EMRESEARCH®

FULL SPECTRUM INNOVATION

SATCOM

PRODUCT SELECTION GUIDE

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EM RESEARCH, Inc.
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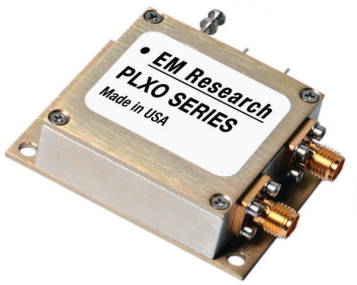
PLXO Series | Phase locked Crystal Oscillator

Description

The PLXO series generates phase-locked, low phase noise reference signals for system and ADC/DAC clocks or LO signal generation, and can be used to translate one reference frequency to another or to clean up noisy references.

Features

- Fixed frequencies to 500 MHz
- Small package size
- Surface mount available



Summary

Frequency Range	5 to 500 MHz
Package Size	1.5" x 1.5" x 0.6"
Reference	5 to 100 MHz
Harmonics	Less than -20 dBc
Spurs	Less than -70 dBc
Power Output	Up to +15 dBm

Models

Model	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
					100 Hz	1 KHz	10 KHz		
PLXO-10-42	10	+7	-20	10	-120	-145	-160	+15	120
PLXO-10-43	10	+14	-20	10	-120	-145	-155	+5	200
PLXO-50-22	50	+10	-20	10	-110	-140	-160	+12	120
PLXO-100-120	100	+10	-25	10	-115	-145	-155	+5	135
PLXO-500-04	500	+7	-20	10	-80	-110	-135	5	180

MOX Series | Master Oscillator Multiplexer

Description

The MOX multi-output OCXO system reference with L-Band + reference diplexer and DC bias tee supports all modem to LNB/BDC/BUC connections.

Features

- High vibration and shock tolerance
- Wide operating temperature range
- Standard unit is 10 MHz output frequency
- 50 MHz and 100 MHz frequency output available

Summary

Frequency Range	10 to 100 MHz
Package Size (pictured)	2.55" x 2.00" x 1.83"
Reference	Internal
Harmonics	<-40 dBc
Power Output	0 to +5 dBm

Models

Model	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
					1 KHz	10 KHz	100 KHz		
MOX-10-02	10	+2	Minimal	Internal	-157	-160	-160	15	350
MOX-50-02	50	+5	Minimal	Internal	-160	-165	-170	15	350

FULL SPECTRUM
SATELLITE COMMUNICATIONS

EM Research is a leading solutions provider of off the shelf and highly customized rugged components necessary to successfully construct and operate the ground stations, on board flight communications systems, and satellite radios that deliver consistent throughput and high reliability performance no matter the mission profile.

RDS Series | Reference Detect Switch

Description

The RDS is a fail-safe redundancy solution – install it in-line with your system reference signal and if the system reference goes down, it will notify you and automatically turn on and supply a backup reference signal to keep your system running.

Features

- Standard internal TCXO (±2.5 ppm, Stability)
- Optional internal OCXO (±30 ppb, Stability)
- Fixed frequencies to 100 MHz

Summary

Frequency Range	10 to 100 MHz
Package Size (TCXO)	2.0" x 1.5" x 0.6"
Reference	10 to 100 MHz
Harmonics	Less than -15 dBc
Spurs	Less than -60 dBc
Power Output	Up to +20 dBm

Models

Model	Frequency (MHz)	Power Out (dBm)	Temperature Stability (ppm)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
					100 Hz	1 KHz	10 KHz		
RDS-10-40	10	+12	+/- 2.5	10	-120	-140	-145	+5	150
RDS-10-44	10	+10	+/- 0.03	10	-140	-150	-155	+12	250**
RDS-50-01	50	+20	+/- 2.5	10	-110	-130	-140	+5	200
RDS-100-07	100	+13	+/- 5.0	10	-105	-135	-145	+5	200
RDS-100-08	100	+10	+/- 0.09	10	-120	-140	-150	+5	250**

** After OCXO Stabilization

SBC Series | Low Close In Phase Noise Oscillator

Description

The SBC series incorporates a sophisticated synthesizer architecture to achieve close to ideal "20 LOG N" phase noise performance from a low noise reference. These single output synthesizers are available at frequencies through Ka band, come in a compact 2.5" x 3.5" x 0.75" connectorized housing and are ideally suited as local oscillators in satellite communication systems.

