ZPro-C1/ZPro-C2

User Guide and Installation Manual

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Safety Precautions

The presence of this symbol is to alert the installer and user to the presence of uninsulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to produce a risk of electric shock.

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS DEVICE TO RAIN OR MOISTURE. DO NOT OPEN THE UNIT. REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

- ➢ DO NOT apply power to the unit until all connections have been made, all components have been installed and all wiring has been properly terminated.
- ➢ DO NOT terminate, change or uninstall any wiring without first disconnecting the unit's power adapter from the device.
- ➢ This device is supplied with the appropriately rated power supply. The use of any other power supply could cause damage and invalidate the manufacturer's warranty.
- ➢ DO NOT connect the power cord to the device if the power cord is damaged.
- ➢ DO NOT cut the power cord.
- ➢ DO NOT plug the power cord into an AC outlet until all cables and connections to the device have been properly connected.
- ➢ The device should be installed in an environment consistent with its operating temperature specifications. Placement next to heating devices and ducts is to be avoided as doing so may cause damage. The device should not be placed in areas of high humidity.
- ➢ DO NOT cover any of the device's ventilation openings.
- ➢ DO NOT cover or obstruct the device's fan or fan openings.
- ➢ If the device has been in a cold environment allow it to warm to room temperature for at least 2 hours before connecting to an AC outlet.

Package Contents

This package contains:
- ➢ ZPro-C1 or ZPro-C2 Encoder / Modulator
- ➢ DIN cable(s)
- ➢ One installation / configuration manual

Inspect the package before starting installation to ensure there is no damage and all supplied contents are present.

Section 1

Introduction

The **ZyCast** ZPro-C Series is a single or dual version, engineered to meet the high demands of commercial, hospitality, higher education, and advanced video systems. This encoder-modulator series delivers broadcast-quality video all within a sleek and compact 1RU design. Equipped with a robust set of features, the ZPro Series offers performance and flexibility. Key functionalities include IP streaming capabilities, GOP control (factory set), and separate R J-45 port s for IP streaming and remote setup. Users can also choose between MPEG-2 and H.264 outputs, ensuring compatibility with diverse video systems and requirements.

- QAM 64 / QAM 256 output
- High Resolution up to 1080i/1080p
- 3 VCN Modes
- GUI for easy setup and control
- HDMI, Component / Composite via DIN cables
- MPEG2 or H.264 (AVC) Video (Selectable) Output
- > +43dB MER
- Closed Captioning Support
- 25 dBmV Output
- Rack mountable (with provided rack mount ears)

ZyCast ZPro Series of Encoders (ZPro-C1/ZPro-C2)
ZyCast Compact Encoder/Modulator

MPEG-2 / H.264 Video Encoding with QAM and IP out.
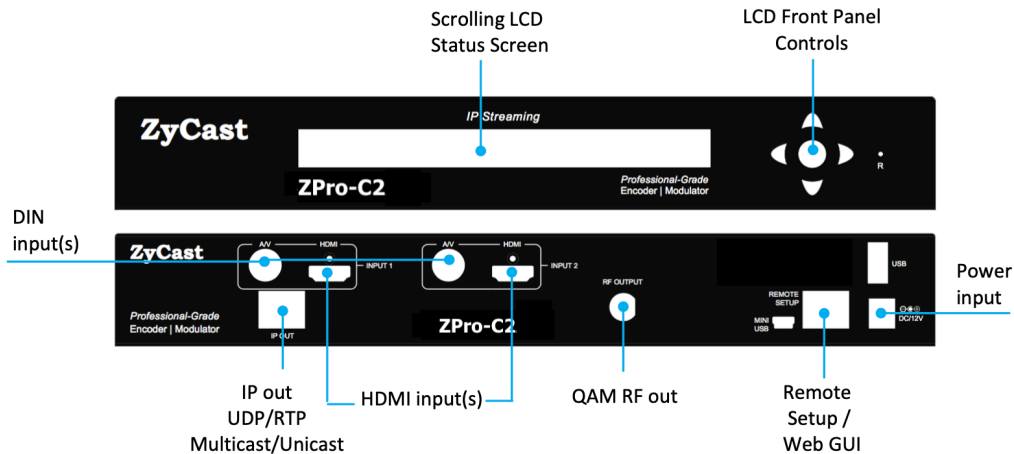
- Available in Single or Dual Inputs (ZPro-C1 / ZPro-C2)
- Simultaneous QAM / IP Out
- HD/ SD Video Bitrate Control
- H.264 or MPEG-2 Video Encoding (Selectable)
- HDMI in / DIN input (Component / Composite) inputs
- Rack Mountable (with rack mount kit)
- MPEG-1 Layer II / MPEG-2 AAC/ MPEG-4 AAC /AC-3 Pass Through

