



DATA SPECIFICATION FOR THE MULTI-OCTAVE RF UPCONVERTER

MODEL NUMBER: RF2-3000UCV1

NuWaves Engineering
Superior Engineering Design Services

NuWaves Engineering
Research and Technology Center
122 Edison Drive
Middletown, Ohio 45044-3269

NuWaves' **MULTI-OCTAVE RF UPCONVERTER (MORF)** provides excellent performance with a user friendly interface over the frequency range of 2 MHz to 3 GHz. By providing a simple command and configuration interface and standard SMA connectors, the end user can quickly and easily integrate into a system. The software provides a set of rich features to allow customization of system parameters and the ability to change settings as requirements change.



Phone: 513-360-0800
Fax: 513-360-0888
E-mail:
product.sales@nuwaves-ltd.com
www.nuwaves-ltd.com

Multi-Octave RF Upconverter Operates from 2 MHz to 3 GHz

1. PRODUCT OVERVIEW

1.1 Introduction

The RF2-3000UCV1 is a wideband IF-to-RF Upconverter. The upconverter accepts an IF signal in the range of 2 MHz to 70 MHz as an input, which is then upconverted to any desired frequency in the range of 2 MHz to 3 GHz. The upconverter utilizes a straight-forward command/control serial interface for ease of integration. Unique to this module is the functionality to allow end-users the ability to select many of their own system parameters to achieve high performance.

The upconverter provides 50 dB of dynamic range performance over the 2 MHz to 3 GHz frequency range in steps of 5 kHz. The IF bandwidth of the upconverter is user selectable as 4 MHz or 35 MHz.

As an added benefit, the upconverter incorporates over-current and reverse voltage protection.

1.2 Product Highlights

- Exceptionally Wide IF Input Frequency Range: The RF2-3000UCV1 can support IF frequencies from 2 MHz to 70 MHz.
- Extremely Wide RF Output Frequency Range: The RF Upconverter provides RF outputs from 2 MHz to 3 GHz.
- User Definable Frequency Selection: The Multi-Octave RF Upconverter is designed to allow end users the ability to select an output frequency from wide range of IF input frequencies in 5 kHz increments.
- Enclosure: The Multi-Octave RF Upconverter is housed in a rugged aluminum enclosure with SMA connectors.
- User Friendly: By using the Graphic User Interface (GUI), the end user can adjust many parameters such as output frequency, attenuation, and IF filter bandwidth.
- High Reliability: NuWaves' selection of conservatively de-rated components provides high reliability and excellent MTBF results. Each Multi-Octave RF Upconverter is quality inspected to IPC-A-610 Class III standards.
- User Selectable Reference Frequency: The Upconverter can be utilized with its own internal frequency reference or with a 10 MHz external frequency reference.

- User Selectable Bandwidths: The user has the ability to program the Upconverter for either 4 MHz or 35 MHz signal bandwidth.
- RF Attenuation Control: The user has over 50 dB of RF level control in 0.5 dB increments.
- RF KEY: The user can program the unit for RF ON or RF OFF.
- Storage Capability: The user can store a configuration as start up settings.
- Simple Interface Control: The upconverter uses a straight forward RS232 command interface.

Typical Applications	Cable Modem ▪ Fixed Wireless ▪ Mobile Infrastructure ▪ Industrial Scientific Medical Band Applications ▪ Signal generator ▪ Software Defined Radio (SDR) ▪ Joint Tactical Radio System (JTRS) ▪ RF Exciter ▪ Test Beds ▪ Transmit Uplinks
Typical Users	Engineering and Scientific Laboratories ▪ Test and Measurement Facilities ▪ OEMs of RF High End Systems ▪ Research Laboratories ▪ Communications Engineering Firms ▪ Cable TV System Engineers ▪ RF System Integrators ▪ Test Ranges ▪ Universities ▪ Antenna Design Facilities ▪ Field Service Technicians ▪ Aerospace and Defense Systems ▪ Radio and TV Engineers ▪ Amateur Radio ▪ Scientific and Consulting Agencies ▪ Radio and Wireless Communication Services ▪ Precision Equipment Repair Organizations ▪ Professional and Technical Service Institutions ▪ Military Radio & Communication Facilities

1.3 Functional Description

The upconverter accepts RS-232 command/control data from a host controller or personal computer (PC) terminal program. The primary host functions are:

- Programming the upconverter's synthesizers (setting the output frequency)
- Programming the upconverter's address
- Selecting the operational bandwidth
- Selecting the system attenuation
- Selecting frequency reference
 - Internal Reference
 - External Reference

The physical interface to the upconverter is a 9-Pin Micro-D plug which enables the upconverter to be mated with a host controller via a cabling harness and three SMA female connectors for IF input, external reference input, and RF output. The upconverter's simple interface consists of a single supply voltage, basic command/control lines and keyline control. [See Figure 1.]

