One World. One Smart Choice.™

AB-HDRX

HD/SD COFDM Dual Diversity Receiver
Owner's Manual

A7595-0438 Rev A

TABLE OF CONTENTS

IMPORTANT:

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."

INTRODUCTION:

The AB-HDRX is a compact, narrowband COFDM microwave receiver that utilizes dual antenna diversity for robust, error free signal reception. The AB-HDRX is ideal for applications requiring a full featured high performance HD or SD receiver housed in a compact enclosure. ASI, HD-SDI, SD-SDI, Composite video, User Data and streaming video outputs are available from the AB-HDRX. The AB-HDRX uses industry standard output connectors for compatibility with a wide range of AV equipment.

Though the unit ships pre-configured, a graphical user interface that runs on a Windows PC is available to modify the operating parameters. While this manual contains basic information about the operation of the AB-HDRX, the programming of the unit (including preset configuration) via the AB Control Software is not covered. Please refer to the AB Control Software Manual for detailed information on how to program and configure the unit.

QUICK SET-UP

AB-HDRX Quick Set-up

- Remove AB-HDRX Receiver from the case.
- Attach AB-HDRX to the Manfrotto Magic Arm using the tripod mounting bracket.
- Connect Video output as needed (BNC connector).
- Connect Audio output as needed (RCA jacks).
- Connect RX antennas (larger sector directional) to the RF Inputs (N-Type).
- Aim directional sector antennas (marked “Front”) in the general area of AB-HDTX operation.
- Connect your Anton/Bauer Logic Series® battery to the AB-HDRX via the Gold Mount®.
- Select an AB-HDRX preset using the set button.

Connecting External Signals

The AB-HDRX Receiver has the following major output interfaces:

- RS-232 Serial Port
- Left and Right Audio Outputs
- Composite Video Output (not down converted from HD)
- ASI Video Output
- SDI Output for HD-SDI and SD-SDI Video
- Ethernet
- User Data

Audio and Video

Connect the desired Audio and Video outputs to A/V monitoring devices with appropriate cables. The AB-HDRX has RCA jacks for audio and 75ohm BNC connectors for Composite Video, SDI and ASI.

Power

The AB-HDRX may be powered by the following:

- DC Power – Anton/Bauer Logic Series battery
- AC Power – Anton/Bauer Tandem 70 charger connected to AC power

RS232 Control and User Data

If desired, connect a suitable cable to the 9 pin D Remote/User Data connector per the pinout in the Specifications chapter. Cables are available standard in the kit.

ASI Out

If required, connect a suitable ASI output cable (75Ω BNC).

Antennas

Connect antennas directly to the N-Type RF input connectors. Antennas are sector antennas with a 110° azimuth. Aim the antennas in the direction of the AB-HDTX transmission (input labeled ‘Front”).

WARNING: If cabling the AB-HDRX directly to a transmitter (e.g. for testing) you must use in-line RF attenuators. 50dB minimum recommended. Pre-Configure the AB-HDRX user options.

QUICK SET-UP

Figure 1: AB-HDRX Antenna Connectors

The AB-HDRX has a wide range of programmable settings. Before using the AB-HDRX in your application, you should pre-configure it to for the settings you want to use in your application. Settings are selected and configured using the AB Control Software. Please refer to the AB Control Software Manual for details.

Using the AB-HDRX to Receive Audio and Video

The AB-HDRX receives and demodulates COFDM radio signals from the AB-HDTX. It then decodes the MPEG4 transport stream for output.

The dual antenna diversity feature of the AB-HDRX is used to maximize the robustness of video reception. The primary goal of dual antenna diversity is to enable the user to prevent line of site obstruction on the transmission path from causing receiver errors to occur. By separating the antennas, the user has two chances to receive the signal properly, regardless of obstructions between the transmitter and AB-HDRX antennas. Properly directing your antenna to the transmit source is key obtaining the best range possible.

Video may be viewed on a monitor, which accepts SD Composite video, or SDI. Encoded video is also included in the transport stream on the ASI output, and must be decoded using an MPEG4 decoder prior to viewing on a monitor.

Audio can be output to a recorder or amplifier. Audio is also embedded in SDI outputs and included in the transport stream on the ASI output.

Streaming video and audio may be output via a laptop or PC with a compatible MPEG4 decoder program.

