



MICROLITE TRANSMITTER

HD/SD COFDM Transmitter



User Manual

IMT PUBLICATION: M22-0005-00A, REV 1.0

Revision History

| Date | Revision | Modified By | Description |
|----------------------------|-------------|-------------|--|
| 05/16/2011 – 06/13/2011 | 0.0D | DLA(MH) | Initial release to approvers |
| 06/20/2011 | 0.1D | DLA / MH | Ongoing updates and clarifications (WIP) |
| 08/17/2011 | 0.2D | MH | Added regulatory text (FCC and IC) |
| 10/12/ 2011 | 0.3D (BETA) | MH | Updated to new form factor |
| 11/15/2011 | 0.4D | DLA | Updated LED indicator descriptions, 21MLT |
| 01/25/2012 – 02/03/2012 | ,5D | SMV | Updated Specifications, formatting, outline drawings, physical description. Added new models released. Added Appendix A. |
| 02/05/12 | 1.0 | SMV | Initial Release |
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| | | | |

MICROLITE TRANSMITTER
User Manual

IMT Publication: M22-0005-00A

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We make every effort to ensure our documentation is as accurate and as complete as possible. In the event that you find any errors or omissions, please contact Customer Tech Support at (908) 852-3700, or via email at service@nucomm.com.

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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.

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.

- 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.



MICROLITE TRANSMITTER User Manual

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Chapter One **1**

Introduction

1 Introduction

This document is a user manual for RF CENTRAL's *microLite* microwave video transmitter. The *microLite* 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, and can also accept User Data (e.g. NMEA GPS sentences) for transmission along with the main input signals. It has a built in MPEG4 (H.264 part 10 AVC) encoder and COFDM modulator. The *microLite* is housed in an ultra compact, lightweight enclosure.

Throughout this manual, the product is referred to as the "*microLite*", the "*microLite* Transmitter", "*MLT*", "*microLite* TX", or simply the "transmitter."

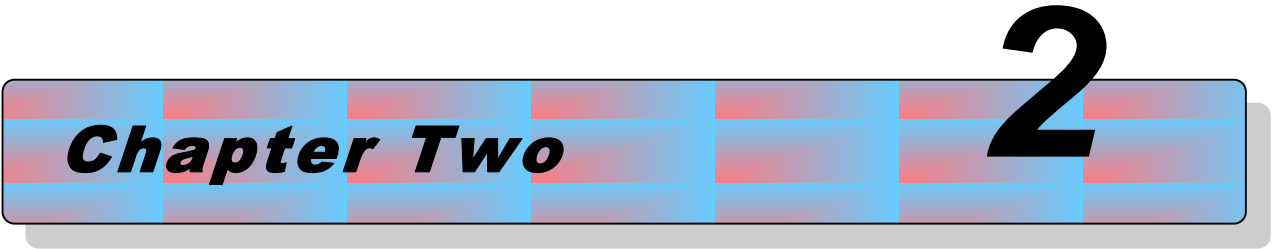
1.1 Manual Overview

The contents of this manual are as follows:

Chapter 2 - Describes the theory of operation and the features of *microLite* Transmitter.

Chapter 3 - Contains a list of the *microLite* Transmitter specifications. The specifications include transmitter feature specifications, power requirements, environmental specifications, and I/O specifications.

Chapter 4 - Describes operating and installation procedures for the *microLite* Transmitter.

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Chapter Two **2**

Description

2 *microLite* Description

This chapter describes the *microLite* transmitter theory of operation, features, and physical description. It also contains a block diagram of the *MLT* circuitry and a typical application example.

The *MLT* has external connectors and features direct plug-in compatibility with off the shelf equipment using industry standard interfaces.

The *MLT* internal circuitry encodes the audio and video signals, and organizes the compressed data into digital video transport streams. The transmitter uses COFDM modulation and transmits at microwave frequencies in the specific band supported by the unit.

Though the unit ships pre-configured, a graphical user interface that runs on a Windows PC is available to modify the operating parameters.

IMT has the ability, should the need ever arise, to provide the user with firmware files and instructions for local firmware installation, such as for feature upgrades, etc.

