AMNPTTX01 and AMN42012

Operational and Installation Manual

An AMIMON Ltd. Document

Version 1.0

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This installation guide is intended for host manufacturer integrating the AMNPTTX01 and AMN42012 modules inside their end products.

The AMNPTTX01 and AMN42012 modules **can't** be bought off-the-shelf.

Please refer to the regulatory guide regarding regulatory information that needs to be on the labeling and user manual.

Revision History

Version	Date	Description
1.0	Jul 3, 2022	Initial Release

AMIMON

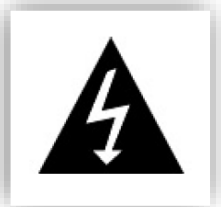
Safety Instructions

- When operating this equipment, read and follow all the instructions in this manual
- Do not open unit
- Do not block air ventilation
- Use only accessories/batteries/ power supplies provided, specified or recommended by AMIMON.
- When devices are switched on keep away at least 20 cm from your body.
- People with pacemakers should ALWAYS keep the device at the listed distance from their pacemaker when turned ON. Should you have any reason to suspect that interference is taking place, you should turn your device OFF.
- Do not expose to moisture, excessive heat or fire
- Keep away from water and other liquids
- Do not power the device when it is wet or damp
- 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
- Please avoid electrostatic discharge from the antenna ports for proper operation
- WARNING – do not touch. Please beware of hot surfaces of the devices and wait until it cools off

- Please avoid electrostatic discharge from the antenna ports for proper operation
- Keep these instructions in a safe and accessible place for future use.
- Declared maximum operating temperature: +50°C

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.

Introduction

The **AMNPTTX01** and **AMN42012** are wireless video system comprising of a video transmitter and video receiver modules, that operate at the 5 – 6.425GHz unlicensed band.

They are based on AMIMON's Professional chipset that consist of the AMN2130 and AMN2230 baseband receiver and the MAXIM 2850 and 2851 ICs, providing the ultimate solution for 4K Video transmission. The perfect video, audio quality, the high robustness and the invisible latency of the wireless system are unmatched by any other wireless technology and presents a true alternative to cable. The system transmits video and audio streams wirelessly and thus simplifies and eliminates system issues, such as: lip-sync, large buffers and other burdens like retransmissions or error propagation.

System Technical Specifications:

AMNPTTX01	
Frequency Range:	5.925 ~ 6.425 GHz
Antenna:	Total connectors: 2 2 transmitting ports of which 2 ports also act as receiving ports using diversity through a single receive chain on-board UFL or RP-SMA Connectors: connected to 2dBi omni directional antenna
Environment:	Operational: -10 ÷ 50°C, 10 ÷ 90% humidity Storage: -20 ÷ 55° C, 10% ÷ 90% humidity
Voltage:	$5V_{DC}$ ±10%
Size:	Petit: L: 56mm x W: 38mm x H: 7.7mm Jay: L: 60mm x W: 38mm x H: 7.3mm Tulip: L: 60mm x W: 38mm x H: 7.3mm
FCC ID **IC**	VQSAMNPTTX01 7680A-AMNPTTX01

Table 1: **AMNPTTX01** - ***Technical Specifications***

AMN42012	
Frequency Range:	5.925 ~ 6.425 GHz
Antenna:	Total connectors: 5 1 transmitting chain with antenna diversity and 5 receive ports External using on-board UFL Connectors: 2dBi omni Antenna gain
Environment:	Operational: -10 ÷ 50°C , 10 ÷ 90% humidity Storage: -20 ÷ 55° C, 10 ÷ 90% humidity
Voltage:	$5V_{DC}$ ±10%
Size:	L: 70.0mm x W: 55.0mm x H: 7.5mm
User Control:	3 LEDs indicating Power, Video lock and Network lock 3 buttons for pairing, reset, boot;
FCC ID **IC**	VQSAMN42012 7680A-AMN42012