Verify Operation

After installing the AB-HDRX, power up the receiver by attaching a Logic Series battery and your overall system. The LED's on presets 1-4 will sequentially illuminate until boot up is complete.

Verify operation of the AB-HDRX by using the following methods:

- Use a video monitor to view SD Composite video (NTSC or PAL, as appropriate).
- Display video on equipment with ASI or SDI input connectors. This may include video analysis equipment or PC's with ASI or SDI input cards used for video storage and editing.
- To stream video over IP use the Ethernet connection to a PC or laptop running a compatible MPEG4 audio and video decoder program.

Streaming Video over IP/Ethernet

The AB-HDRX is pre-configured to stream video over IP on its Ethernet port. To stream video over IP use the Ethernet connection to a PC or laptop running a compatible MPEG4 audio and video decoder program.

QUICK SET-UP

Streaming Modes

There are three selections for streaming modes:

- Off - The unit does not stream in the “Off” mode.
- RTSP - In the RTSP mode the video streaming is sent only as clients request it. This can occur via unicast (single client) or multicast (multiple client) calls.
- Manual - Streaming is always on in the manual mode and can be sent to a single client or multiple clients using a multicast destination address.

RTSP Streaming Modes

There are four supported streaming modes from the RTSP server.

- Unicast, RTP
- Unicast, UDP
- Multicast, RTP
- Multicast, UDP

There is no need to set any parameters in this mode as the RTSP server takes care of this automatically.

RTSP Mode Set-up

Unicast, RTP - This mode will stream the data packets encapsulated by an RTP header to a single client only.
Use the AB Control Software to download and open the preset file for editing.
Set the mode to RTSP as shown in Figure 2.

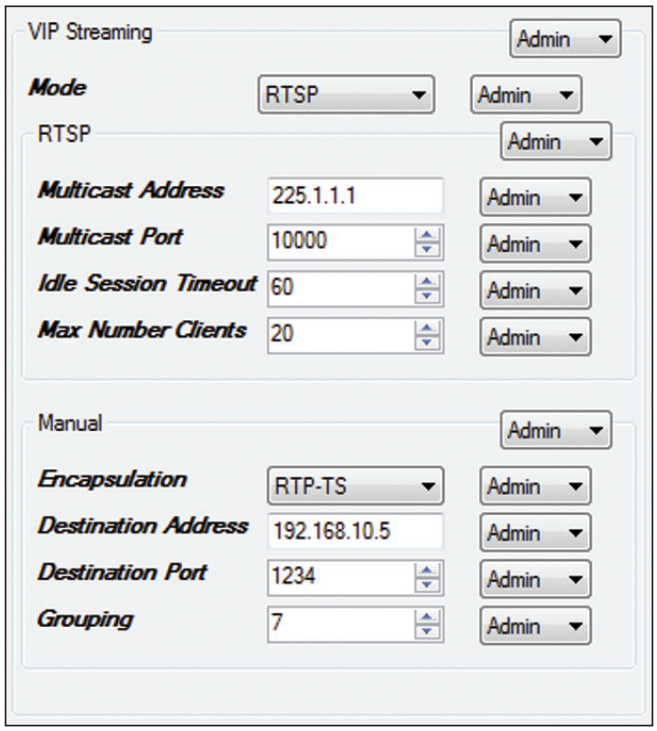


Figure 2: Preset file for Video Streaming Parameters

Upload the preset file into the radio
The default network URL for this method is rtsp://<device ip address> (Default 192.168.010.035)

- Unicast, UDP - This method will stream the data packets without the RTP header to a single client. The default network URL for this method is rtsp://<device ip address>/unicast/udp
- Multicast, RTP - This method will stream the data packets with the RTP header to multiple clients. The default network URL for this method is rtsp://<device ip address>/multicast
- Multicast, UDP - This method will stream the data packets without the RTP header to multiple clients. The default network URL for this method is rtsp://<device ip address>/multicast/udp

Streaming in the Manual Mode

This mode requires manual configuration of the streaming parameters in order to replicate the four types of streaming listed above. The data packets are streamed constantly. Set the destination port to the port that your application uses to receive video. Set your PC network adapter to a static IP address with the same subnet as the AB-HDRX unit.

