

Adimos Wireless Video Module

User Manual

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Federal Communication Commission Interference Statement

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 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.

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 Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

NOTE:

The WVM1104-Tx (FCC ID: MXF-940307AT) is limited in CH1~CH11 for 2.4 GHz by specified firmware controlled in U.S.A.

This device is intended only for OEM integrators under the following conditions: □

1)The antenna must be installed such that 20 cm is maintained between the antenna and users, and □

2)The antenna should be integral if the end device is intended to be operated in 5.15 ~ 5.25GHz frequency range. □

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing □ their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC □ peripheral requirements, etc.). □

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another □ transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these □ circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate □ FCC authorization. □

End Product Labeling □

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the □ antenna and users (for example: Connector Board...etc.). The final end product must be labeled in a visible area with the following: “Contains □ TX FCC ID: MXF-940307AT”. □

Manual Information That Must be Included □

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the users □ manual of the end product which integrate this module. □

The users manual for OEM integrators end users must include the following information in a prominent location “ IMPORTANT NOTE: To □ comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance □ of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter”. □

The end product should include “The 5.15 to 5.35GHz band is restricted to indoor use only. Use of this product in outdoor could void the user’s □ authority to operate this equipment. □

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1. Introduction

1.1 Purpose and Scope

The Wireless Video Module product (WVM) delivers video over wireless channel. It enables a wireless connection between a video source (DVD, VCR, PVR, STB, BS or PC) and a video display (standard TV, flat screen TV or video monitor).

This document guides the user how to configure the WVM via a set of configuration and status registers.

1.2 Terms and Abbreviations

BS	Base Station
CPU	A microprocessor or microcontroller device
DVD	Digital Video Disk
MPEG	Motion Picture Expert Group
N/A	Not Applicable
PVR	Personal Video Recorder
STB	Set Top Box
VCR	Video Cassette Recorder
WLAN	Wireless Local Area Network
WVM	Wireless Video Module

2. References

- [1] Adimos WVM - Frequency Channel Tables

3. Configuration and Status Registers

3.1 General Description

The WVM provides a set of internal registers, which can be modified or read via I2C interface. The values of these registers determine the behavior of the WVM. Each register has a unique sub-address.

3.2 Register Details

3.2.1 Introduction

This section describes the internal registers.

- Byte order: Byte0 is the first byte in a read/write operation.
- Bit order: Bit 7 is the most significant bit within a byte.
- 0x... is a hexadecimal number.

3.2.2 Register Summary

Sub-address	Name	Side	Read/Write	Size [bytes]	Function
0x00	System Version	Tx, Rx	R	4	System version ID
0x01	Set video standard	Tx	R/W	2	Set NTSC/PAL/SECAM/Auto.
0x02	Video standard status	Tx, Rx	R	1	Actual status of video standard
0x03	Select video input port	Tx	R/W	2	Select Composite-video, S-Video, Component-video or Auto. Applicable only to WVM1103.
0x04	Video input port status	Tx, Rx	R	1	Actual status of video input port. Applicable only to WVM1103.
0x05 – 0x08	Reserved	----	----	----	
0x09	Set video rate	Tx	R/W	2	Set video bit rate
0x0A	Video rate status	Tx, Rx	R	1	Actual status of video bit rate
0x0B – 0x0F	Reserved	----	----	----	
0x10	Country Code	Tx, Rx	R/W	2	Set Country code for WLAN
0x11	Set WLAN channel	Tx	R/W	2	Set frequency channel for WLAN
0x12	WLAN channel status	Tx, Rx	R	2	Actual status of WLAN channel
0x13	Change operation mode	Tx, Rx	W	1	Change the operation mode at the local unit
0x14	Operation mode status	Tx, Rx	R	1	Actual operation mode at the local unit
0x15	Reserved	----	----	----	
0x16	Reserved	----	----	----	
0x17	IR Enable/Disable	Rx	R/W	1	Enable/Disable the IR function
0x18	Reserved	----	----	----	
0x19	Discrete Inputs status	Rx	R	1	Status of Discrete Inputs of the Tx unit.
0x1A	Wireless ID	Rx	R	16	Value of wireless ID string
0x1B	RSSI status	Tx, Rx	R	1	Status of signal strength
0x1C – 0x1E	Reserved	----	----	----	
0x1F	PER status	Tx, Rx	R	1	Status of Packet Error Rate
0x20	Remote operation mode change request	Tx, Rx	W	1	Request a change of the operation mode at the remote unit
0x21	Change request status	Tx, Rx	R	1	Status of change request
0x22	Do installation process	Tx	W	1	Initiate installation process (Tx-Rx synchronization)
0x23	Discrete I/O test	Tx, Rx	R/E	1	Test mode for the Discrete I/O's
0x24 – 0x50	Reserved	----	----	----	
0x51	Reset unit	Tx, Rx	W	1	Unit reset command

