EMRESEARCH®

FULL SPECTRUM INNOVATION

FULL-LINE CATALOG

WWW.EMRESEARCH.COM

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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WHY EM RESEARCH

EMRESEARCH®
FULL SPECTRUM INNOVATION

HIGHEST QUALITY

ISO, IPC, J-Std, RoHs, and REACH Compliant.

Rigorous Configuration Management and Quality Assurance program.

Streamlined manufacturing capability with top of the line equipment, and automated testing and alignment procedures.

Robust in-house testing including environmental simulations for vibration, temperature, and humidity.

COMPREHENSIVE SERVICE

Direct access to engineers and technical experts, partnered to build what you need.

More than 150 years combined engineering expertise.

We commit to your organization's success by delivering constant communications

We partner with industry leaders to provide cutting edge products.

Specifications to meet every one of your project's needs

BEST PERFORMANCE

Individualized product support until the end of our customer's needs.

Ruggedized design to ensure performance in the toughest environments

Customizable specifications, manufacturing, and testing to meet your project's needs

We deliver exceptional products that give you a competitive advantage.

Find out why industry leaders rebuy from EMR again and again.

We are committed to delivering an exceptional customer experience, and providing products you can trust for a competitive advantage.

EMRESEARCH
FULL SPECTRUM INNOVATION

PRODUCT PORTFOLIO

EM Research offers an extensive library of over 60 frequency generation and signal conversion solutions. All of our products are fully configurable to provide the perfect fit for any project, making EMR your all in one RF solutions provider.

The infographic below shows the number of distinct product lines we offer within each category of parts, as well as highlighting some of the top performing entries in each category.

EM Research also offers fully customized build-to-print opportunities.

= Number of Products in Category

FREQUENCY GENERATION

15 — FIXED FREQUENCY SYNTHESIZERS

Spotlight:

SLFS
Ruggedized, Low Noise Synthesizer

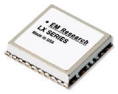
HFS
Surface Mount w/Reference Options

16 — PROGRAMMABLE FREQUENCY SYNTHESIZERS

Spotlight:

ZFR
Fast Switching, Low Noise Synthesizer

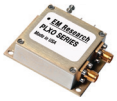
LX
Miniature Surface Mount Synthesizer



4 — PHASE LOCKED CRYSTAL OSCILLATORS

Spotlight:

PLXO
Compact, Low Noise Oscillator



4 — REFERENCE OSCILLATORS

Spotlight:

REF
Free Running, Low Noise Reference Oscillator

2 — FREQUENCY MULTIPLIERS

Spotlight:

M10X
Ruggedized, x10 Multiplication

1 — FREQUENCY DIVIDER

Spotlight:

FD
High Performing Frequency Divider

SIGNAL CONVERSION

2 — CHANNELIZED CONVERTERS

Spotlight: **DCV**
Down Converter with Low Phase Noise, Low Spurious, Low Power Consumption

4 — BLOCK-UP CONVERTERS

Spotlight: **TBUC**
Triple Band Block Up-Converter with Wide Frequency Range

2 — BLOCK-DOWN CONVERTERS

Spotlight: **LNB**
Ruggedized Block Down Converter With Excellent Noise Figure

* = IMAs Customized Via Configuration

INTEGRATED MICROWAVE ASSEMBLIES

* MULTI-TONE SOURCES

Spotlight: **MTS**
Provides Up to 14 Independent Fixed Output Frequencies

* MULTI-BAND CONVERTERS

Spotlight: **DBUC2**
Multi-Band Up-Converter with Low Noise and Integrated Filters

