## I.D.

# CAM ~ WAVE HD

# **CW-7**Operation Manual

EU Version 2<sup>nd</sup> Edition

IDX Company, Ltd.



 $\ensuremath{\mathrm{IDX}}$  thanks you for choosing the CW-7 and is sure that you will benefit from its unique features.

Please read this instruction manual to safely operate and to maximize performance.

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### I. SAFETY INSTRUCTIONS

To use this product safely and correctly please follow the safety precautions set out below. Product misuse may cause fire, shock, injury, product failure or other hazards. Please read this manual prior to using your CW-7 and retain for future reference.

## ♠ CAUTION

# Fire or electric shock may cause injury or other accidents.

- •Before using an external power supply, always check that the voltage is within the specified range and that the polarity of the connector is correct, as this will avoid smoke or fire.
- •Do not attempt to disassemble, modify or repair this product yourself. It may cause fire or electric shock. Please consult your dealer or local IDX office for inspection and repair services.
- •Do not use this product near water or in high humidity environments. It may cause fire or electric shock.
- •In case of damage, smoke, unusual smell or other unexpected situations, stop use immediately and consult your dealer or local IDX office.
- •Turn the power switch off if any liquid or substance gets inside the product. Continuous use under such condition may cause shortage, fire or electric shock.
- •When a battery is mounted on CW-7, or CW-7 is mounted on a video camera or on a monitor, please ensure that they are correctly and firmly locked.

# ⚠ CAUTION - continued Fire or excessive heat may cause

injury or damage to surroundings.

•If ventilation openings are blocked, this may cause excessive heat or damage.

•After long periods of continuous use, the case of the unit may become very heated – be cautious when touching.

•Using the CW-7 in an environment with a lot of moisture, soot or dust may cause excessive heat or electric shock.

•Do not stare at LED lights on the side panel of CW-7, as this may cause damage to the eyes.

•Do not place this product on an uneven or vibrating surface. It may cause malfunction or damage.

#### **CW-7 Important Notification of Use**

## **⚠** CAUTION

IDX requires that CW-7 TX (transmitter) be installed on the V-Mount interface of a video camera. Depending on connectivity, installing CW-7 TX with equipment other than a video camera may cause problems to CW-7 TX or other equipment.

For further information, and to install the CW-7 system with equipment other than a video camera, please contact your local IDX representative.

#### Caution on the use of this product and radio waves

- This product has been approved for technical standard compliance certification as a wireless device of radio stations with low antenna power specified under the ETSI Radio wave regulations. Therefore a license for radio station use is not required to operate this product.
- This product is allowed to be used only in Europe.
- This product is pursuant to the ETSI standard and can be used in both indoor and outdoor environments.
  - Please note that it is a user's responsibility to confirm an appropriate authority and use of wireless equipment in the each country.
- When the frequency selection SW is "DFS AUTO" mode, it will take about one minute to link the system in order to detect the presence or absence of radar wave in the area..
- CW-7 uses 5GHz band radio frequencies and it has been shown not to interfere with medical devices. However, when in use, it is recommended to keep the CW-7 at least 30cm (12in.) away from medical devices to ensure safety.

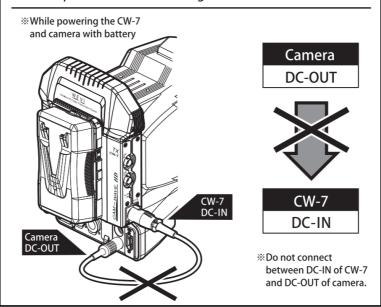


This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. In order to obtain the declaration of conformity statement for the European Union countries, please contact the appropriate IDX office.

## **CW-7 Important Notification of Use**



Please do not connect between DC-IN of CW-7 and DC-OUT of the camera while powering with battery as shown below. This may cause serious damages to the CW-7.



#### Attention: When used EXT-DC and battery simultaneously

- Mount a battery after EXT-DC power is turned ON.
- When EXT-DC power OFF and turns ON again, please remove battery.