Unicast, RTP (manual mode)

- Set the Streaming mode to “Manual” as shown in Figure 3.
- Set the Encapsulation type to RTP-TS
- Enter the destination address of your computer

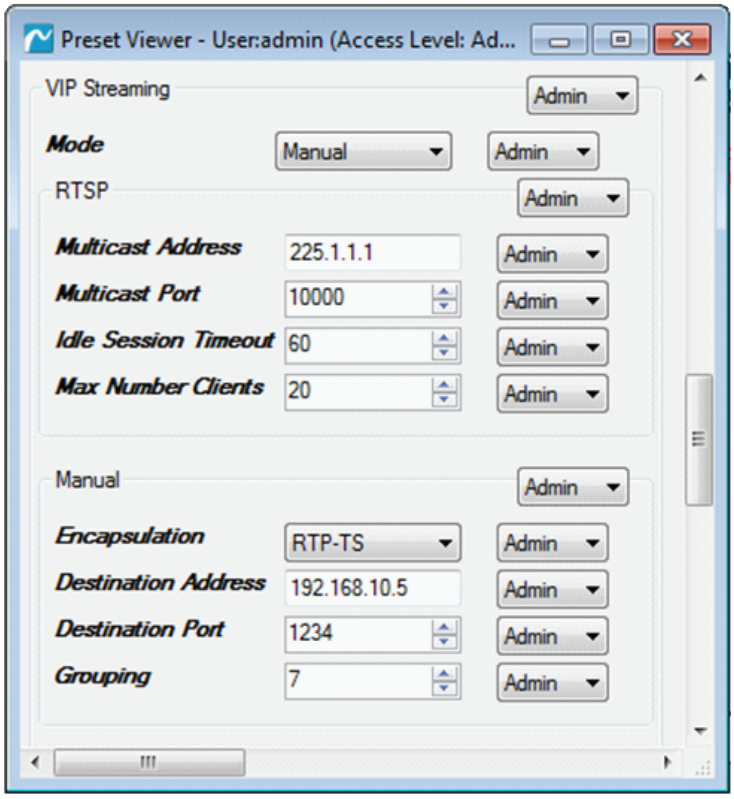


Figure 3: Change the Streaming Mode to Manual

- Unicast, UDP (manual mode)
  1. Set the Encapsulation type to UDP-TS
  2. Enter the destination address of your computer

- Multicast, RTP
  1. Set the encapsulation type to RTP-TS
  2. Enter a multicast address for the destination address

- Multicast, UDP
  1. Set the encapsulation type to UDP-TS
  2. Enter a multicast address for the destination address

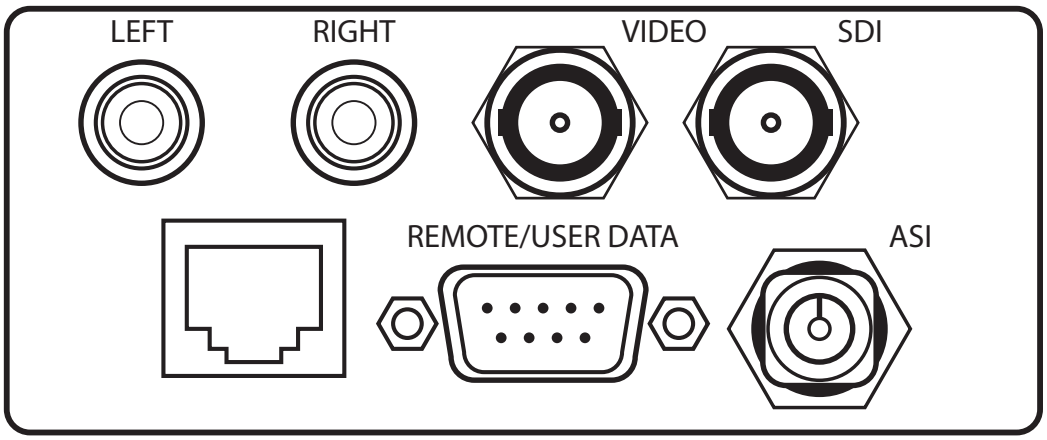


Figure 4: Output Connectors

Item	Description	Connectors
Left, Right	Audio Line Outputs	75 Ohm RCA
SDI	HD-SDI or SD-SDI Output	BNC
Video	Composite Video (PAL or NTSC)	BNC
ASI	Encoded Video Output	BNC
DC In	Via Anton/Bauer Logic Series Battery	Gold Mount
Ethernet Port	100mbps LAN Interface	RJ45
Remote / User Data	RS-232 Connector	DB-9

QUICK SET-UP

Local User Interface

The AB-HDRX has two control buttons and several status LED's on the front panel. Any changes made via a remote control interface will be reflected by the front panel LED's.