* IQ MODULATORS

Spotlight: **IQM**
DC to 500 MHz Input, Optimized for Low EVm

* IQ DEMODULATORS

Spotlight: **IQD**
DC to 500 MHz Output, Optimized for Low EVm

* TRANSCEIVERS

Spotlight: **TCVR**
Ruggedized Outdoor Transciever Unit

* AMPLIFIERS

Spotlight: **SAM**
Compact Universal Amplifier

* MASTER OSCILLATOR MULTIPLEXER

Spotlight: **MOX**
Ruggedized, Low phase noise OXCO

PRODUCT OFFERINGS

FREQUENCY GENERATION

FIXED FREQUENCY SYNTHESIZERS

PROGRAMMABLE FREQUENCY SYNTHESIZERS

PHASE LOCKED CRYSTAL OSCILLATORS

REFERENCE OSCILLATORS

FREQUENCY MULTIPLIERS

FREQUENCY DIVIDERS

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

PRODUCT OFFERINGS

SIGNAL CONVERSION

BLOCK UP-CONVERTERS

BLOCK-DOWN CONVERTERS

CHANNELIZED CONVERTERS

INTEGRATED MICROWAVE ASSEMBLIES

INTEGRATED MICROWAVE ASSEMBLIES

SUPPORT PRODUCTS

EM RESEARCH, Inc.
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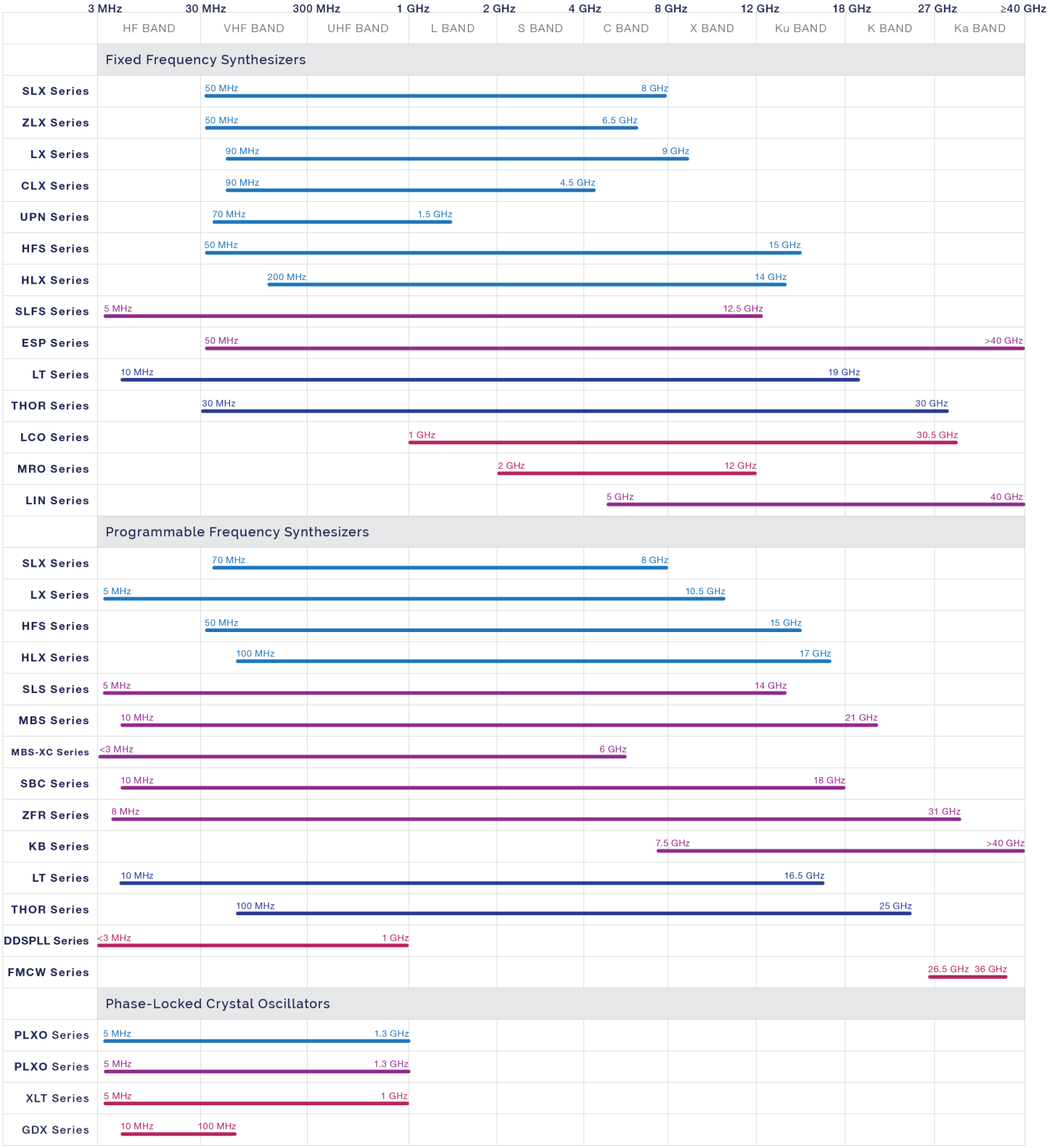
QUICK SELECTION GUIDE

