ENGLISH (UK)

REFERENCE GUIDE

CT2200HDV

ENGLISH (UK)

Please read this first!

If you do not understand the contents of this manual:
Do not operate this equipment.

Also, translation of this manual into any EC official language can be made available, at your cost.

ITALIANO

LEGGERE QUESTO AVVISO PER PRIMO!

Se non si capisce il contenuto del presente manuale
NON UTILIZZARE L'APPARECCHIATURA.

È anche disponibile la versione italiana di questo manuale, ma il costo è a carico dell'utente.

SVENSKA

LÄS DETTA FÖRST!

Om Ni inte förstår informationen i denna handbok
ARBETA DÅ INTE MED DENNA UTRUSTNING.

En översättning till detta språk av denna handbok kan också anskaffas, på Er bekostnad.

NEDERLANDS

LEES DIT EERST!

Als u de inhoud van deze handleiding niet begrijpt
STEL DEZE APPARATUUR DAN NIET IN WERKING.

U kunt tevens, op eigen kosten, een vertaling van deze handleiding krijgen.

PORTUGUÊS

LEIA O TEXTO ABAIXO ANTES DE MAIS NADA!

Se não compreende o texto deste manual
NÃO UTILIZE O EQUIPAMENTO.

O utilizador poderá também obter uma tradução do manual para o português à própria custa.

SUOMI

LUE ENNEN KÄYTTÖÄ!

Jos et ymmärrä käsikirjan sisältöä
ÄLÄ KÄYTÄ LAITETTA.

Käsikirja voidaan myös suomentaa asiakkaan kustannuksella.

FRANÇAIS

AVANT TOUT, LISEZ CE QUI SUIT!

Si vous ne comprenez pas les instructions contenues dans ce manuel
NE FAITES PAS FONCTIONNER CET APPAREIL.

En outre, nous pouvons vous proposer, à vos frais, une version française de ce manuel.

DANSK

LÆS DETTE FØRST!

Udstyret må ikke betjenes

MEDMINDRE DE TIL FULDE FORSTÅR INDHOLDET AF DENNE HÅNDBOG.

Vi kan også for Deres regning levere en dansk oversættelse af denne håndbog.

DEUTSCH

LESEN SIE ZUERST DIESEN HINWEIS!

Sollte Ihnen der Inhalt dieses Handbuches nicht klar verständlich sein, dann
Bedienen Sie dieses Gerät nicht.

Eine Übersetzung des Handbuches in dieser Sprache ist gegen Berechnung lieferbar.

ΕΛΛΗΝΙΚΑ

ΔΙΑΒΑΣΤΕ ΠΡΩΤΑ ΑΥΤΟ!

Αν δεν καταλάβετε το περιεχόμενο αυτού του βοηθήματος/εγχειριδίου
ΜΗΝ ΛΕΙΤΟΥΡΓΗΣΕΤΕ ΑΥΤΟΝ ΤΟΝ ΕΞΟΠΛΙΣΜΟ.

Επίσης, αυτό το εγχειρίδιο είναι διαθέσιμο σε μετάφραση σε αυτή τη γλώσσα και μπορείτε να το αγοράσετε.

ESPAÑOL

LEA ESTE AVISO PRIMERO!

Si no entiende el contenido de este manual
NO OPERE ESTE EQUIPO.

Podemos asimismo suministrarle una traducción de este manual al (idioma) previo pago de una cantidad adicional que deberá abonar usted mismo.

List of Contents

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Preliminary Pages

Chapters 1 to 4

List of Figures

About this Reference Guide

This Reference Guide provides instructions and information for the installation and operation of the CT2200HDV.

This Reference Guide should be kept in a safe place for reference for the life of the equipment. It is not intended that this Reference Guide will be amended by the issue of individual pages. Any revision will be by a complete reissue. Further copies of this Reference Guide can be ordered from the address shown on *page ix*. If passing the equipment to a third party, also pass the relevant documentation.

