



Advantech
Wireless

OPERATION MANUAL

**L-BAND TO C-BAND
INTEGRATED OUTDOOR
BLOCK UP-CONVERTER
AWUB-LC**

PM 100-UC1000-000, Rev. 5n

WARRANTY

This Advantech Wireless product is warranted against defects in material and workmanship for a period of 2 years from date of shipment. During the warranty period, Advantech Wireless will, at its option, either repair or replace the product, which proves to be defective.

To return a product for warranty or repair service, first request a Return Material Authorization (RMA) number by contacting Advantech Wireless at:

Phone: (514) 420-0045 or Fax: (514) 420-0073
Website: www.advantechwireless.com or e-mail: support@advantechwireless.com

The product should be shipped to the following address, in the original shipping container (box), with the prepaid shipping charges.

Advantech Wireless
657 Orly Avenue
Dorval, Quebec
H9P 1G1
CANADA

Please indicate the RMA number on all shipping documentation.

Units shipped without a prior issued RMA, or not shipped in the original container, may be rejected and returned at sender's expense.

LIMITATIONS OF WARRANTY

Advantech Wireless warrants this product to be free of defects in materials and workmanship.

The foregoing warranty shall not apply to defects resulting from improper handling or abuse by the purchaser, unauthorized modification, operating outside of the product's environmental specifications, improper installation or maintenance.

Advantech Wireless shall not be liable for any direct, indirect, special, incidental or consequential damages.

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1. SAFETY

In addition to this section, included by reference are the following pertinent sections of the International Standard IEC-215, 'Safety requirements for radio transmitting equipment':

Appendix D, 'GUIDANCE ON ASSESSING THE COMPETENCE OF PERSONNEL FOR DESIGNATION AS SKILLED' and also Sub-clause 3.1 of the Standard.

Appendix E, 'GUIDANCE ON SAFETY PRECAUTIONS TO BE OBSERVED BY PERSONNEL WORKING ON RADIO TRANSMITTING EQUIPMENT', also Sub-clauses 3.2, 3.7 and 22.1 of the Standard.

To prevent the risk of personal injury or loss related to equipment malfunction Advantech Wireless uses the following symbols for safety related information. For your own safety, please read the information carefully BEFORE operating the equipment.

Symbols used in this manual:

WARNING: This indicates a hazardous procedure that could result in serious injury or death, if not performed properly.

CAUTION: This indicates a dangerous procedure that could result in light-to-severe injury or loss related to equipment malfunction, if proper precautions are not taken.

----- WARNING -----

When supplying power to this equipment, connect to a **grounded power outlet**; also use a **ground strap** between the station's ground bus and the chassis ground of the unit. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

In the context of this document any voltage that is lethal is viewed as 'High Voltage'. Therefore, even prime power (90 to 264 VAC) is dangerous because prime power potentials have been known to cause death or injury.

----- WARNING -----

This equipment can not be repaired by the operator. DO NOT attempt to remove the equipment cover or to disassemble internal components. Only qualified service technicians should service this equipment. There are high-voltage parts in this equipment presenting a risk of severe injury to untrained personnel. In addition, there is a risk of damage to precision components.

----- WARNING -----

ALWAYS TERMINATE THE OUTPUT CONNECTOR OF THE UNIT WITH A RF LOAD CAPABLE OF DISSIPATING FULL CW RF POWER. SIMILARLY TERMINATE THE INPUT TO AVOID THE POSSIBILITY OF THE UNIT BEING DRIVEN BY STRAY LEAKAGE SIGNALS. Incorporate the termination prior to applying prime power to the unit. This procedure prevents self-oscillation and irradiation of the local environment. Even if a source is not connected to the unit you are working with, there are situations when the unit can go into a self-induced mode and generate high levels of RF energy. Destruction caused under excessive load voltage standing wave ratio (VSWR) will void the warranty.

----- WARNING -----

DO NOT TOUCH AND DO NOT LOOK INTO THE OUTPUT PORT OF THE POWERED BLOCK UP-CONVERTER. Treat the powered unit with extreme care. Keep in mind that levels of microwave radiation that do not induce immediate physical discomfort in most individuals can be sufficiently high to induce longer term effects. Your eyes are particularly vulnerable parts of your body.

The permissible levels of exposure are quite low in comparison to the power levels of the equipment built by Advantech Wireless (e.g. less than 10 mW versus 4 to 700 W delivered by different units). The permissible levels are currently being studied by a number of organizations. In the past the U.S. Safety Code established a dosage rate of 10 mW/cm². Currently there is consideration being given to reducing the permissible level to 1 mW/cm² in the United States, as has been the case for several European countries.