SURFACE-MOUNT | CONNECTORIZED | MODULE-MOUNT | SPECIAL CAPABILITIES



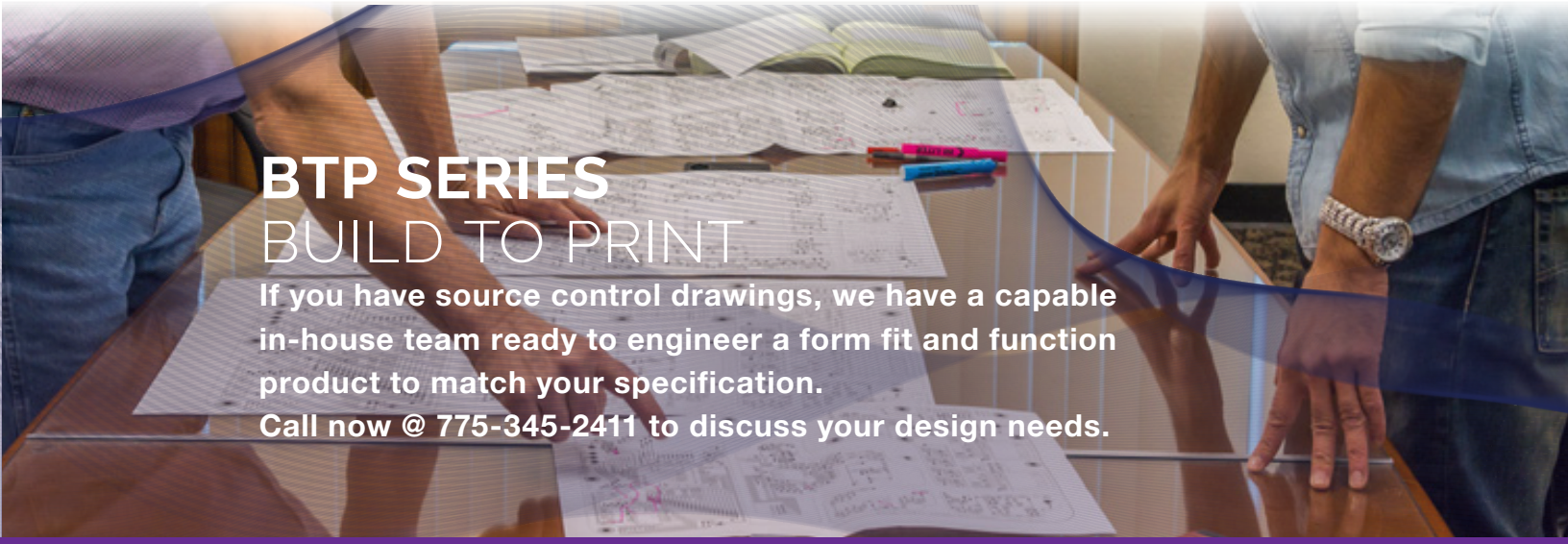
EMRESEARCH

QUICK SELECTION GUIDE

SURFACE-MOUNT | CONNECTORIZED | MODULE-MOUNT | SPECIAL CAPABILITIES

	3 MHz – 30 MHz	30 MHz – 300 MHz	300 MHz – 1 GHz	1 GHz – 2 GHz	2 GHz – 4 GHz	4 GHz – 8 GHz	8 GHz – 12 GHz	12 GHz – 18 GHz	18 GHz – 27 GHz	27 GHz – ≥40 GHz
	HF BAND	VHF BAND	UHF BAND	L BAND	S BAND	C BAND	X BAND	Ku BAND	K BAND	Ka BAND
	Reference Oscillators									
REF Series	5 MHz – 500 MHz									
REF Series	5 MHz – 500 MHz									
RDS Series	10 MHz – 100 MHz									
RDS Series	10 MHz – 100 MHz									
	Frequency Multipliers									
M10X Series		100 MHz – 400 MHz								
M10X Series	10 MHz – 100 MHz									
	Frequency Dividers									
FD Series	10 MHz				3 GHz					
	Channelized Converters*									
DCV Series		100 MHz – 170 MHz								
UPCV Series				950 MHz – 2 GHz						
	Block Up-Converters*									
BUC Series	10 MHz									40 GHz
DBUC Series									27.5 GHz – 31 GHz	
DBUC2 Series									27.5 GHz – 30 GHz	
TBUC Series									27.5 GHz – 31 GHz	
	Block Down-Converters*									
BDC Series				950 MHz – 2 GHz						
LNB Series							10.5 GHz			20 GHz