### II. CONTENTS

#### 1. Product overview

The CW-7 is a wireless transmission device which transmits HD-SDI/SDI video and audio with 5GHz band radio frequencies. TX is the transmitter, and connects to a video source such as a video camera. RX is the receiver, and connects to a monitor, for example. Video and audio from the video source can be observed without cable connections. CW-7, also, provides DFS¹ function which enable to use indoor and outdoor without any concern of local wireless regulations. With the transmission output power in HIGH mode, the signals can be transmitted up to 50m (150ft) if a direct line-of-sight is offered between TX and RX.

#### **Features**

- Supported HD-SDI / SD-SDI input and output.
- Transmitting HD video (1080i, 1080p, 720p) and SD video (525i/625i)
- Supporting SDI embedded audio. (Audio CH1 and CH2 only)
- Transmission delay is less than 1msec.
- Signal protection by 128bit AES encryption (in UNICAST mode)
- WHDI technology supplied by AMIMON enables un-compressed high quality video transmission.
- Both automatic and manual selection of transmitted frequencies.
- Newly adopted DFS functionality allows for use in outdoors as well.
- Two-level select (HIGH/LOW) of transmission output power.
- Power can be supplied either by V-Mount type Lithium Ion battery or by EXT DC via XLR 4P connector.
- Backup power failure function enables switching to a battery if the external DC failed.
- Either of EXT DC or battery power supply to the camera thorough CW-7.

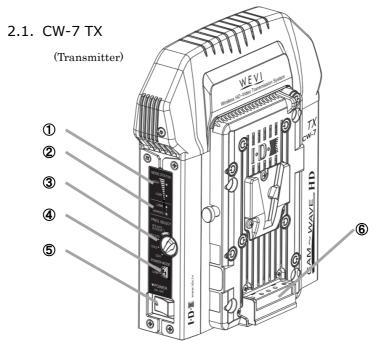
This function automatically changes the frequency used by the wireless equipment. The provided 5GHz band wireless equipment will not affect the weather radar.

<sup>&</sup>lt;sup>1</sup> DFS (Dynamic Frequency Selection):

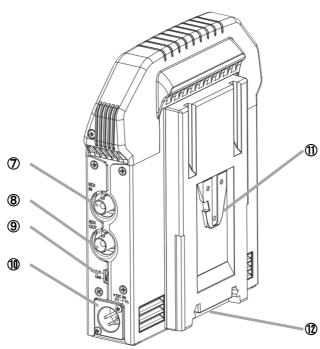
#### **Attention**

- \* The transmission distance may vary depending on frequencies, surroundings, radio wave conditions, buildings, weather condition etc. The transmission distance of 50m (150ft) is not definite.
- $\*$  When CW-7 is placed near a device such a TV, the transmitted video image may be disrupted. Please increase the distance between TV and CW-7 when this happens.
- \* In locations where other 5GHz wireless devices are operating, CW-7 may be affected by other devices causing disconnection and/or interruption of video.
- \* Signal reception may vary depending on height and angle of CW-7 placement. If reception is not stable then manually relocate to optimize the signal.

## 2. Switches and connectors

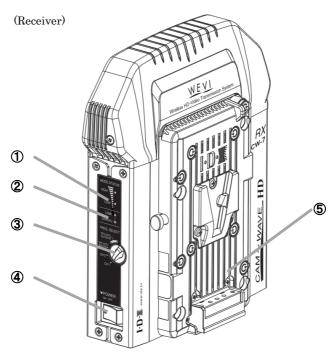


1. MODE STATUS LED	Indicate selected power output mode.	
2. LINK LED	Indicate link status (Linked or Searching).	
3. FREQ SELECT	Select transmission frequencies.	
	Manual selection : CH1 / CH2	
	Automatic selection :	
	DFS AUTO INDOOR / DFS AUTO OUTDOOR	
	In DFS AUTO position, transmission frequency is	
	selected automatically.	
4. POWER MODE	Select transmission power (HIGH / LOW)	
5. POWER SW	Turn ON / OFF the power of CW-7 TX.	
6. V-Mount	Mount V-Mount type Lithium Ion battery.	