Issues of this Reference Guide are listed below:

Issue	Date	Build Version	Comments
1	May 2007	1.0	Initial release.
2	Jul 2007	2.0	Update Information for use in US and Canada

> **Note...**
>
> The Build Version in the table refers to an overall number which encompasses all the various software/firmware versions of video, audio, etc in the device.

Acknowledgements

General

All best endeavours have been made to acknowledge registered trademarks and trademarks used throughout this Reference Guide. Any notified omissions will be rectified in the next issue of this Reference Guide. Some trademarks may be registered in some countries but not in others.

Registered trademarks and trademarks used are acknowledged below and marked with their respective symbols. However, they are not marked within the text of this Reference Guide.

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Musicam® is a registered trademark of Thomson and Télédiffusion de France (TDF), Europe, and is a registered trademark of CCS (now Musicam USA Incorporated), USA.

Ethernet® is a registered trademark of Xerox Corporation.

XILINX® is a registered trademark of Xilinx Inc.

Warnings, Cautions and Notes

Heed Warnings

All warnings on the product and in the operating instructions should be adhered to. The manufacturer can not be held responsible for injuries or damage where warnings and cautions have been ignored or taken lightly.

Read Instructions

All the safety and operating instructions should be read before this product is operated.

Follow Instructions

All operating and use instructions should be followed.

Retain Instructions

The safety and operating instructions should be retained for future reference.

Warnings...

Warnings give information which, if strictly observed, will prevent personal injury or death, OR DAMAGE TO PERSONAL PROPERTY OR THE ENVIRONMENT. They are boxed and shaded for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires THEM.

Cautions...

Cautions give information which, if strictly followed, will prevent damage to equipment or other goods. They are boxed for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

Notes...

Notes provide supplementary information. They are highlighted for emphasis, as in this example, and are placed immediately after the relevant text.

EMC Compliance

This equipment is certified to the EMC requirements detailed in *Annex B, Technical Specification*. To maintain this certification, only use the leads supplied or if in doubt contact Customer Services.

RF Exposure Info:

For body worn operation, device has been tested and meets FCC RF exposure guidelines when used with an accessory that contains no metal and that positions device a minimum of 25 mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

Technical Training

Training Courses

BMS Europe provides a wide range of training courses on the operation and maintenance of our products and on their supporting technologies. BMS can provide both regularly scheduled courses and training tailored to individual needs. Courses can be run either at your premises or at one of our dedicated training facilities.

Where to Find Us

For further information on BMS Europe training program please

contact us:

International Telephone: + 49 6124 7239-00
International Facsimile + 49 6124 7239-29

Customer Services and BMS Europe Postal Address

BMS-Europe GmbH & Co. KG

Schwalbacher Straße 12

65321 Heidenrod – Kemel

Germany

Return of Equipment

If you need to return equipment for repair, please contact

Tel: + 49 6124 7239-00

Fax: + 49 6124 7239-29

BMS-Europe GmbH & Co. KG

Schwalbacher Straße 12

65321 Heidenrod – Kemel

Germany

Introduction to the CT2200HDV

Preliminary Remarks

The present manual is provided for users and operators of the CT2200HDV Transmitter. It is intended to support the installation, operation, maintenance and daily use of the unit in general.

The manual should be kept with the CT2200HDV Transmitter and may be consulted when questions occur. If problems should remain after you have read the manual carefully or if you have any further questions concerning the functionality or operation of the Transmitter, please contact the Customer Service.

Designation and P/N

Designation	CT2200HDV	
	Frequency range	P/N
	2.0 – 2.3 GHz	11.2403.100 Sony V-mount
	2.0 – 2.3 GHz	11.2403.300 Anton Bauer
	2.3 – 2.7 GHz	11.2403.000 Sony V-mount
	2.3 – 2.7 GHz	11.2403.200 Anton Bauer

Description

General Information on D-ENG (Digital Electronic News Gathering)

The introduction of the DVB standard established the basis for digital broadcast video transmission making efficient use of the available bandwidth. Powerful compression algorithms allow a reduction in the amount of data to be transferred, while maintaining the high quality standards for video and audio signals used in broadcasting applications. New modulation techniques and error correction algorithms ensure a secure signal transmission even when the transmission conditions are poor.

