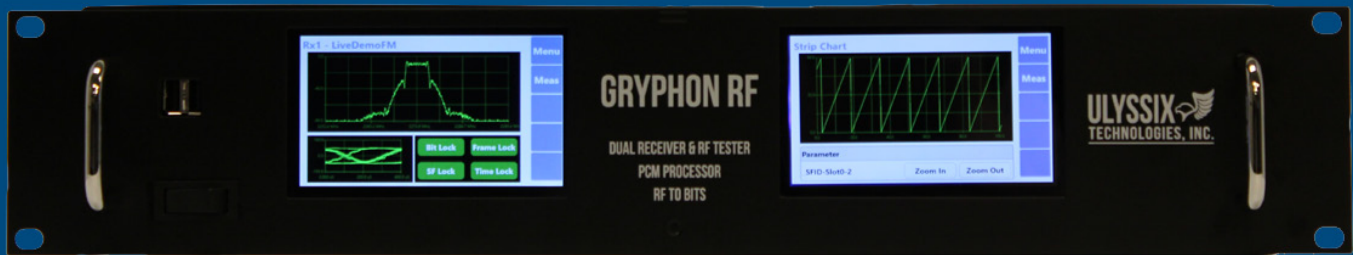


# Gryphon RF-DC

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"RF to Bits" Rackmount Dual Multi-Mode Receivers with Diversity Combiner, RF Modulating Signal Generator and full Dual PCM Processing and Ethernet Data Output with full BERT Functionality



Two Independent C/S/L/Extended P/P/IF Band Multi-Mode Demodulating Receivers with optional RF Modulating Signal Generator

Two full Dual Bit Sync/Frame Sync/PCM Decommutator/IRIG Time Code Reader/PCM Baseband Simulator with optional Chapter 10 storage/RF PCM Signal Generation/BERT RF Tester

External UL/CEC Listed AC/DC Adapter Included

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# Gryphon RF-DC

Ulyssix's "RF to Bits" 2U rackmount complete ground-based telemetry system. The Gryphon RF-DC is a custom rackmount solution using the combined advanced Ulyssix Bald Eagle RF and Tarsus3-PCle-02 with an embedded processor. The full functionality of the combined Ulyssix solution gives the user complete RF and baseband data acquisition with data processing in this single solution. The Gryphon RF-DC is set-up and controlled by dual high-resolution color touchscreen displays for complete flexibility using the front panel touchscreen interface. The Gryphon RF-DC solution is powered by the latest INTEL FPGA technology with user upgradable DSP firmware algorithms.

## Gryphon RF-DC Features:

- Features Included:
- Dual Multi-Mode Receivers
  - Dual PCM Baseband
  - IRIG Time Code Reader
  - PCM Simulator Setup
  - Internal BERT Operation

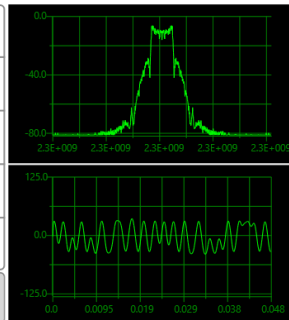
## Optional Features:

- RF Modulating Generator
- IRIG CH10 Recorder/Playback
- UDP Frame and Parameter Broadcasting
- TMoIP Interface



### Receiver 1 Setup

|            |            |      |
|------------|------------|------|
| Freq Band  | S Band     |      |
| RF Freq    | 2273.9 MHz |      |
| BitRate    | 1          | Mbps |
| Modulation | FM         |      |
| Div Comb   | Off        |      |
| RF Power   | -48.8 dBm  |      |



- Menu
- Rx Adv
- Tx
- Bit Sync
- Apply

### Bit Sync 1 Setup

|           |            |               |        |
|-----------|------------|---------------|--------|
| Input     | Input RX   | LoopBW        | 0.1    |
| Code Type | RNRZ(11)-F | AGC Freeze    |        |
| Bit Rate  | 20 Mbps    | Auto Polarity | Off    |
| Impedance | 75 Ohms    | Polarity      | Normal |
| BS Status | BS Rate    |               |        |
| Lock      | 2000000.0  |               |        |

- Menu
- Rx
- FS

### Frame Sync 1 Setup

|                 |           |                |           |
|-----------------|-----------|----------------|-----------|
| Bits per MF     | 256       | Sync Errors    | 0         |
| FS Pattern Bits | 32        | Bit Slips      | 0         |
| FS Pattern      | fe6b2840  | Burst Mode     | Off       |
| FS Mask         | 0         | Data In Search | Off       |
| Number MF       | 64        |                |           |
| Frame Lock      | SFID Lock | SFID           | Bit Slips |
| Lock            | Lock      | 48             | 0         |

- Menu
- SubFS
- BS
- Sim

## Basic Feature

The Gryphon RF-DC is a 2U rackmount solution based on the state-of-the-art Ulyssix Bald Eagle RF and Tarsus3 PCM Processing product.