The AB-HDRX can be pre-configured using the programmable serial interface and then quickly changed between preset modes using the "Set" pushbutton.

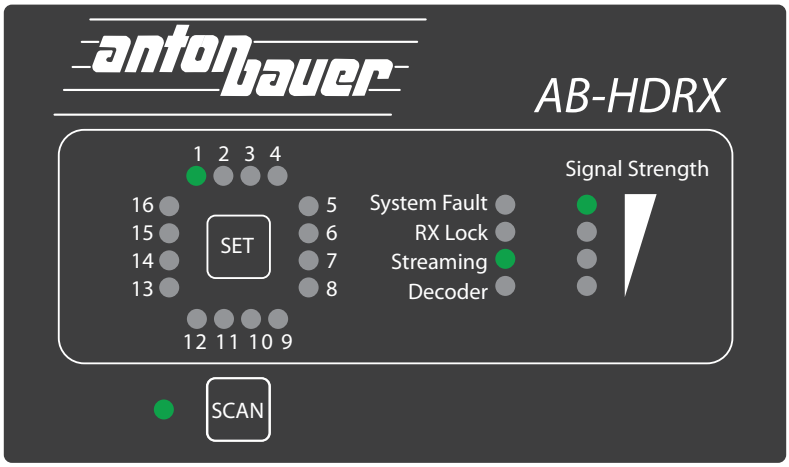
AB-HDRX Receiver User Interface		
Control/Indicator	**Description**	
Set Button	Advances the unit through the presets. The 1-16 LED's indicate in GREEN, which preset is currently active.	
SCAN (future feature)	Scans available presets until it locks on an incoming signal.	
RSSI	LED's will light to provide a Received Signal Strength	
Decoder	Decoder Operating	
Streaming	Indicates that the unit is streaming video through the Ethernet port.	
Rx Lock	When YELLOW, the demodulator is locked	
System Fault	Normally OFF. If an Alarm is present, the LED will be RED.	

Figure 5: AB-HDRX Receiver User Interface

SPECIFICATIONS

Specifications

Frequency Bands and RF Performance

Base Part Number	Frequency (GHz)	Power Consumption
58AB-HDRX	5.725-5.850	9 Watts Typical

Tuning step size	250 KHz
Frequency stability	± 10ppm
Modulation Modes	
Modes are auto detected within modulation format	
Format:	COFDM (DVB-T)
Carriers:	2K
Constellation:	QPSK, 16QAM
Code Rate:	1/2, 2/3, 3/4, 5/6, 7/8
Guard Interval:	1/32, 1/16, 1/8, 1/4
Bandwidth:	6 MHz, 8 MHz
Diversity	
Dual Receivers	
Channels:	2 input Maximum Ratio Combining
Video	
Standard:	MPEG-4 Part 10 / H.264 AVC and MPEG2
Video Coding:	AVC
Video Input:	Composite and SDI
SD-SDI input:	ANSI/SMPTE 259M
HD-SDI Input:	ANSI/SMPTE 292M
Formats	
SD:	NTSC 720 x 480 (4:2:0)
PAL:	720 x 566 (4:2:0)
HD:	See table below

Remote Control / User Data Pinout		
Pin	**Function**	**Notes**
1	N/C	
2	RX / IN A	Remote Control
3	TX / OUT A	Remote Control
4	N/C	
5	Ground	Ground
6	TX / OUT B	User Data
7	RX / IN B	User Data
8	N/C	
9	N/C	

SPECIFICATIONS

Standard	Rate	Mode	Latency
720	59.94	p	4 frames
720	50	p	4 frames
720	29.97	p	4 frames
720	25	p	4 frames
720	24	p	4 frames
720	23.98	p	4 frames
1080	50	i	4 frames
1080	59.94	i	4 frames
1080	29.97	p	4 frames
1080	25	p	4 frames
1080	24	p	4 frames
1080	23.98	p	4 frames
1080	29.97	psf	5 frames
1080	25	psf	5 frames
1080	24	psf	5 frames
1080	23.98	psf	5 frames