Table 2: **AMN42012** - ***Technical Specifications***

Product Description

- AMNPTTX01

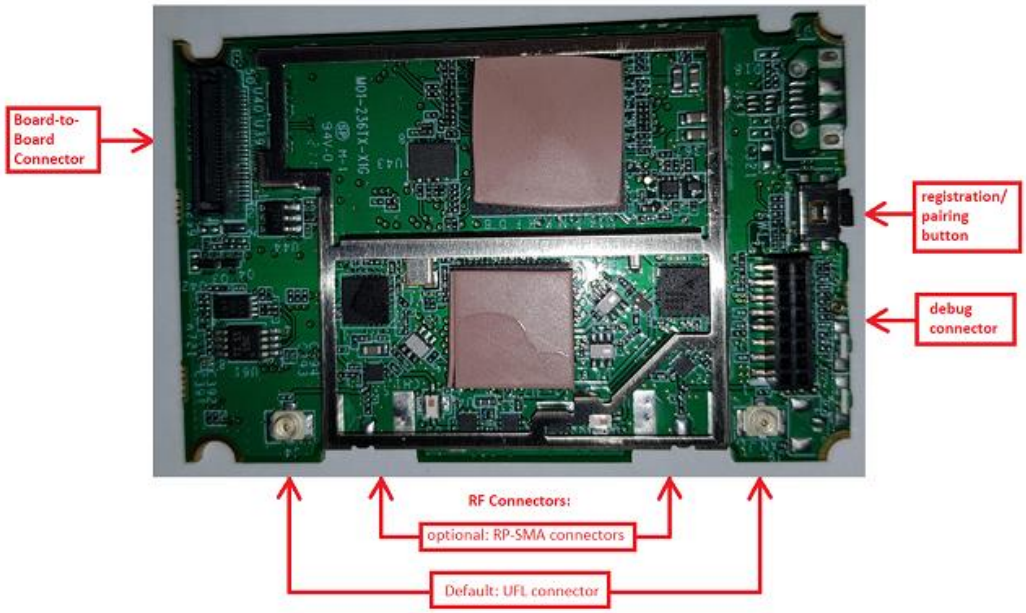


Figure 1 –AMNPTTX01 top view

- AMN42012

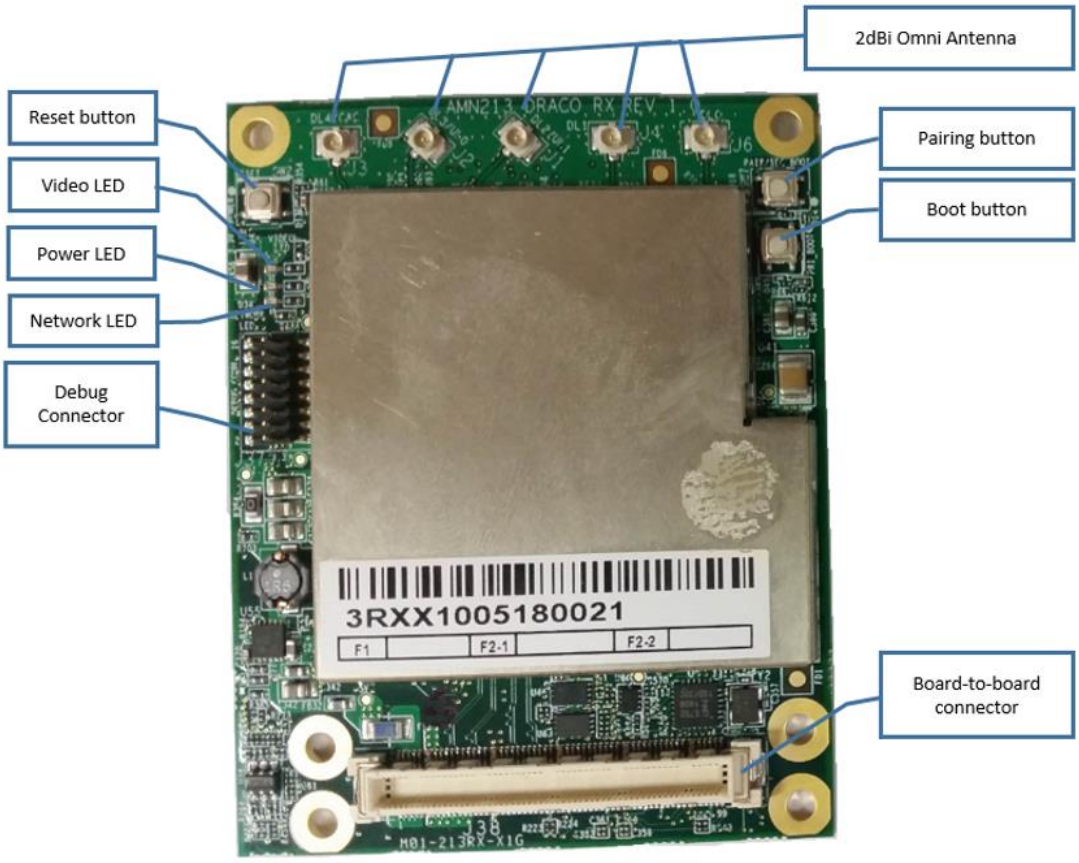


Figure 2 – AMN42012 top view

- LED behaviors

Network LED

Flashing Rate	Indication
Fast blinking (errors)	Stuck in bootloader / MAC not alive / No XML / default calibration
Off	Not registered to TX / power down / disconnected/ Waiting for user response at registration
Normal blinking	Searching for TX
Fast blinking	During registration / out of range
On	In link