Dual multi-mode receivers with diversity combiners are the basis for the product.

All RF IP algorithms are in FPGA firmware which is customer upgradable giving the end user endless upgrade for future features.

Ulyssix offers extended warranty support which also includes no charge upgrade for future development receiver and PCM processing algorithms.

## Optional RF Generation

Allows user to RF modulate the internal PCM simulator output or use either stored Ulyssix .tad file formats or Chapter 10 format packet PCM data files.

User can perform a full RF through bits BERT analysis using stored pseudo-random patterns or internal stored data files.

RF Multi-mode modulation capability using C/S/L/Extended P/P/IF frequency bands.

Gryphon RF-DC can also be used as a frequency translator both within the same RF frequency band or between RF frequency bands.

## Storage & Diagnostics

PCM bit sync data is able to be stored using either the built-in USB connectors to external CD/jump drives or out the Ethernet connector.

Diagnostic feature used to aid Ulyssix in troubleshooting FPGA firmware internal control register configuration from user setup configuration.

Retrieval popup form built-in to the Gryphon RF-DC embedded software which outputs diagnostic file for transfer to Ulyssix for quick system analysis for card configuration errors, setup errors, or actual hardware failures.

Where Technology Soars

# Gryphon RF-DC

## RF Specifications\*



### Receiver Specifications

|                             |   |
|-----------------------------|---|
| Input RF Frequency Range    | C-Band 4400 – 5250 MHz<br>S-Band 2185 – 2485 MHz<br>U/L L-Band 1420 - 1850 MHz<br>P-Band Extended 500 - 1250 MHz<br>P-Band 200-500 MHz<br>IF 70 MHz |
| RF Inputs                   | 2   |
| Frequency Tuning Resolution | 50 kHz  |
| Dynamic Range               | -10 dBm to -104 dBm   |
| VSWR Ratio                  | 2:1 typical, 2.5:1 maximum  |
| Noise Figure                | 5 dB typical, 8 dB max  |
| Maximum Safe RF Input Level | +20 dBm without damage  |
| Input Impedance             | 50 ohms into SMA connectors   |
| Spurious signal rejection   | > 60 dBc  |

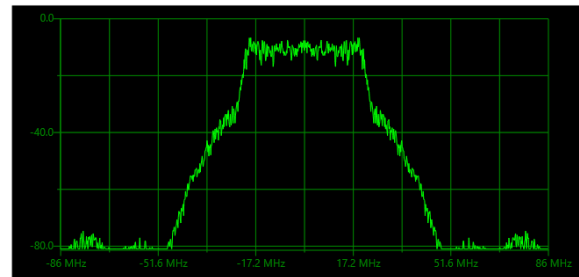
### Signal Processing Specifications

|                          |  |
|--------------------------|--|
| IF Bandwidth             | 20 kHz to 56 MHz   |
| Demodulation Modes       | FM/SOQPSK/BPSK/QPSK/GMSK   |
| Diversity Combiner       | Optimal Ratio and Best Source  |
| Combiner Mode:           | Pre-D  |
| AFC Tracking             | Maximum AFC acquisition range is +/- 50 MHz for C and S Band; +/- 25 MHz for L-Band; +/- 12.5 MHz for EP Band; +/- 6.25 MHz for P-Band/IF 70 MHz |
| AFC Frequency Resolution | 1 kHz for all bands  |
| AFC Acquisition          | ≤ 100 msec for all bands   |
| AGC Time Constants       | 1.0 msec, 0.1msec, 0.01msec, selectable  |
| AGC Modes                | Automatic, Manual, Freeze  |
| AM AGC Out               | AC coupled AM AGC detector output, 50 kHz frequency response, 5 Vpp bipolar or unipolar out  |
| AGC DC Level Detector    | DC coupled form 0 to +/- 3.5 VDC for min to max RF AGC attenuation   |