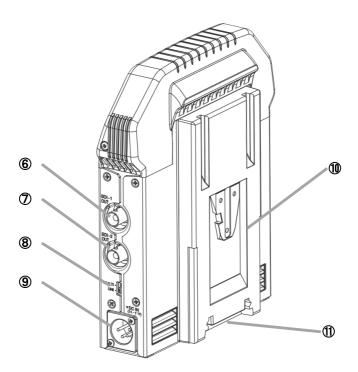


7. SDI IN	Connects the video source.		
8. SDI OUT	SDI Loop-thorough output.		
	Use for video monitoring.		
9. UNI/MULTI SW	Select the link mode.		
	♦ UNI :Unicast mode		
	♦ MULTI :Multicast mode		
10. DC-IN	Use when external power is connected.		
	♦ Connector : XLR-4P male connector		
	♦ Input range: DC 11 ~ 17V		
	♦ Pin assign : No.1:negative(-) No.4:positive(+)		
11. V-Plate	Attach the TX onto the V-Mount camera.		
12. Screw hole (Bottom)	Screw hole for mounting (3/8inch).		

### 2.2. CW-7 RX



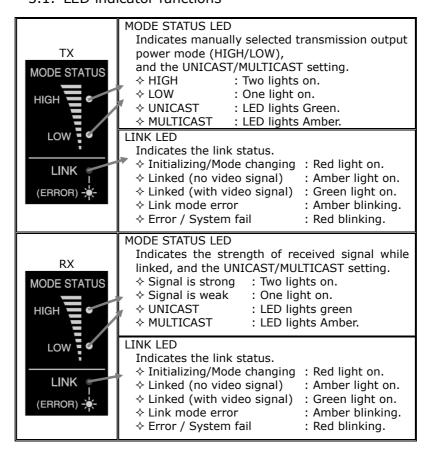
1. MODE STATUS LED	Indicate level of incoming signal.		
2. LINK LED	Indicate link status (Linked or Searching).		
3. FREQ SELECT	Select frequency.		
	Manual selection : CH1 / CH2		
	Automatic selection:		
	DFS AUTO INDOOR / DFS AUTO OUTDOOR		
	In DFS AUTO position, transmission frequency is		
	selected automatically.		
4. POWER SW	Turn ON/OFF the power of CW-7 RX.		
5. V-Mount	Mount V-Mount type Lithium Ion battery.		



6. SDI-1 OUT	Connect to the monitor, recorder, etc.		
7. SDI-2 OUT	Buffered out of SDI-1		
8. UNI/MULTI SW	Select the link mode.		
	♦ UNI :Unicast mode		
	♦ MULTI :Multicast mode		
9. DC-IN	Use when external power is connected.		
	♦ Input range: DC 11 ~ 17V		
	♦ Pin assign: No.1:negative(-) No.4:positive(+)		
10. V-Plate	Attach the RX to the V-Mount monitor, etc.		
11.Screw hole (Bottom)	Screw hole for mounting (3/8inch).		

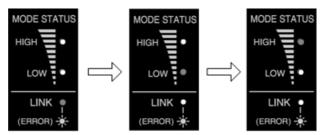
#### 3. LED indicators

#### 3.1. LED indicator functions

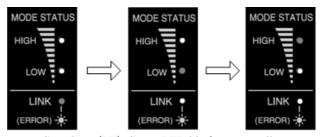


#### 3.2. CW-7 Link initialization

When the power switch is turned on, TX and RX will start searching for a frequency that it can be linked to. It will change the link mode if it is in operation or the transmission signal is lost. The three LED lights will cycle ON and OFF, starting from bottom to top until it is firmly linked. The LED lights switching is an indication that it is searching for a counter device.



Searching (TX): Green LED blinks repeatedly.



Searching (RX): Green LED blinks repeatedly.