2. INTRODUCTION

The Advantech Wireless L-Band to C-Band Block Up-Converter has been designed to interface easily with popular L-Band modulators and can provide full bandwidth operation over the whole C-Band transmission range. It meets or exceeds all the exacting standards for stability and noise emission required by satellite operators.

The key features are:

- 5.850 to 6.425 GHz transmission bandwidth
- High stability and excellent phase noise characteristics
- Lock alarm monitoring connector
- Excellent spurious emission performance
- Up to +3 dBm output level
- Gasket sealed, wide temperature range for outdoor use

Advantech Wireless has prepared this manual for use as a guide for the proper installation, operation and maintenance of Advantech Wireless equipment and computer programs. The drawings, specifications and information contained herein are the property of Advantech Wireless. Unauthorized use or disclosure of these drawings, specifications and information is strictly prohibited. They shall not be reproduced, copied or used in whole or in part as the basis for manufacturing or sale of the equipment or software programs without the prior written consent of Advantech Wireless.

3. PRODUCT DESCRIPTION

As seen on **Figure 1**, the L-Band to C-Band Block Up-Converter accepts an input in L-Band (950 – 1525 MHz) and provides conversion into the C-Band frequency range (5.850 – 6.425 GHz) using a 4.9 GHz local oscillator. It is line powered using a 110/220 V AC (autoranging) supply, and it is using an internal 10 MHz reference signal to phase-lock its local oscillator.

The L-Band to C-Band Block Up-Converter also provides an alarm connector to monitor the lock condition of the PLL.