### Physical Specifications

|                      |  |
|----------------------|--|
| Dimensions           | 2U 19" rackmount chassis with 100V-240V AC input capability  |
| Interface Connectors | RF inputs and outputs through N-Channel connectors, baseband PCM inputs and outputs through single ended 75 ohm BNC rackmount connectors     |
| Manufacturing        | The design utilizes Surface Mount Technology (SMT) manufactured with robotic assembly techniques to IPC-610B Class 2 manufacturing standards |
| Temperature Range    | Operating: 0°C to 50°C<br>Storage: -20°C to 60°C   |
| Power Consumption:   | Less than 300 Watts  |

### Receiver 1 Waveform



**RF Power**  
**-42.8 dBm**

### LQ Tester

|                |                   |                       |                  |
|----------------|-------------------|-----------------------|------------------|
| <b>Sync</b>    | <b>Lock</b>       | <b>Total Errors</b>   | <b>2</b>         |
| <b>Update</b>  | <b>Update</b>     | <b>Interval BER</b>   | <b>0.00E+000</b> |
| <b>RX Bits</b> | <b>9.925E+010</b> | <b>Cumulative BER</b> | <b>2.02E-011</b> |
| <b>Seconds</b> | <b>4960.4</b>     |                       |                  |

Clear    Insert Error    End Test

### RF Generator Specifications (Optional)

|                           |  |
|---------------------------|--|
| Output RF Frequency Range | C-Band 4400 – 5250 MHz<br>S-Band 2185 – 2485 MHz<br>Upper L-Band 1700 – 1850 MHz<br>Lower L-Band 1420 – 1590 MHz<br>P-Band Extended 500 – 1250 MHz<br>P-Band 200– 500 MHz<br>IF 70 MHz |
| Transmit Outputs:         | 1  |
| IF Bandwidth              | 1 kHz to 40 MHz  |
| Modulation Modes          | FM/SOQPSK/BPSK/QPSK/GMSK   |
| Modulation Source         | Tarsus3 PCM simulator running stored PN-11/15 patterns, user defined PCM frame, archived user data, or external TTL Input PCM stream   |
| Output Dynamic Range      | -20 dB to -90 dB   |
| Output Impedance          | 50 ohms using SMA connector  |

Menu

Meas

Menu

LQ  
Setup

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# Gryphon RF-DC

## PCM Baseband Specifications\*

### Bit Synchronizer Input Specifications

|                           |   |
|---------------------------|---|
| Input Data Rate           | Bit Sync programmable input tunable rates from 1 bps to 40 Mbps for NRZ-L/M/S, RNRZ-L and 1 bps to 20 Mbps for Bi- $\Phi$ L/M/S |
| Input Source              | 2 independent inputs per bits (Receiver direct internal input, 1 single ended BNC)  |
| Input Impedance           | Hi-Z/75 $\Omega$ /50 $\Omega$ , single ended input, software selectable   |
| Maximum Safe Input        | $\pm$ 35 VDC  |
| Input Signal Level        | 30 mVp-p to 5 Vp-p  |
| DC Input Level            | +/- 5 VDC   |
| Input PCM Codetypes Modes | NRZ-L/M/S, RNRZ-L, RZ, Bi- $\Phi$ L/M/S, program selectable (consult factory for other codetypes)                               |
| Derandomizer Input        | RNRZ-11/15, forward/reverse, program selectable   |
| Input Polarity            | Normal, inverted or auto selectable using frame sync correlator   |

### Bit Synchronizer Data Specifications

|                        |   |
|------------------------|---|
| Loop Bandwidth         | 0.01% to 3.0%, to the programmed bit rate   |
| Capture Range          | +/-3 times of the programmed loop bandwidth   |
| Data Tracking Range    | +/-5 times of the programmed loop bandwidth   |
| Sync Acquisition       | Less than 200 bits, typically 100 bits max  |
| Bit Error Probability  | Less than 1 dB to theoretical bit sync BER performance for bit rates up to 25 Mbps, less than 2 dB to theoretical from 25 Mbps to 33 Mbps, less than 2.7 dB to theoretical to 40 Mbps |
| PCM Encoder Output     | TTL and RS422 Level driven  |
| PCM Encoder Code Types | NRZ-L/M/S, RNRZ-L, RZ, Bi- $\Phi$ L/M/S or RNRZ 11/15, program selectable   |
| Clock Output           | 0°, 90°, 180°, 270°   |