Table 3 - Network LED

Video LED

Flashing Rate	Indication
Fast blinking (errors)	Stuck in bootloader / MAC not alive / No XML / default calibration
Off	Not registered to TX / power down / disconnected/ Waiting for user response at registration
Normal blinking	Searching for TX
Fast blinking	During registration / out of range
On	In link

Table 4 - Video LED

Power LED

Flashing Rate	Indication
Off	No power, power level is below acceptable levels
On	Power is supplied and ON/OFF switch is on (when exist).

Table 5 - Power LED

- Board-to-Board Connector

The Interface connector provides various interfaces to communicate between the module and the MCU to configure video related parameters and settings, or receive the network status and communication related parameters.

The following interface options are available:

- External Power Supply voltage ($5V_{DC}$ ±10%)
- Signal Ground
- Video signal
- I2S audio interface
- I2C bus
- Indication output (Power, Network, Video Indications)
- Board attached ID pins
- UART
- USB
- SPI

Host manufacturers are advised to contact Amimon to request the complete pin allocation and functional description of the interface board.

Installation

The modules are designed to be integrated with any compatible Video Interface Board (VIB), to provide a complete wireless Video Solution.

At common application, the VIB shall provide standard video interface that can be connected to standard video monitor. This video interface may be HDMI, HD-SDI or any other standard or custom video interface.

It is advised to verify compatibility of the VIB to the interface connector type, pin functionality, and signal compatibility of the modules, before initiating the installation.

At installation, make sure that the modules are firmly attached and secured to the VIB by proper mechanical means.

Installation of the modules must provide the adequate heat dissipation means to provide the modules ambient temperature within the product operating conditions as specified.

See 'Product Description' for port location described in this section.

Connect AMIMON modules to the compatible Video Interface Board (VIB).

Connect the antennas to the modules. Only use antennas provided by AMIMON

Connect the receiver VIB to a video monitor through the supported video interface of the VIB.

Connect the transmitter VIB to a video source (for example, camera) through the supported video interface of the VIB.

1. Power ON the VIB according to its operating manual.
2. Set the Antenna orientation of the receiver module to perform optimal performance:

One option is to separate the antennas to match the picture. Receiving antennas should be oriented in the same plane as the transmitting antenna.

3. If the devices are not paired to each other, press the "pairing" button on each module.

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 modules with proper air ventilation.
- Use only approved accessories recommended by Amimon
- Avoid Co-location: Place the modules and their antennas as far away as possible from other transceiver devices, 20cm separation is a minimal distance unless otherwise specified in the Grant.
- Avoid Proximity to Metal Objects: The antennas must be at least 7 cm away from any metal object.

Regulation Installation Requirements

The AMNPTTX01 and AMN42012 modules can't be bought off-the-shelf.

This section is intended to guide host manufacturer integrating the AMNPTTX01 and AMN42012 modules inside their end products with the regulatory requirements.

Host integrators must comply with the following requirements when operating in the UNII5 band:

Modifications:

- Any changes or modifications not expressly approved by AMIMON or *the party responsible for compliance* could void the user's authority to operate the equipment and invalidate the regulatory approval.
- Host manufacturer must follow KDB Publication 996369 D04 Module Integration Guide.
- Host manufacturer is responsible for regression tests to show compliance to the applicable standards due to the following actions:
  - any modification done to the module.
  - Integration of the module into a host device
- Host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.
- Final host product is required to show compliance to Part 15 Subpart B with the modular transmitter installed

Usage Conditions: The OEM must define uses/conditions of at least 20 cm from user's body.

Label Requirements:

Label on the host device must be permanently attached to a non-removable exterior portion of the host device.

