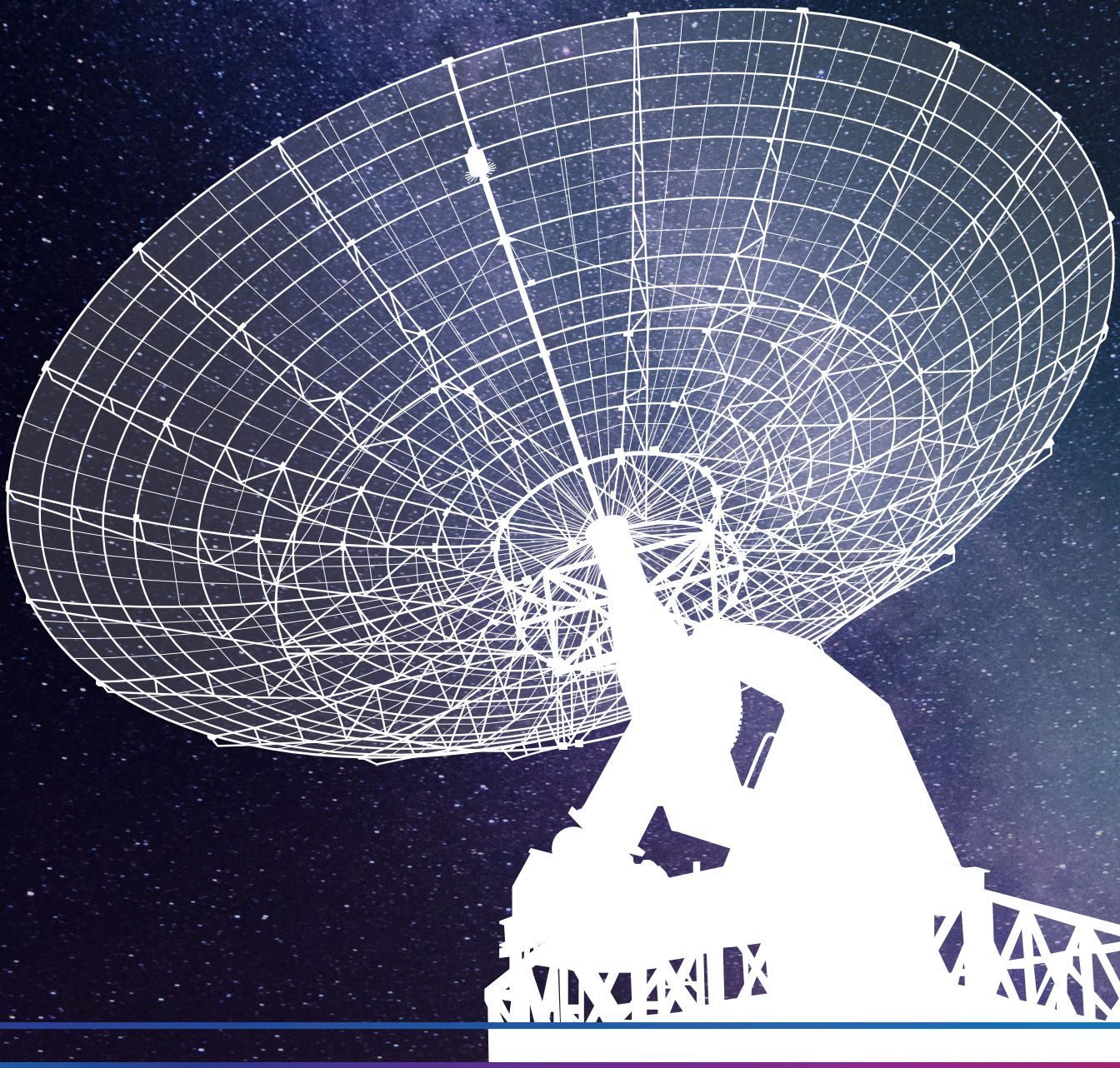
EMRESEARCH®

FULL SPECTRUM INNOVATION

SATELLITE CATALOG



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EMRESEARCH®

FULL SPECTRUM INNOVATION

HIGHEST QUALITY • COMPREHENSIVE SERVICE • BEST PERFORMANCE

"For more than 30 years, EM Research (EMR) has designed and manufactured innovative frequency generation products, signal conversion solutions, and integrated microwave assemblies that our clients rely on to achieve mission success. We believe that our spirit of partnership is essential to producing the highest quality RF solutions on the market, which is achieved by making the EMR team available to provide comprehensive support every step of the way. See the full spectrum of EM Research products on our website."