Features

- Industry Setting Low Phase Noise at 1 Hz and 10 Hz
- Excellent Phase Noise at all offsets
- Compact Package

Options

- Hermetic Seal

NEW

Models

Model	Frequency (MHz)	Power Out (dBm)	Reference (MHz)	Phase Noise (dBc/Hz)								VCC (V)	ICE (mA)
				1 Hz	10 Hz	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	10 MHz		
SBC-26300-02	26550	20	External	-47	-68	-85	-88	-106	-108	-120	-140	12	850

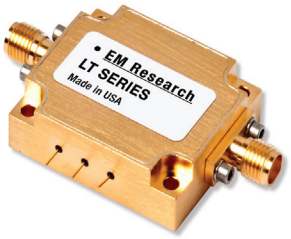
LT Series | Fixed-Frequency Synthesizer

Description

The LT series is designed for harsh environments and is available in fixed frequency outputs up to 15GHz. These synthesizers are vibration tolerant, available with hermetic seal and come in a small 0.2"x1.1"x1.3" housing. An excellent choice for environmentally challenging, real world applications.

Features

- Ruggedized, modular package
- Removable SMA connectors
- Hermetic seal per MIL-STD-883 available
- Extreme shock and vibration tolerance



Summary

Frequency Range	50 MHz to 19 GHz
Package Size	1.3" x 1.1" x 0.2"
Reference	5 to 100 MHz
Harmonics	Less than -25 dBc
Spurs	Less than -60 dBc
Power Output	Up to +14 dBm

Models

Model	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
					1 KHz	10 KHz	100 KHz		
LT-2672-02	2672.5	+15	-20	100	-88	-98	-120	+5	225
LT-4000-10	4000	+17	-20	100	-85	-95	-115	+5	230
LT-9800-07	9800	+12	-20	10	-75	-90	-110	+5	165
LT-10500-03	10500	+3	-20	10	-70	-90	-110	+5	175
LT-14500-02	14500	+7	-15	10	-80	-95	-105	+5	250

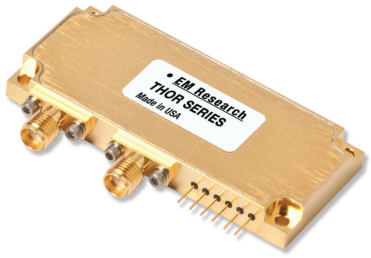
THOR Series | Rugged Frequency Synthesizer

Description

The THOR series is designed for harsh environments and is available in both programmable frequency and fixed frequency outputs up to 15GHz. These synthesizers are vibration tolerant, available with hermetic seal and come in a small 0.4" x 1.1" x 2.5" housing. An excellent choice for environmentally challenging, real world applications.

Features

- Ruggedized, modular package
- Removable SMA connectors
- Hermetic seal per MIL-STD-883 available
- High shock and vibration tolerance
- Fixed and programmable options
- Tunable synthesizers available



Summary

Frequency Range	1 to 30 GHz
Package Size	2.5" x 1.1" x 0.4"
Reference	5 to 200 MHz
Harmonics	Less than -25 dBc
Spurs	Less than -60 dBc
Power Output	Up to +20 dBm

Models

Model	Freq. Range (MHz)		Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
	Min	Max				1 KHz	10 KHz	100 KHz		
THOR-2380-02	None	2380	+20	-20	10	-90	-95	-120	+5	225
THOR-10900-02	None	10900	+17	-30	Internal	-80	-85	-100	+5	350
THOR-12800-10	None	12800	+7	-30	50	-80	-90	-110	+5	200
THOR-14275-04	None	14275	+12	-20	25	-75	-85	-95	+5	375
THOR-18300-02	None	18300	+18	-20	25	-75	-85	-95	+5	375
THOR-29050-01	26550	29050	+7	-20	10	-73	-82	-87	+5	500
THOR-30000-03	27500	30000	+7	-20	10	-73	-82	-87	+5	500

FULL SPECTRUM
CUSTOM ASSEMBLIES

EM Research was founded on building unique solutions to challenging problems. We take pride in engineering the impossible and creating custom designs for our customers. We constantly challenge ourselves to reach for the stars and push the limits of the RF/Microwave industry.

ESP Series | Fixed-Frequency Synthesizer

Description

The ESP series is a robust, very low phase noise fixed frequency synthesizer employing low noise VCO and phase detector technology. Its dimensions and performance allow it to be used as a replacement for existing phase locked DRO synthesizers, as well as for new systems that require excellent phase noise performance in a compact package.

