One World. One Smart Choice.™

AB-HDTX

HD/SD COFDM Transmitter
Owner's Manual

A7595-0000 Rev A

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IMPORTANT:

This product has been approved by the following regulatory bodies at 5.8 GHz:

FCC (USA) IC (Canada) CE (EU)

CAUTION!

RISK OF ELECTRICAL SHOCK. DO NOT REMOVE COVERS.

- Do not remove any covers
- Refer servicing to qualified technicians only
- Disconnect all power before servicing
- Read and perform all instructions carefully
- Failure to follow suggested instructions and guidelines may void all warranties

PRUDENCE!

RISQUE DE CHOC ÉLECTRIQUE. NE SUPPRIMEZ PAS LES COUVERTURES.

- Ne supprimez pas les couvertures
- Voir entretien à qualifiés Techniciens seulement.
- Déconnectez tous les pouvoir avant l'entretien.
- Lecture et effectuer toutes les instructions attentivement.
- Échec de suivre les lignes directrices et les instructions proposées peut-être annuler toutes les garanties.

FCC STATEMENT

This equipment (FCC ID: I4U-58MLT) has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

DÉCLARATION DE FAC

Cet équipement (FCC ID: I4U-58MLT) a été testé et de respecter les limites pour une classe b dispositif numérique, conformément à la partie 15 des règles de la FCC.

FCC CAUTION/ PRUDENCE DE FAC

Any change or modification not approved by the party responsible for compliance could void the user's authority to operate this device.

This device requires professional installation.

For operation within 5.725 - 5.850 GHz frequency range, the maximum EIRP must be less than 36 dBm. The qualified antenna types to be used with this device include:

Low Gain Collinear Omni Antenna (4.5dBi or 6 dBi)

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.

In order to maintain compliance with the FCC RF exposure guidelines, this device should be installed and operated with a minimum distance of 20cm between the radiator, and the body of the operator and/or nearby persons.

Tout changement ou modification non approuvé par la partie responsable de la conformité pouvait annuler l'autorisation de l'utilisateur pour l'exploitation de ce dispositif.

Ce dispositif nécessite l'installation professionnelle.

Pour l'opération au sein de la gamme de fréquences de 5.725-5.850 GHz, la pire maximale doit être inférieure à 36 dBm. Les types d'antenne qualifiés pour être utilisé avec ce dispositif, citons :

Antenne Omni colinéaires faible Gain colinéaires Omni antenne (4.5dBi ou 6 dBi).

Cet appareil est conforme à la partie 15 des règles de la FCC. Opération est soumis à deux conditions suivantes: (1) ce dispositif ne peut pas causer de brouillage préjudiciable, et (2) ce dispositif doit accepter toute ingérence a reçu, y compris le brouillage qui peut provoquer l'opération non désirée.

Afin de maintenir la conformité avec les directives d'exposition RF FCC, ce dispositif doit être installé et exploité avec une distance minimale de 20 cm entre le radiateur et le corps de l'opérateur ou à proximité de personnes.

IMPORTANT:

IC Notice: IC Avis

1. 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.

   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.

2. This radio transmitter **(IC: 9479A-58MLT)** has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type 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.

   Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a 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.

Antenna Approved/Antenne approuvé		
Type/Type	**Max. Gain/Max. Gain**	**Impedance/ Impédance**
Collinear Omni Antennas/ Colinéaires Omni antennes	6 dBi	50 Ω

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

   Le présent appareil est conforme aux CNR d'Industrie Canada applicables 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.

4. In order to maintain compliance with the IC RF exposure guidelines, this device should be installed and operated with a minimum distance of 20 cm between the radiator, and the body of the operator and/or nearby persons.

   Afin de maintenir la conformité avec les directives d'exposition RF IC, ce dispositif doit être installé et exploité avec une distance minimale de 20 cm entre le radiateur et le corps de l'opérateur ou à proximité de personnes.

INTRODUCTION

The AB-HDTX is a compact transmitter that digitally encodes video signals and transmits them using COFDM modulation over microwave frequencies. The unit accepts HD-SDI, SD-SDI, or composite video inputs in NTSC or PAL format. It has a built in MPEG4 (H.264 part 10 AVC) encoder and COFDM modulator. The AB-HDTX is housed in an ultra compact, lightweight enclosure.