*** Only Output Frequency Displayed**



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.
Call now @ 775-345-2411 to discuss your design needs.

FIXED FREQUENCY SYNTHESIZERS

EM Research's Fixed Frequency RF synthesizers generate clean, low-noise frequencies in a range from 5 MHz to 46 GHz. We offer a large portfolio of specialized synthesizer series, each with extensive configuration options, to meet the exact needs of every customer.

Our RF synthesizers are available in a range of packages, including surface mount and connectorized options. Select series also have the capacity to be ruggedized for performance under difficult conditions, using methods such as hermetic sealing of the external housing.

SPOTLIGHT PRODUCT: LIN SERIES

EMR's LIN series is the newest addition to our portfolio, and represents one of our most advanced offerings with regards to phase noise performance. The LIN is a fixed frequency synthesizer that features ultra-low phase noise and spurious performance, as well as providing exceptional close-in phase noise performance. Contact our sales team to learn more about the configuration options for this exciting and quickly growing series!

SLX Series

Smallest Size Synthesizer

0.50" x 0.50" x 0.15"

- Sub-miniature, SMT package (0.5" Square)
- Fixed frequencies up to 8 GHz
- Buffered output power available
- Low power consumption
- Spurs less than -55 dBc

50 MHz to 8 GHz
Within Selected Bands

SURFACE-MOUNT

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					10 KHz	100 KHz	1 MHz	(V)	(mA)
SLX-80-06	80	+7	-12	10	-95	-105	-	+5	60
SLX-525-02	525	+5	-12	10	-91	-108	-130	+5	60
SLX-1000-08	1000	+5	-12	10	-91	-108	-130	+5	60
SLX-2400-05	2400	+7	-10	10	-85	-105	-	+5	60
SLX-3500-04	3500	+0	-10	10	-95	-110	-	+3.3	60
SLX-8000-02	8000	+3	-10	100	-80	-100	-	+5	55

CLX Series

LX with CRO Oscillator

0.75" x 0.75" x 0.25"

- Exceptionally low phase noise
- Miniature, SMT package (0.75" Square)
- Fixed frequencies up to 4.5 GHz
- Spurs less than -60 dBc
- Harmonics less than -20 dBc

90 MHz to 4.5 GHz
Within Selected Bands

SURFACE-MOUNT

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					1 KHz	10 KHz	100 KHz	(V)	(mA)
CLX-300-07	300	+7	-35	100	-107	-120	-142	+5	120
CLX-900-06	900	+7	-20	100	-100	-110	-130	+5	100
CLX-1452-04	1452	+7	-25	10	-95	-105	-135	+5	90
CLX-2520-03	2520	+5	-20	10	-90	-103	-125	+5	60
CLX-3600-04	3600	0	-20	Internal	-85	-100	-120	+5	105
CLX-3870-03	3870	+13	-20	10	-90	-100	-120	+5	100

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

FIXED FREQUENCY SYNTHESIZERS

SURFACE-MOUNT

ZLX Series

Small Footprint Synthesizer

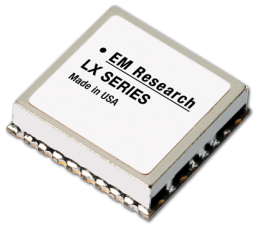
0.60" x 0.60" x 0.15"

- Excellent phase noise
- Industry standard SMT package (0.60" Square)
- Optional internal reference
- Output power up to +10 dBm available
- Spurs less than -70 dBc