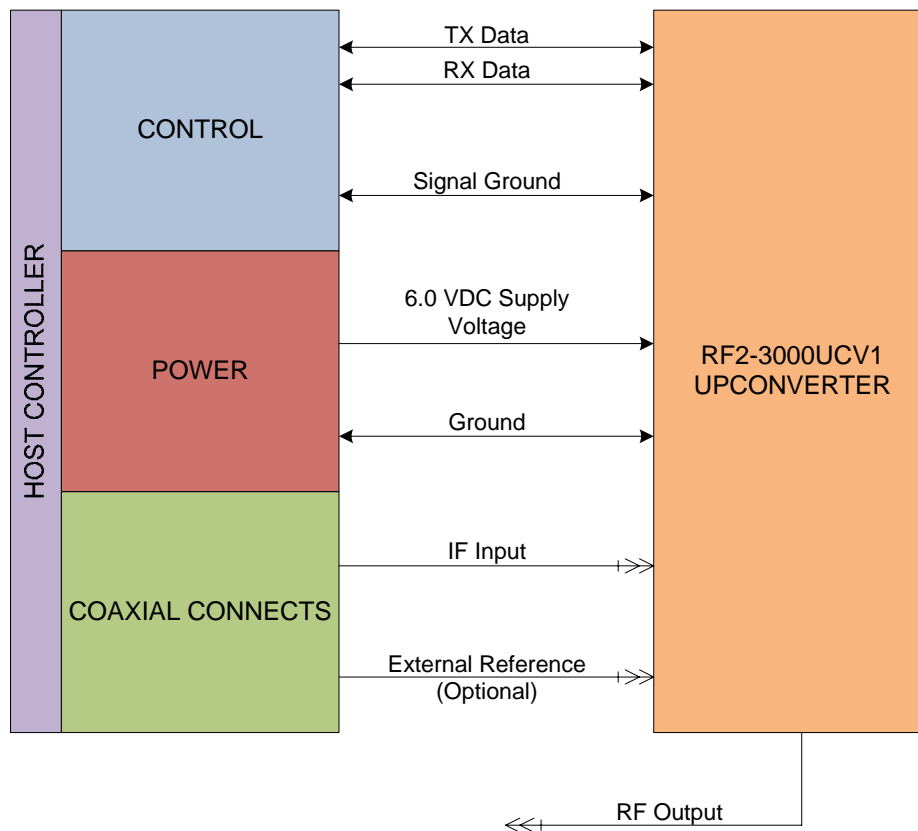


Figure 1: MORF Upconverter Host Interface Signals

1.4 Part Number Ordering Information:

Part Number	Description
RF2-3000UCV1	Multi-Octave RF Upconverter Module
RF2-3000UCV1-KIT	Development Kit – Upconverter Module, Software, Power/Data Interface Cable

2. MULTI-OCTAVE RF UPCONVERTER CHARACTERISTICS

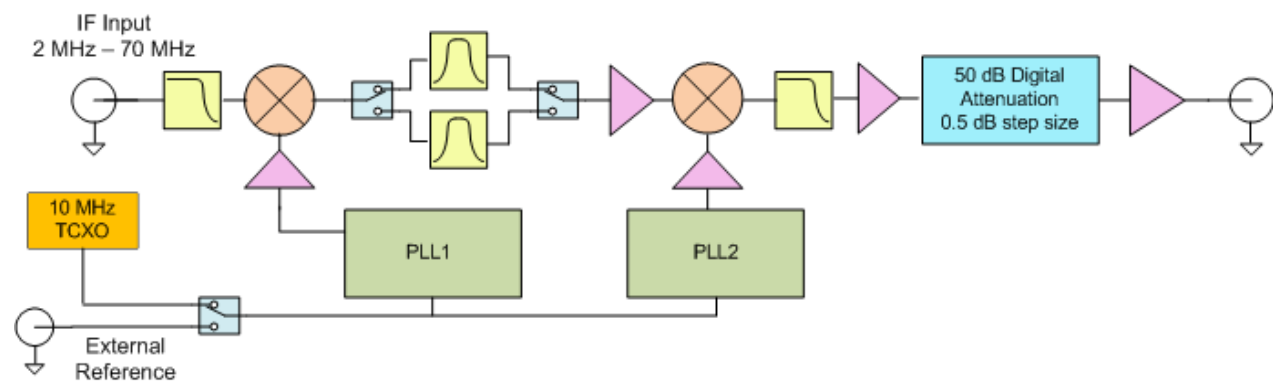


Figure 2: Multi-Octave RF Upconverter Block Diagram

System Parameter	Specification (Subject to Change)
Output Frequency Range	2 MHz to 3 GHz
Frequency Step Size	5 kHz
Output P1dB	> +8 dBm
Output Spurious	< -30 dBc (typ)
Reference Oscillator	User Selectable Internal/External 10 MHz
Reference Level Input	0 dBm to +7 dBm
LO Phase Noise	-130 dBc/Hz @ 1 MHz offset
IF Input Frequency Range	2 to 70 MHz
Attenuation Control	User Selectable: 0 to 50 dB; 0.5 dB step size
IF Bandwidth	User Selectable: 4 MHz / 35 MHz
IF Rejection	30 dB