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-HDTX, the programming of the unit (including preset configuration) via the Control GUI is not covered. Please refer to the Control Manual for detailed information on how to program and configure the unit.

QUICK SET-UP

AB-HDTX Quick Set-up

- Remove AB-HDTX Transmitter from the case. Attach the transmitter to the Gold Mount on the camera.
- Connect video source to the Video/SDI Input (BNC jack) using a 75Ω BNC cable.
- Connect analog audio source (Telocate to XLR) to the transmitter using the two provided audio cables (if not using embedded audio).
- Connect TX antenna (small omni directional) to the RF output (N-Type).
- Connect the Anton Bauer power solution to the AB-HDTX.
- Turn power on using the on/off rocker switch.
- Select the desired preset using the set button.
- Transmit signal using the AB-HDTX Tx/Standby button.
- The Hi/Low button will control the power output level.

Note: The unit has an internal fan and the air ducts must not be blocked.

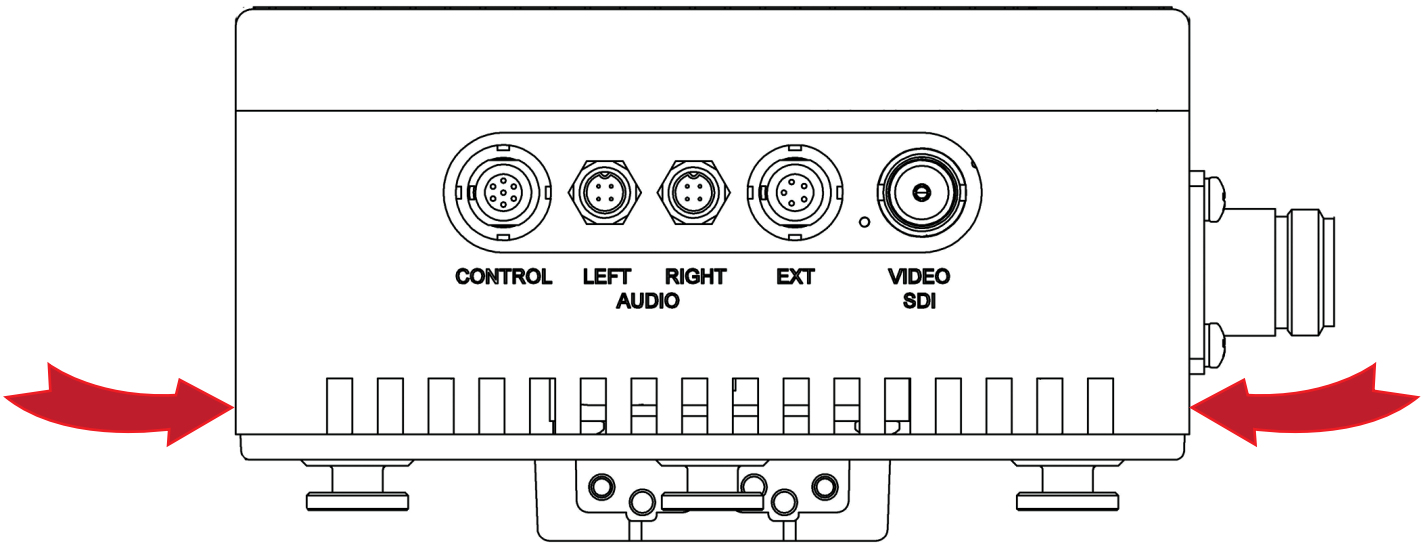


Figure1: Detail of Air Ducts

Powering Up the AB-HDTX

Turn on the power to the overall system. The AB-HDTX requires up to 25 seconds to complete its internal power up sequence. The first 4 preset led's (1, 2, 3, 4) light up in succession as the unit advances thru the boot process.

Note: Before applying power, ensure proper antenna termination on RF output.

AB-HDTX Pre-Configured Options

The AB-HDTX has a wide range of programmable settings. The unit is shipped with factory default settings that are applicable to many use cases.