WWW.EMRESEARCH.COM

HOW TO BUY FROM EMR

For easy quoting, go online to emresearch.com.
Our sales team can be contacted at sales@emresearch.com, or
Call us at 775-345-2411

- ## Request an Existing Part Number

  If you already know the part number you need, please contact our sales team via email at sales@emresearch.com.

- ## Request for an Existing Series to Configure

  If you know the series you are interested in, but don't see the exact specifications you need, we've got you covered. On the series product page, fill out the blank configuration form located beneath the product description with your full specifications. We will reach back out with a specialized quote in 1-2 business days. You can also email us at sales@emresearch.com, or call us at 775-345-2411.

- ## Request a Build to Print Design

  If your required package size is different than any of the standard series shown in our portfolio, please reach out to our sales team at sales@emresearch.com, or give us a call. We will work with you to create a spec within our Build-to-Print (BTP) series that satisfies your requirements. Our team will respond to you within 1-2 business days.

- ## Request a Quote From Your Source Control Drawing

  If you have a source control drawing (SCD) you want us to build, please reach out to our sales team at sales@emresearch.com. We will respond to you within 1-2 business days. We will review your SCD, provide feedback, and schedule a meeting with our engineers to work with your team on developing the customized part.

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PRODUCT OFFERINGS

FREQUENCY SYNTHESIZERS

REFERENCE OSCILLATORS

BLOCK CONVERTERS

CHANNELIZED CONVERTERS

IMA

EM RESEARCH, Inc.
1301 Corporate Blvd. Reno, Nevada 89502 - USA
Phone 775.345.2411 | Fax 775.345.1030 | sales@emresearch.com

SURFACE-MOUNT

HFS Series

Fixed Frequency
High Frequency Synthesizer

1.25" x 1.00" x 0.25"

- Broadband designs available
- Optional internal reference
- Optional Reference Detect Switch
- Internal reference output available
- Harmonics less than -20 dBc

50 MHz to 15 GHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					1 KHz	10 KHz	100 KHz	(V)	(mA)
HFS-206-03	206	+7	-25	Internal	-105	-120	-145	+5	120
HFS-840-03	840	+13	-25	10	-97	-115	-140	+5	100
HFS-1300-05	1300	+12	-40	100	-	-98	-118	+5	80
HFS-2320-05	2320	+7	-20	100	-	-105	-125	+5	100
HFS-4000-16	4000	+10	-25	Internal	-87	-98	-120	+5	100
HFS-5560-03	5560	+10	-25	100	-	-100	-120	+5	140

SURFACE-MOUNT

HFS Series

Programmable Frequency
High Frequency Synthesizer

1.25" x 1.00" x 0.25"

- Programmable frequencies up to 15 GHz
- Broadband designs available
- Optional internal reference
- Optional Reference Detect Switch
- Internal reference output available

50 MHz to 15 GHz
Within Selected Bands

Model***	Frequency Range (MHz)		Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
	Minimum	Maximum				1 KHz	10 KHz	100 KHz	(V)	(mA)
HFS-800-03	650	800	+12	-20	70	-90	-98	-120	+5	120
HFS-1475-03	1025	1475	+13	-15	10	-85	-95	-110	+5	120
HFS-2095-08	1470	2095	+13	-15	10	-85	-95	-110	+5	120
HFS-2150-12	950	2150	+7	-12	10	-85	-90	-115	+5	120
HFS-7000-03	5500	7000	+7	-15	100	-85	-95	-95	+5	170
HFS-12000-08	7000	12000	+12	-17	250	-80	-88	-90	+5	200

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**

ESP Series

Fixed Source PLL DRO Replacement

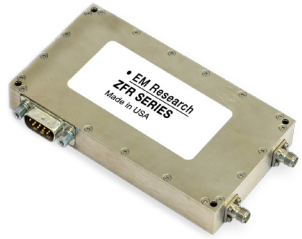
2.25" x 2.25" x 0.6"