## 4. Selecting frequencies and power output

FREQ SELECT switch is equipped on both TX and RX. POWER MODE switch is located on TX side only.

FREQ SELECT switch is used to select transmission and receiving frequency.

FREQ SELECT switch must be same position on both TX and RX.

POWER MODE switch enables you to change the transmission power, HIGH or LOW.

#### 4.1. Available frequencies and transmission power

The table shows the available frequencies and transmission power for EU region.

Channel	frequencies	Limitation	Transmitt	ted power
position	(MHz)	Limitation	HIGH	LOW
CH1	5190MHz	Indoor only		
CH2	5230MHz	Indoor only		
		Indoor only		
	Indoor use only.			
DFS AUTO	Automatic selection from the	System initialization		
INDOOR	following frequencies.	(link time) will take		
INDOOR	5270,5310,5510,5550,	one minute,		
	5590,5630,5670 MHz	and ten minutes at		
		5590,5630MHz	20mW/Ant.	5mW/Ant.
	Outdoor use allowed. Same function even if select	Indoor/Outdoor		
	either of two positions.	System initialization		
DFS AUTO	Automatic selection from the	(link time) will take		
OUTDOOR	following frequencies.	one minute,		
	5510,5550,5590,5630,	and ten minutes at		
	5670 MHz	5590,5630MHz		

There is a strict regulation allowing certain frequencies for indoor use only. Please note that uses of unauthorized frequencies outdoors may be a violation of the law.

#### 4.2. DFS function

When the FREQ SELECT switch selects DFS AUTO, DFS (Dynamic Frequency Selection) function will be enabled. If DFS detects radio waves of weather radar (using 5GHz band) the system will automatically search other available frequency band to avoid interference.

The DFS function is regulated by the radio standard for use the frequencies of  $5250 \cdot 5300 MHz$  and  $5470 \cdot 5725 MHz$ .

There are two positions of "DFS AUTO OUTDOOR" and "DFS AUTO INDOOR".

#### • DFS AUTO INDOOR

This frequency band can be used indoors. Automatically selects from seven frequencies bands, shown in the table on P.15.

#### • DFS AUTO OUTDOOR

This frequency band can be used in both outdoor and indoor. Automatically selects from five frequency bands, shown in the table on P.15.

#### **Important Notes**

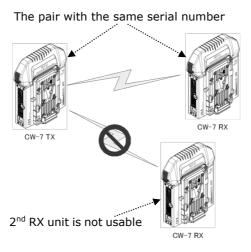
- \* When DFS AUTO is selected, waiting time of the link will be one minute or more due to initialization.
- \* The waiting time (one minute) occurs in the following cases:
  1.Power turned ON and FREQ SELECT switch is set to DFS AUTO.
  2.FREQ SELECT switch changed to DFS AUTO position during operation.
- \* While the system is initializing, the RED and GREEN LINK LED will switch back and forth from bottom to top repeatedly.
  - →Refer P.14 "CW-7 Link initialization"
- \* In the event of conflict with radar wave, DFS automatically enables to connect to another available frequency without interrupting the video.
- \* MULTICAST with DFS AUTO will not function simultaneously and Amber LED blinks as "LINK MODE ERROR".
  - →Refer P.13 "LED indicator functions"
- \* When DFS AUTO is selected, waiting time of the system link will be one minute or ten minutes, depend on the frequency selected.
  - →Refer P.15 "Available frequencies and transmission power"

## 5. Link mode -UNICAST/MULTICAST

UNI/MULTI switch is used to select the link mode. UNI/MULTI select switch is located on both TX and RX and must be set in the same mode.

#### 5.1. UNICAST mode (1 to 1 communication)

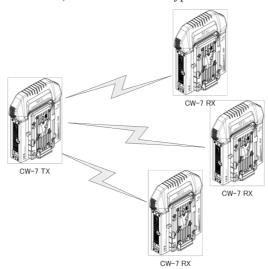
When UNI/MULTI switch is set to UNI position, CW-7 links in UNICAST mode. In UNICAST mode, the system communicates only between the TX and RX with the same serial numbers. The transmission signal is encoded by 128bit AES encryption therefore it will not be intercepted by other CW-7 nearby.