Before using the AB-HDTX in your application, you should pre-configure it to for the settings you need. Settings are selected and configured using Control software. Please refer to the Control documentation for details.

Using the Button and LED Interface

The AB-HDTX has several control buttons and LED's on the front panel, which are used to perform basic operation and view basic unit status. Any changes made via a remote control interface will be reflected by the front panel LED's.

QUICK SET-UP

AB-HDTX Transmitter User Interface	
Control/Indicator	**Description**
Set	The Set button Advances the unit through the presets. The 1-12 LED's indicate in GREEN which preset is currently active.
Tx/Standby	The TX/STBY button toggles between Transmit and Standby modes. TX LED = Green for TX mode. Yellow LED for standby mode.
Hi/Low	The HI/LOW button toggles between High and Low Power modes. The Green LED for High power Yellow LED for Low power.
Fan	The AB-HDTX comes standard with a Fan control button. This push button switches the fan on and off.
Power	LED is green when power is applied and turned on
Video Input	The Video LED will display Green when Video is present on the SDI input connector. Blinking YELLOW indicates that no video input signal (composite or SDI) is detected. This only detects the presence of video and does NOT detect if the encoder supports the format applied. See Section 4.3 for supported formats.
PSF Enabled	LED is GREEN when encoding PSF formats. Pressing the preset 'Set' button for 5 seconds will toggle between interlace and PSF only for the following formats: 1080 psf 29.97/1080i 59.94 1080 psf 25/1080i 50 All other formats are automatically detected.
Fan Mode	When the fan is off, the LED blinks yellow. When the unit is close to maximum temperature the LED begins blinking faster. Green LED indicates that fan is on.
System Fault	Led indicator is red when a system fault occurs and is off with no fault.

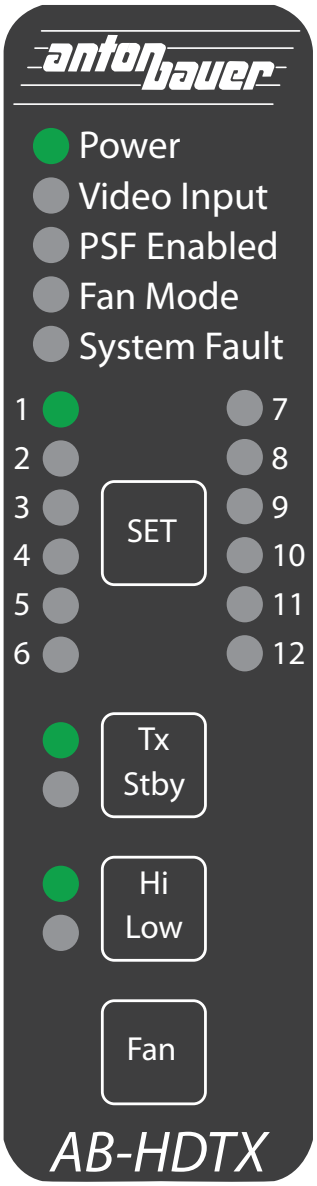
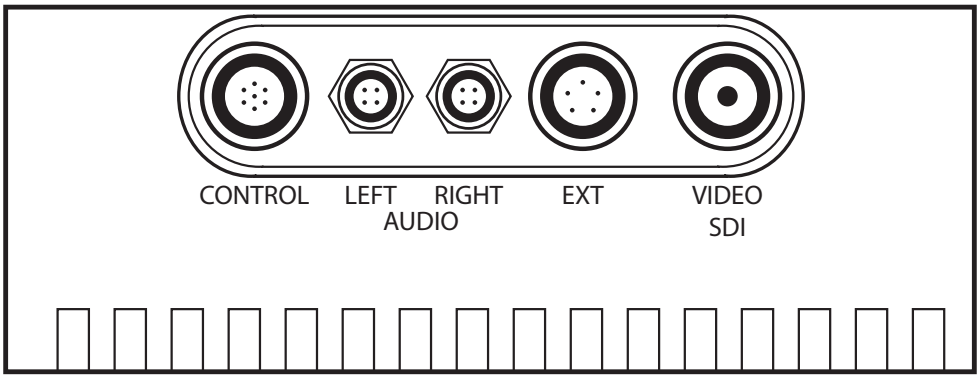