Table 2-1: Summary of High Level Features and Benefits

| Feature | Benefit |
|--|---|
| COFDM Microwave Digital Video Transmitter | Microwave output frequencies in multiple bands. |
| Multiple Output Frequencies | User orderable frequency band options. User programmable channels and offsets within band. |
| ASI, HD-SDI, and SD-SDI Inputs | Compatible with advanced video cameras. |
| NTSC or PAL Composite Video Inputs | Compatible with industry standard SD video cameras. |
| Stereo Audio Line Inputs | Direct audio input option for use with video signals that do not contain embedded audio. |
| Embedded Audios | Direct SDI input for cameras with embedded audio. |
| MPEG4 (H.264 Part 10) Encoder | Industry standard compliant video compression. Implements latest algorithms for high quality. |
| User Data Channel | Data is transmitted along with audio and video to the receiver. |
| Remote Control GUI for Programming the MicroLite | Convenient menu and button based graphical user interface for Windows PC's. Used to program the preset settings on the top panel. |
| Compact Housing | Fits in small form factor applications. |

2.1 Theory of Operation

2.1.1 Functional Block Diagram

Major blocks in the MICROLITE TX 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
- Programmer's Serial Interface for Remote Control Purposes
- Internal Microprocessor and Memory
- Power Circuitry

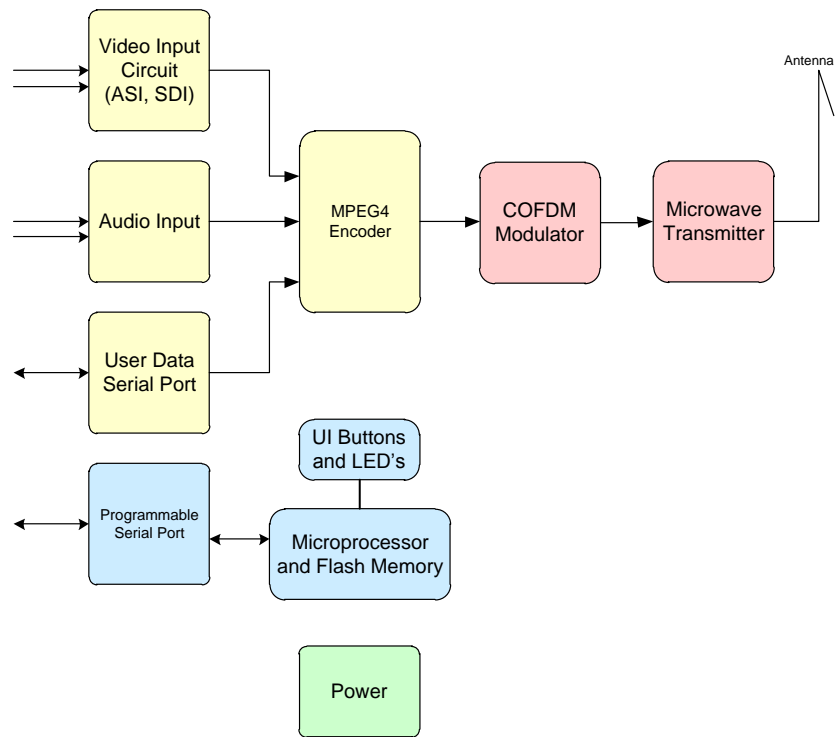


Figure 2-1: Internal Block Diagram

2.1.2 Power, Remote Control, and User Data Interface Connector

The *microLite* Transmitter Power, Remote Control, and User Data interface includes power and ground connections plus two RS-232 serial port interfaces.

2.1.3 Audio and Video Input Connectors

The *microLite* TX 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.

2.1.4 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.

2.1.5 MPEG4 Encoder (H.264 Part 10)

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

2.1.6 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 *microLite* TX 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 COFDM modulator settings used.

2.1.7 RF Transmitter

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

The *microLite* TX has a single SMA style antenna connector. The output impedance of the antenna connector is 50 ohms.

Note: On 5.8GHz models, the connector is RP-SMA due to FCC requirements.

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

2.1.8 Remote Control and Firmware

2.1.8.1 Remote Control via Serial Interface

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 Power/Control connector.

The IMT NanoController GUI is available for controlling the unit via the RS-232 serial interface. A Windows compatible computer running Windows XP or Vista with 500 MB of memory and 1 GHz Pentium or above can be needed. Refer to Chapter 4, “Operation” and the NanoController Manual (M27-0001-00A) for more information.

2.1.8.2 Firmware updates

The unit firmware is updated via the USB interface on the Power/Control connector, using the *IMT NanoTx Programmer* software. A programming cable (IMT part number 922-B963-01A-R) is required. Contact IMT Tech Support for additional details.