**UNICAST** operation

#### 5.2. MULTICAST mode (1 to n communication)

When UNI/MULTI switch is set to MULTI position, the CW-7 links in MULTICAST mode. In MULTICAST mode, the transmitted video and audio can be received by multiple RX. Please note that if MULTICAST mode had been selected, there is no AES encryption.



**MULTICAST** operation

There is no limit on the number of receiving CW-7 RX in MULTICAST mode as long as they are within reach of the transmitted signal and existing environmental conditions are taken into regard.

#### **Important Notice**

- \* MULTICAST function denied when DFS AUTO is selected.
  When the FREQ SELECT switch selected at DFS AUTO, the link LED display as "Link mode error".
  - $\rightarrow$ Refer P.13 "LED indicator functions"
- \* CH1 and CH2 (non-DFS band) are limited to use for MULTICAST operation.

#### 6. Operation guide

#### 6.1. Set up

The CW-7 does not include various accessories that may be used in its operation. Please obtain each of the following items as needed for your specific application before use.

- BNC cable for HD-SDI IN and OUT.
- IDX ENDURA batteries or external power supply Note: Power supply; Use only an AC adaptor or batteries specified below.
  - ➤ CW-7 accepts the DC power range of 11V 17V.
  - > EXT DC-IN connector is XLR-4P male, Pin No.1: negative (-), Pin No.4: positive (+).

Note: Please do not apply over-voltage or reverse-polarity voltage as it will cause serious damage to the system.

#### 6.2. Operating procedures

- Attach the TX to the V-Mount on the camera or other video source device and RX to the monitoring side with same manner. If either device does not have a V-Mount, use an applicable adapter.
- 2. Connect the SDI output of camera and SDI input of TX with a BNC cable. Then connect the SDI output of RX and SDI input of monitoring or other devices with BNC cable.
  - TX has loop-through SDI output and RX has buffered SDI output equipped for ease of use.
- Attach the fully charged ENDURA batteries to TX and RX, or plug in the 4P- XLR connector to EXT DC input.
  - Note: DC voltage will be supplied for both CW-7 and video camera/monitors simultaneously.
- Set the FREQ SELECT, POWER MODE, UNI/MULTI switches on both TX and RX in appropriate position.
- 5. Turn the power switch ON; the LED shows link initialization status. Please Refer P.14 "CW-7 Link initialization".

#### 6.3. When signal reception is unstable

Unstable signal reception may be caused by the placement, such as position, height and angle of TX and RX or the operating environment. When TX and RX are placed too close to each other, the transmission signal may become too strong and may disturb the video signal. Please set the POWER MODE switch on the TX to LOW position when the distance between TX and RX is 3m or less.

#### 6.4. Power back-up function

When operating the system by using external EXT DC, a power failure can be prevented by mounting ENDURA battery on TX and/or RX simultaneously. This function enables for continuous operation of the system even when an accidental EXT DC power failure occurs.

#### 6.5. Power through feature

The power switch located on the CW-7 will be turned ON and OFF of the CW-7 and this ON/OFF switch will not affect the supplying of power to the other devices. This feature is available on both the battery and EXT DC operation.