Features

- Exceptionally-low phase noise
- Fixed frequencies to 46 GHz
- Optional internal reference (TCXO and OCXO available)
- Robust designs for extended temperature and high vibe
- Hermetic seal per MIL-STD-883 available

Summary

Frequency Range	50 MHz to 46 GHz
Package Size	2.25" x 2.25" x 0.6"
Reference	5 to 500 MHz
Harmonics	Less than -35 dBc
Spurs	Less than -70 dBc
Power Output	Up to +30 dBm

Models

Model	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
					1 KHz	10 KHz	100 KHz		
ESP-1000-21	1000	+3	-40	Internal	-130	-136	-142	+12	300
ESP-2000-21	2000	+14	-30	10	-95	-115	-140	+12	225
ESP-8000-15	8000	+13	-30	100	-100	-105	-112	+5	450
ESP-13250-05	13250	+13	-30	100	-95	-100	-105	+12	300
ESP-22000-09	22000	+10	-30	10	-86	-100	-108	+12	350
ESP-34000-03	34000	+7	-20	100	-95	-100	-102	+15	300
ESP-42000-02	42000	+7	-20	100	-95	-100	-102	+15	300

LCO Series | Calibration Oscillator

Description

The LCO's exceedingly stable output power versus time and temperature variations allow for site/system gain/loss measurements of unprecedented precision and accuracy.

Features

- Extremely low output power variance (+0.05 dB)
- Output power to +10 dBm available
- Optional internal reference

Summary

Frequency Range	16 MHz to 31 GHz
Package Size	3.5" x 2.5" x 0.6"
Reference	5 to 100 MHz or Internal
Harmonics	Less than -30 dBc
Spurs	Less than -65 dBc
Power Variation	±0.1 dB over 0°C to +85°C

Models

Model	Freq. Range (MHz)		Step (KHz)	P. Out (dBm)	Harm. (dBc)	Ref. (MHz)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
	Min	Max					1 KHz	10 KHz	100 KHz		
LCO-2270-02	None	2270	N/A	+10	-30	50	-80	-100	-125	+5	200
LCO-12750-05	10900	12750	250	+0	-20	Internal	-88	-95	-95	+5	700
LCO-20700-02	18000	20700	500	+0	-45	Internal		-50	-75	+5	775
LCO-30000-01	27500	30000	500	+0	-45	Internal		-50	-75	+5	700
LCO-30500-04	28000	30500	500	+0	-45	Internal		-50	-75	+5	700

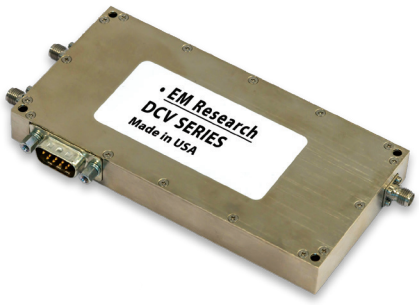
DCV Series | Channelized Down Converter

Description

The DCV series translates a 36 or 72 MHz wide channel from anywhere in L-Band (950 to 2150 MHz) down to a fixed IF centered at 70 or 140 MHz – well within the range of a low frequency, low cost ADC front end.

Features

- Fully programmable
- Wide choice of frequency ranges
- Integrated filters
- Gain control
- Internal / External references
- Low power consumption
- Low phase noise
- Low spurs



Options

- L-Band to 70 MHz IF range available
- L-Band to 140 MHz IF range available
- CAN, RS-232, I2C, or SPI control
- Internal / External references
- Other custom designs available

Models

Model	Input Frequency (MHz)	Output Frequency (MHz)	LO Steps
DCV-1450-03	950 to 1450	52 to 88	Channelized, 125 KHz
DCV-2150-03	950 to 2150	52 to 88	Channelized, 125 KHz
DCV-2150-04	950 to 2150	104 to 176	Channelized, 125 KHz

UPCV Series | Channelized Up Converter

Description

The UPCV series translates a 36 or 72 MHz wide IF channel to anywhere in L-Band (950-2150 MHz).

Features

- Fully programmable
- Wide choice of frequency ranges
- Integrated filters
- Gain control
- Lower power consumption
- Low phase noise
- Low spurs

Options

- 70 MHz IF to L-Band range available
- 140 MHz IF to L-Band range available
- CAN, RS-232, I2C, or SPI control
- Internal / External references
- Other custom designs available

Models

Model	Input Frequency (MHz)	Output Frequency (MHz)	LO Steps
UPCV-1450-01	52 to 88	950 to 1450	Channelized, 125 KHz Steps
UPCV-2150-02	52 to 88	950 to 2150	Channelized, 125 KHz Steps
UPCV-2150-03	104 to 176	950 to 2150	Channelized, 125 KHz Steps

BDC Series | Block Down Converter

Description

Our BDC series provides highly linear and low phase noise block down-conversion - perfectly suited for receive chains or transmitter monitoring. Available in a wide range of frequency bands, and with a compact housing to ease integration into your system level application.