The DVB-T standard was established for terrestrial digital TV broadcasting, in particular considering the difficult conditions of radio transmission. The highly efficient OFDM multicarrier modulation procedure enables transmission without interference even under multipath propagation conditions occurring with nondirectional transmission or reception. Practical experience soon has proved that the DVB-T standard guarantees ruggedness of transmission to an extent even allowing mobile reception.

Increasing miniaturization, in particular of MPEG encoders and OFDM modulators, enables using the DVB-T standard for mobile portable transmission systems.

Previous analog FM systems were adversely affected by signal reflections directly resulting in video and audio interferences. Such effects do not occur when the digital ENG system (D-ENG) is deployed. Even mobile transmission from moving vehicles or the use of omnidirectional antennas on the transmitting or receiving side does not impair the picture or sound quality at all, opening a completely new range of applications in TV production and news gathering.

Functional Overview

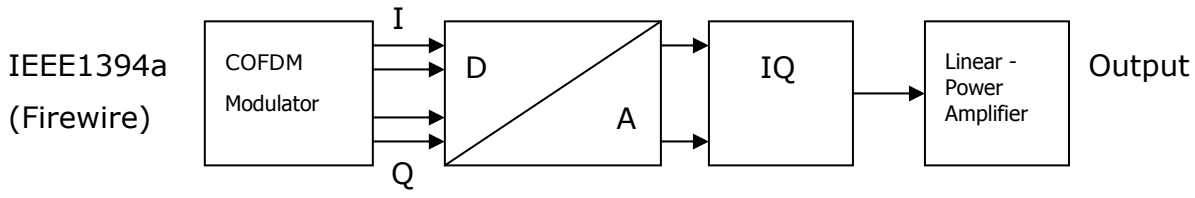


Figure 1 Block Diagram of the CT2200HDV

The CT2200HDV essentially contains the following functional blocks:

- MPEG-2 COFDM Modulator
- D/A Converter
- IQ-Modulator
- Linear Low-Power Amplifier.

Video Inputs

The CT2200HDV accepts only HDV encoded information at the input:

- HDV IEEE-1394a (Firewire)

CT2200HDV operates with all currently available HDV cameras.

OFDM Modulator

The digital data signal for wireless transmission is processed by the OFDM Modulator and following IQ MOdulator. The OFDM (Orthogonal Frequency Division Multiplex) modulation procedure has a major impact on the transmission properties and was specifically developed for terrestrial radio transmission.

The setup of the OFDM modulator occurs automatically dependent on HDV format of the camera.

Each setting is well proven and provides best quality for the customer without any need of OFDM Modulator setup.

User interface

With its integrated Multifunctional Display it is easy to set up the transmit frequency, display contrast and automatic display cutoff. The current Software version can also be displayed.

Low-Power Linear Amplifier

The linear power amplifier amplifies the output signal of the Modulator to an output of about 400 mW (+26 dBm). The output port of the Low-Power Amplifier is located on top of the CT2200HDV.

Installing the Equipment

Safety instructions

Warning

The regulations of VDE0100 must be observed for installation and operation of the unit.

Caution

- Establish all other connections before starting the unit by connecting it to 12VDC. Essential a valid video signal must be connected to the desired input before power on the CT2200HDV.
- When you connect the CT2200HDV as described in the following sections, make sure that the "Caution" instructions given there are observed.
- Make sure that there is sufficient air circulation to ensure adequate cooling of the unit.
  External forced ventilation may be required if the unit is installed in a rack or cabinet.

Connectors

Figure 2 Input connector of the CT2200HDV

- **RF Connector**

  The RF output signal of the Low-Power Amplifier is fed out at the SMA(f) connector on top of the unit.

  The CT2200HDV provides a RF output of about 400mW (+26dBm). The signal may be further amplified by a secondary amplifier optimized for HD-COFDM signals.

  See section "Connecting the RF Output", page 6

Connecting Signal Sources

The encoded Video/Audiosignal supplied by the camera have to applied to the IEEE 1394a connector of the transmitter.