2.2 MicroLite Physical Features and Interfaces

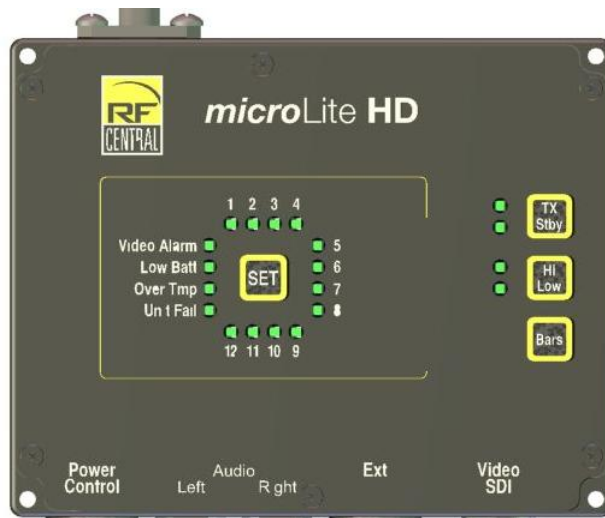


Figure 2-2: *microLite* Transmitter User Interface



Figure 2-3: *MLT* Connectors

Table 2-2: *microLite* Connectors

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

! WARNING – DO NOT OPEN THE *microLite*

The *microLite* Transmitter contains no user serviceable parts. Do not open the *microLite* housing. Failure to comply will result in voiding of the warranty.

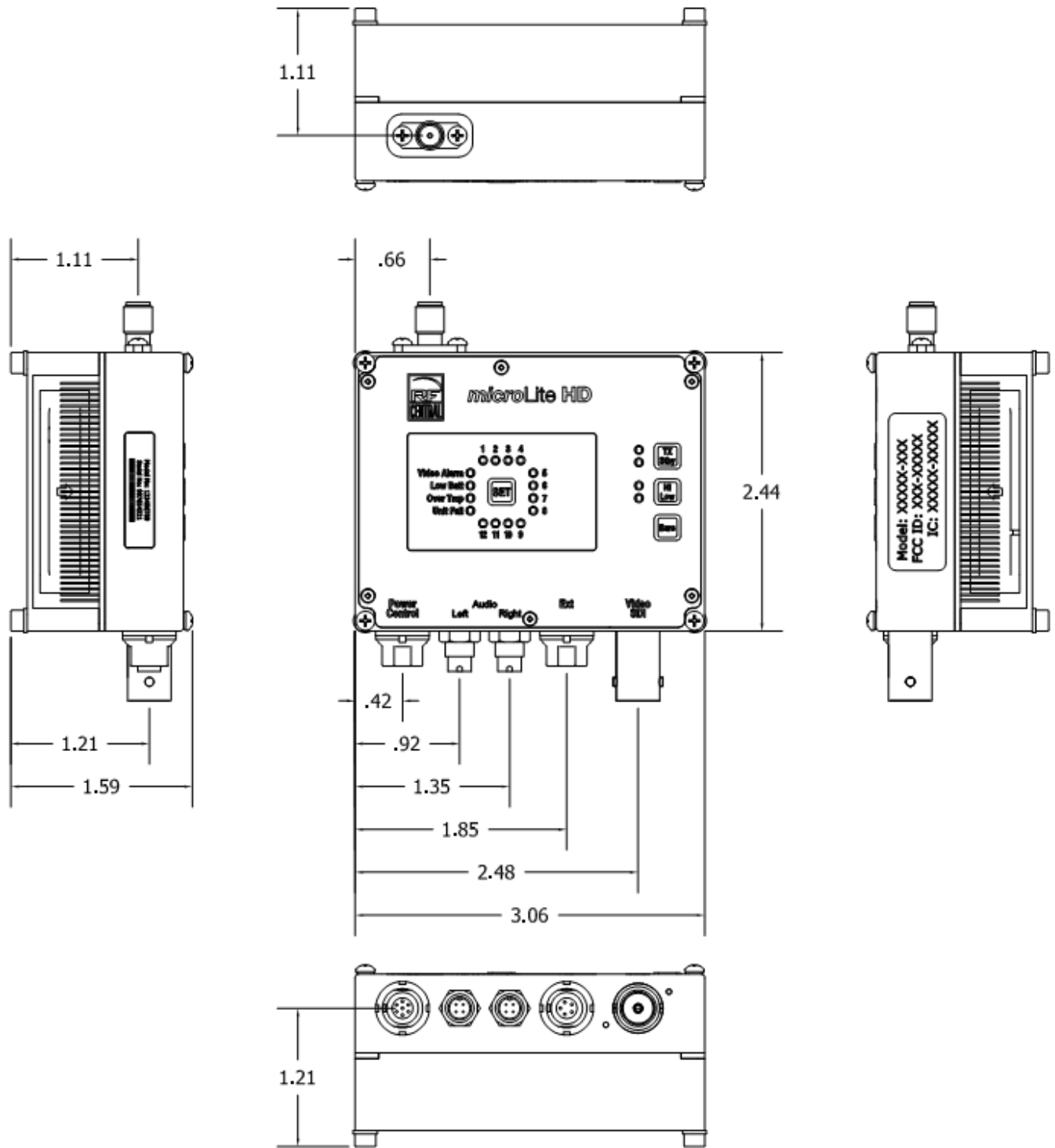


Figure 2-4: microLite Outline Drawings (Dimensions in Inches)