Audio	
Audio Coding:	ISO/IEC 11172-3(Layer II)
Audio Sample Rate:	48Khz
Audio Channels:	1 Stereo, 2Mono Standard
Audio Output Levels:	Direct line output with adjustable gain
Embedded Audio:	Available in SDI as embedded audio

System	
Video Present:	Remote Standby/Test Generator Selectable
Latency (*using AB-HD Transmitter):	4 frames in Low Latency Mode for all formats except PSF 5 frame in Low Latency Mode for PSF formats
ASI Output:	Auto output rate follows modulation or fixed output user selectable (PCR Retime stamp)
User Data:	RS232 Side channel (300-115K Baud)
Ethernet:	100 Mbps Ethernet interface
Remote Control:	Via LAN and/or PC GUI
Streaming Video:	Streaming MPEG-TS over UDP/RTSP

Power Requirements	
Input Range: DC:	+9 to +28
Power Consumption:	9W typical

SPECIFICATIONS

Physical Characteristics	
Size (including connectors):	3.69” x 6.75” x 2.31”
Volume (including connectors);	57.5 in^3
Weight:	1.4 lbs (620 grams)

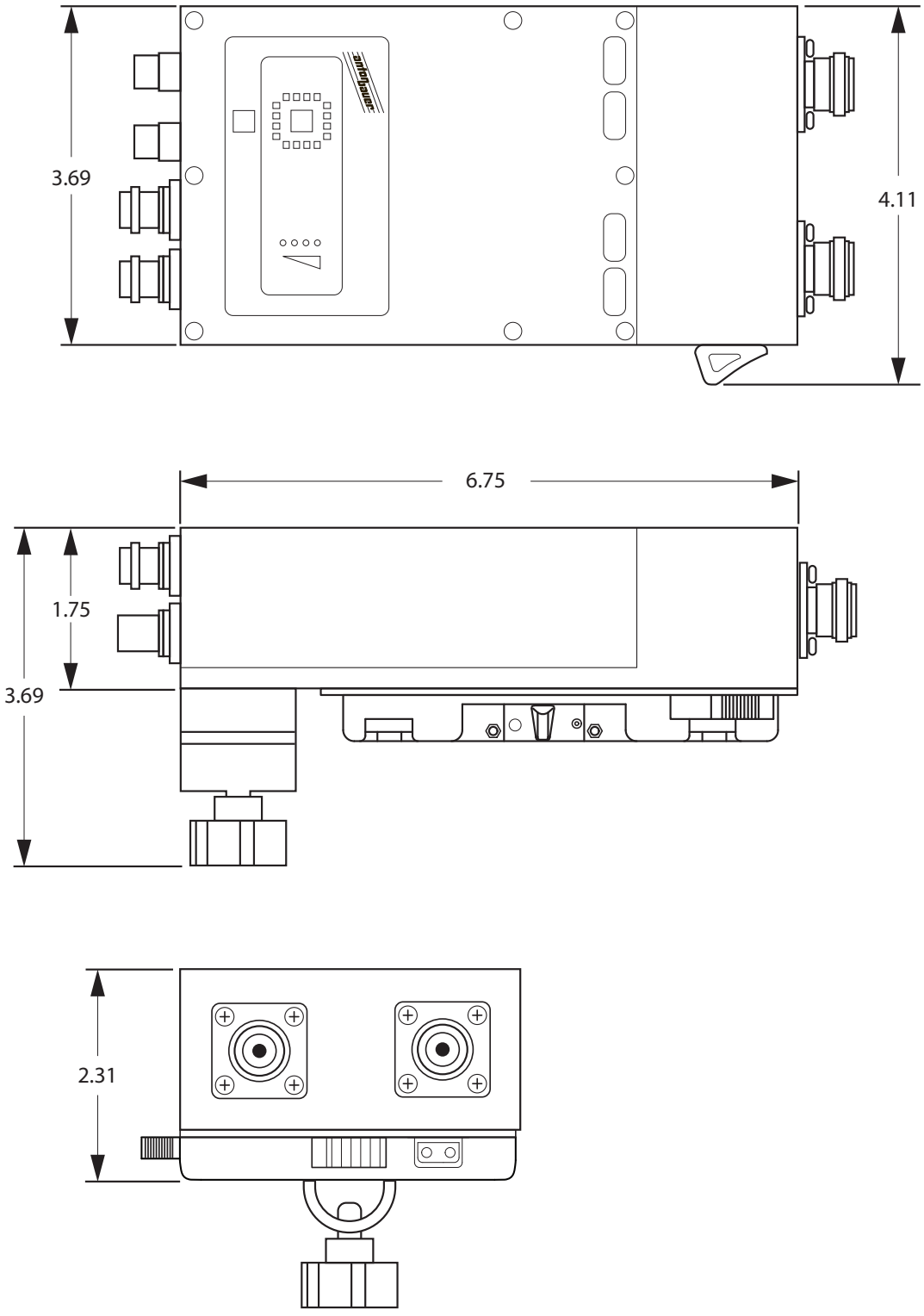


Figure 6: AB-HDRX Outline Drawings (Dimensions in Inches)

THEORY OF OPERATION

Functional Block Diagram

Major blocks in the AB-HDRX diagram include:

- Dual Antenna Inputs
- Dual Microwave Receiver and COFDM Demodulator Circuits
- Dual Input Maximal Ratio Combining Circuit
- MPEG4 Video Decoding Circuit
- Video Output Interfaces: ASI, SDI, and Composite Video
- Left and Right Audio Output Interfaces
- Preset Selection and Status Monitoring User Interface
- Programmable Serial Interface and Internal Control CPU With Flash Memory
- Interface For Firmware Upgrades
- Power Circuitry