Figure 2: Transmitter User Interface

AB-HDTX Connectors



Connector (from left above)	Label on Unit	Description
Lemo 7 pin	Control	USB and RS-232 Remote Control Interface
Telocate	Audio Left	Audio Input
Telocate	Audio Right	Audio Input
Lemo 5 pin	Ext	ASI input and User Data
BNC	Video & SDI	Composite NTSC or PAL Input, HD-SDI, SD-SDI Input

Figure3: AB-HDTX Connectors

SPECIFICATIONS

Physical Characteristics	
Size (including connectors):	5.41” x 4.01” x 2.63”
Volume (including connectors);	57 cubic inches
Weight:	1.4 lbs (635 grams)

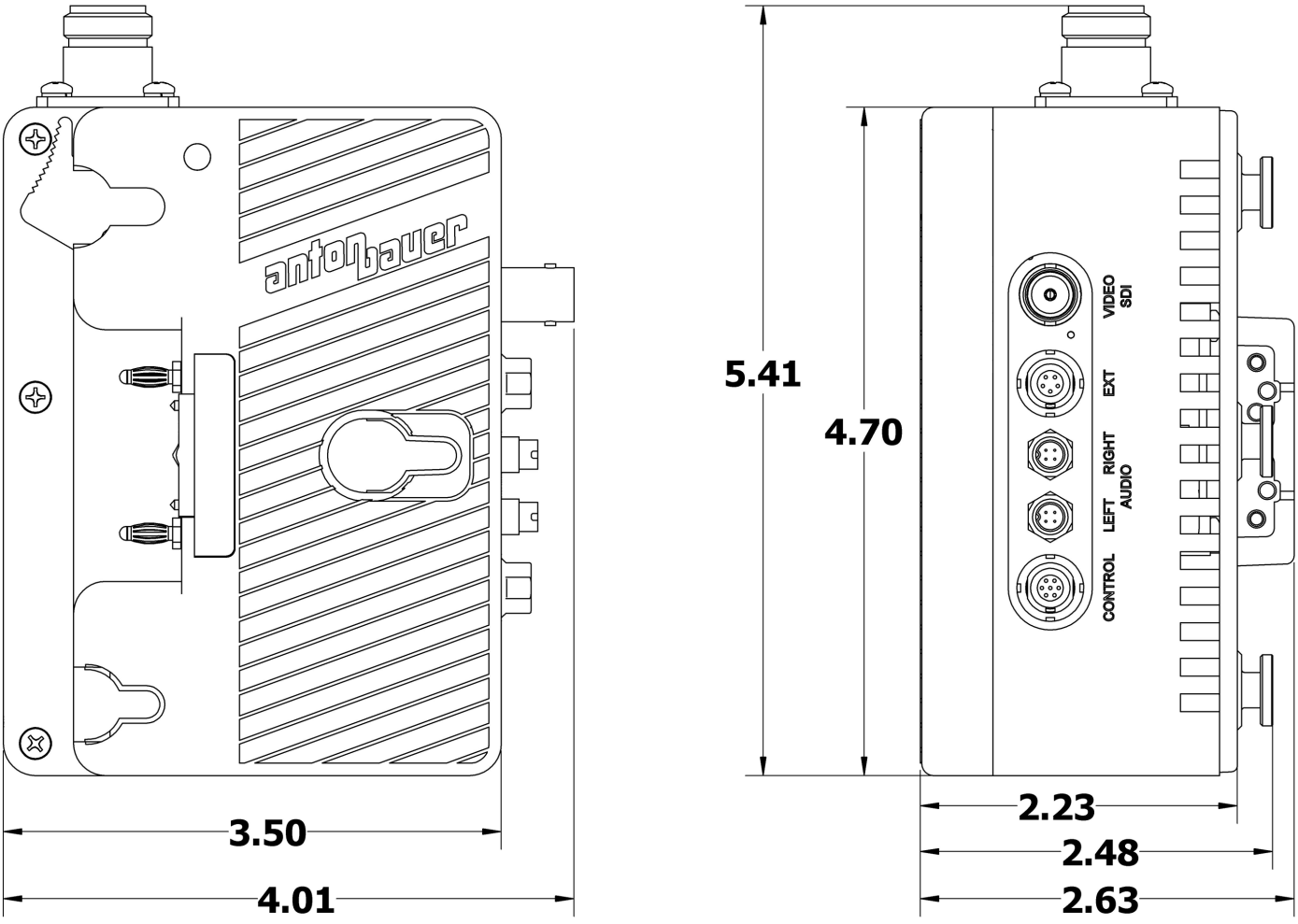


Figure 7: AB-HDTX Outline Drawings (Dimensions in Inches)