Specifications

Parameter	ZPro-C1 / ZPro-C2
Inputs	
HDMI 1.4	Single / Dual Connector
Component / Composite	Single / Dual-Input Mini DIN to 6x RCA (Y, Pb, Pr) or (Video, Audio L & R)
Audio	HDMI: Embedded PCM ; Component / Composite: Analog
Encoding Profile	
Resolution	1080p (H.264 Only) / 1080i / 720p/ 480p / 576i / 480i
Video Codecs MPEG-2	MP@HL
Video Codecs H.264 (HD)	1920 x 1080p60 High Profile @Level 4.2 1920 x 1080p30 High Profile @Level 4 1280 x 720p60 Main Profile @Level 3.2 1280 x 720p30 Main Profile @Level 3.1
Video Codecs H.264 (SD)	720 x 480p60 Base Profile @Level 3 720 x 480p30 Base Profile @Level 3 720 x 576p50 Base Profile @Level 3 720 x 576p25 Base Profile @Level 3
Video Bitrate (per video)	MPEG-2: 10.0-15.7 Mbps (HD)/ 2.0-8.0 Mbps (SD) H.264: 2.0-10.0Mbps (HD) / 1.0-4.0 Mbps (SD)
Audio Codecs	MPEG-1 Layer II / MPEG-4 AAC / AC-3 Pass Through
Closed Captioning	Composite / EIA-608
GOP	Open / Closed (Options Available while Ordering, Factory Setting not User Adjustable)
RF Output	
RF Connector	1 x "F" Female
Modulation	64-QAM / 256-QAM
Standard	J.83 Annex B
Frequency Range	57 to 861 MHz (Under STD Mode)
Channels' Bandwidth	6 MHz
Output Level	98 dBμV Typical
Level Adjustment	0 to 20dB
Carrier Suppression	55 dB
VCN	Auto (Major & Minor) / Manual (Major & Minor) / Manual (One Part)
Output Return Loss	10 dB Typical
MER	41 dB Typical
IP Output	
Connector	Single RJ45
Standard	Web Management: 100Base-T Ethernet , Full Duplex IP Streaming Output: 1000Base-T Ethernet, Full Duplex
UDP / RTP	Unicast / Multicast Supported
General	
Power Supply	12VDC 3A
Consumption	13W Typical for Single-Input Model; 18W Typical for Dual-Input Model
Fan Cooled	Internal
Weight	ZPro-C1 approx. 4.58 lb / ZPro-C2 approx. 4.63 lb

* Specifications subject to change without notification

Installation

System Installer must adhere to Article 820-40 of the NEC that provides guidelines for proper grounding and specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as possible.

Unpacking and Inspection

Each unit is shipped factory tested. Ensure all items are removed from the container prior to discarding any packing material.

Thoroughly inspect the unit for shipping damage with particular attention to connectors and controls. If there is any sign of damage to the unit or damaged or loose connectors contact your distributor immediately. Do not put the equipment into service if there is any indication of defect or damage.

Hardware Installations and Connections

   It is highly recommended that quality cables and connectors be used for all video and audio source connections.
1.   The unit can be rack mounted in a standard EIA19" rack using the provided rack ears kit. Connect the right and left rack mount ears (if rack-mounting).

2.   The unit comes with HDMI and Component/Composite (via DIN) inputs. Connect the required cables to the back of the unit using a HDMI or DIN cables.

   Repeat this step for each video source connection.

   Be sure the connections for each source are consistent with the unit's inputs (IN1…IN2).

3.   Use a quality 75Ω coaxial cable with "F" connectors from the unit's **RF Output.**

4.   Connect the included power cord to the unit's **POWER** plug.

5.   Connect the power cord to an appropriately rated AC power outlet.

DEVICE Programming and Setup:

Connecting to the GUI Interface:

Factory Default IP: 192.168.1.9

   1. Connect an Ethernet cable to the Remote Setup Port of the ZPro-B2 and to your PC/Laptop.

   2. Modify your PC/Laptop's IP address to 192.168.1.50.

   3. Enter '192.168.1.9' into your web browser.

   4. Make all required parameter changes.

   5. Save all changes.

Encoder Programming and Setup via GUI Interface:

After connecting the device to the **Remote Setup** port located on the rear of the device and connecting to a PC / Laptop.