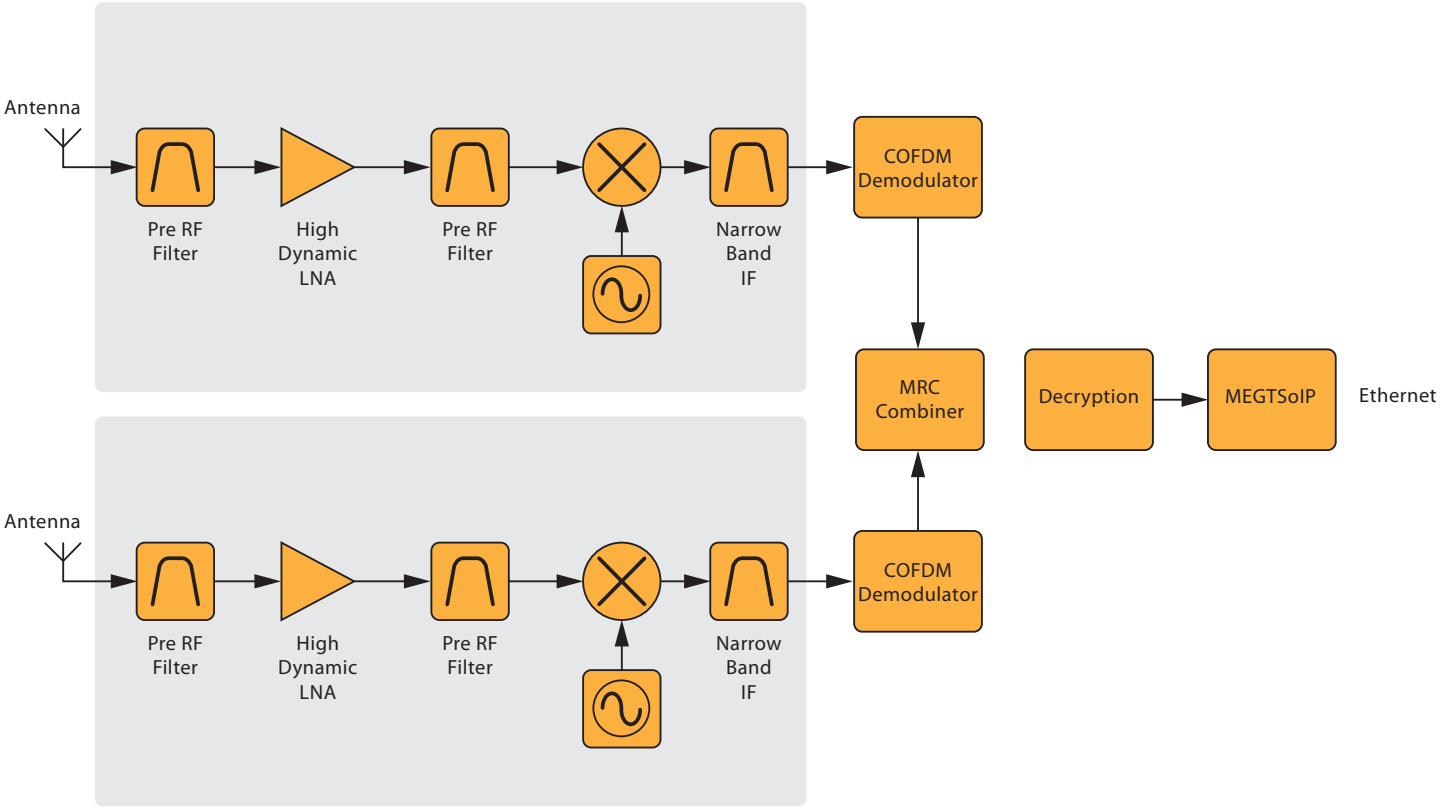


Figure 7: Internal Block Diagram

Dual Antenna Inputs

The AB-HDRX has two N-Type antenna input connectors. The input impedance of the antenna connectors are 50 ohms.
The frequency band supported by the antenna connectors are labeled next to the antenna inputs.

Dual Microwave Receiver COFDM Demodulator Circuits

The AB-HDRX is capable of receiving COFDM transmissions from compatible products. Each antenna input is filtered and amplified by a low noise amplifier. The output of the amplifier is filtered again at the output of the RF receiver circuitry. The receiver mixer down converts the received signals to the internal IF frequency.
The COFDM demodulator is programmable to support transmission modes offering different data rates (Refer to Chapter 4 for more information). The output of the COFDM demodulator circuits contains transport streams carrying audio, video, and user data.

THEORY OF OPERATION

Maximal-Ratio Combining Circuit
This feature enhances the robustness of the receiver when line of site obstructions occur in the transmission path.

MPEG4 and MPEG 2 Decoder
The AB-HDRX contains a built-in auto-detect MPEG4 (H.264 part 10) compliant and MPEG2 decoder. The decoder audio and video output is available on the SDI output jack. Both HD-SDI and SD-SDI are output on the SDI jack.

Video Outputs
Video output jacks include:
ASI – Encoded transport stream
SDI – HD-SDI and SD-SDI audio and video
Composite Video – The AB-HDRX composite video output circuit automatically outputs any SD video into either NTSC or PAL.

Audio Outputs
The AB-HDRX has left and right audio line output jacks. Stereo audio is also part of the ASI and SDI video outputs. The Audio output jacks are RCA connectors.

User Data Output