2.3 External Signals

The *microLite* connectors include the following major interfaces:

- Power and Ground Plus RS-232 programming interface (7 pin Lemo)
- Video Input Connector - accepts Composite Video, ASI, or SDI with appropriate cables (BNC)
- Analog Audio 1 and 2 Line/MIC Inputs (4 pin Telocate)
- User Data (5 pin Lemo)

Table 2-3: Power and Control Cables

| IMT part # | Cable Description | Cable Type |
|----------------|---|-------------------------------|
| 922-B964-01A-R | 7pin LEMO to Tamiya Male connector | Power input cable |
| 922-B962-01A-R | 7pin LEMO to Tamiya Male connector, w/DB9 | Power input cable (w/Control) |
| 922-B973-01A-R | Anton Bauer D-tap to Tamiya Female connector | Source cable |
| 904-P088-00A-R | 12vDC Power Supply with Tamiya Female connector | Source cable |

2.4 RF Output

RF Out is a single SMA female connector.

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

2.5 Connector Pin Assignment Information

2.5.1 Power/Control Connector Pinout

Table 2-4: Power/Control Pinout

| Pin | Function |
|-----|-----------|
| 1 | +12VDC |
| 2 | RS232 RX |
| 3 | USB DM |
| 4 | USB DP |
| 5 | RS232 TX |
| 6 | USB POWER |
| 7 | GROUND |

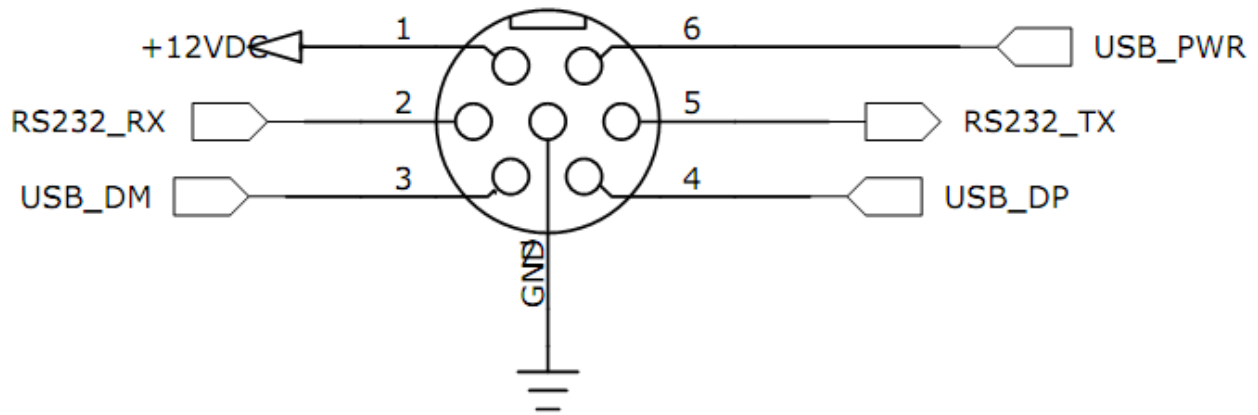


Figure 2-5: Power/Control Connector Detail

2.5.2 Audio Input Connectors Pinout

Table 2-5: Audio 1 & 2 Pinout

| Pin | Function |
|-----|--------------|
| 1 | LINE SELECT |
| 2 | +5V MIC BIAS |
| 3 | AUDIO IN |
| 4 | GROUND |