Step 1: Enter Device's IP address in web browser.

| Overview | Encoder Setup | Streaming Setup | Output Setup | Network Setup | Administration |

Device Name	Model Name	Serial Number	System	Firmware Version	Net Version
ZYCAST-335794	ZPro-C2	2335 335794	Cable / IP	20220804_0940	20220728_0918

RF1

Stream1
Stream2
Unused

Ch 7(177.0000MHz)
256QAM
17.0733 / 38.8100 Mbps

Stream	Video Input	Video Output	Audio Output	Video Mode	Bitrate	Status	Streaming Destination	Streaming Output	RF
1	Auto Detect	MPEG2 CBR	AC3	SD	8.5367	Freerun	rtp://192.168.1.20:10000	Active	1
2	Auto Detect	MPEG2 CBR	AC3	SD	8.5367	Freerun	rtp://192.168.1.21:10000	Active	1

Command Processing:
Please note that upon system initialization, the hardware will boot in a few minutes and then populate system parameters.
There may be a small delay in menu page updates that are performed after the hardware changes are complete.

Step 2: Enter User Name/Password

Select Encoder Setup

After selecting the Encoder Setup Tab the user will be prompted to enter the user name and password for device.

GUI Login Password:

Default User Name: **admin**
Default Password: **Admin123**

Note: To change the Password for the GUI go to the Administration Tab.

Step 3: Encoder Setup

Encoder Setup

This page allows the user to configure the parameters of each encoder. After changes are made, use the `Save and Confirm` button. The demodulators will apply the new settings.

	Encoder 1	Encoder 2
RF #	1	1
Short Name	DTV-101	DTV-102
Long Name	ATSC-digi-TV-101	ATSC-digi-TV-102
VCN	101.1	102.1
VCN Mode	Manual(two-part)	Manual(two-part)
Source ID	101	102
Video Input	Auto Detect	Auto Detect
Video Output	MPEG2 CBR	MPEG2 CBR
Aspect Ratio	16:9	16:9
HD Bitrate	14.8	14.8
SD Bitrate	8.0	8.0
Audio Input	Auto Detect	Auto Detect
Audio Output	MPEG1 Layer2 (MP2)	MPEG1 Layer2 (MP2)
Brightness	128	128
Contrast	128	128
Saturation	128	128
Hue	128	128
TS ID (IP only)	1000	1001
Program Number	1	2
HDCP (test mode)	Active	Active
Closed Caption	Active	Active
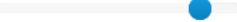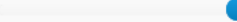
Save and Confirm   Cancel

Encoder Setup page allows the integrator to select and set the parameters needed for each stream.

1. **Select** the "Edit" Icons for the Encoders.
   (Both Encoders can be managed at the same time)

Encoder Setup

This page allows the user to configure the parameters of each encoder. After changes are made, use the `Save and Confirm` button. The demodulators will apply the new settings.

	Encoder 1 ☑	Encoder 2 ☑
RF #	1	1
Short Name	DTV-101	DTV-102
Long Name	ATSC-digi-TV-101	ATSC-digi-TV-102
VCN	101.1	102.1
VCN Mode	Manual(two-part)	Manual(two-part)
Source ID	101	102
Video Input	Auto Detect	Auto Detect
Video Output	MPEG2 CBR	MPEG2 CBR
Aspect Ratio	16:9	16:9
HD Bitrate	⬤	14.8
SD Bitrate	⬤	8.0
Audio Input	Auto Detect	Auto Detect
Audio Output	MPEG1 Layer2 (MP2)	MPEG1 Layer2 (MP2)
Brightness	⬤	128
Contrast	⬤	128
Saturation	⬤	128
Hue	⬤	128

2. **Select** and **set** the specific parameters settings as required.

3. After setting all the required parameters- **Select** the edit icon again.
   - Note: All changed parameters will be shown in red.

Encoder Setup

This page allows the user to configure the parameters of each encoder. After changes are made, use the `Save and Confirm` button. The modulator(s) will apply the new settings.

	Encoder 1	Encoder 2
RF #	1	1
Short Name	DTV-101	DTV-102
Long Name	ATSC-digi-TV-101	ATSC-digi-TV-102
VCN	101.1	102.1
VCN Mode	Manual(two-part)	Manual(two-part)
Source ID	101	102
Video Input	HDMI	Component
Video Output	H.264 CBR	MPEG2 CBR
Aspect Ratio	16:9	16:9
HD Bitrate	8.0	14.8
SD Bitrate	4.0	8.0
Audio Input	Auto Detect	Auto Detect
Audio Output	MPEG1 Layer2 (MP2)	MPEG4 AAC
Brightness	128	128
Contrast	128	128
Saturation	128	128
Hue	128	128
TS ID (IP only)	1000	1001
Program Number	1	2
Closed Caption	Active	Active

[Save and Confirm] [Cancel]

4. **Select** "Active/Inactive" to activate for remaining parameter(s) as required.
5. **Select** "**Save and Confirm**" to save all changed parameters.
6. **Select** "Apply" in the pop-up window.

