF switch
12 DFS antenna (located on the other side)	21 USB port
13 Power LED	22 IR input connector
14 Video LED	23 HD-SDI output
15 Network LED	24 2D-SDI output
16 N/A	25 Reset button
17 DIP switches	26 DC power connector 7-17v

LED behaviors - Receiver

Network LED

BLINKING MODE	DESCRIPTION
Solid	When a connection to Tx is established*/Link quality is good
Slow	Device is in listen mode/Link quality is reasonably good
Normal	During link setup mode/during registration
Fast	System Error (Video LED flashing as well)/Link quality is poor

*In Aerial mode even when Tx is out of range.

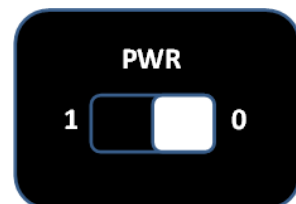
Video LED

BLINKING MODE	DESCRIPTION
Solid	Video signal is locked
Fast	System Error (Video LED flashing as well)

Power LED

BLINKING MODE	DESCRIPTION
Solid	Power is supplied and ON/OFF switch is on

ON/OFF Slide switch - operation mode selection



1 – Powered ON
0 – Powered OFF

DIP switches - operation mode selection



DIP SWITCH	UP	DOWN
#1	Default	N/A
#2	Default	N/A
#3	Default	N/A
#4	Aerial mode	Multi-Monitor mode

Operating modes

Aerial mode

In this mode a link is established between a single receiver and a single transmitter. This mode uses DFS frequencies as well making it flexible and easy to adjust to all different fields of use and to meet the regional and national frequency requirements and laws.

For some SkyLink version the message "please wait 60 seconds" may appear on the monitor when the link is first established to inform the user that the system is searching for a free DFS frequency. In this case this message will be followed by a second identical message to inform that the system is searching for an alternative DFS frequency. Upon completion the message "Ready" will appear on the monitor.

In Aerial mode a link can be established only if the systems are within close proximity to each other. If either receiver or transmitter is reset, both sides must be brought close together and reset in order to re-establish the link.

Operating Frequencies

FREQUENCIES [MHz]	DESCRIPTION
5190	Non-DFS
5230	Non-DFS
5270	DFS
5310	DFS
5510	DFS
5550	DFS
5590	DFS
5630	DFS
5670	DFS
5755	Non-DFS
5795	Non-DFS

Multi-monitor mode

In this mode a single transmitter can establish a link with several receivers. A link can be established even when the systems are not within close proximity to each other.

Operating Frequencies

FREQUENCIES [MHz]	DESCRIPTION
5190	Non-DFS
5230	Non-DFS
5755	Non-DFS
5795	Non-DFS

Switching between Aerial and Multi-monitor modes

Switching between Aerial and Multi-monitor will be done by toggling DIP switch #4 on the Rx side and sliding Mode Slide switch on the Tx side. Switching between modes will reset the systems.

Installation

Transmitter

See [Transmitter Product Description](#) for port location described in this section.

1. Switch on Source.
2. Connect the Amimon - AMN35223_PB transmitter to the HD video source via HDMI input port (port #13).
3. Connect the Amimon - AMN35223_PB transmitter to the 7-17v power, via the Lemo connector (port #14).
4. Antenna orientation: It is recommended to separate the antennas so that they form a "V" (as shown in the picture).
Receiving antennas should be oriented in the same plane as the transmitting antenna.



Receiver

See [Receiver Product Description](#) for port location described in this section.