Notes:

- The Side column designates if the register is applicable to both Tx and Rx units, Tx only or Rx only.
- The Read/Write column designates if the register is Read only (R), Read and Write (R/W) or Write only (W).
- The Size column designates the number of bytes in the register, e.g. 1, 2 or 4.

3.2.3 System Version

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x00	System Version	R	4	Byte0: V1 Byte1: V2 Byte2: V3 Byte3: V4 Byte values are 0-0xFF	N/A

The System version is presented as: V1.V2.V3.V4.

V1 – Product type

V2 – Major version ID

V3, V4 – Minor version ID

3.2.4 Video standard

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x01	Set video standard (Tx only)	R/W	2	Byte0 = 1: NTSC Byte0 = 2: PAL Byte0 = 3: SECAM Byte0 = 0xFF: N/A (only on Read)	1 (NTSC)
				Byte1 = 0: Fixed Byte1 = 1: Automatic (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	1 (Automatic)
0x02	Video standard status	R	1	Byte0 = 0: No video signal Byte0 = 1: NTSC Byte0 = 2: PAL Byte0 = 3: SECAM	N/A

The video standard at the video input can be set to NTSC, PAL or SECAM, or can be set to Automatic. When set to Automatic, the system will select automatically the appropriate video standard, according to the actual input signal.

Writing to register 0x01 commands the system to a desired video standard.

Reading from register 0x02 presents the video standard that is currently active.

3.2.5 Video input port

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x03	Select video input port (Tx only)	R/W	2	Byte0 = 1: Composite video Byte0 = 2: S-Video Byte0 = 3: YPbPr-interlaced video Byte0 = 0xFF: N/A (only on Read)	1 (Composite video)
				Byte1 = 0: Fixed Byte1 = 1: Automatic (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	1 (Automatic)
0x04	Video input port status	R	1	Byte0 = 0: No video signal Byte0 = 1: Composite video Byte0 = 2: S-Video Byte0 = 3: YPbPr-interlaced video	N/A

The video input can be selected among YPbPr (component) input with interlaced video, S-Video and Composite video, or set to Automatic.

When set to Automatic the Tx unit will perform automatic detection of a video signal in the following order of precedence:

- YPbPr-interlaced video
- S-Video
- Composite Video.

Writing to register 0x03 commands the system to a desired video input port.

Reading from register 0x04 presents the video input port that is currently active.

Note: Register 0x03 and 0x04 are applicable only to WVM1103 model.

3.2.6 Video rate

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x09	Set video rate (Tx only)	R/W	2	Byte0 = 1: 4 Mbps Byte0 = 2: 8 Mbps Byte0 = 3: 14 Mbps Byte0 = 4-7: reserved Byte0 = 0xFF: N/A (only on Read)	3 (14 Mbps)
				Byte1 = 0: Fixed rate Byte1 = 1: Limited Automatic rate (up to the rate set by Byte0) Byte1 = 2: Fully Automatic rate (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	2 (Fully Automatic)
0x0A	Video rate status	R	1	Byte0 = 0: No video transfer Byte0 = 1: 4 Mbps Byte0 = 2: 8 Mbps Byte0 = 3: 14 Mbps	N/A

The video transmission rate can be set to 4, 8 or 14 Mbps, or can be set to Limited Automatic or Fully Automatic.