⏻ Apply changes   ×

Apply 6 changes to this device?

[Apply] [Cancel]

7. Repeat process for each encoder or if additional changes are required.

VCN Modes:

The ZPro-C Series offers 3 VCN (Virtual Channel Number) Modes.

1. **VCN (Auto two-part)-**VCN Auto 2-part- will force the VCN channels to be based on the CH/freq. selected on the Output Setup page of the device.

Examples:

CH	VCN Channel
57	57.1, 58.1
101	101.1,102.1
134	134.1, 135.1

2. **VCN (Manual two-part)-** VCN Manual 2-part- will allow the installer to control VCN channels regardless of the CH/freq. selected on the Output Setup page of the device.

Examples:

CH	VCN Channel
57	55.1, 57.2
101	101.1,107.1
134	134.2, 135.2

3. **VCN (Manual one-part)-**VCN Manual 1-part- will allow the installer to control VCN channels regardless of the CH/freq. selected on the Output Setup page of the device.

Examples:

CH	VCN Channel
57	59, 69
101	101,107
134	133, 135

Section 4 AV over IP Setup

Streaming Setup

Streaming Setup

This page allows the user to configure the streaming settings. Enter the **Streaming Destination** and **TTL** information for each Stream. Use the `Save and Confirm` button to save any changes made. The Streaming engine will apply the new settings.

□ Enable	Streaming Destination	TTL
☑ 1	rtp://224.1.1.20:10000	4 ⌄
☑ 2	rtp://224.1.1.21:10000	4 ⌄

Save and Confirm   Cancel

Input format: [protocol]://[IP]:[port]

Protocol
- **UDP**: The most common low-level protocol to use multicast addressing.
- **RTP**: A protocol provides facilities for jitter compensation and detection of out of sequence arrival in data.

IP address
- **IP Multicast**: Multicast addresses are defined by the leading address bits of 1110(224.0.0.0/4).

UDP and RTP port
- Port number is a 16-bit unsigned integer, thus ranging from 0 to 65535.
- Specific port numbers are often used to identify specific services.
- Of the thousands of enumerated ports, 1024 well-known port numbers are reserved by convention to identify specific service types on a host.

Example
- UDP multicast: udp://224.1.1.1:1234
- RTP unicast: rtp://123.234.135.79:28450

1. **Enable** the Stream by selecting the check box 1-2.
   (All streams can be enabled at the same time by using the "master" checkbox)
2. **Enter** the stream Destination IP [example: udp://224.1.1.4:1234].
3. **Set** the TTL value.
4. **Select** 'Save and Confirm' once all the streams are setup.

Disabling IP Stream(s):

To disable an IP Stream **uncheck** the checkbox in front of the appropriate IP Stream_ID

Output Setup
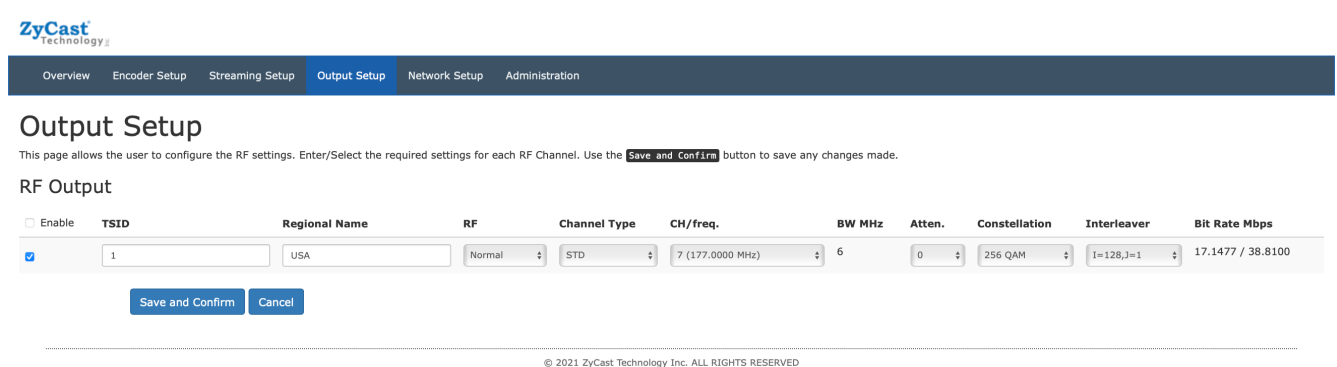
Use the Output Setup page to set the RF output type, RF Output CH/frequency, Attenuation, QAM, and Interleaver.