A data channel is transmitted with the audio and video information. Access of the data channel is through the RS-232 serial interface output connector. The baud rate and other RS-232 parameters are programmable.

Video over IP Encapsulation for Streaming Video
The AB-HDRX features a 100 Mbps Ethernet LAN interface for streaming video over IP. This feature allows received video to be viewed remotely using MPEG4 decoder software on a personal computer.

Local User Interface
If you commonly use several configurations in the field, the faceplate LED preset settings and “Set” selector button provide a quick way to change pre-programmed configurations. Status information is also presented by LED’s. Refer to page 9 for more information.

Remote Control and Firmware

Remote Control via Ethernet
An Ethernet port allows remote control of all configuration options, as well as monitoring of internal status and settings.

The AB Control Software is available for controlling the unit via the Ethernet port. Any Windows compatible computer running Windows XP or Windows 7 with 500 MB of memory and 1 GHz Pentium or above can be used. Refer to the AB Control Software Manual for more information.

Remote Control via RS-232
An RS-232 command set is implemented to allow remote control of all configuration options, as well as monitoring of internal status and settings. Commands and responses are sent via the RS-232 serial interface on the 9-pin connector.

The AB Control Software is available for controlling the unit via the RS-232 serial interface. Any Windows compatible computer running Windows XP or Windows 7 with 500 MB of memory and 1 GHz Pentium or above can be used. Refer to the AB Control Software Manual for more information.

Firmware updates
Update unit firmware via the Ethernet interface. Contact Anton/Bauer Customer Support Group for additional details.