SPECIFICATIONS

Audio Input Connectors Pinout

Audio Input Connectors Pinout	
Pin	**Function**
1	LINE SELECT
2	+5V MIC BIAS
3	AUDIO IN
4	GROUND

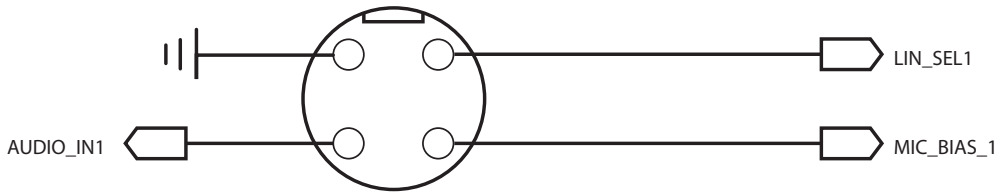


Figure 4: Audio Input Connectors Pinout

EXT Connector Pinout	
Pin	**Function**
1	GROUND
2	n/a
3	RX User Data
4	TX User Data
5	ASI IN

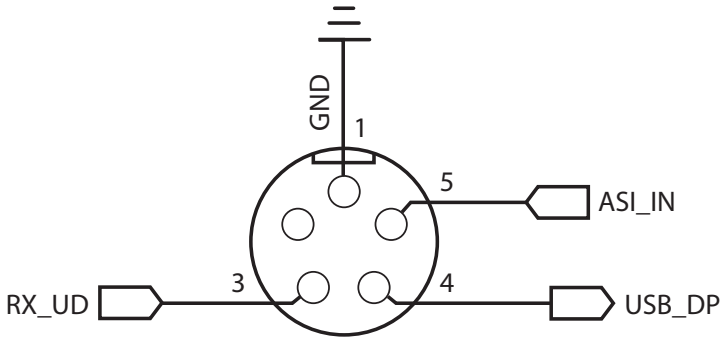


Figure 5: EXT Connector Pinout

RF Output

RF Out is a single N-Type female connector.

Note: Before applying power, ensure proper antenna termination is on RF output.

Control Connector Pinout	
Pin	**Function**
1	n/a
2	RS232 RX
3	USB DM
4	USB DP
5	RS232 TX
6	USB POWER
7	GROUND

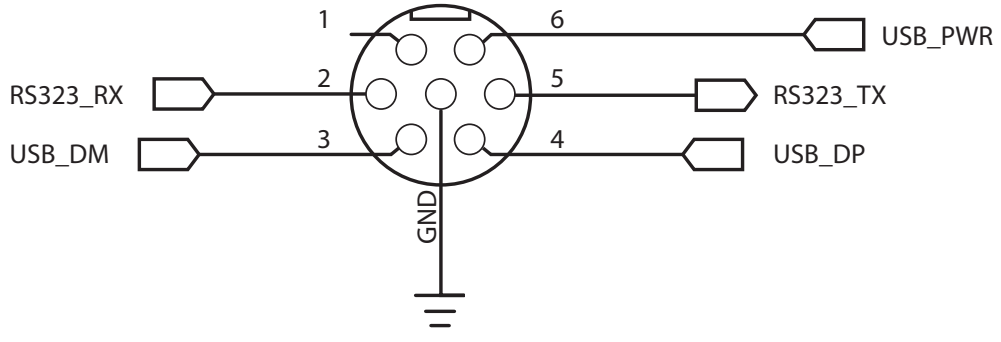


Figure 6: Control Connector Pinout

SPECIFICATIONS

RF

Base Part Number	Frequency (GHz)	RF Power (dBm)	DC Power (W)
AB-HDTX	5.725-5.850	20	15