Features

- Integrated filters
- Gain control
- Low power consumption
- Low phase noise
- Low spurs

Options

- Wide choice of frequency ranges
- CAN, RS-232, I2C, or SPI control
- Internal / External references

Models

Model	Input Frequency (MHz)	Output Frequency (MHz)	LO Frequency (MHz)
BDC-4200-03	3400 to 4200	950 to 1750	5150
BDC-8400-02	7900 to 8400	1050 to 1550	6850
BDC-10850-02	9900 to 10850	900 to 1850	9000
BDC-11700-04	10700 to 11700	950 to 1950	9750
BDC-12750-05	11700 to 12750	950 to 2000	10750
BDC-30000-06	27500 to 30000	500 to 3000	27000

LNB Series | Low Noise Block Down Converter

Description

The LNB series are low noise block down converters that convert K and Ku bands down to IF frequencies. They feature an integrated low noise amplifier and voltage selectable, multi-band capability. These LNBs are designed to operate in harsh airborne environments as well as terrestrial.

Features

- State of the Art Noise Figure
- Multi-band capabilities
- Vibration Tolerant
- Low Phase Noise
- Low Spurious

Options

- Multiple, voltage selectable frequency ranges
- Hermetic Seal
- 10 MHz or 50 MHz Reference

NEW

Models

Model	Input Frequency (MHz)	Output Frequency (MHz)	LO Frequency (MHz)	Noise Figure (dB)
LNB-12750-02	Band 1: 10700 - 11700 Band 2: 11700 - 12750	Band 1: 950 - 1950 Band 2: 950 - 2000	Band 1: 9750 Band 2: 10750	0.9 Max
LNB-20200-10	Band 1: 17700 - 18700 Band 2: 18450 - 19450 Band 3: 19200 - 20200	950 to 1950	Band 1: 16750 Band 2: 17500 Band 3: 18250	1.5 Max

BUC Series | Block Up Converter

Description

The BUC series upconverts a single modem L-Band output solution to Ku, K or Ka-Band. The BUC series can be integrated with an SSPA for a single, compact unit.

Features

- Integrated filters
- Gain control
- Low power consumption
- Low phase noise
- Low spurs

Options

- Wide choice of frequency ranges
- CAN, RS-232, I2C, or SPI control
- Internal / External references

Models

Model	Input Frequency (MHz)	Output Frequency (MHz)	LO Frequency (MHz)
BUC-14500-07	950 to 1700	13750 to 14500	12800
BUC-18400-04	950 to 2050	17300 to 18400	16350
BUC-28550-03	950 to 1950	27550 to 28550	26600
BUC-29150-03	1500 to 2450	28150 to 29100	26650
BUC-29500-03	1000 to 2000	28500 to 29500	27500
BUC-30000-15	950 to 1950	29000 to 30000	28050
BUC-31000-18	1000 to 2000	30000 to 31000	29000

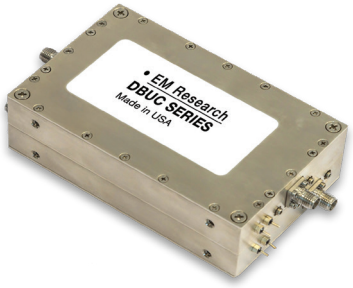
DBUC Series | Dual Band Block Up-Converter

Description

The DBUC series of Satellite Block Upconverters allows the user to select two separate output bands for transmit, eliminating the need for an additional BUC and its additional cost and

Features

- Integrated filters
- Gain control
- Low power consumption
- Low phase noise
- Low spurs



Options

- Wide choice of frequency ranges
- CAN, RS-232, I2C, or SPI control
- Internal / External references

Models

Model	Input Frequency (MHz)	Band 1 Output Frequency (MHz)	Band 2 Output Frequency (MHz)
DBUC-29150-04	950 to 1950	27550 to 28550	28150 to 29150
DBUC-30000-03	950 to 1950	28000 to 29000	29000 to 30000
DBUC-31000-09	950 to 2000	29000 to 30000	30000 to 31000

DBUC2 Series | Dual Contiguous Band Block Up-Converter

Description

The DBUC2 combines the IF input from two modems onto a sigle Ka-Band output. This enables up to 2.5 GHz of RF bandwidth.