- Exceptionally low phase noise
- Robust designs for extended temperature and high vibe environments available
- Optional internal/external reference detect circuit
- ESP exhibits no aging
- Optional internal reference (TCXO and OCXO Available)

50 MHz to 46 GHz
Within Selected Bands

CONNECTORIZED

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					1 KHz	10 KHz	100 KHz	(V)	(mA)
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-4600-02	4600	+15	-35	10	-100	-112	-120	+12	200
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



ZFR Series

Fast Switching Frequency Synthesizer

4.5" x 2.5" x 0.6"

- Programmable frequencies up to 31 GHz
- Small step sizes (down to 1 KHz)
- Broadband designs available (up to 4 octaves)
- Fast switching units available (<100 µSec)

8 MHz to 31 GHz
Within Selected Bands

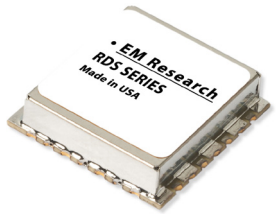
CONNECTORIZED

Model***	Frequency Range (MHz)		Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
	Minimum	Maximum				1 KHz	10 KHz	100 KHz	(V)	(mA)
ZFR-8500-04	7200	8500	+0	-25	Internal	-80	-90	-95	+5	650
ZFR-12750-06	10900	12750	0	-20	Internal	-88	-95	-95	+5	700
ZFR-20000-09	4000	20000	+10	-20	10	-86	-90	-90	+5	1500
ZFR-30500-03	28000	30500	0	-20	Internal	-	-50	-75	+5	700

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**

REFERENCE OSCILLATORS

SURFACE-MOUNT



RDS Series
Reference Detect Switch (SMT)

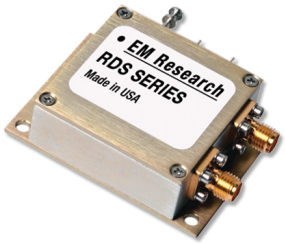
0.90" x 0.90" x 0.21"

- Standard internal TCXO (±2.5 ppm, stability)
- Tighter stability available
- Fixed frequencies up to 100 MHz
- Also available in a connectorized package

10 to 100 MHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					100 Hz	1 KHz	10 KHz	(V)	(mA)
RDS-10-42	10	+3	-20	10	-110	-130	-140	+5	75
RDS-10-43	10	+13	-20	10	-110	-140	-145	+5	85
RDS-100-09	100	+7	-20	10	-95	-130	-160	+5	85
RDS-100-10	100	+15	-15	10	-95	-130	-155	+5	100
RDS-100-11	100	+7	-20	10	-100	-135	-155	+5	85

CONNECTORIZED



RDS Series
Reference Detect Switch (Connectorized)

2.0" x 1.5" x 0.6"

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

10 to 100 MHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Temp. Stability (ppm)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					100 Hz	1 KHz	10 KHz	(V)	(mA)
RDS-10-40	10	+12	±2.5	10	-120	-140	-145	+5	150
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

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**

PHASE LOCKED CRYSTAL OSCILLATORS

SURFACE-MOUNT

PLXO Series

Phase Locked Crystal Oscillator

1.5" x 1.5" x 0.6"

- Fixed frequencies to 400 MHz
- Small, SMT package (0.90" Square)

5 MHz to 1.3 GHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					100 Hz	1 KHz	10 KHz	(V)	(mA)
PLXO-40-26	40	+10	-20	10	-110	-140	-160	+5	85
PLXO-50-23	50	+10	-20	10	-110	-130	-160	+5	85
PLXO-100-121	100	+7	-15	10	-105	-140	-160	+5	85
PLXO-100-122	100	+7	-15	10	-100	-130	-150	+5	85
PLXO-120-16	120	+7	-15	10	-100	-130	-155	+5	85
PLXO-400-09	400	-5	-12	10	-	-105	-117	+3.3	95

CONNECTORIZED

PLXO Series

Phase Locked Crystal Oscillator

1.5" x 1.5" x 0.6"

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

5 MHz to 1.3 GHz
Within Selected Bands

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-10-43	10	+14	-20	10	-120	-145	-155	+5	165
PLXO-50-22	50	+10	-20	10	-110	-140	-160	+12	95
PLXO-100-120	100	+10	-25	10	-115	-144	-154	+5	120
PLXO-500-04	500	+7	-20	10	-80	-115	-140	5	120