Connecting the RF Output

A Omni directional antenna with SMA(m) connector can be directly mount at the RF out socket.

Connecting the 12VDC Supply Voltage

Caution

When using a battery or power pack, make sure that the maximum supply current is at least 3A and the output voltage matches the input voltage range of the CT2200HDV.

Failure to comply with these requirements **may cause fatal damage** to the battery/power pack and/or CT2200HDV.

Battery Powered Operation of the CT2200HDV

Many types of batteries are available on the market and we tried to support the best ones.

On this way it is possible to order the Transmitter with Anton Bauer or Sony V-Mount.

Others on request.

Shut-Down

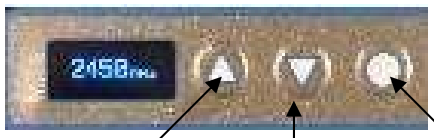
Caution

To shut-down the unit, first disconnect it from the 12VDC supply voltage.

After disconnection from the supply voltage by removing the battery or disconnecting the 12VDC supply cable, the other connecting cables can be removed from the unit.

Operating the Equipment

Multifunctional display



During power up time the display of the CT2200HDV pass a self test. It displays manufacture, transmitter type and software version.

After the selftest, the current frequency is displayed.

With its automatically COFDM setup the customer menu is very easy to handle. Due to press and hold the button 3 for approximately 2sec. the setup menu is accessibly.

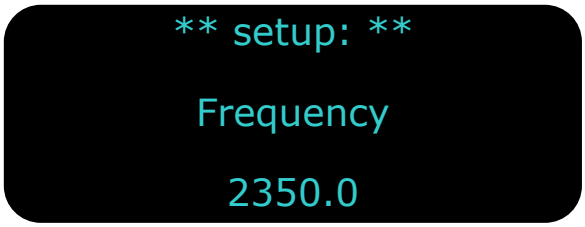
Menu structure:

- Initialization
  - Frequency input
  - Software version
  - Automatical display cutoff
  - Display contrast

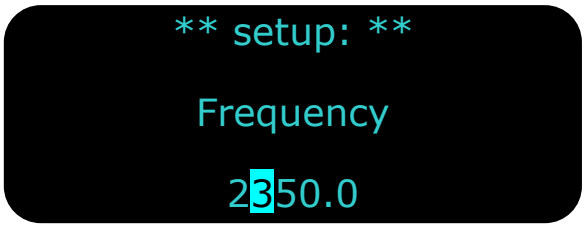
To get access to any submenu press button 1 or 2

Frequency input

In the Submenu „Frequency" the current frequency is displayed.



To change the frequency press button 3 for approximately 2 sec.

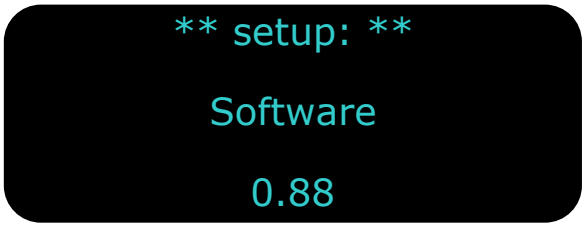


The flashing curser indicates the current changing position of the frequency. With button 1 or 2 the marked digit can be increased or decreased about one digit. To change the next lower digit, press button 3 and repeat the step before. When frequency change is complete so save the changes by press button 3 again to quit the frequency setup.

> **NOTE:** For use in US see guidance in chapter B.1.6

Software version

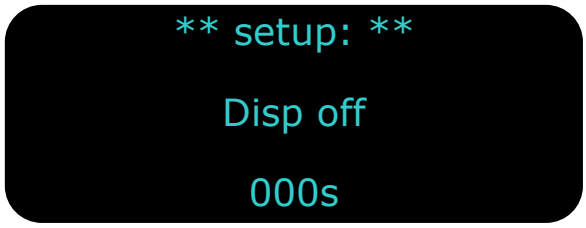
To display the actual software version enter the submenu „Software".



Automatical display cutoff

The display can be set to turn off automatically after a preset time of inactivity.