Tuning step size	1 MHz step size
Frequency stability	± 10ppm
Standby mode	No RF output
Normal	Instant on-frequency transmission

Modulation Modes	
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

MPEG Encoder	
Video	
Standard:	MPEG-4 Part 10 / H.264 AVC
Video Coding:	AVC
Video Input:	Composite
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

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

SPECIFICATIONS

Audio	
Audio Coding:	ISO/IEC 11172-3(Layer II)
Audio Sample Rate:	48Khz
Audio Channels:	1 Stereo, 2Mono Standard
Audio Input:	Line; Single ended 1Vp-p (nom.) into 10K Ohms (-12dB to +50dB gain) Mic, (-12dB to +50dB gain); 10K Ohms De-embedded from SDI
Tone	Level Adjustable

System	
Video Present:	Remote Standby/Test Generator Selectable
Test Generator (Dynamic): 16 Character ID (Match SDT Service name)	SMPTE CB(NTSC)/100% CB(PAL)
1.0 and 1.2kHz Tones	
ASI input:	Rate converted from 0mpbs-Max modulation rate
User Data:	RS232 Side channel (300-115K Baud)
Remote Control:	RS232
Local Control:	Key Board

Power Requirements	
Input Range: DC:	+9 to +28
Power Consumption:	15 W

Environmental

Item	Specification
Operational Temperature	–10° to +50°C Ambient
Temperature Range, Storage	–40° to +80°C
Humidity	0% to 95% RH, non-condensing
Altitude, Operating	20,000ft (6,000m) maximum
Altitude, Storage	50,000ft (15,000m) maximum

Table 3-2: Environmental Specs

THEORY OF OPERATION

Functional Block Diagram

Major blocks in the AB-HDTX include:

- Video Input Interfaces - ASI or HD-SDI, SD-SDI; NTSC or PAL
- Stereo Audio Input Interface
- MPEG4 Video Compression Circuit
- COFDM Modulator
- Microwave Transmitter and Antenna Connector
- Programmers Serial Interface for Remote Control Purposes
- Internal Microprocessor and Memory
- Power Circuitry