LIMITED WARRANTY

This two (2) year limited warranty for the product specified in this document ("Product") is given by Anton/Bauer, Inc. ("Anton/Bauer"), 14 Progress Drive, Shelton, Connecticut 06484. If you (the purchaser of the Product from Anton/Bauer, or the person for whom the Product was purchased, if it was a gift) have any questions regarding Product applications, Product specification, or to obtain warranty service on this or any Anton/Bauer product, contact the company at the address below.

THIS PRODUCT MUST BE REGISTERED WITH ANTON/BAUER WITHIN 30 DAYS OF PURCHASE TO ASSURE WARRANTY COVERAGE. TO REGISTER YOU MAY EITHER:

(1) MAIL WARRANTY REGISTRATION CARD or
(2) REGISTER ON LINE AT www.antonbauer.com

The liability of Anton/Bauer hereunder is expressly limited to a claim for repair or replacement of the Product or as otherwise stated herein at Anton/Bauer's sole discretion. Notice of any claim under this warranty shall be delivered to Anton/Bauer during the period of the warranty and the Product shall be returned with its packaging promptly, at your expense, to an Anton/Bauer Customer Support Center or to the address above. Upon receipt of the Product and a record of your compliance with the conditions of this warranty, Anton/Bauer will repair or replace the Product and return it to you, or issue a credit, as applicable. You are responsible for all shipping and handling charges to and from authorized facility.

THIS WARRANTY DOES NOT APPLY TO AND IS VOID IN THE CASE OF DEFECTS OR DAMAGE RESULTING FROM ACCIDENTS, DISASTER, NEGLECT, MISUSE, IMPROPER INSTALLATION, IMPROPER OR UNAUTHORIZED SERVICE OR MAINTENANCE, UNAUTHORIZED REPLACEMENT PARTS OR ATTACHMENTS; OR DYSFUNCTION OR MALFUNCTION OF, OR CAUSED BY, ANY OTHER PRODUCT OR DEVICE. **Misuse includes any use of the Product in other than its intended application, including the use of this Product with any charging device or accessory not manufactured by and/or specified by Anton/Bauer. This warranty does not cover, and Anton/Bauer assumes no responsibility for, any equipment or devices used in conjunction with the Product.**

ANTON/BAUER DISCLAIMS ANY LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY WRITTEN OR IMPLIED WARRANTY OF THE PRODUCT. UNDER NO CIRCUMSTANCES WILL ANTON/BAUER BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

This Warranty is to be construed and enforced in accordance with the law of the State of Connecticut, including the provisions of the Uniform Commercial Code as adopted and from time to time amended in the State of Connecticut, and not the Convention for the International Sale of Goods. This choice of Connecticut law is exclusive of any Connecticut law that would require reliance on any law foreign to Connecticut. Should any action of law or in equity be brought by any person under this Warranty, such action shall be brought only in the United States District Court for the District of Connecticut, or in any Superior Court in Fairfield County, Connecticut, USA. Some states do not allow limitations on how long a warranty lasts, so the time period limitation herein may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may have other legal rights which may vary from state to state.

Use of unauthorized equipment in conjunction with Anton/Bauer products constitutes misuse under our warranties and may limit or void those warranties. Anton/Bauer does not authorize, condone, recommend, or otherwise assume any liability or responsibility resulting from the use of any battery, charger or accessory made by Anton/Bauer manufacture with any battery, charger or accessory not manufactured, produced or sold by Anton/Bauer. Anton/Bauer only authorizes the use of original Anton/Bauer product with this product. Use only original Anton/Bauer equipment with this product.

Anton/Bauer, Inc.
World Headquarters
14 Progress Drive, Shelton, CT U.S.A.
Tel (203) 929-1100 or (800) 541-1667
Fax (203) 929-9935
support@antonbauer.com

Anton/Bauer Europe, B.V.
Eurode Business Center, Eurode - Park 1-2
6461KB Kerkrade, The Netherlands
Tel (+31) 45 5639220
Fax (+31) 45 5639222
eurosupport@antonbauer.com

Anton/Bauer, Inc. - Signapore Office
6 New Industrial Road, # 02-02 Hoe
Huat Ind. Bld., Singapore 536199
Tel (+65) 62975784
Fax (+65) 62825235
asia@antonbauer.com

www.antonbauer.com

Anton/Bauer
A Vitec Group brand