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**

BLOCK CONVERTERS

CONNECTORIZED

BUC Series

Block Up-Converter

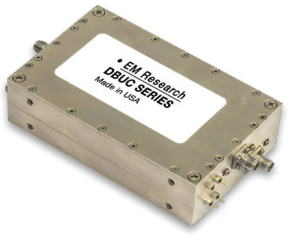
5.0" x 2.5" x 0.6"

- Integrated filters
- Gain control
- Low power consumption
- Low phase noise and spurs
- CAN, RS-232, I2C, or SPI control
- Internal / External References

10 to 40000 MHz
Within Selected Bands

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

CONNECTORIZED



DBUC Series

Dual Band Block Up-Converter

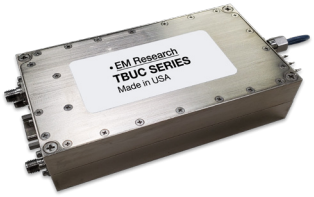
4.0" x 2.5" x 1.2"

- Integrated filters
- Gain control
- Low power consumption
- Low phase noise and spurs
- CAN, RS-232, I2C, or SPI control
- Internal / External References

27.5 GHz - 31 GHz
Within Selected Bands

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	1000 to 2000	28000 to 29000	29000 to 30000
DBUC-31000-09	950 to 1950	29000 to 30000	30000 to 31000

CONNECTORIZED



TBUC Series

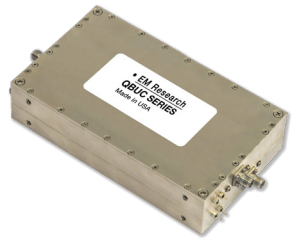
Triple Band Block Up-Converter

4.5" x 2.5" x 1.2"

- Three digitally selectable Ka Band frequency ranges
- Integrated filters
- Gain control
- Low power consumption
- Low phase noise and spurs
- CAN, RS-232, I2C, or SPI control

3 Bands Within 27500 to 31000 MHz

Model	Input Freq. (MHz)	Band 1 Output Freq. (MHz)	Band 2 Output Freq. (MHz)	Band 3 Output Freq. (MHz)
TBUC-30000-10	950 to 1950	27500 to 28500	28500 to 29500	29000 to 30000



QBUC Series

Quad Band Block Up-Converter

4.5" x 2.5" x 1.2"

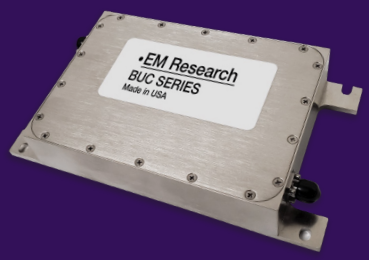
- L-Band to Ka-Band
- 4 Switchable Bands
- Low power consumption
- Low phase noise and spurs
- CAN, RS-232, I2C, or SPI control

4 Bands Within 27500 to 31050 MHz

CONNECTORIZED

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-31000-XX	950 to 1950	27500 to 28500	28500 to 29500	29000 to 30000	30000 to 31000
QBUC-31050-XX	950 to 2000	27500 to 28550	28750 to 29800	29000 to 30050	30000 to 31050

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**



INTRODUCING THE BROADBAND BUC

SIZE, WEIGHT, AND POWER ARE KEY

EM Research's broadband block up-converter series allows our customers to use modern modems to send more data faster. This BUC's compact size, low weight, and low power consumption allow for it to be used in many applications.

General Specifications	
Reference Frequency	10, 50, or 100 MHz External
IF Input Frequency	1250 - 3750 MHz
Input (No Damage)	+ 10 dBm
RF Output Frequency	27.5 to 30 GHz
Spurious	-65 dBc
Input & Output Impedance	50 Ω
Output Noise Power Density	-150 dBm/Hz typ
Conversion Gain	0 dB ± 2 dB

Phase Noise (dBc / Hz)		
Offset	TYP	MAX
10 Hz	-53	-52
100 Hz	-73	-71
1 KHz	-87	-84
10 KHz	-97	-95
100 KHz	-101	-99
1 MHz	-120	-117

Final product specifications will vary upon customer's parameters.