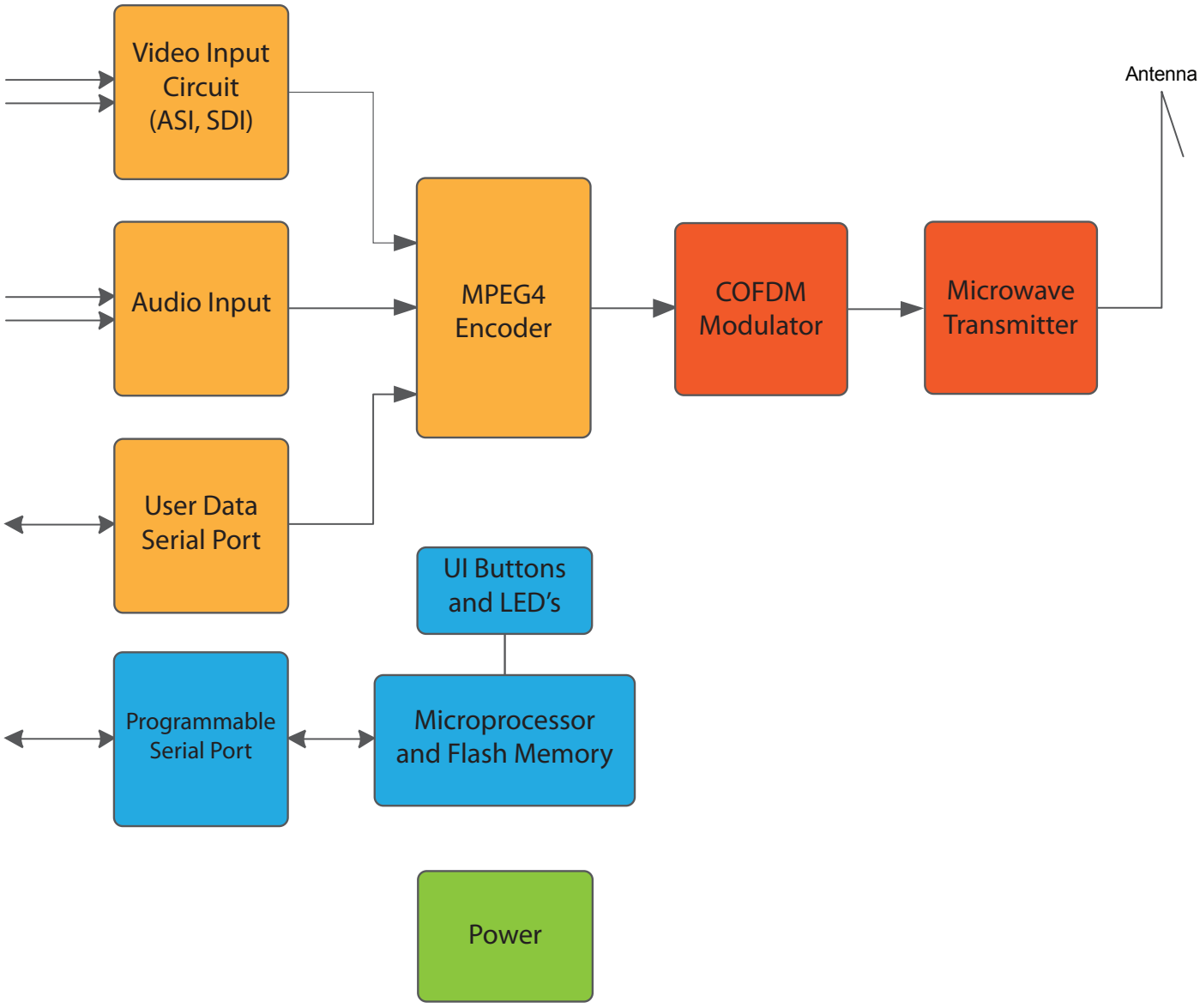


Figure 8: Functional Block Diagram

THEORY OF OPERATION

Power

The AB-HDTX is powered via an Anton/Bauer Logic Series® power solution.

Remote Control, and User Data Interface Connector

The AB-HDTX Transmitter Remote Control and User Data interface consists of two RS-232 serial port interfaces.

Audio and Video Input Connectors

The AB-HDTX has two analog audio inputs and one video input. They are used for stereo audio and HD/SD-SDI or NTSC/PAL video input. Refer to Chapter 3 for specifications of these signals.

User Data Input

A data channel may be transmitted along with the audio and video information. The data channel is accessed through a RS-232 serial interface in the EXT connector.

MPEG4 Encoder (H.264 Part 10)

The AB-HDTX encodes the input video signal before modulation and transmission to reduce bandwidth. The AB-HDTX contains a built-in MPEG4 (H.264 part 10) encoder for this purpose. The AB-HDTX features the latest compression methods utilizing I, P and B frames for more accurate encoding of compressed video signals.

COFDM Modulator

The COFDM modulator receives data from the output of the MPEG4 AVC encoder through a circuit that enhances the security of transmissions. The AB-HDTX is able to transmit data at high data rates and with low error rates using COFDM modulation techniques. The data rate used by the transmitter depends upon the CODFM modulator settings used.

RF Transmitter

The AB-HDTX microwave circuits mix the signal to the desired microwave frequency. The signal is filtered and boosted through a low noise output amplifier.

The AB-HDTX has a single N-Type style antenna connector. The output impedance of the antenna connector is 50 ohms.

Refer to Chapter 3, “Specifications” for frequency band and channel tuning specifications.

Remote Control

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 located on the Control connector.

The Control GUI is available for controlling the unit via the RS-232 serial interface. A Windows compatible computer running Windows XP or Windows 7 with 500 MB of memory and 1 GHz Pentium or above can is required. Refer to the “Operation” section and the Control Manual for more information.

Firmware updates

The unit firmware is updated via the USB interface on the Control connector, using the NanoTx Programmer software. A programming cable is required. Contact the Anton/Bauer Customer Support Group for additional details .

LIMITED WARRANTY

This three (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 above.

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.

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