

40W Ku-Band BUC

Then next generation of High Power Density Amplifiers and Block Up Converters has been unveiled at Paradise Datacom!

Powered by GaN technology, these converters are the most efficient in the Satcom Industry. GaN devices pack a high output power capability within a compact physical volume. GaN devices make ideal power amplifiers at microwave frequencies because they can operate at much higher temperatures and work at much higher voltages than GaAs devices. GaN devices also offer higher power efficiency and greater linear power capability.

A wide range of monitor and control is standard and includes Legacy FSK protocol, Standard Paradise Datacom RS485 and Ethernet support via UDP, SNMP, and an Internal Web Browser.

The vBUC is available in 1:1 redundant configurations, 1:2 redundant configurations with the addition of a RCP2-1200 Redundant System Controller. Chain 1:1 redundancy is available with the use of a RCPD-1100 Dual Redundant Controller.

FEATURES

- Output isolator included for Load VSWR Protection
- Wide Range of Interface Capability including:
FSK Control
RS 485
Ethernet
- Output Power Detection
- Adjustable Gain
- Automatic detection of external reference power and frequency
- Multiple external reference frequency operation including:
5, 10, 20, 25 & 50 MHz
- 13 lbs (5.9 kg)
13.64 x 5.68 x 6.57 in
347 x 144 x 167 mm

OPTIONS

- 6 Amp External Bias Tee for IFL Bias feed
- High Stability internal 10 MHz reference
- AC Power Supply
- System Options including:
1:1 & 1:2 Systems;
1:1 Chain Redundancy
- TX & RX Reject Filters
- LNB Power & Reference Port

ENVIRONMENTAL LIMITS

- -40 to +60 °C
- Humidity:
100% condensing

Electrical Specifications

PARAMETER	NOTES	LIMITS	UNITS
Output Power @: Saturation ¹ @ Two-tone P _{Linear} ¹	VBUCK40_AXXXWXX	46.0 (40) 42.5 (18)	dBm (W) dBm (W)
Power Requirements [Typical (Max)] 48 VDC Input @ P _{sat} 48 VDC Input @ Two-tone P _{Linear}	VBUCK40_AXXXWXX	5.5 (6.0) 4.2 (4.7)	A A
Gain Level Gain Flatness Gain Slope Gain variation vs. Temperature	nominal full band per 40 MHz	76 ± 2.0 ± 0.75 0 ± 1.0	dB dB dB dB
Intermodulation Distortion	Measured @ Two-tone P _{Linear}	-25 Max.	dBc
Spectral Regrowth @ Linear P _{out} ²	Typical	-30	dBc
Spurious	In-Band Signal Related Close to Carrier Spurious (≤ 20 MHz) Local Oscillator Non-Signal Related	-50 -70 -30 -50	dBc dBc dBm dBm
Harmonics	2 nd harmonic measured at Two-tone P _{Linear}	-40	dBc
Output Spectrum	Low side Local Oscillator	Non Inverted	
Input VSWR		1.43:1	
Output VSWR		1.25:1	
Noise Figure		15	dB
Rx Band Output Noise	Typical	-146	dBm/Hz
Group Delay (per 40 MHz segment)	Linear Parabolic Ripple	0.02 0.005 1.0	ns/MHz ns/MHz ² ns p-p
User Adjustable Gain	In 0.1 dB steps	+15	dB
Reference Input Frequency	Diplexed on L-Band Input Connector	5, 10, 20, 25, 50 MHz	MHz
Reference Input Power	Diplexed on L-Band Input Connector	-10 to +5	dBm
Input Voltage	+48 VDC nominal	+36 to +60	VDC
FSK Communication ³ Diplexed on L-Band Input	Center Frequency Deviation Locking Range Input Power Range Start Tone Time	650 ±60 ±32.5 -15 to -5 10	KHz KHz KHz dBm msec
Alarm Output	Phase Lock Alarm Internal BUC Voltages BUC Current +48 VDC Input Voltage Case Temperature LNB Current	Form C Summary Contacts	
Internal Reference Option ⁴	Reference Frequency Freq. Stability over temperature range Aging per day Aging per year Frequency Accuracy Warm up time	10 < ±1 • 10 ⁻⁸ < ±1 • 10 ⁻⁹ < ±5 • 10 ⁻⁸ ±1 • 10 ⁻⁸ 20 minutes	MHz < ±1 • 10 ⁻⁸
Internal Reference Phase Noise	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz	-120 -140 -145 -152 -155	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz
LNB Power & Reference Port	Power Reference	+15 1 +10	VDC A (Max.) dBm (Nom.)