Features

- Integrated filters
- Gain control
- Low phase noise
- Low spurs
- Full 27500-30000 MHz coverage

Options

- CAN, RS-232, I2C or SPI control
- Internal / external reference

NEW

Models

Model	Input Frequency (MHz)	Output Frequency (MHz)
DBUC2-30000-03	Band 1: 1600 - 2700 Band 2: 1700 - 3100	27500 - 30000

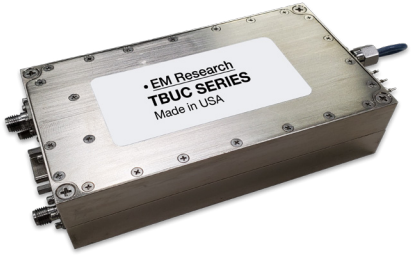
TBUC Series | Triple Band Block Up-Converter

Description

The TBUC series takes a single 1 GHz modem IF band and allows the user to digitally select between three different Ka band frequency ranges.

Features

- Three digitally selectable Ka Band frequency ranges
- Integrated filters
- Gain control
- Low power consumption
- Low phase noise
- Low spurs



Options

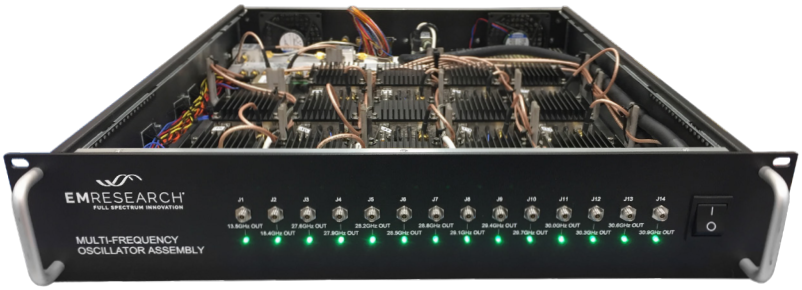
- Wide choice of frequency ranges
- CAN, RS-232, I2C, or SPI control
- Internal / External references

Models

Model	Input Freq. (MHz)	Band 1 Output Freq. (MHz)	Band 2 Output Freq. (MHz)	Band 3 Output Freq. (MHz)
TBUC-30000-07	950 to 1950	27500 to 28500	28500 to 29500	29000 to 30000

MTS Series | Multi-Tone Source

The Ultimate Laboratory Solution



Customizable, the MTS is simple to implement in any system.

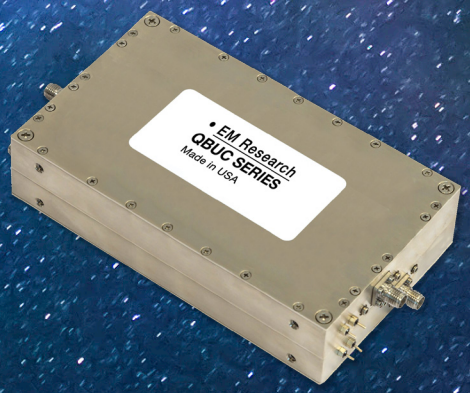
The MTS-31000-01 has up to 14 independent fixed output frequencies and excellent phase noise using our ESP Series frequency synthesizers.

The MTS-7000-01 has up to 19 independent frequency synthesizers in combinations of our fixed SLFS Series and our programmable THOR Series.

The MTS features an easy to read front panel with LED lock indication. Internal fans and heatsinks keep all components within operating temperature range.

NEW QBUC SERIES FROM EM RESEARCH

QUAD BAND BLOCK UP CONVERTER



PRELIMINARY DESIGN

L-Band to Ka-Band | 4 switchable bands

Model	Input Freq. (MHz)	Band 1 Out Freq. (MHz)	Band 2 Out Freq. (MHz)	Band 3 Out Freq. (MHz)	Band 4 Out Freq. (MHz)
QBUC-30000-XX	950 to 1950	27500 to 28500	28500 to 29500	29000 to 30000	3000 to 31000

EM RESEARCH:

Delivering the Performance SatCom Needs

Our appetite for data is at an all-time high and will only continue to increase. Internet service providers and corporations that depend on rapid data transfer need solutions that allow faster upload speed and greater range. EM Research has developed a suite of signal source and converter products for fixed and mobile uplink transmission to accommodate this growing demand for greater bandwidth and more power at a lower cost.

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CONVERTERS

AIRCRAFT-BASED EQUIPMENT

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