### Frame Sync/Decommutator Specifications

|                                    |   |
|------------------------------------|---|
| Input Data Rate                    | Up to 50 Mbps   |
| Input Signals                      | TTL Level single ended, RS-422 differential or direct from Bit Sync section of the PCM Processor, NRZ-L and clock |
| Word Lengths                       | 3 to 64 bits variable from channel to channel   |
| Minor Frame Length                 | 3 to 16,777,216 bits  |
| Major Frame Length                 | 1 to 1024 minor frames per major frame  |
| PCM bit word order                 | MSB or LSB, word by word basis, program selectable  |
| Frame Sync Pattern                 | 16 to 64 bits   |
| Frame Sync Location                | Leading the minor frame   |
| Frame Sync Strategy                | Search-Check-Lock, programmable counts per step   |
| Subframe Sync                      | FCC or SFID   |
| Sync Error Tolerance               | 0 to 8 bits, program selectable   |
| Bit Slip Window                    | 0 to 9999 bits, program selectable  |
| Data Polarity                      | Normal or inverted on a channel by channel basis  |
| Asynchronously Embedded Formats    | Supports up to 8 asynchronous embedded formats based on computer CPU capability                                   |
| Bit Concatenation/Fragmented Words | Software decommutator can combine individual bits from separate PCM words   |

### DAC Output Specifications

|                    |   |
|--------------------|---|
| Number of Channels | 2   |
| Output Level       | 1 Vpp to 5 Vpp, selectable in 0.1 Vpp steps, $\pm$ 2.5V offset in 0.1 VDC steps |

### Time Code Reader Specifications

|                |  |
|----------------|--|
| IRIG Codetypes | Supports DC Level IRIG-B and AM Modulated IRIG A, B, G & NASA-36 |
|----------------|--|

### Gryphon RF-DC Diagnostics

|                     |   |
|---------------------|---|
| Version Control     | All current software, firmware and driver version numbers stored for easy retrieval |
| Latest Setup        | Current card setup configuration is stored for verification of proper setup         |
| Diagnostic Download | Direct download to file for transfer to Ulyssix for evaluation and recommendations  |

### Physical Specifications

|  |   |
|--|---|
| Dimensions   | 2U 19" rackmount chassis with 100V-240V AC input capability   |
| Interface Connectors                                       | RF inputs and outputs through N-Channel connectors, baseband PCM inputs and outputs through single ended 75 ohm BNC rackmount connectors      |
| Manufacturing  | The design utilizes Surface Mount Technology (SMT), manufactured with robotic assembly techniques to IPC-610B Class 2 manufacturing standards |
| Temperature Range  | Operating: 0°C to 50°C<br>Storage: -20°C to 60°C  |
| Power Consumption:   | 250 Watts / 300 Watts Peak  |
| DC Input Voltage   | 6-30 Volts, using standard Molex 2x3 469930619 connector  |
| AC/DC External Power Adapter (included with Gryphon RF-DC) | 24 VDC, 250 Watts, 100~240 VAC Nominal<br>UI/cUL 62368-1, 60950-1; CE: IEC 62368-1, 60950-1   |

### Ordering Options

|                                   |  |
|-----------------------------------|--|
| Gryphon RF-DC                     | 2U rackmount Dual Multi-Mode RF Receiver with Diversity Combiner C/S/L-Band/Extended-P/P-Band, and Dual PCM Processing capability, IRIG Time Code Reader, PCM Simulation and BERT Tester Option for Bit Error Tester of RF and PCM Data Stream |
| ULX-OPT-Gryphon TX                | RF Modulating Multi-Mode/Multi-Band transmitter/generator also with frequency translation capability   |
| ULX-OPT-CH10                      | Chapter 10 recording and reproducer for both Chapter 10 disk files and UDP-CH10-Ethernet packets   |
| ULX-OPT-TMoIP                     | TMoIP Ethernet output capability to IRIG standard TMoIP receiver station and processor   |
| ULX-OPT-UDP PARAM/FRAME BROADCAST | UDP Frame and/or decom parameter multicast or unicast broadcast for external ALTAIR software networking or external data transfer  |

### PCM Simulator Specifications

|                      |   |
|----------------------|---|
| Output Data Rate     | 1 bps to 40 Mbps for NRZ-x, RNRZ-L, or 20 Mbps for all others   |
| Output PCM Codetypes | NRZ-L/M/S, RNRZ-L 11/15, RZ, Bi- $\Phi$ L/M/S, RNRZ 11/15/, forward/reverse, program selectable             |
| Output Signal Levels | Data and Clock, TTL, and RS422 level driven   |
| Word Lengths         | 3 to 64 bits, variable length   |
| Frame Length         | Same as decommutator specs  |
| Data Words           | Fixed or math functions (sine wave, triangle, square wave, sawtooth, counter) with programmable sample rate |