¹ De-rate output power by 1 dB linearly from 14.0 GHz to 13.75 GHz (Frequency Sub-Band "B").

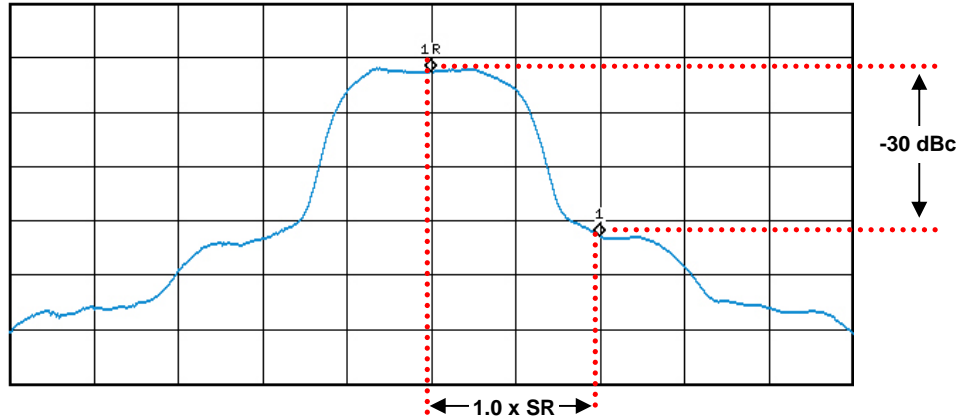
² Linear P_{out} varies upon modulation scheme; see Page 3 for more information.

³ FSK Communication protocol, document # 201410

⁴ Internal reference option units will automatically detect and switch to an applied external reference.

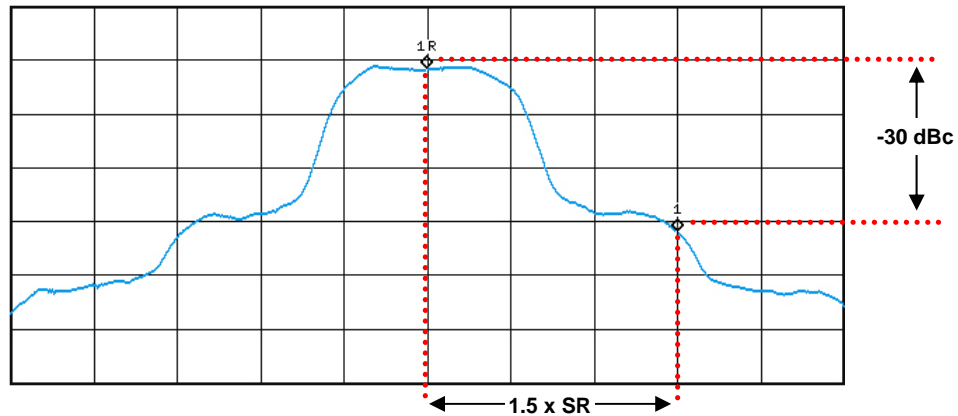
Typical Single Carrier Operation @ Linear P_{out}

Spectral Regrowth @ 1.0 x Symbol Rate



PARAMETER	MODULATION	OUTPUT POWER	48 VDC INPUT [Typical (Max)]
Linear P_{out} ¹ @ 1.0 x Symbol Rate	8PSK, QPSK, OQPSK	44 dBm	4.7 (5.2) Amps
	16QAM	43 dBm	4.4 (4.8) Amps