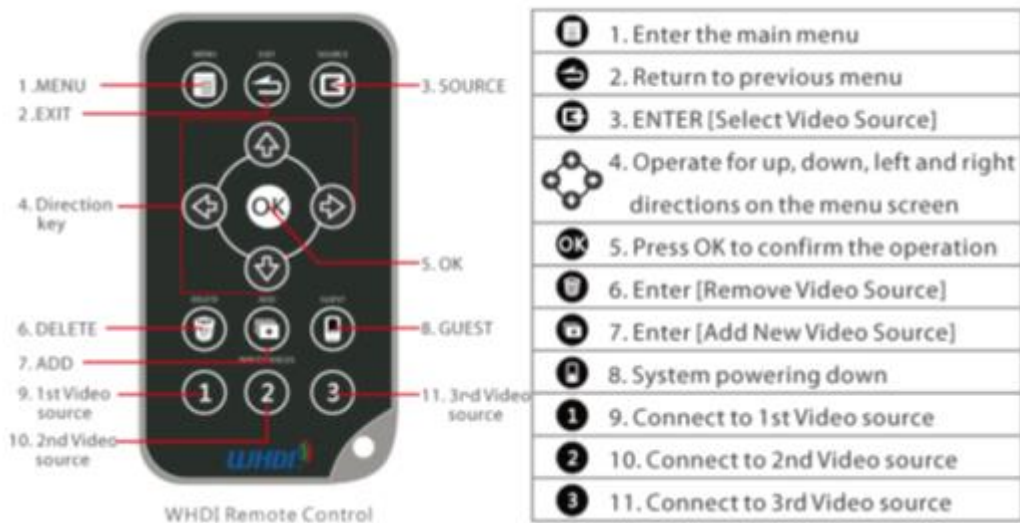
1. Switch on Monitor.
2. Connect the Amimon-AMN36254_PR2 receiver to the video sink (monitor) using a HD-SDI cable via HD-SDI output (port #23/#24).
3. Make sure all DIPs on DIP Switch are up (port #17).
4. Connect the Amimon-AMN36254_PR2 receiver to the "Input Voltage connector 7-17v", using the power supply (port #19).
5. Enable Power on by sliding the slide Switch #20 left.
6. Antenna orientation: It is recommended to separate the antennas to match the picture. Receiving antennas should be oriented in the same plane as the transmitting antenna.



Note: For maximal range

- Keep line of sight between the transmitter and the receiver.
- Avoid placing any obstacles besides the transmitter or the receiver.
- Position both transmitter and receiver in an upwards position, for enhanced antennas performance.
- Mount the Amimon - AMN35223_PB transmitter and the Amimon-AMN36254_PR2 receiver with proper air ventilation.
- Bring the transmitter and receiver closer together while trying to maintain at least 1 meter between them.

Remote control



Remote Control Hotkeys

- **ADD** - Direct access for starting the registration process on the receiver.
- **Delete** - will open the "Remove Video Source" in the OSD menu to allow the user to choose to remove devices from the list of registered devices.
- **Video Source Keys** – These three keys (1st/2nd/3rd Video Source) will toggle between the first, second or third source registered with the receiver, in order of appearance on the registered sources list.



Registration

Amimon products require registration between the transmitter and receiver, in order to establish a wireless link. The registration process includes keys exchange, for enhanced security and can be managed using the remote control, provided with the product.



Sets of Amimon - AMN35223_PB transmitter and Amimon-AMN36254_PR2 receiver usually arrive pre-paired, when purchased as pairs. In such case, video link will be established automatically after completing installation.

The registration is required only once, and after registration, the sets of transmitters and receivers will connect automatically upon boot up.

Important: Registration must be done when the system are in Aerial mode.

Registering a transmitter to a single receiver

If there is no transmitter registered to the receiver, you should see an OSD menu on the monitor.

1. Connect the HD Source to the Amimon - AMN35223_PB transmitter.
2. Connect a HD-SDI cable from the Amimon-AMN36254_PR2 receiver to the HD display*.
3. Turn on the transmitter and receiver.
4. Use the remote control on the Amimon-AMN36254_PR2 receiver and Press the "Add"  Hotkey button.
5. The message "Please Activate the Registration on Transmitter Unit" will appear on the monitor.
6. Press the registration button on the transmitter until the "Network" LED starts blinking.
7. Wait for OSD message of "Adding [Tx name] Press OK to continue or Exit to cancel".
8. Press the "OK"  button on the Remote control to confirm the addition of a new Amimon - AMN35223_PB transmitter.
9. Wait until the registration process is complete. An OSD message of " Adding [Tx name]..."and a progress bar will appear during the process.
10. Video link is established.

*The registration process can be done without HD source, an OSD message will appear to notify of missing video source.

Note: Once the registration process starts on the receiver side, it may take up to 30 seconds for the registration process to start on the transmit side. In case the registration process exceeds 30 seconds, re-start the registration process by going back to stage 4.

Registering without remote control



If there is no transmitter registered to the receiver, you should see an OSD menu on the monitor.

1. Connect the HD Source to the Amimon-AMN36254_PR2 transmitter.
2. Connect a HD-SDI cable from the Amimon-AMN36254_PR2 receiver to the HD display*.
3. Turn on the transmitter and receiver.
4. Long press the Registration button [#18] on the Rx.
5. The message "Please Activate the Registration on Transmitter Unit" will appear on the monitor.
6. Press the Registration button [#5] on the Tx until the "Network" LED starts blinking.
7. Wait for OSD message of "Adding [Tx name] Press OK to continue or Exit to cancel".
8. Press the Registration button [#18] on the Rx to confirm.
9. Wait until the registration process is complete. An OSD message of " Adding [Tx name]..."and progress bar will appear during the process.
10. Video link is established.