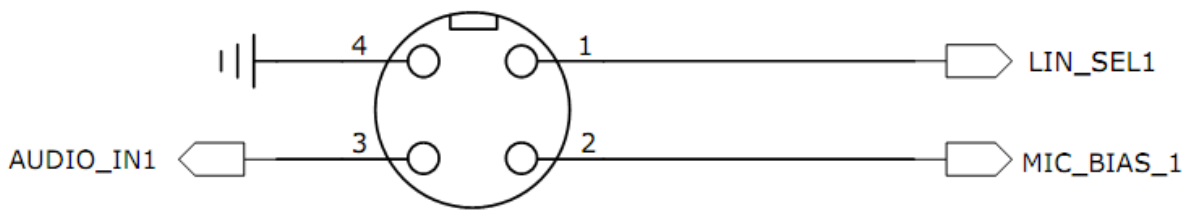


Figure 2-6: Audio Connector Detail

2.5.3 Ext Connector Pinout

Table 2-6: Ext Pinout

| Pin | Function |
|-----|--------------|
| 1 | GROUND |
| 2 | ASI OUT |
| 3 | RX User Data |
| 4 | TX User Data |
| 5 | ASI IN |

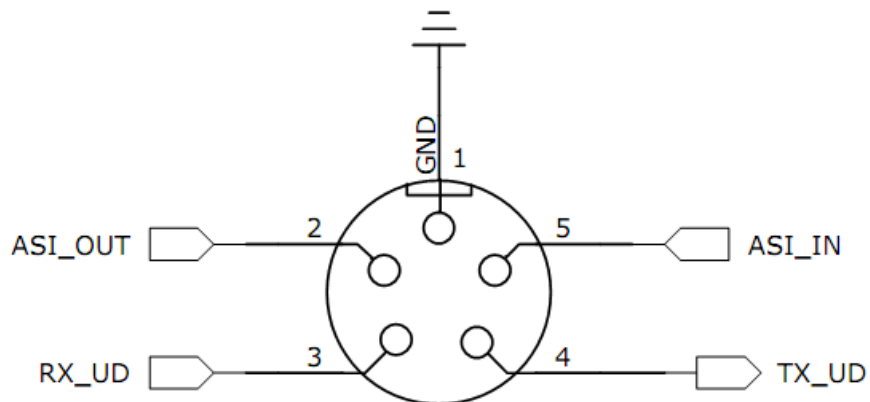



Figure 2-7: EXT Connector Detail

2.5.4 Connector Part Numbers:

- 5 pin Lemo (on TX) ECG.0B.305.CLN
 - IMT PN 512-F3022-005-R
- 5 pin Lemo (mating) FGG.0B.305.CLAD52
 - IMT PN 512-F3022-005-R
- 7 pin Lemo (on TX) ECG.0B.307.CLN
 - IMT PN 512-F3022-007-R
- 7 pin Lemo (mating) FGG.0B.307.CLAD52
 - IMT PN 512-F3022-007-R



Chapter Three **3**

Specifications

3 Specifications

3.1 RF

Table 3-1: Frequency Band Coverage

| Base Part Number | Frequency (GHz) | RF Power (dBm) | DC Power (W) |
|-----------------------|-----------------|----------------|--------------|
| 21MLT-23-U3-C3 | 2.025-2.110 | 23 | 13 |
| 23MLT-23-U3-C3 | 2.200-2.400 | 23 | 13 |
| 58MLT-20-U3-C3 | 5.725-5.850 | 20 | 15 |

Tuning step size 1 MHz step size (0.5Mhz for 21MLT model)

Frequency stability..... ± 10ppm

Standby mode No RF output

Normal Instant on-frequency transmission

3.2 Modulation Modes

Modulation 1

- 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

3.3 Video Modes supported

Table 3-2: Formats Supported

| Standard | Rate | Mode | Low | Simple | Long | Advanced |
|----------|-------|------|----------|--------|------|----------|
| 720 | 59.94 | p | 4 frames | n/a | n/a | n/a |
| 720 | 50 | p | 4 frames | n/a | n/a | n/a |
| 720 | 29.97 | p | 4 frames | n/a | n/a | n/a |
| 720 | 25 | p | 4 frames | n/a | n/a | n/a |
| 720 | 24 | p | 4 frames | n/a | n/a | n/a |
| 720 | 23.98 | p | 4 frames | n/a | n/a | n/a |
| 1080 | 50 | i | 4 frames | n/a | n/a | n/a |
| 1080 | 29.97 | p | 4 frames | n/a | n/a | n/a |
| 1080 | 25 | p | 4 frames | n/a | n/a | n/a |
| 1080 | 24 | p | 4 frames | n/a | n/a | n/a |
| 1080 | 23.98 | p | 4 frames | n/a | n/a | n/a |
| 1080 | 29.97 | psf | 5 frames | n/a | n/a | n/a |
| 1080 | 25 | psf | 5 frames | n/a | n/a | n/a |
| 1080 | 24 | psf | 5 frames | n/a | n/a | n/a |
| 1080 | 23.98 | psf | 5 frames | n/a | n/a | n/a |