Spectral Regrowth @ 1.5 x Symbol Rate

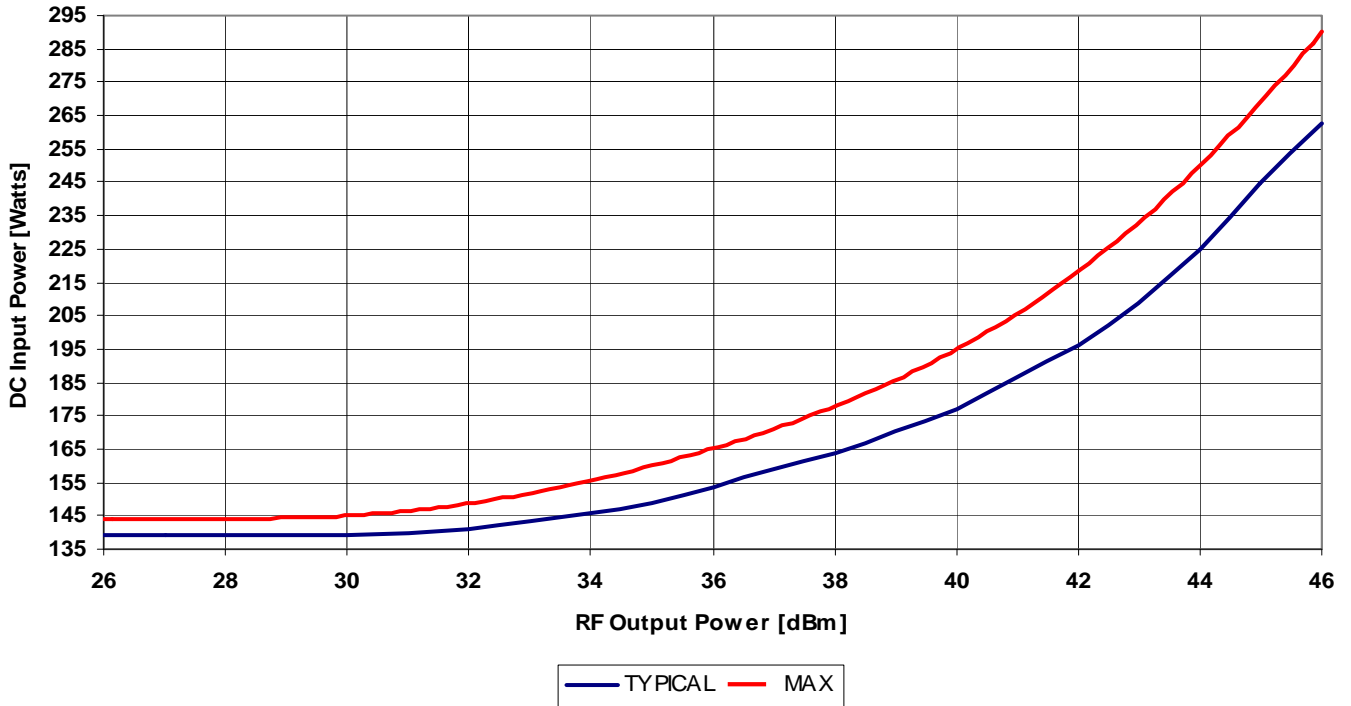


PARAMETER	MODULATION	OUTPUT POWER	48 VDC INPUT [Typical (Max)]
Linear P_{out} ¹ @ 1.5 x Symbol Rate	8PSK, QPSK, OQPSK	45 dBm	5.1 (5.7) Amps
	16QAM	44.5 dBm	4.9 (5.5) Amps

¹ De-rate output power by 1 dB linearly from 14.0 GHz to 13.75 GHz (Frequency Sub-Band "B").