When set to Limited Automatic, the system will select automatically the highest possible video rate, up to the value set in Byte0 of register 0x09. This setting may be used when the user wants to limit the system to 4 or 8 Mbps only, without trying to go to 14 Mbps.

When set to Fully Automatic, the system will select automatically the highest possible video rate.

Writing a value to register 0x09 commands the system to a desired video rate.

Reading from register 0x0A presents the video rate currently used by the system (i.e., the fixed video rate set by the user or the video rate selected automatically by the system).

3.2.7 Country Code (This function is not available for US model)

Sub-addr	Name	R/W	Size [bytes]	Value	Factory Setup

3.2.8 WLAN channel

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x11	Set WLAN channel (Tx only)	R/W	2	Byte0 = 1, 2, ... : Index of a fixed channel in the list of permitted channels, according to configured Country code.	1
				Byte0 = 0xFF: N/A (only on Read)	
				Byte1 = 0: Fixed channel Byte1 = 1: Automatic channel (Byte0 is ignored) Byte1 = 0xFF: N/A (only on Read)	1 (Automatic)
0x12	WLAN channel status	R	2	Byte0 = Channel number, according to Channel Table below, of actual channel.	N/A
				Byte1 = Index of actual channel in the list of permitted channels, according to configured Country code.	N/A

The WLAN frequency channel can be set to one of the permitted channels, according to configured Country code, or can be set to Automatic.

When set to Automatic, the system will select automatically the best available channel.

Writing to register 0x11 commands the system to a desired mode and channel.

Reading from register 0x12 presents the channel currently used by the system.

Channel Table

Channel Number (Hex)	Channel Frequency (GHz)
01	2.412
02	2.417
03	2.422
04	2.427
05	2.432
06	2.437
07	2.442
08	2.447
09	2.452
0A	2.457
0B	2.462
0C	2.467
0D	2.472
0E	2.484

Channel Number (Hex)	Channel Frequency (GHz)
22	5.170
24	5.180
26	5.190
28	5.200
2A	5.210
2C	5.220
2E	5.230
30	5.240
34	5.260
38	5.280
3C	5.300
40	5.320

Channel Number (Hex)	Channel Frequency (GHz)
64	5.500
68	5.520
6C	5.540
70	5.560
74	5.580
78	5.600
7C	5.620
80	5.640
84	5.660
88	5.680
8C	5.700
95	5.745
99	5.765
9D	5.785
A1	5.805
A5	5.825

3.2.9 Operation mode – local unit

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x13	Change operation mode	W	1	Byte0 = 0: Enter Sleep mode Byte0 = 1: Exit Sleep mode	N/A
0x14	Operation mode status	R	1	Byte0 = 0: Sleep mode Byte0 = 1: Idle mode Byte0 = 2: Work mode	N/A

Notes:

- Enter Sleep Mode command is applicable only when the unit is in Idle or Work mode. Entering Sleep mode stops any video and audio transfer.
- Exit Sleep Mode command is applicable only when the unit is in Sleep mode. The unit will switch to Idle mode.

3.2.10 Operation mode – remote unit

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x20	Remote operation mode change request	W	1	Byte0 = 0: Request to enter Sleep mode on the remote unit Byte0 = 1: Request to exit Sleep mode on the remote unit	N/A
0x21	Change request status	R	1	Byte0 = 0: Success of change request Byte0 = 1: Failure of change request Byte0 = 2: Request in progress	N/A

Notes:

- Enter Sleep mode request is applicable only when the remote unit is in Idle or Work mode. Entering Sleep mode stops any video and audio transfer.
- Exit Sleep mode request is applicable only when the remote unit is in Sleep mode. The unit will switch to Idle mode.
- Register 0x21 shows the status of the last change request.
When the request is in progress, the register will be set to 2.
In case of failure in executing the command (e.g., the remote unit is off), the register will be set to 1. It may take approximately 1 sec. to set the register to Failure value.
In case of successful execution the register will be set to 0.
The Success/Failure condition will remain set until the next request will start.