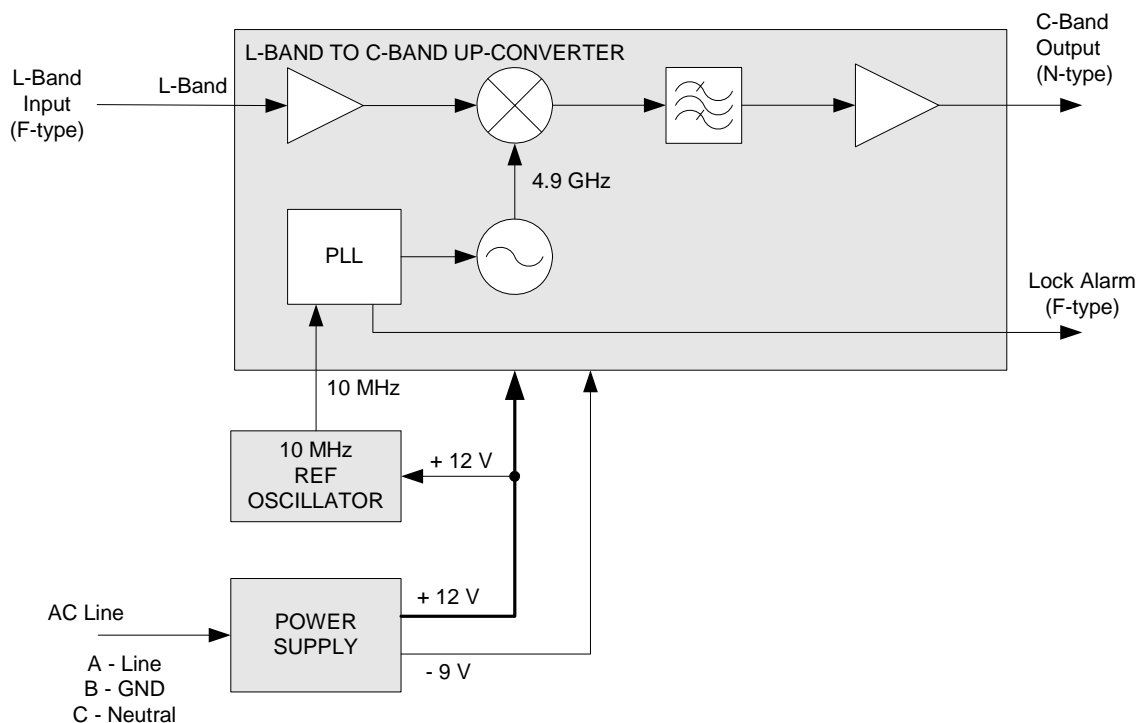


Figure 1: Block Diagram

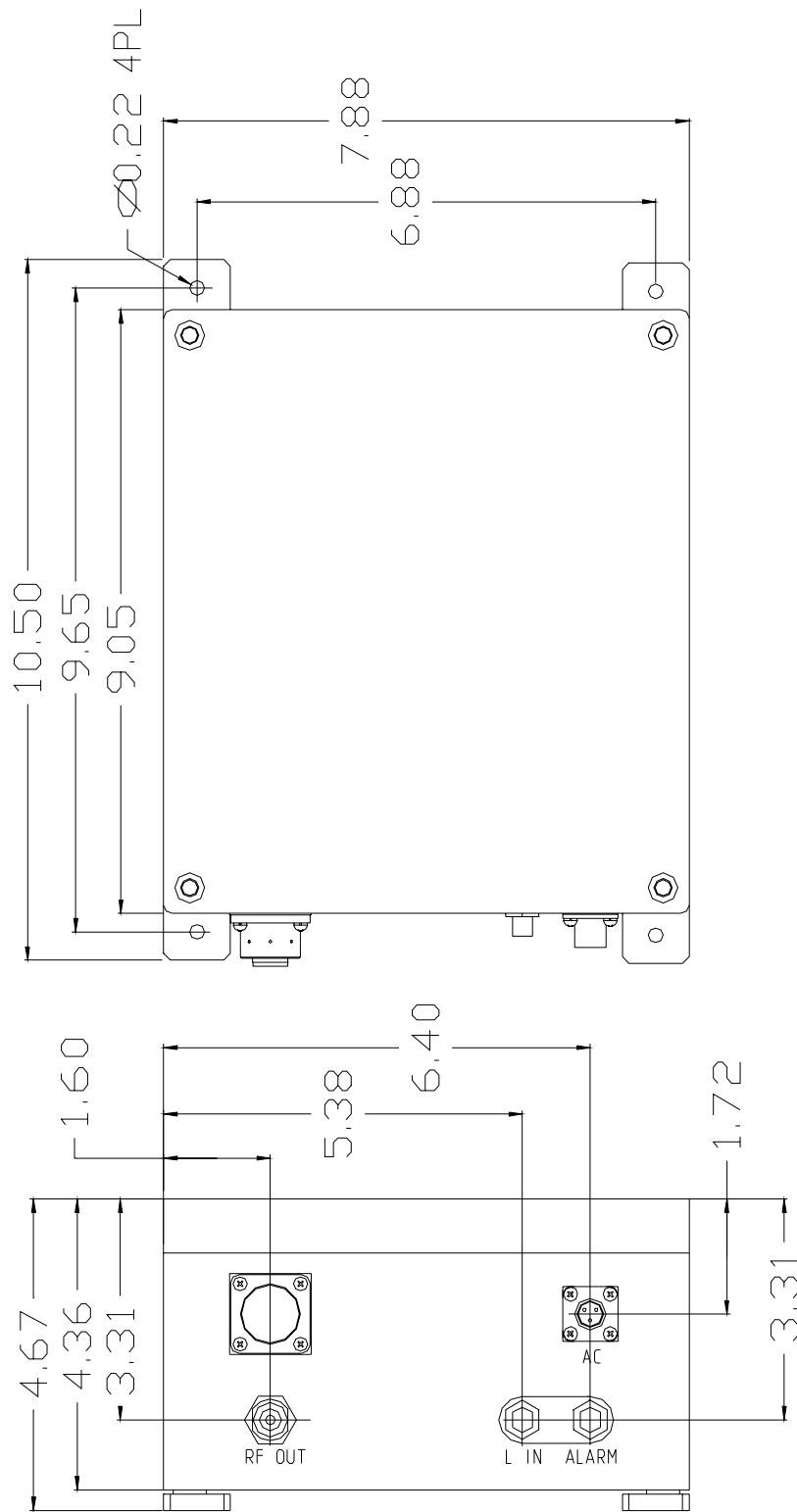


Figure 2: Outline Drawing

4. INSTALLATION

The installation consists of 2 basic steps: up-converter mounting and RF/electrical connections.

4.1 UP-CONVERTER MOUNTING

The up-converter is designed for outdoor operation. Mount the unit using the four mounting holes (0.22 inches).

The up-converter is cooled by air convection. For proper cooling, the unit should be positioned such that the air can easily flow on its surfaces. Also, it is recommended to mount the up-converter such that one of its flat surfaces is in contact with another metal surface (to allow heat transfer).

4.2 RF / ELECTRICAL CONNECTIONS

The RF/electrical connections to be made to the up-converter are shown in **TABLE 1**. Note that the L-Band signal is applied at the “L IN” port of the up-converter.