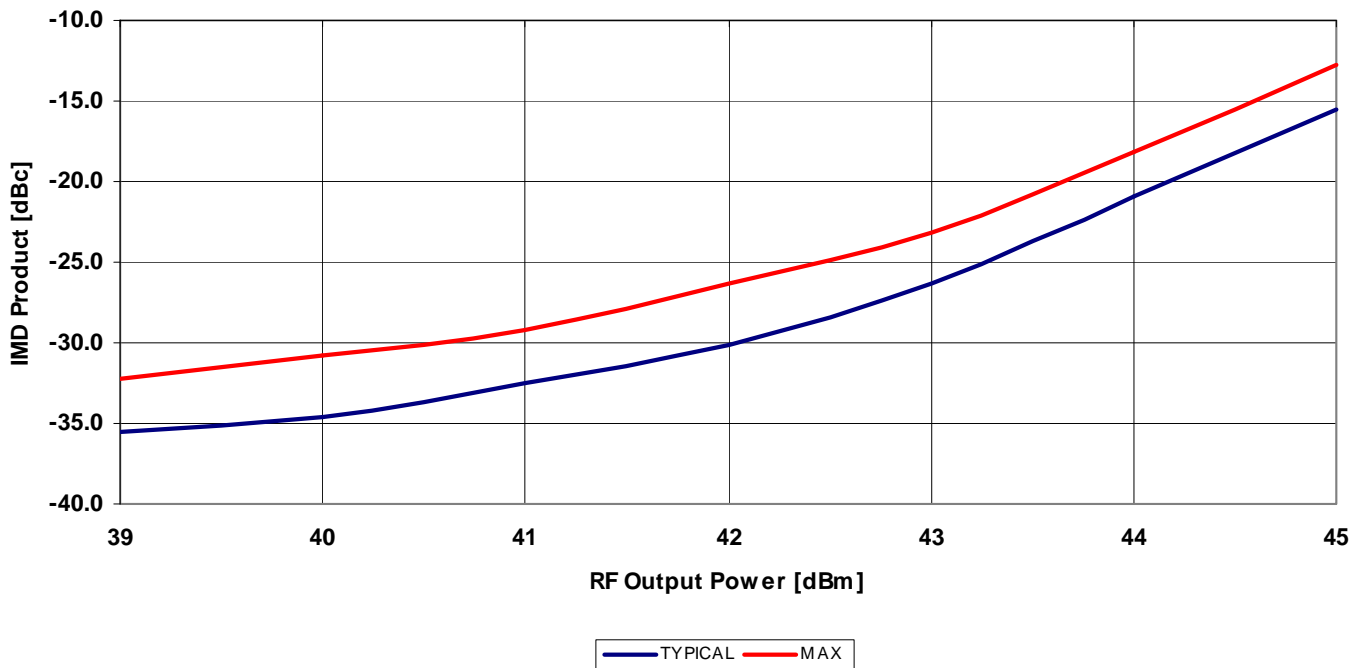
Best Efficiency of any Block Up Converter of Equivalent Output Power Capability

DC Input Power vs. RF Output Power



Highest Linear Output Power per Housing Volume in the Industry

Two Tone IMD vs. RF Output Power
5MHz Tone Spacing



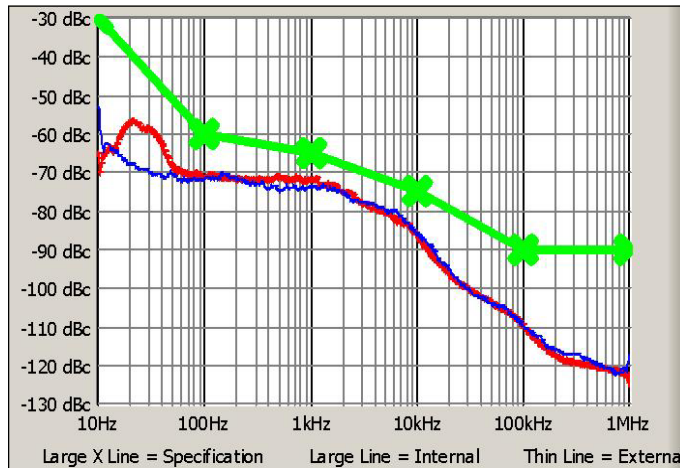
Frequency Bands

Band	Frequency Plan*	IF Input	LO Frequency	RF Output
Ku	Standard Ku-Band	950 - 1450 MHz	13.050 GHz	14.00 - 14.50 GHz
Ku	Extended Ku-Band	950 - 1700 MHz	12.800 GHz	13.75 - 14.50 GHz

* Custom frequency plans available upon request.