*The registration process can be done without HD source, an OSD message will appear to notify of missing video source.

Registering a transmitter to multiple receivers



The Amimon - AMN35223_PB transmitter has the ability to connect up to 4 receivers at a time.

1. There is a need to make sure the transmitter is not transmitting video to other receivers, so all other receivers which are registered to the transmitter should be powered down while registering an additional receiver.
2. *Connect the HD Source to the Amimon - AMN35223_PB transmitter.
3. Using HD-SDI cables connect each Amimon-AMN36254_PR2 receiver to a HD display.
4. Power on the transmitter and receiver.
5. Power on only one receiver at a time for ease of installation.
6. Use the remote control at the Amimon-AMN36254_PR2 receiver and Press the "Add"  Hotkey button.
7. The message "**Please Activate the Registration on Transmitter Unit**" will appear on the monitor.
8. Pressing the registration button on the transmitter until the "**Network**" LED starts blinking.
9. Wait for OSD message of "**Adding [Tx name] Press OK to continue or Exit to cancel**".
10. Press the "OK"  button on the IR Remote to confirm the addition of the receiver.
11. Wait until the registration process is complete. An OSD message of " **Adding [Tx name]...**"and progress bar will appear during the process.
12. In order to add additional receivers to the transmitter, Power down all other Amimon-AMN36254_PR2 receivers, except the latest one.
13. Repeat steps 5 through 12 for each receiver.

14. When all the receivers have been registered to the transmitter power on all the receivers one by one.
15. The video should be displayed on all monitors.


*The registration process can be done without HD source, an OSD message will appear to notify of missing video source.

Registering multiple transmitters to a receiver



1. Connect the HD Source to the Amimon - AMN35223_PB transmitter*.
2. Connect a HD-SDI cable from the Amimon-AMN36254_PR2 receiver to the HD display.
3. Power on the transmitter and receiver.
4. Use the remote control at the Amimon-AMN36254_PR2 receiver and Press the "Add"  Hotkey button.
5. The message "Please Activate the Registration on Transmitter Unit" will appear on the monitor.
6. Pressing the registration button on the transmitter until the "Network" LED starts blinking.
7. Wait for an OSD message of "Adding [Tx name] Press OK to continue or Exit to cancel".
8. Press the "OK"  button on the Remote control to confirm the new Amimon - AMN35223_PB transmitter.
9. Wait until the registration process is complete. An OSD message of "Adding [Tx name]..."and progress bar will appear during the process.
10. Video link is established.

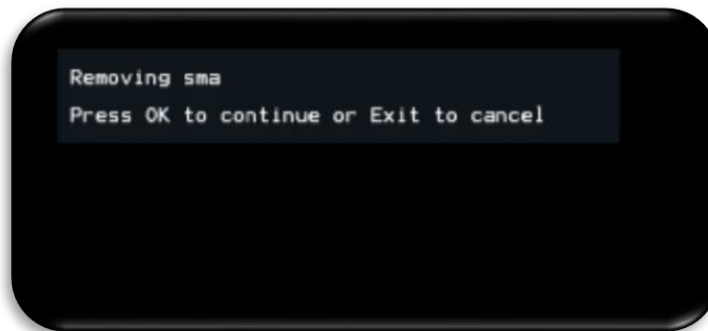
*The registration process can be done without HD source, an OSD message will appear to notify of missing video source.

Unregistering transmitters

1. Power on the Amimon-AMN36254_PR2 receivers.
2. Use the remote control at the Amimon-AMN36254_PR2 receiver and Press the "Delete"  Hotkey button.
3. Select the source to be removed, using the up, down arrow buttons, and "OK" button.



4. Confirm removal of the selected source by pressing the "OK"  button, or cancel the selection by pressing the "Exit"  button.




5. Wait 30 seconds for the removal process to be completed.



6. **Transmitter removal is complete.**

Switching between transmitters

1. In order to switch between video transmitters, press the "SOURCE"  button and a menu will appear
2. Choose the desired transmitter using the up, down arrows, and "OK" buttons.
*Note this is a Unicast product, the desired transmitter must be disconnected from any another system before being chosen.
3. The existing video link will be lost and within 30 seconds, the new transmitter will connect and new video link will be established.