50 MHz to 6.5 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)
ZLX-970-04	970	+7	-25	Internal	-80	-100	-120	+5	65
ZLX-1260-04	1260	+1	-20	10	-90	-100	-120	+5	40
ZLX-1620-05	1620	+2	-20	10	-90	-100	-120	+5	40
ZLX-2090-04	2090	+3	-20	10	-85	-100	-120	+5	35
ZLX-3100-05	3100	+2	-25	10	-80	-100	-120	+5	40
ZLX-3500-03	3500	+7	-25	10	-85	-98	-120	+5	65

SURFACE-MOUNT



LX Series

SMT 0.75" Synthesizer

0.75" x 0.60" x 0.15"

- Miniature, SMT package (0.75" Square)
- Optional internal reference
- Fixed frequencies up to 9 GHz
- Output power up to +12 dBm available

90 MHz to 9 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)
LX-93-08	93	+7	-20	10	-	-100	-120	+5	65
LX-300-11	300	+7	-20	Internal	-80	-100	-120	+5	70
LX-715-02	715	+7	-20	10	-90	-100	-120	+5	60
LX-2400-18	2400	+3	-20	Internal	-70	-90	-110	+3.3	60
LX-4650-02	4650	+6	-20	100	-88	-98	-110	+3.3	145
LX-9222-02	9222.5	+12	-20	25	-70	-85	-105	+5	150

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

HLX Series

Hybrid LX Synthesizer

0.8" x 0.8" x 0.15"

- Ruggedized, SMT package (0.8" Square)
- Hermetic sealed option per MIL-STD-883
- Extreme shock and vibration tolerance
- Output power up to +14 dBm available
- Spurs less than -60 dBc
- Harmonics less than -23 dBc

50 MHz to 14 GHz
Within Selected Bands

SURFACE-MOUNT

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					1 KHz	10 KHz	100 KHz	(V)	(mA)
HLX-200-03	200	+7	-30	10	-108	-110	-125	+5	75
HLX-2250-03	2250	+9	-23	10	-93	-93	-113	+5	95
HLX-8200-02	8200	+7	-25	100	-85	-90	-100	+5	185
HLX-9590-02	9590	+10	-30	10	-80	-85	-85	+5	170
HLX-14000-04	14000	+6	-20	Internal	-80	-93	-95	+5	250

HFS Series

High Frequency Synthesizer

1.25" x 1.00" x 0.25"

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

50 MHz to 15 GHz
Within Selected Bands

SURFACE-MOUNT

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	165

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

FIXED FREQUENCY SYNTHESIZERS

CONNECTORIZED

UPN Series

Upgraded PLL Synthesizer

0.90" x 0.90" x 0.21"

- Exceptionally low phase noise
- Fixed frequencies up to 14.5 GHz
- Robust design for extended temperature and high vibe environments available
- Spurs less than -60dBc
- Harmonics less than -20 dBc

70 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)
UPN-3730-03	3730	+4	-25	100	-93	-103	-113	+3.3	160
UPN-4000-09	4000	+7	-20	100	-100	-108	-115	+5	150
UPN-5300-05	5300	+3	-20	100	-95	-95	-112	+3.3	175
UPN-6000-07	6000	+4	-20	100	-100	-100	-108	+3.3	175
UPN-6950-05	6950	+3	-20	10	-85	-90	-107	+3.3	160
UPN-7390-03	7390	+4	-35	100	-88	-98	-108	+3.3	185

SURFACE-MOUNT

SLFS Series

Single Loop Fixed Synthesizer

1.5" x 1.5" x 0.6"

- Fixed frequencies to 12.5 GHz
- Output power up to +20 dBm
- Optional internal reference
- Compact, connectorized package

5 MHz to 14 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)
SLFS-500-11	500	+7	-35	10	-100	-110	-130	+12	150
SLFS-800-11	800	+10	-25	10	-105	-110	-130	+12	200
SLFS-1000-34	1000	+7	-35	10	-95	-105	-125	+12	150
SLFS-2000-11	2000	+7	-35	10	-90	-100	-125	+12	150
SLFS-3000-10	3000	+7	-35	10	-95	-100	-115	+12	150
SLFS-4000-07	4000	+7	-35	10	-80	-90	-115	+12	150
SLFS-6000-04	6000	+7	-35	10	-80	-90	-115	+12	200
SLFS-8000-07	8000	+7	-35	10	-80	-90	-115	+12	200