Local Oscillator Phase Noise

Offset	Guaranteed Max.	Ku-Band Typical	Units
10 Hz	-30	-50	dBc/Hz
100 Hz	-60	-65	dBc/Hz
1 KHz	-65	-72	dBc/Hz
10 KHz	-75	-80	dBc/Hz
100 KHz	-90	-100	dBc/Hz
1 MHz	-90	-115	dBc/Hz



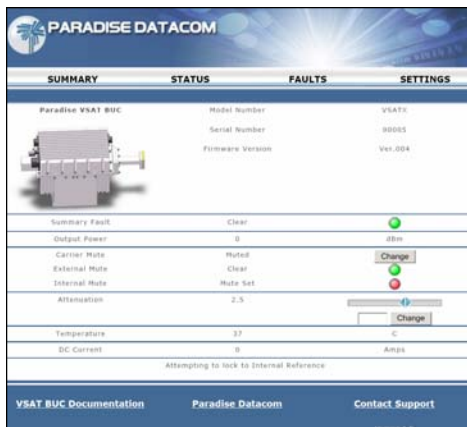
**Typical Ku-Band
Phase Noise Plot**

Physical Specifications

PARAMETER	LIMITS	UNITS
Weight, vBUC unit only (with cooling fan) with Optional AC Power Supply	13.0 (5.9) + 5.0 (2.3)	lbs. (kg) lbs. (kg)
Finish	Paint	White, powder coat
Cooling System	Integrated, Forced air	110 CFM
Altitude	No temperature de-rating up to 10,000 ft. (3000 m) De-rate maximum temperature by 2 °C per 1,000 ft. (300 m) beyond 10,000 ft.	
Shock	50 g p-p, 11 msec pulses	
Vibration	3g rms 30 min. 5-2000 Hz	

Interfaces

Port	Connector	Description	Details	
J1	L Band Input	IF, 10 MHz, FSK Input DC must be tapped off using external Bias Tee	Type N	female
J7	DC Input MS3102R18-4P	+48 VDC	A B C D	+ VDC + VDC - VDC - VDC
J4	Monitor & Control MS3112E14-18S	Serial Communication Serial Communication Serial Communication Summary Alarm Contacts Summary Alarm Contacts Summary Alarm Contacts TX Inhibit Ethernet Ethernet Ethernet Ethernet Ground Ground Ground Serial Override Ethernet Override	U R L B F D J H G C A E K M S N	RS-485 (-) RS-485 (+) Isolated Ground Form C - Closed on Fault Form C - Common Form C - Open on Fault Ground Enable TX TX - TX + RX - RX + Chassis Ground Chassis Ground Chassis Ground Ground resets to Serial Comms Ground resets to Ethernet Comms
J5	Link Connector MS3112E12-10S	Reserved Ground Ground +15 VDC for LNB Reserved Redundancy Switch Drive Link In Link Out Redundancy Switch Common	J C H A B G E F K	Closure to Ground Ground Ground Current Sensed +15 VDC +15 VDC @ 1A +48 Current Sink +48 VDC (Vin+)
J8	Fan Voltage MS3112E8-3S	V+ V-	A B	+48 VDC Return