The OEM must add the following statements on the labels:

"FCC/ISED Regulations restrict operation of this device to Indoor Use Only"

- "Operation on oil platforms, cars, trains, boats and aircraft shall be prohibited except for on large aircraft flying above 10,000 ft."
- FCC ID/IC Information (unless change ID is pursued):

- For host devices containing VQSAMNPTTX01, the label should state: "contains: FCC ID: VQSAMNPTTX01
  IC: 7680A-AMNPTTX01"

- For host devices containing VQSAMN42012, the label should state: "contains: FCC ID: VQSAMN42012
  IC: 7680A-AMN42012"

- e-label is permitted on devices qualifying for e-label per KDB 784748

Antenna Requirements:

- The following antennae were approved with the modules:

Radio FCC ID	Antenna Information				
	Model	Type	Gain	Location	impedance
VQSAMNPTTX01	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMNPTTX01	AMN_ANT_1012-0	dipole	0dBi Typical at 5-7.3GHz	Internal	50Ω
VQSAMN42012	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMN42012	AMN_ASM_1011	mushroom	2dBi Typical at 5-7.3GHz	External	50Ω

- The product is provided with an approved antenna. Use only supplied or approved antenna by AMIMON. Any changes or modifications to the Antenna may void the regulatory approvals obtained for the product.
- Host device must comply with FCC Part 15 antenna requirements
- The OEM must design the host so that the antenna will be installed as an integrated antenna for the host containing the AMNPTTX01 and the end user shall not be able to access, remove or replace the antenna.

Manual Requirements: Manual to the end user must contain the following statements:

Antenna Requirements:

- FCC:

The following antennae were approved with the modules listed in the Antenna Information table.

- Industry Canada

The radio transmitters 7680A-AMNPTTX01, and 7680A-AMN42012 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated.

Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.
Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication
Les présent émetteur radios 7680A-AMNPTTX01, et 7680A-AMN42012 ont été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.
Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Radio FCC ID	Antenna Information				
	Model	Type	Gain	Location	impedance
VQSAMNPTTX01	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMNPTTX01	AMN_ANT_1012-0	Dipole	0dBi Typical at 5-7.3GHz	Internal	50Ω
VQSAMN42012	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMN42012	AMN_ASM_1011	mushroom	2dBi Typical at 5-7.3GHz	External	50Ω

- The product is provided with an approved antenna. Use only supplied or approved antenna by AMIMON. Any changes or modifications to the Antenna may void the regulatory approvals obtained for the product.
- Host device must comply with FCC Part 15 antenna requirements
- The OEM must design the host so that the antenna will be installed as an integrated antenna for the host containing the AMNPTTX01 and the end user shall not be able to access, remove or replace the antenna.

RF Exposure

- FCC Statement

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- Industry Canada Statement

IMPORTANT NOTE:
Radiation Exposure Statement: This equipment complies with IC radiation exposure limits set forth for uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.
NOTE IMPORTANTE:
Déclaration d'exposition aux radiations: Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Unintentional Radio Interference

- FCC Statement

  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 installed 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.

- Canada Statement
  CAN ICES-3 B / NMB-3 B

Radio Transmitters

- General
  - Operation of these devices in the 5.925-6.425 GHz band is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.
  - Operation of these devices in the 5.925-6.425 GHz band is prohibited for control of or communications with unmanned aircraft systems.
  - Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
  - In the 5.925-6.425 GHz band, devices containing AMN42012 (which is a client device) must operate under the control of a device containing the AMNPTTX01 which is an indoor access point. In all cases, an exception exists for transmitting brief messages to an access point when attempting to join its network after detecting a signal that confirms that an access point is operating on a particular channel. Access points may connect to other access points. Client devices are prohibited from connecting directly to another client device.

- FCC Statement
  Radio Transmitters (Part 15) – Class B Digital Devices

  This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

  FCC regulations restrict operation of these devices in the 5.925-6.425 GHz band to indoor use only

- Canada Statement

This device complies with RSS-248 of the Industry Canada Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation of the device.

Ce dispositif est conforme à la norme CNR-248 d'Industrie Canada applicable aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Caution:
Operation shall be limited to indoor use only; Operation on oil platforms, cars, trains, boats and aircraft shall be prohibited except for on large aircraft flying above 10,000 ft.
Avertissement:
Utilisation limitée à l'intérieur seulement; Utilisation interdite à bord de plateformes de forage pétrolier, de voitures, de trains, de bateaux et d'aéronefs, sauf à bord d'un gros aéronef volant à plus de 10 000 pieds d'altitude

Enclosure Requirements: Host devices containing the AMNPTTX01 module and operating in the UNII5 is prohibited from having a weatherized enclosure.

Usage Requirements:

- Host devices containing the AMNPTTX01 module and operating in the UNII5 must be powered by wired connection such as AC adapter (battery use is not allowed).
- AMNPTTX01 and AMN42012 do not have a battery backup.
- If host devices containing AMNPTTX01 module are designed to have a battery backup, the use of the backup battery should only be allowed during power outages and for indoor use.
- Host devices containing AMN42012 are prohibited from direct connection to the internet.