1. **Enable** the RF by checking the checkbox. (Factory Default is enabled)
2. **Select and set** the required parameters for your installation:
    RF: Normal, C.W., Inverted (Factory Default is Normal)
    Channel Type: STD, HRC, IRC (Factory Default is STD)
    CH/Freq.: Factory Default is 101.
    Attenuation: 0 ~ -20 (Factory Default is 0)
    Constellation (QAM Type): 256 QAM, 64 QAM (Factory Default is 256)
    Interleaver: Factory Default is I=128, J= 1.

Save and Confirm all changes settings on Output Setup page.

Application Note:

When installing more than 1 device into a system, each device must have a unique RF TS_ID.

We highly recommend you save your encoder configuration files.
See Administration tab for how to backup device settings.

Section 6 Network Configuration

Network Setup Tab

Management IP Setup:

Use the Network Setup to configure the device's Management Port's IP address (GUI address) of the device, Subnet Mask, Gateway, Enable/Disable DHCP, and set Host Name.

Save and Confirm: Once all parameters are set remember to Save and Confirm all changes.

Note: Above example shows current GUI IP as 192.168.8.210.

Factory Default GUI IP is 192.168.1.9.

Streaming IP SETUP:

Use the Streaming IP tab to modify the Streaming IP port of the device as required.

Save and Confirm: Once all parameters are set remember to Save and Confirm all changes.
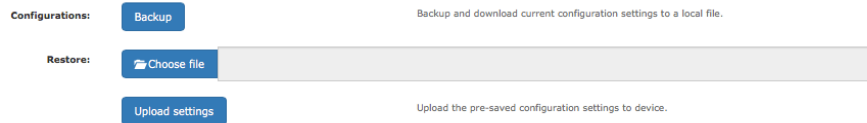
Section 7 Administration

Administration

Reboot Device

Reset to default

Backup and Restore Configuration

Configurations:	Backup	Backup and download current configuration settings to a local file.
Restore:	Choose file	
	Upload settings	Upload the pre-saved configuration settings to device.

Reboot Device
Click the 'Reboot Device ' button to reboot the device from within the GUI.

All unsaved changes will be lost.

Reset to Default
Click the 'Reset to Default' button to disregard any parameter changes made to the device.
Note: Device settings will revert to factory default settings.

Backup and Restore Configuration
Saving your configuration files
We highly recommend you save your encoder configuration files. Simply **Click** the **"Backup"** button and the config files will be saved to your computer.

Backup:

We highly recommend saving your device's setting.

1.   Select Administration tab.

2.   Select backup from the menu.

3.   Locate (configs.hex) files and name file for future use.

Restore:
1. Select Administration tab.
2. Select "Browse"
3. Locate the required file to be imported.
4. Select "Upload" to import the selected file into the device.
   Note: backup can be imported to assist in setting up new or multiple devices onsite.
      Remember to save and backup any and all changes.

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Change Password:

Use the Change Password section to change or modify the device's password as desired.

Change Password

CAUTION: The new password must contain:

- 6~8 characters
- At least one digit
- At least one uppercase character
- At least one lowercase character

Old Password: [   ]

New Password: [   ]

Retype New Password: [   ]

Save and Confirm

After changing the password use the Save and Confirm button. The browser will redirect to the Overview page allowing the user to use the new password.

Save and Confirm new password.

References:
Private Address Ranges, IPv4

Private IPv4 addresses are addresses set aside by the IANA (Internet Assigned Numbers Authority) for use within networks that will not directly communicate or not be seen by the internet. These private addresses cannot be used on the Internet or be used to communicate with the Internet. ISP's filter out and delete packets using private IP addresses. Any organization that uses private IP addresses on devices that communicate with the internet must use a device that performs Network Address Translation.
Anyone can us private addresses and they are not required to seek permission to use them. Again, networks using private IP addresses cannot communicate directly with the internet.

There are three blocks of addresses that are set aside by IANA for use in private internets and are not publicly routable on the global
internet:
Private Class A Range: 10.0.0.0 - 10.255.255.255
Private Class B Range: 172.16.0.0 - 172.31.255.255
Private Class C Range: 192.168.0.0 - 192.168.255.255

It is important to note that only *some* of the 172.xx.xx.xx and the 192.xx.xx.xx address ranges are designated for private use. The remaining addresses are public and can be routable via the global Internet.

More information regarding private addresses can be found at http://www.iana.org and https://www.arin.net.

For More information on ZyCast products visit: **www.ZyCastTech.com**