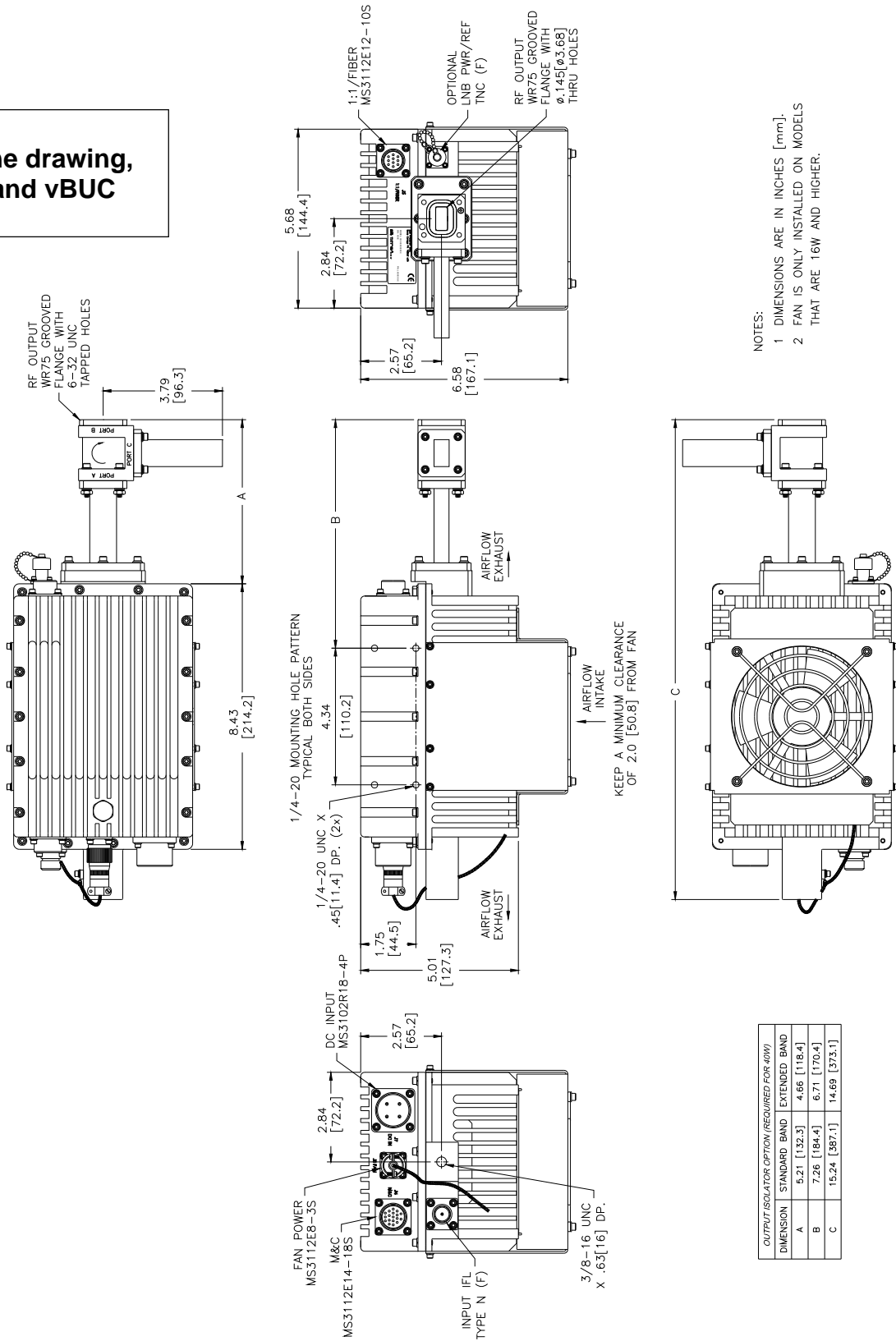


Universal M&C Software

The Paradise Datacom Universal Monitor & Control software provides a remote view of the state of the vBUC via a web browser.

The user may adjust the attenuation of the vBUC and mute/unmute the unit. In addition, the web-based status screen shows the fault condition, mute state, current and temperature.

**Outline drawing,
Ku-Band vBUC**



OUTPUT ISOLATOR OPTION (REQUIRED FOR 40W)	
DIMENSION	STANDARD BAND / EXTENDED BAND
A	5.21 [132.3] / 4.66 [118.4]
B	7.26 [184.4] / 6.71 [170.4]
C	15.24 [387.1] / 14.69 [373.1]