System Parameter	Specification (Subject to Change)
Dimensions	3.5" x 2.5" x 1.0" (L x W x H)
Power Supply	6.0 VDC
Current Consumption	600 mA (Typical @ 6 VDC)
Operating Temperature	-15° C to +50° C
Storage Temperature	-40° C to +85° C
Digital Interface	RS-232 Half Duplex (115.2 kbps 8 N 1) Standard [RS-485 Half Duplex as an Option, hardware configured at factory.]
Power and Serial Interface Connector	9 pin Micro-D Plug
RF Output Connector	SMA (F)
RF Output Impedance	50Ω
IF Input Connector	SMA (F)
IF Input Impedance	50Ω
Reference Frequency Connector	SMA (F)

3. INSTALLATION, CONNECTING, AND USING THE MULTI-OCTAVE RF UPCONVERTER

The **RF2-3000UCV1** module has been designed to be highly reliable under the specified operating conditions. The following installation and hook-up guidelines should be followed to prevent damage to the module. The input voltage of the module is designed to operate at 6VDC; damage can occur if you exceed 7 VDC.

The interface pin-out definitions and the command strings for programming the Upconverter are detailed in NuWaves' document number 6007-1000-1201 entitled "Interface Control Document for the RF2-3000UCV1 Multi-octave RF Upconverter Module". Consult the factory to request subject document.

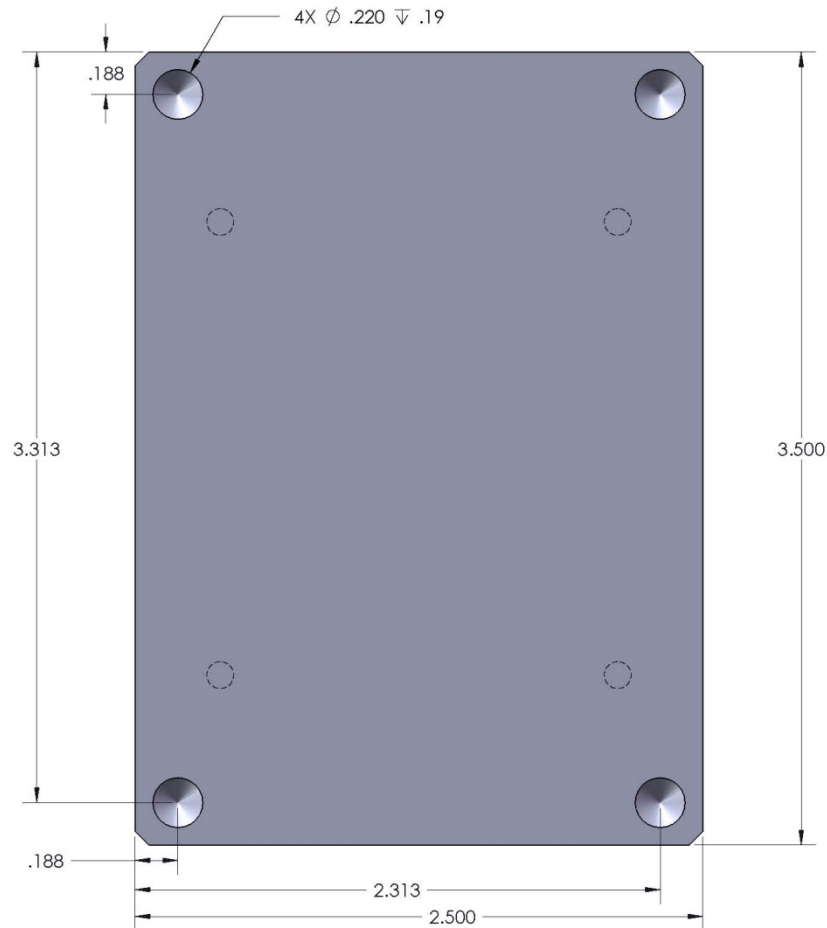
The Multi-Octave RF Upconverter contains components that are sensitive to Electro-Static Discharge (ESD). The use of wrist strap, mats, and ground straps should be adhered to during the installation process.



The enclosure is NOT watertight, so the electronics of the unit must be kept away from moisture to prevent damage.

4. MECHANICAL

The following figure provides a dimensional view of the upconverter assembly.



Outline Dimensions	
Length	3.50 in
Width	2.50 in
Height	1.00 in
Weight	9.6 oz. (typ)

5. GETTING ASSISTANCE – APPLICATIONS ENGINEERING

NuWaves is proud of its products and getting assistance on the Multi-Octave RF Upconverter module is easy.

Sales and Technical Solutions Engineering:

Mr. Kevin Harrison
(513) 360-0800 Ext. 313
FAX: (513) 360-0888
Email: kharrison@nuwaves-ltd.com

NuWaves Home Page: www.nuwaves-ltd.com

Standard Product Warranty: http://nuwaves-ltd.com/pdf/Standard_Warranty.pdf

6. GENERAL INFORMATION

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