Multi-system operation

SkyLink supports multisystem mode, i.e. several pairs of receivers and transmitters can work simultaneously. It is recommended to keep the pairs at least 1 meter away from each other.

Link drop

Likely causes for this might be:

- 1. Exceeded Range**

To re-establish link bring systems back in to range.

- 2. Reset**


To re-establish link in case Tx/Rx have been reset, it is necessary to reset both sides. In Aerial mode both systems must be **within 30 meters** of each other. In Multi-monitor mode the systems must be within the operating range defined in the spec.

OSD - Menu

The Amimon-AMN36254_PR2 receiver generates an OSD-Menu (On-Screen Display).

This is used for adding/removing devices and presenting the link status and technical information.

OSD - Setup window

In order to open the Setup window Use the remote control at the Amimon-AMN36254_PR2 receiver and Press the "Menu"  Hotkey button.

The Setup window contains: **Add new source**, **Remove source**, **Modify name source** and **Status menus** for technical information.



Adding new video Source

To add a new Video Source, refer to [Registering a transmitter to a single receiver](#) section.




Removing video Sources

In order to remove a source please refer to the [Unregistering transmitter](#) section.


Modify video source name



In order to modify the source name, follow the instructions below:

1. In order to modify the transmitter name press the "MENU"  button to open the OSD menu.
2. Choose the "Modify Video Source Name" option using the up and down arrows.
3. Press the "OK"  button.
4. A list of all the registered transmitters will pop up.
5. Choose the source to rename using the "Up" and "Down" arrow buttons.
6. Press "OK"  to select the source.
7. Choose the characters you wish to modify using the right and left buttons on the remote control, and modify the name using the up, down and "OK" buttons.



8. Press "OK"  to save the modified name.

Note: the transmitter name is modified on the receiver, so if the transmitter is registered to another receiver, the original name of the transmitter will not change on that receiver.

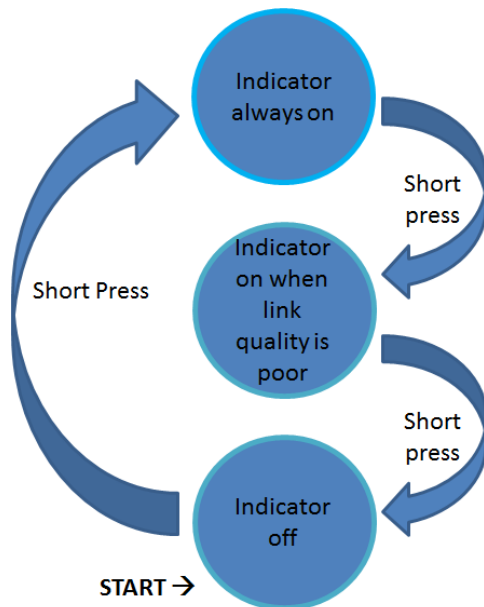
Link Quality Indicator

The link quality indicator gives the user an indication of link quality.

When enabled this indicator appears in the top left corner in three different colors, depending on the quality of the link:



In order to enable the indicator the user must short press the link quality button on the Receiver during link. With a series of short presses the user can switch between several indication modes as described in the flow chart below:



Note that the link quality indication button on the receiver is used for registration as well. During link a long press will generate the registration message on the monitor.

Before a link is established:

This button is used solely for the registration process. See Registration section for correct usage.

Technical Specifications

SPECIFICATION	DESCRIPTION		
Video Resolution:	1080p/50, 1080p/60, 1080/59.94i, 1080/50i, 1080/29.97p, 1080/23.98p, 720/59.94p, 720/50p, 525i/59.94, 625i/50, 1080/24p.		
Frequencies:	<p>Non-DFS Frequencies :</p> <p>5.170~ 5.250 GHz for EU</p> <p>5.170 ~ 5.250 GHz and 5.735~5.815 GHz for US</p> <p>DFS Frequencies (used only in Aerial mode):</p> <p>5.250-5.330 GHz and 5.490 ~ 5.690 GHz for EU</p> <p>5.250-5.330 GHz and 5.490 ~ 5.590 GHz and 5.650 ~ 5.690 GHz for US</p> <p>ISM Frequencies:</p> <p>5.725 ~ 5.875 GHz for EU</p>		
Video Interface:	<table border="1"> <tr> <td>Tx: HDMI</td> <td>Rx: SDI with automatic detection (SD, HD and 3G) over 75 Ohm BNC.</td> </tr> </table>	Tx: HDMI	Rx: SDI with automatic detection (SD, HD and 3G) over 75 Ohm BNC.
Tx: HDMI	Rx: SDI with automatic detection (SD, HD and 3G) over 75 Ohm BNC.		
Environment:	Operational - 0:40° C, 10%~90% humidity Storage - 0:55° C, 10%~90% humidity		
Range:	Up to 500m line of sight.		
Delay	Less than 1 msec.		
Product Regulation:	CE,FCC, RoHS, ESD +2Kv, , DFS		
FCC ID	VQSAMNKHIN1		