Select "Disp off" submenu and press button 3 for 2 seconds. Use buttons 1 and 2 to set value. Set the desired time-out interval between 015 to 240 seconds. A value of 000 (default) causes the display to stay on continuously.

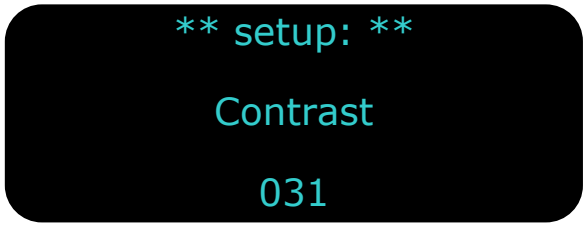


To exit this submenu, press button 3.

Display contrast

The display contrast can be adjusted from 0 (dark) to 127 (light). The default value is 031.

Select "Contrast" submenu and press button 3 for 2 seconds. Use buttons 1 and 2 to set value.



To exit this submenu, press button 3.

List of Abbreviations

The following specific abbreviations are used within this document:

4:2:0	Digital video coding method in which the color difference signals are sampled on alternate lines at half the luminance rate.
4:2:2	Digital video coding method in which the color difference signals are sampled on all lines at half the luminance rate.
COFDM	Coded Orthogonal Frequency Division Multiplex (digital modulation procedure)
Composite	CVBS video signal, 1 V_{pk-pk}
CVBS	Color Video Black Sync Signal
D-ENG	Digital Electronic News Gathering
DVB-T	Digital Video Broadcasting Terrestrial
EMC	Electromagnetic Compatibility
ETS	European Telecommunications Standard
FBAS	German for CVBS
FEC	Forward Error Correction
FM	Frequency Modulation (analog modulation procedure)
IF	Intermediate Frequency
IEC	International Electrotechnical Committee
ISO	International Standards Organisation
kbit/s	1000 bits per second
Mbit/s	Million bits per second.
MP@ML	Main Profile at Main Level: A subset of the MPEG-2 standard, which supports digital video storage (DVD etc.) and transmissions up to 15 Mbit/s over various mediums.
MPEG	Motion Pictures Experts Group (compression technique)
NTSC	National Television Systems Committee
OFDM	Orthogonal Frequency Division Multiplex
QAM	Quadrature Amplitude Modulation: A method of modulating digital signals
QPSK	Quadrature phase shift keying (digital modulation technique)
PAL	Phase Alternation Line (a color TV broadcasting system)
PCM	Pulse Code Modulation
RF	Radio Frequency
RGB	Red, green, blue. The chroma information in a video signal.

RS 232, RS-232	EIA-232
SDI	Serial Digital Interface
TS	Transport Stream
XLR	Audio connector featuring three leads, two for signal and one for GND
YUV	Y: Luminance component (brightness), U and V: chrominance (color difference)
Y/C	Broadcast Video with separate color, Y luminance and C chroma (sometimes called S-Video)

Technical Specification

B.1 Compliance[1]

B.1.1 Safety

This equipment has been designed and tested to meet the requirements of the following:

EN 60950	European	Safety of information technology equipment including business equipment.
IEC 60950	International	Safety of information technology equipment including business equipment.

B.1.2 EMC[2]

The equipment has been designed and tested to meet the following:

EN 55022 and AS/NZS 3548	European Australia and New Zealand	Emission Standard Limits and methods of measurement of radio frequency interference characteristics of information technology equipment - Class A.
EN 61000-3-2[3]	European	Electromagnetic Compatibility (EMC), Part 3 Limits; Section 2. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
EN 61000-3-3[3]	European	Electromagnetic Compatibility (EMC), Part 3. Limits; Section 3. Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current ≤ 16 A.
EN 55024:1998	European	Information technology equipment - Immunity characteristics - Limits and methods of measurement.

[1] The version of the standards shown is that applicable at the time of manufacture.

[2] The EMC tests were performed with the Technical Earth attached, and configured using recommended cables.

[3] Applies only to models of the equipment using mains (ac) power sources.