After connections are made, wrap both RF connectors, and alarm connector with mastic tape (provided in the shipping kit) to prevent connector corrosion and resulting damage.

TABLE 1: CONNECTIONS			
Signal Description	Up-Converter Port Designation	Connector Type	Mating Connector
L-Band (950 – 1525 MHz) input	L IN	F-type 75 Ω (F)	F-type 75 Ω (M)
AC input 110/220 V AC	AC	MS 3112E8-3P	MS 3116F8-3S (provided in shipping kit)
C-Band (5.850 – 6.425 GHz) output	RF OUT	N-type 50 Ω (F)	N-type 50 Ω (M)
Alarm output	ALARM	F-type (F)	F-type (M)

NOTES: Do not apply AC voltage to the up-converter before all connections are made. The absolute maximum value for AC input voltage is 264 V AC.

5. OPERATION

The up-converter is designed to be completely self-controlled, therefore it does not require any operator intervention. When the local oscillator is out-of-lock, the RF output of the up-converter is automatically muted. Moreover, should the internal temperature rise beyond +85°C, the up-converter will be automatically shut down.

The up-converter provides an alarm signal to monitor the PLL lock status. When the local oscillator is NOT phase-locked to the 10 MHz reference signal, the “ALARM” pin is open (open-circuit) relative to the “GND” shield. When the local oscillator is phase-locked to the 10 MHz reference signal, the “ALARM” pin is closed (short-circuit) relative to the “GND” shield.

TABLE 2: AC LINE CONNECTOR – PIN ASSIGNMENT	
Pin	Description
A	PHASE (LINE)
B	GROUND
C	NEUTRAL

WARNING: Proper grounding of the AC power outlet is necessary for personnel and equipment safety.

6. PRODUCT SPECIFICATION

TABLE 3: SPECIFICATIONS	
Input frequency	950 – 1525 MHz
Output frequency	5.850 – 6.425 GHz
LO frequency	4.9 GHz
Conversion gain @ central frequency	15 ± 0.5 dB
Conversion gain flatness	3 dB p-p, max. (over 575 MHz) 0.6 dB p-p, max. (over 40 MHz)
Output Power (P _{1dB})	0 dBm, min.
Local oscillator phase noise @ offset:	
100 Hz	-65 dBc/Hz, max.
1 kHz	-75 dBc/Hz, max.
10 kHz	-85 dBc/Hz, max.
100 kHz	-95 dBc/Hz, max.
In-band spurious signal related	-65 dBc @ P _{out} = 0 dBm
LO to IF leakage	-20 dBm, max.
LO to RF leakage	-20 dBm, max.
Image rejection	20 dB, min.
Output 3 rd order intercept point	+13 dBm, min.
Noise figure	25 dB, typical
Input Return Loss	9 dB, min (on 75 Ω)
Output Return Loss	16 dB, min (on 50 Ω)
Internal Reference frequency	10 MHz, sine wave
Internal Reference frequency level	0 ± 3 dBm
Supply voltage	110/220 V AC (autoranging)
Current consumption	150 mA @ 110V, typical
Input connector	F-type, 75 Ω
Output connector	N-type, 50 Ω
Lock alarm connector	Open drain when not locked
Temperature range	- 30 °C to + 55 °C

7. PACKING LIST

TABLE 4: PACKING LIST (SHIPPING KIT P/N 195-UC1000-001)			
Item	Qty	Description	Part #
1.	1	Installation and Operating Manual	PM 100-UC1000-000 Rev. 5n
2.	1	C-Band to L-Band Quad Down-Converter	100-UC1000-000
3.	1	Connector Circular 3-S MIL-C-26482	631-311603-001
4.	1 roll	Mastic Tape	709-224200-001

8. APPENDIX A: SAFETY AND EMC COMPLIANCE

Advantech Wireless products are compliant with following standards:

SAFETY: IEC 60950-1 second edition 2005

EMC: EN301489-1 2004 (EMC for radio equipment and services, common technical requirements):

- EN 55022: 1998 / A1: 2000 - Class A
- EN61000-4-4 Transient/burst 0.5kV Signal Lines, 1 kV Power Lines
- EN61000-4-2 Electrostatic discharge 4kV CD, 8 kV AD
- EN61000-4-5 Surge 1kV, 0.5 kV
- EN61000-4-11 AC port dips 70%, 40%, 0%
- EN 61000-4-3 Radiated Immunity 80-1000 MHz @ 3 V/m

SUPPLEMENTARY INFORMATION:

The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and of the EMC Directive 89/336/EEC and may carry the CE-marking accordingly.