3.4 MPEG Encoder

StandardMPEG-4 Part 10 / H.264 AVC

Video

- Video Coding.....AVC
- Video Input:Composite
- NTSC:720 x 480(4:2:0)
- PAL:720 x 576(4:2:0)
- SD-SDI input:ANSI/SMPTE 259M
- HD-SDI Input:ANSI/SMPTE 292M

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
5v Phantom power or Ext. Bias
.....De-embedded from SDI
- Tone(-10dBfs/8dBm) Level Adj. (-10-26dBfs)

3.5 System

- Video Present:Remote Standby/Test Generator Selectable
- Test Generator (Dynamic):SMPTE CB(NTSC)/100% CB(PAL)
16 Character ID (Match SDT Service name)
- 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

3.6 Power Requirements

- Input range: DC: +9 to +28
- Power consumption:See table above

3.7 Environmental

Table 3-3: Environmental Specs

| 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 |

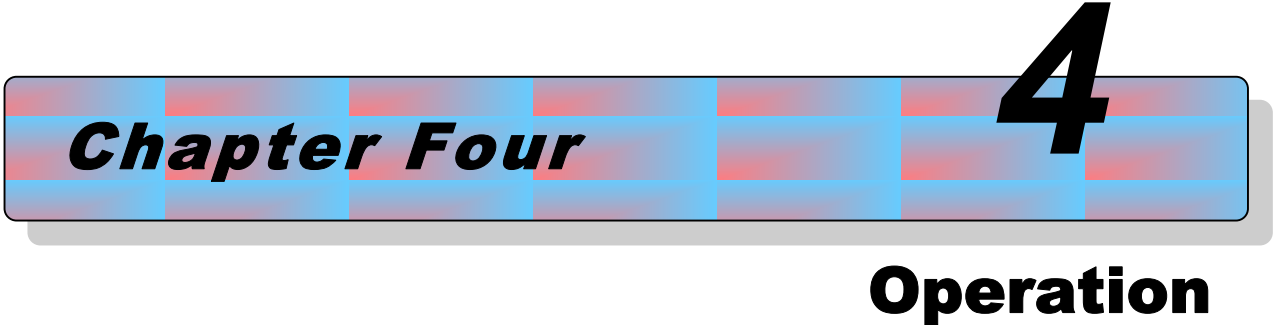
3.8 Physical Specifications

Size (excluding connectors):3.06” (78mm) x 1.59” (40.5mm) x 2.44” (62mm)

Weight:0.522lbs (237g)

3.9 Connectors

- Power, RS232 Control: LLemo, 7 pin
- BNC Input:Composite, HD-SDI, SD-SDI, or ASI Input
- Left and Right Audio:4pin Telocate
- ASI Input B, ASI Output, User Data:Lemo, 5 pin
- RF Output:50 Ohm RP-SMA (due to FCC requirement)

A horizontal graphic with a blue and red striped background. The text "Chapter Four" is written in a bold, italicized black font on the left side. A large, bold black number "4" is positioned on the right side of the graphic. Below the graphic, the word "Operation" is written in a bold black font.

Chapter Four

4

Operation

4 Operation

While this chapter contains basic information about the operation of the *microLite* transmitter, the programming of the unit (including preset configuration) via the NanoController GUI is not covered. Please refer to the IMT NanoController manual (IMT Publication: M27-0001-00A) for detailed information on how to program and configure the unit.

In this chapter, you will find info on how to use the *microLite* transmitter to transmit video, audio, and user data.

4.1 *microLite* Set-up

- Remove *microLite Transmitter (MLT)* from the case. Mounting bracket and Litepanels kit is preassembled. Attach assembly to 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 (SMA).
- Connect the power source to the *MLT* using the supplied transmitter power cable.
- Select the desired preset using the set button.
- Transmit signal using the *MLT* Tx/Standby button.
- Hi/Low button will control the power output level.
- *microLite* Transmitter will have one of the following button controls:
 - BARS – Will turn internal Bars on and off.
 - FAN – Will turn the internal fan on and off

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

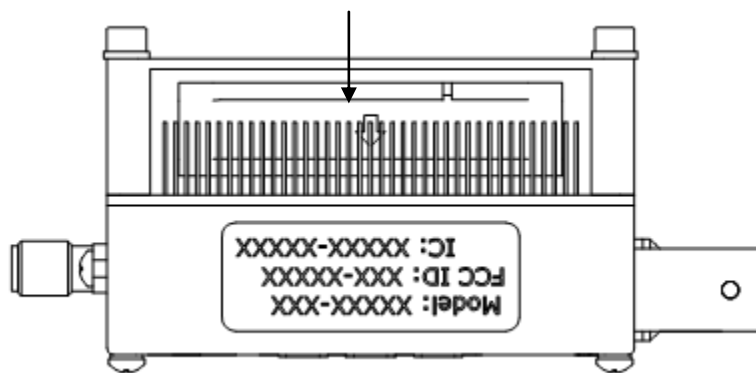


Figure 4-1: Detail of Air Ducts

4.2 Powering Up the microLite

Turn on the power to the overall system.