BLOCK CONVERTERS

CONNECTORIZED

BDC Series

Block-Down Converter

5.0" x 2.5" x 0.6"

- Integrated filters
- Gain control
- Low power consumption
- Low phase noise and spurs
- Wide choice of frequency ranges
- CAN, RS-232, I2C, or SPI control
- Internal / External references

Model	Input Frequency (MHz)	Output Frequency (MHz)	LO Frequency (MHz)
BDC-4200-04	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

CONNECTORIZED

LNB Series

Low Noise Block-Down Converter

3.49" x 3.86" x 1.74"

- State of the Art Noise Figure
- Multi-band capabilities
- Vibration Tolerant
- Low Phase Noise and spurious
- Multiple, voltage selectable frequency ranges
- Hermetic Seal
- 10 MHz or 50 MHz Reference

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

CONNECTORIZED

LNA Series

K-Band Low Noise Amplifier

3.13" x 1.68" x 0.88"

- K-band low noise amplifier
- Low phase noise and high gain
- Vibration tolerant
- Ruggedized for airborne and satcom applications.

Model	Input Frequency (MHz)	Gain	Noise Figure (dB)
LNA-23550-02	Band 1: 20200 - 21200 Band 2: 22550 - 23550	51dB min, 55 dB max	Band 1: 1.6 Max Band 2: 1.8 Max

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**

UPCV Series

Channelized Up-Converter

5.0" x 2.5" x 0.6"

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

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

HIGHEST QUALITY • COMPREHENSIVE SERVICE • BEST PERFORMANCE

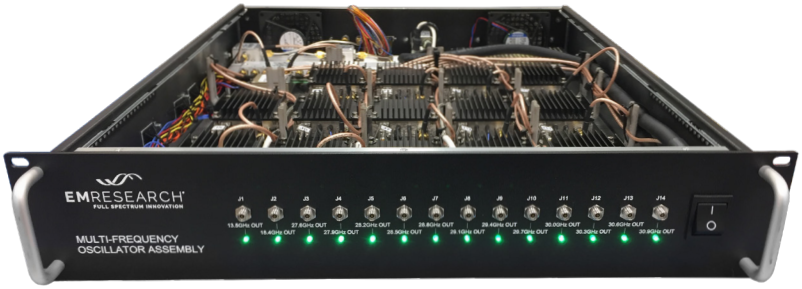
Comprehensive Customer Service and Product Support

EM Research is committed to delivering comprehensive customer service at every stage of the buying process. We treat each customer relationship as a true partnership, providing an open line of communication and direct access to our extensive team of engineers and technical experts.

With over 150 years of combined engineering experience and a dedicated team of knowledgeable sales personnel, EM Research is uniquely equipped to provide the information, communication, and products to ensure an exceptional customer experience.

MTS Series | Multi-Tone Source

The Ultimate Laboratory Solution

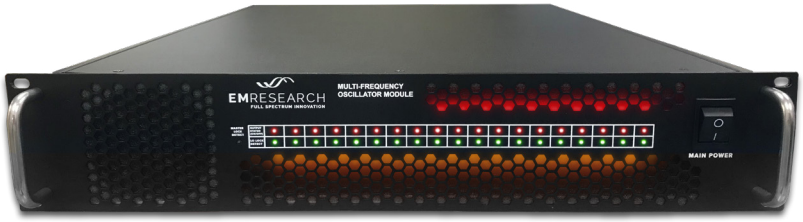


Customizable, the MTS is simple to implement in any system.

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.



IMA SPOTLIGHT

TCVR - EMR Transceiver

The TCVR is a Ka band transciever which utilizes extremely high digital modulation levels to produce exceptionally fast broadband data rates. EMR's transciever features low EVM, 4 watts linear power, dual polarization support. It is compliant to Outdoor Unit IP68, RTCA-DO-160G, and is tested to 1024 QAM.

*****REPRESENTATIVE MODEL FROM A VAST LIBRARY OF OPTIONS**

BTP SERIES
BUILD TO PRINT

If you have source control drawings, we have a capable in-house team ready to engineer a form fit and function product to match your specification. Contact us now to discuss your design needs.

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