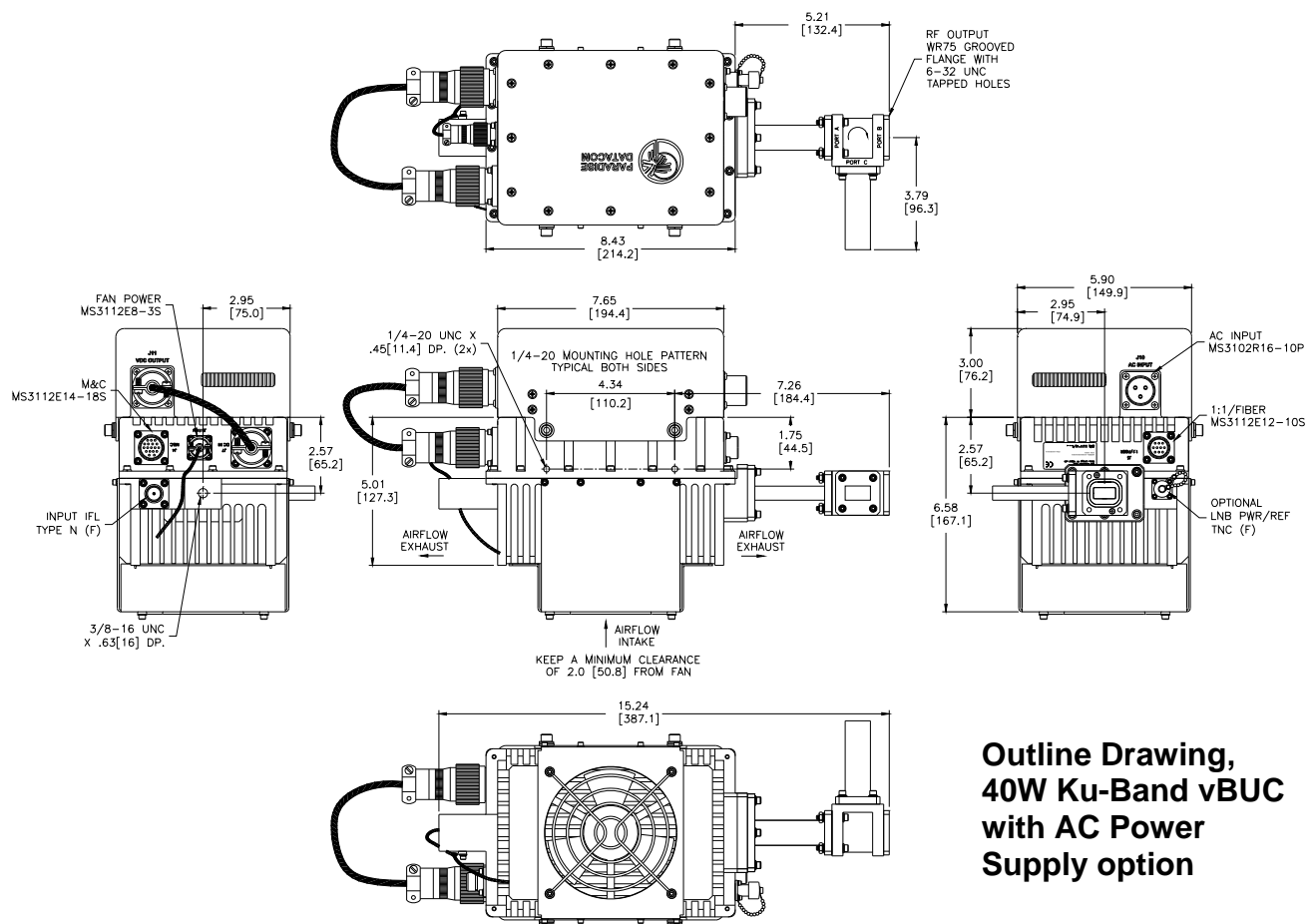
AC Power Supply option

The vBUC is available with an optional AC Power Supply, which attaches to the top of the BUC, opposite the fan. An optional stand-alone mounting assembly is also available.

The AC Power Supply provides up to 500 Watts of power at 48VDC output. The AC Power Supply adds 5 lbs. (2.3 kg) to the overall weight of the unit.

Input power requirements: 85-265VAC, 47-63Hz.

	Pin-outs			
	A	B	C	D
AC Input	Line	GND	Neutral	--
DC Output	+48V	+48V	48V Return	48V Return



**Outline Drawing,
40W Ku-Band vBUC
with AC Power
Supply option**

Part Number Configuration