Specifications

Amimon - AMN35223_PB transmitter and Amimon-AMN36254_PR2 receiver

	TRANSMITTER AMN35223	RECEIVER AMN36254
Video Interface	HDMI male connector	SDI splitter Option to connect external connector board
Audio	Over HDMI. Supports up to 2 channels.	Over SDI
Frequency Control	Automatic	Automatic
Antenna	2 transmitting 1 Receiving external using on-board RP SMA Connectors	5 receiving 1 transmitting Internal or external using on-board RP SMA Connectors
Voltage	7-17 ±10%	7-17 V ±10%
Size	Without case: 90mm x W60mm x H With case :	L130mm x W106mm x H
User Control	3 LEDs indicating Power, Video lock and Network lock USB connector for software update Registration button Reset button 2 Slide switches for mode selection External host connector UART	3 LEDs indicating Power, Video lock and Network lock USB connector for software update Hidden button for registration Reset button

Troubleshooting

Registration fails

- ✓ Make sure both transmitter and receiver are powered on.
- ✓ Make sure the power cable is continuous.
- ✓ Make sure that pairing units are the only Amimon devices currently powered on.
- ✓ Bring the transmitter and receiver closer together but no closer than 1 meter.
- ✓ Keep the number of solid walls between the transmitter and receiver to a minimum.

No Signal on monitor

- ✓ Make sure the receiver is powered on.
- ✓ Make sure the monitor is powered on.
- ✓ Make sure the receiver is properly connected to the monitor.
- ✓ Make sure the monitor is set to display video from the right source (HD-SDI1, HD-SDI2, HD-SDI3 etc.).
- ✓ Reboot the receiver.
- ✓ Unplug and then re-plug the HD-SDI cable between the receiver and the monitor.
- ✓ Replace the HD-SDI cable.
- ✓ Make sure the video resolution is supported by the monitor.

No video over the wireless link

- ✓ Make sure the transmitter is properly connected to the source.
- ✓ Make sure the source is powered on.
- ✓ Unplug and then re-plug the transmitter to the source.

Abnormal Color or Noise on the monitor

- ✓ Unplug and then re-plug the HD-SDI cable between the receiver and the monitor.
- ✓ Unplug and then re-plug the HDMI cable between the transmitter and the source.
- ✓ Bring the transmitter and receiver closer together but no closer than 1 meter.
- ✓ Keep the number of solid walls between the transmitter and receiver to a minimum.
- ✓ Power cycle the system.

No Audio

- ✓ Check the mute and audio volume settings on the monitor.
- ✓ Check the audio format setting on the source is incompatible with system. Change the source to output PCM 2.0, DTS or Dolby Digital.
- ✓ Make sure the pin #2 on the DIP switch is down.

IR Remote Control Malfunctions

- ✓ Make sure the plastic cover of the battery is removed.
- ✓ Make sure the remote control batteries are fully charged.

- ✓ Make sure the IR receiver is connected to the Amimon-AMN36254_PR2 receiver.
- ✓ Make sure there is a far enough distance between the IR receiver and any fluorescent lighting or radiation interfering with the IR signals.

Other malfunctions

The receiver keeps outputting a "Searching..." message, and the NETWORK LED is constantly blinks: It should take up to one minute to establish a wireless link. If the link was not established within that time period, verify the transmitter is powered on and not connected to another receiver.

The receiver is outputting "Connected to source name, Please Check Video Source": Check the HD-SDI connection between the transmitter and the video source.

The receiver displayed a connection failure message and outputs a "Wireless Off" message: If there is more than one registered transmitter, and the receiver failed to connect to it within a minute or two, the receiver will go into standby mode and shut down the RF. In order to connect to the desired source, press on the "SOURCE" button and choose the desired source.

The NETWORK LED blinks rapidly and there is no display on the monitor: Power cycle the unit. If the issue remains, the device might be faulty. Please contact Amimon support team.

Link cannot be established or poor video/Audio quality: Try to decrease the range between the transmitter and the receiver or remove obstacles out of the way between the transmitter and receiver.

Appendix

Tx without enclosure



Rx without enclosure