The microLite requires up to 25 seconds to complete its internal power up sequence. The top row of front panel preset led's (1, 2, 3, 4) light up in succession as the unit advances thru the boot process.

Supply current will jump up in steps as internal circuits are powered. The final DC supply current will settle after 20 seconds.

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

4.3 microLite Pre-Configured Options

The microLite has a wide range of programmable settings. It is shipped with factory default settings that are applicable to many use cases.

Before using the microLite 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 NanoController software. Please refer to the NanoController documentation for details.

4.4 Button and LED Interface

The microLite has several 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.

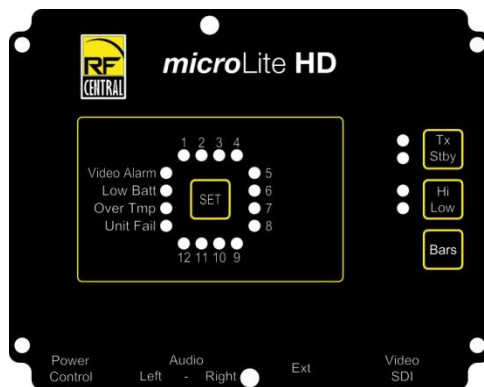


Figure 4-2: Unit Interface - Broadcast

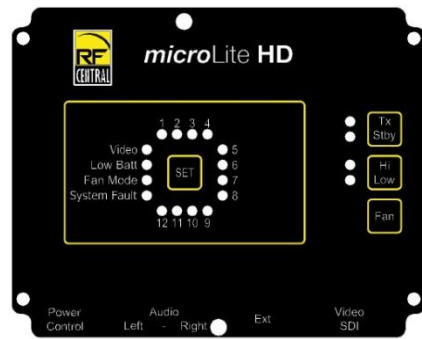


Figure 4-3: Unit Interface - Sports and Entertainment

4.4.1 Unit Interface Buttons

4.4.1.1 SET

The Set button Advances the unit through the presets. The 1-12 LED's indicate in GREEN, which preset is currently active.

4.4.1.2 TX/STBY

The TX/STBY button toggles between Transmit and Standby modes. TX LED= Green for TX mode. Yellow LED for standby mode.

4.4.1.3 Hi /LOW

The HI/LOW button toggles between High and Low Power modes. The Green LED for High power Yellow LED for Low power

4.4.1.4 Bars or Fan

The MicroLite HD comes standard with either an external Bars or Fan control button depending what version you order.

- Bars - This is a push button switch pressing once changes to bars mode. Then push it once again to go back to video mode.
- Fan – This push button switches the fan on and off.

4.4.2 User Interface Alarm Indicators

4.4.2.1 Unit Fail or System Fail

The LED will display Blinking YELLOW, which indicates an RF synthesizer lock failure. The unit will not transmit. Return unit to IMT for service.

4.4.2.2 Low Battery

The LED will display Blinking YELLOW which indicates battery voltage < 9V.

4.4.2.3 Over Temp/Fan Mode

- Over Temp - The LED will display Blinking YELLOW that indicates internal temperature is too high. Check Fan operation or move to a lower ambient temperature.
- Fan Mode – The light is green when unit is cool enough to turn the fan off. Yellow indicates fan is off. Blinking yellow indicates fan is off but will automatically turn on in a minute.

4.4.2.4 Video

The Video LED will display Green when Video is present on 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 3.3 for supported formats

4.5 Select User Level Settings

By use of the SET button, select an appropriate preset so that your MicroLite transmitter and suitable receiver are on the same RF and modulation settings.

4.6 Put the unit in Transmit Mode

Press the TX / STBY toggle button to put the unit in Transmit mode. Pressing the button again will put the unit in Standby mode (no RF output).

4.7 Select Power Level

Press the HI / LOW toggle button to select the power level desired. In HI mode, the unit will output its full rated power. In LOW mode, the output will be approximately 6dB down from the HIGH power output.