B.1.3 Shock and Vibration

The device chassis complies with the requirements of ETS 300-019-2-5 Table 2, for both non-operational and operational states, without any special mounting or casing requirements over and above the standard mounting requirements specified.

ETS 300-019-2-5	European	Equipment Engineering (EE): Environmental conditions and environmental tests for telecommunications equipment Part 2-5: Specification of environmental tests Ground Vehicle Installations. Table 2.

B.1.4 CE Marking

The CE mark is affixed to indicate compliance with the following directives:

89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

73/23/EEC of 19 February 1973 on the harmonisation of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits.

> **Note...**
> The CE mark was first affixed to this product in 2006.

B.1.5 FCC Marking

FCC ID: VFB-CT2200HDV0000

This device complies with Part 74 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.

B.1.6 TV Pick-Up Channel Assignments for US and Canadian Users

The preferred channel arrangement defined for the TV pick-up systems are up to seven 12 MHz one-way RF channels in the 2025 to 2110 MHz band.

In the major metropolitan preference will be given to TV pick-ups.

Elsewhere, the level of priority access given to TV pick-ups will be at the discretion of the regional offices.

To the extent possible, TV pick-up usage should avoid the spectrum designated for very low capacity systems.

Arrangement:
Band G(n) = 2019.5 + 12n
Where: n = 1 to 7, and G(n) is the centre frequency of the channel in MHz.

G1: 2031.50
G2: 2043.50
G3: 2055.50
G4: 2067.50
G5: 2079.50
G6: 2091.50
G7: 2103.50

Due to the large area affected by helicopter usage of TV Pick-ups, some restrictions on the number of TV Pick-up channels available for this application may be applied by the regional offices. These restrictions may be based on consideration of factors such as frequency assignment re-use, availability of assignments in other TV Pick-up bands and co-existence with point-to-point systems.

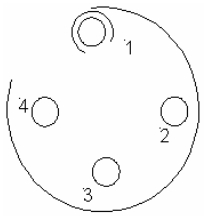
> Note: The TV Pick-up channel plan is harmonized with Canada and USA, and may be changed in accordance with the future changes and availability of equipment.

B.2 Technical Specifications

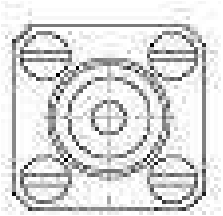
Signal Parameters

Output (RF)	2.3 – 2.7 GHz (standard; others on request) Connector: SMA female, 50 Ω 26 dBm (400mW)
Audio/Video Inputs	IEEE 1394a (Firewire)
Modulator	COFDM, ETS 300744, 2k carriers only Bandwidth: 8 MHz 64 QAM automatic mode for guard interval and FEC
Power Input	10.2 – 17.5 VDC (Battery powered)
Power Consumption	13W
Operating Conditions	Ambient temperature -20℃ – 45℃
Dimensions (W x D x H)	138 mm x 87 mm x 27 mm (without Battery bracket)
Weight	0.33 kg approx

Connectors

Input Voltage	10.2 – 17.5V DC via Battery bracket
	1 GND 2 +12V
Data Input	4-pin Lemo, female series EGG.0B.304.CLL
	1 TPA- Transmit strobe / Receive data 2 TPA+ Transmit strobe / Receive data 3 TPB- Receive strobe / Transmit data 4 TPB+ Receive strobe / Transmit data Shielding : GND

Antenna Output	SMA, female; 50 Ω



Centre	Signal
Shielding	GND

Ordering Information CT2200HDV Models

P/N	COFDM Bandwith	Frequency Range *	Battery bracket
11.2403.000	8 MHz	2.3 – 2.7 GHz	Sony V-mount
11.2403.100	8 MHz	2.0 – 2.3 GHz	Sony V-mount
11.2403.200	8 MHz	2.3 – 2.7 GHz	Anton Bauer
11.2403.300	8 MHz	2.0 – 2.3 GHz	Anton Bauer

***** Other frequency ranges on request

Manufacturer: BMS-Europe GmbH & Co. KG