#### 7. Important notice

- The available service frequencies and transmission power varies depending on the designated regions because each region has different local regulations and restrictions of radio waves. Therefore, all the CW-7s are programmed accordingly to each region, thus, shipment and usage of the CW-7 in an unspecified region may cause violation of law.
- Use of 5GHz band in outdoors has been limited by the frequency. DFS AUTO OUTDOOR position allows to use in outdoor. When operate in indoor, CH1,CH2 and DFS AUTO INDOOR should be selected.
- The maximum transmission range depends on the selected frequency, surrounding environment, radio wave conditions, composition of the wall, weathering, etc. Thus the specification of the transmission range is 50m/150ft with POWER MODE HIGH, however this is not a definite range.
- 4. When TX and RX are placed too close to each other, the transmission signal becomes too strong and may disturb the video signal. Please set the POWER MODE switch on the TX to LOW position in case of when the distance between TX and RX is 3m or less.
- CW-7 has a built-in antenna and modification of adding external antenna is not authorized by IDX. This may affect the performance of CW-7 and void IDX standard warranty.
- $6. \quad SDI \ \ signal \ \ complies \ \ with \ \ SMPTE-292M/SMPTE-259M \ \ however, \\ clock jitter \ may \ exceed \ the \ regulated \ values \ caused \ by \ link \ condition.$
- 7. SDI embedded audio channels are Ch1 and Ch2.
- Quality of wirelessly transmitted signal may not be the same as the quality of when using coaxial cable as the transmission quality varies by operational conditions and environment.
- IDX recommends attaching the TX onto the camera with IDX standard V-Mount adaptor installed. If the V-Mount on the camera is made by an unknown third party, it may cause an unexpected malfunction.

## III. Specifications

## 8. CW-7 TX

Video · Audio				
Video input signal	SD-SDI(SMPTE 259M-C)			
	HD-SDI(SMPTE 292M)			
Audio input signal	SDI Embedded			
	(Embedded Audio C	H1,CH)		
Monitoring	SD-SDI/HD-SDI thro	ough out		
Video Format	HD: 4:2:2 YCbCr 10	bit		
	1080/59.94i, 10	80/50i,		
	1080/29.97p, 10	080/25p, 1080/	24p, :	1080/23.98p,
	1080/30PsF, 108	30/29.97PsF, 10	80/25	5PsF, 1080/24PsF,
	1080/23.98PsF,			
	720/59.94p, 720	0/50p		
	SD: 4:2:2 YCbCr 10	bit		
	525i/59.94, 625	i/50		
Wireless transmission				
Frequency	EU Region:			
	Frequencies (MHz)	Regulation	DFS	SW select
	5190,5230	Indoor only	OFF	CH 1,2
	5270,5310	Indoor only	ON	DFS AUTO Indoor
	5510,5550,5590,	Indoor /	ON	DFS AUTO Indoor /
	5630,5670	Outdoor		DFS AUTO Outdoor
	Frequency bandwidt	h: 40MHz		
Transmission power	EU Region:			
	Power Mode HIGH:	•		
	Power Mode LOW:	•		
Transmission distance	50m / 150ft (outdoor LOS)			
Transmission format	MIMO / OFDM / JSCC			
Antenna	Built-in			
	DOWNLINK x4 / UPL	_INK x1		
Coding AES 128bit				
	(only UNICAST mode)			
Link mode	UNICAST / MULTICAST			

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Indication and Operation				
Power SW	Power ON/OFF			
Frequency select SW	Frequency/DFS mode select (5 position)			
Power mode SW	Transmission power HIGH / LOW select			
UNI/MULTI select SW	UNICAST / MULTIC	AST select		
Status LED	MODE STATUS LED	: RED • GREEN two colour LED ×2		
	LINK LED	: RED · GREEN two colour LED ×1		
Power				
Power input	Battery input: 11-1	17V / Ext-DC input: 11-17V		
Power output	Through-out the D	C power (Battery or Ext-DC)		
Recommended battery	IDX ENDURA series	s Lithium Ion battery		
In and Out terminal				
Video input	BNC ×1	(SD-SDI/HD-SDI)		
Video out	BNC ×1	(SD-SDI/HD-SDI · Loop through out)		
Battery input	V-Mount ×1	(P-V2 equivalent)		
DC power output	V-Plate ×1	(A-NH2E equivalent)		
Ext-DC input	Canon XLR-4 ×1	(Female, Pin1:minus, Pin4:plus)		
Product specification				
Dimension	Width 159mm Depth 72mm Height 190mm (W6.3, D2.8, H7.5 inches)			
Weight	850g / 1.9Lb			
Power consumption	Max 12W			
Operating temperature	0~40°C (No Dew)			
Regulation/Certification	CE: EN62311			
	EN301 489-1			
	EN301 489-17			
	EN301 893			
	EUROPEAN COUNCIL DIRECTIVE 2006/95/E			
	European Standard 2006/95/EC			
	EN60950-1 / IEC 60950-1			
	RoHS			