3.2.11 IR enable/disable

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x17	IR Enable/Disable (Rx only)	R/W	1	Byte0 = 0: Disabled Byte0 = 1: Enabled Byte0 = 0xFF: N/A (only on Read)	1 (Enabled)

The IR function can be enabled or disabled.

3.2.12 Discrete Inputs Status

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x19	Discrete Inputs Status (Rx only)	R	1	Byte0 = 0-7: Status of Discrete Input 1, 2, 3 at the Tx unit. Bit 0 is 1 when Discrete Input 1 is low; bit 1 corresponds to Discrete Input 2 and bit 3 corresponds to Discrete Input 3.	N/A

The Discrete Inputs Status is updated when there is a change in the input status at the Tx unit.

3.2.13 Wireless ID

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x1A	Wireless ID (Rx only)	R	16	Byte0-15 = Value of wireless ID string.	N/A

The Wireless ID string is a 128-bits (16-bytes) string, which identifies the Rx unit. It is used for communicating to the Rx unit from a PC equipped with Adimos PC Connectivity product.

3.2.14 RSSI Status

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x1B	RSSI status	R	1	Byte0 = 0-0x46 (0-70): RSSI in dB units	N/A

RSSI is an acronym for Received Signal Strength Indication. The RSSI value measures the signal relative to a calibrated noise floor. The noise floor is measured over the relevant bandwidth over a long time, and the minimum value establishes the calibrated noise floor.

The RSSI on the Rx side relates to the video stream direction; the RSSI on the Tx side relates to the Acknowledge packets direction.

The RSSI is updated every 100 mSec.

3.2.15 PER Status

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x1F	PER status	R	1	Byte0 = 0-0xC7 (0-199): PER in 0.5% units (e.g., 2 means PER of 1%) Byte0 = 0xC8 (200): the unit is not connected to a peer unit.	N/A

PER is an acronym for Packet Error Rate. While in video transmission, the PER is measured and updated at the Tx unit every 300 mSec.

Special values of the PER status register:

- When the unit is not connected, waiting for a peer unit to connect, PER status register is 200.
- When the unit is in sleep mode and connected to a peer unit, PER status register is 0.

3.2.16 Do Installation Process

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x22	Do Installation Process (Tx only)	W	1	Byte0 = 1: Do normal installation process Byte0 = 2: Do temporary installation process	N/A

The Installation Process is required for sending MAC and Wireless ID parameters from a Tx unit to a Rx unit. After the two units are “synchronized”, video/audio transfer can be done.

The normal installation process writes the Tx details in the Rx, in a list of recognized Tx units. (The Normal process is usually done by pressing the Installation button at the Tx unit).

The temporary installation process is for testing while in production. The Rx writes the Tx details in the list of recognized Tx units, but deletes the details when the Tx-Rx wireless link is cut off.

3.2.17 Discrete I/O Test Mode

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x23	Discrete I/O Test	R/W	1	Byte0 = 0: Normal operation of the Discrete I/O port Byte0 = 1: Enter Discrete I/O test mode	0 (Normal operation)

The Discrete I/O Test Mode is required for production testing of Tx and Rx units.

When in Discrete I/O test mode, the 4 LEDs (pin 1, 2, 3, 4 of the Discrete I/O port) are turned on.

When pin 5, 6, 7 or 8 of the Discrete I/O port is shorted to GND, the LED of pin 1, 2, 3 or 4, respectively, is turned off. All 4 input pins can be shorted to GND in any combination.

3.2.18 Reset unit

Sub-addr	Name	R/W	Size [bytes]	Value	Default
0x51	Reset unit	W	1	Byte0 = 1: Reset unit	N/A

Writing 1 to register 0x51 will cause the WVM to reset and restart into Idle mode.