4.8 Operation Verification

Verify operation of the *microLite* by one of the following methods:

- If your system contains a host processor capable of communicating with the *microLite* via the serial interface, use interrogation commands to check the status of the *microLite*.
- Detect the transmitted signal using a spectrum analyzer.
- Using an appropriate receiver, verify that you are receiving audio and video from your application setup.

4.9 Accessory Kit

The accessory kit with the *MLT* includes the following:

- 1 *microLite* HD Tx with transmitter mounting bracket and Litepanels kit - preassembled
- 1 Omni Directional Tx antenna
- 1 Transmitter power cable set (Lemo to Tamiya)
- 1 Anton Bauer D-Tap power cable (D-Tap to Tamiya)
- 2 Audio cables (Telocate to XLR unbalanced)
- 1 USB-Serial adapters for configuring units (USB to RS-232)
- 1 USB/Power software update cable for system software updates for the *MLT*
- 1 Transmitter power cable (Lemo to Tamiya/DB-9)
- 2 Instruction Manuals and NanoController Software on USB stick

4.10 Maintenance Information

Follow these procedures when maintaining the device:

- Dry the device immediately if it is exposed to water or other liquids. Warranty does not cover liquid damage.
- Do not submerge the device or use it directly in rain.

-
- Do not open the device. This voids the warranty.
- Keep the device clean by wiping with a soft, dry cloth. If necessary, dampen only using a solution suitable for cleaning electronic devices. Warranty does not cover cleaning damage.

Proprietary Information and Disclaimer Notice

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Warranty

Equipment manufactured by IMT, LLC is warranted to meet all published specifications and to be free from defects in material and workmanship within a period of two years from date of original shipment. The company's liability under this warranty is limited to:

- Servicing or adjusting equipment.
- Replacement of defective parts.

Any equipment returned to the factory shall have the freight paid for by the buyer.

Equipment showing damage by misuse, abnormal conditions of operation, or attempts to repair by other than authorized service personnel shall be excluded from this warranty. IMT shall in no event be responsible for incidental injury or property damage. Since IMT has no control over conditions of use, no warranty is made or implied as to suitability for the customer's intended use, beyond such performance specifications as are made part of the purchase order. There are no warranties expressed or implied, except as stated herein. This limitation on warranties shall not be modified by verbal representations.

Shipping Damage

Equipment shipped FOB IMT shall become the property of buyer upon delivery and receipt from carrier. Any damage in shipment should be handled by the buyer directly with the carrier. Immediately request the carrier's inspection upon evidence of damage in shipment.

Field Service

IMT products are designed with easy access to components to facilitate service. However, some modules cannot be service in the field. To prevent voiding of the warranty, please contact Tech

Support before servicing or making any repairs. The user is cautioned to read all module descriptions in this manual. Warnings are included in the circuit descriptions and on certain modules themselves.

Replacement Modules

Troubleshooting to the component level is often not cost-effective and frequently impossible. Often the practical method of effecting repairs is to substitute known good spare modules for suspect units. Replacement modules for our standard product line are usually available.

Technical Support Information

Technical Support personnel are available to extend technical assistance to customers while installing, operating, or troubleshooting IMT equipment. Please have your model number and serial number available.

Telephone

During IMT business hours, 8:30am - 5:30pm EST (-5 Hours, GMT), call:

US908-852-3700

International001-1-908-852-3700

After hours, call:

US or International888-531-3892

Email

Email address.....service@nucomm.com

Internet

Web address.....www.imt-solutions.com

Equipment Returns

If equipment cannot be successfully restored through telephone consultation, return to the factory may be required. Loaner items may be available until the repaired items are returned.

For out-of-warranty equipment only: We evaluate all returned units, and then confers with the client on corrective action. If no fault is found, or no corrective action is authorized, a diagnostic fee may be charged.

Prior to returning products to the factory, please obtain a return material authorization (RMA) number and shipping instructions from Tech Support.

When returning equipment, it is very helpful to enclose a note containing the following:

- RMA number.
- Serial number.
- A detailed description of the problem.
- Name of an engineer or technician we may contact regarding problems encountered.
- A “ship to” and “bill to” address.

Ship all returns to:

IMT, LLC
Attn: RMA# (your RMA number)
200 International Drive
Mt. Olive, NJ, 07828, USA
(908) 852-3700

For International returns:

In addition to the instructions above, when shipping internationally we recommend the use of a courier such as Federal Express, UPS, etc, and that the goods be shipped DOOR-TO-DOOR PRE-PAID. This will reduce Customs costs, handling charges and delays. Enclose all the information above, plus a statement that the equipment was manufactured in the United States (*the latter is needed to expedite customs processing*).



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