## 9. CW-7 RX

Video · Audio				
Video output signal	signal SD-SDI(SMPTE 259M-C)			
video output signai				
	HD-SDI(SMPTE 292M)			
Adia akakaiaaal	BNC x2 (Buffered or	atput)		
Audio output signal	SDI Embedded	ua cua)		
\". C .	(Embedded Audio C			
Video format	HD: 4:2:2 YCbCr 10			
	1080/59.94i, 10		24.	1000/22 00
	1080/29.97p, 1		. ,	, , ,
	1080/30PSF, 108 1080/23.98PsF,	30/29.9/PSF, 10	80/2	5PsF, 1080/24PsF,
	720/59.94p, 72	0/50p		
	SD: 4:2:2 YCbCr 10	<i>'</i>		
	525i/59.94, 625			
Wireless transmission		, = -		
Frequency	requency EU Region:			
	Frequencies (MHz)	Regulation	DFS	SW select
	5190,5230	Indoor only	OFF	CH 1,2
	5270,5310	Indoor only	ON	DFS AUTO Indoor
	5510,5550,5590,	Indoor/Outdoor	ON	DFS AUTO Indoor /
	5630,5670			DFS AUTO Outdoor
	Frequency bandwidt	h : 40MHz		
Power of return signal	EU Region:			
Up-link signal at	14dBm			
UNICAST mode				
Transmission distance	50m / 150ft (Outdoor LOS)			
Transmission format	MIMO / OFDM / JSCC			
Antenna	Built-in			
	DOWNLINK x5 / UPLINK x1			
Coding	AES 128bit			
-	(only UNICAST mode)			
Link mode	UNICAST / MULTICAST			

Indication • Operation			
Power SW	Power ON/OFF		
Frequency select SW	Frequency/DFS mode select (5 position)		
UNI/MULTI select SW	UNICAST / MULTIC	AST select	
Status LED	MODE STATUS LED : RED · GREEN two colour LED ×2 LINK LED : RED · GREEN two colour LED ×1		
Power			
Power input	Battery input: 11-1	7V / Ext-DC input: 11-17V	
Power output	Through-out the Do	C power (Battery or Ext-DC)	
Recommended battery	IDX ENDURA series	Lithium Ion battery	
In and Out terminal			
Video input	BNC ×2	(SD-SDI/HD-SDI · buffered out)	
Battery input	V-Mount ×1	(P-V2)	
Power out	V-Plate ×1	(A-NH2E equivalent)	
Ext-DC input	Canon XLR-4 ×1	(Female, Pin1:minus, Pin4:plus)	
Product specification			
Dimension	Width 159mm Depth 72mm Height 190mm (W6.3, D2.8, H7.5 inches)		
Weight	800g / 1.8Lb		
Power consumption	Max 12W		
Operating temperature	0~40°C (No Dew)		
Regulation/Certification			

## IV. Warranty & Service

- Warranty period of the CW-7 is two years after purchase.
- Warranty may be voided within the warranty period when IDX identifies the following:
  - ➤ Improper use of CW-7
  - > Malfunction/damage due to excess or deficiency of power
  - ➤ Malfunction/damage due to short circuit of the power
  - ightharpoonup Physicall damages caused by dropping or vibration
  - > Malfunction/damage due to water immersion
  - Unauthorized used and/or modification done by customer
- When any assistance is required, please contact your IDX dealer or appropriate IDX office below.

#### Contact us

#### IDX Technology Europe, Ltd.

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CW-7 Manual, EU version.

XXWK120217

2<sup>nd</sup> Edition, 30 Nov. 2012

IDX Company, Ltd.



#### FOR SALES AND SERVICE CONTACT

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