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

ESP Series

Fixed Source PLL DRO Replacement

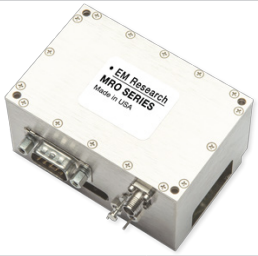
2.25" x 2.25" x 0.6"

- 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



MRO Series

Mechanical Replacement Oscillator

3.05" x 2.02" x 1.62"

- Mechanically tuned cavity replacement oscillator

2 GHz to 12 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)
MRO-6150-03	6150	+13	-30	Internal	-75	-95	-115	-24	250
MRO-6400-03	6400	+13	-30	Internal	-75	-95	-115	-24	250

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

FIXED FREQUENCY SYNTHESIZERS

CONNECTORIZED

LCO Series

Legendary Calibration Oscillator

3.5" x 2.5" x 0.6"

- Extremely low output power variation (± 0.05 dB)
- Fixed frequencies up to 30.5 GHz
- Output power up to +10 dBm
- Optional internal reference

1 to 30.5 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)
LCO-2270-02	2270	+10	-30	50	-80	-100	-125	+5	200
LCO-12750-05	12750	+0	-20	Internal	-88	-95	-95	+5	700
LCO-20700-02	20700	+0	-20	Internal	-	-50	-75	+5	775
LCO-30500-03	30500	+0	-20	Internal	-	-50	-75	+5	700

CONNECTORIZED

LIN Series

Low Close-In Phase Noise Synthesizer

2.25" x 2.25" x 0.6"

- Low Close-In Phase Noise
- Connectorized Package
- Fine Resolution Design
- Low Phase Noise
- Ultra-Low Spurs
- Optional Internal Reference

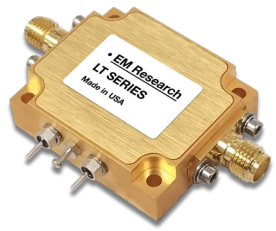
5000 to 40000 MHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
					1 KHz	10 KHz	100 KHz	(V)	(mA)
LIN-26300-02	26300	+20	-20	100	-100	-109	-109	+12	800

Phase noise performance is an essential consideration when choosing components for demanding, high performance systems, and EM Research's fixed frequency synthesizer line contains some of the best options on the market with regards to reliability and phase noise.

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

CONNECTORIZED



LT Series

Little THOR Frequency Synthesizer

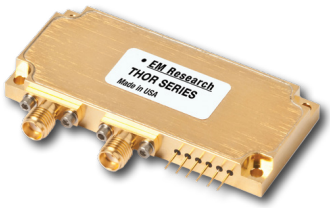
1.3" x 1.1" x 0.4"

- Ruggedized, modular-mount package
- Removable SMA connectors for surface mount-ability
- Fixed Frequency up to 19 GHz
- Hermetic seal optional per MIL-STD-883
- Extreme shock, and vibration tolerance

10 MHz to 19 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)
LT-2672-02	2672	+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	-	-90	-110	+5	165
LT-10500-03	10500	+3	-20	10	-70	-90	-110	+5	175

MODULE-MOUNT



THOR Series

Rugged Frequency Synthesizer

2.25" x 2.25" x 0.6"

- Ruggedized, modular-mount package
- Removable SMA connectors for surface mount-ability
- Hermetic sealed option per MIL-STD-883
- High shock and vibration tolerance
- Internal reference optional

30 MHz to 30 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)
THOR-10900-03	10900	+20	-30	Internal	-80	-85	-100	+5	225
THOR-12800-10	12800	+7	-30	50	-90	-95	-120	+5	200
THOR-14275-04	14275	+12	-20	25	-75	-85	-95	+5	375
THOR-18300-02	18300	+19.5	-20	Internal	-85	-90	-93	+5	325

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

PROGRAMMABLE FREQUENCY SYNTHESIZERS

EM Research's Programmable Frequency synthesizers provide programmable RF signals within specific bands, all while maintaining industry-leading performance across the board with regards to phase noise, spurs, and environmental survivability. We offer a large portfolio of specialized synthesizer series, each with extensive configuration options, to meet the exact needs of every customer.

Our RF synthesizers are available in a range of packages, including surface mount and connectorized options. Select series also have the capacity to be ruggedized for performance under difficult conditions, using methods such as hermetic sealing of the external housing.

Ready for More?

For inquiries about any of our products or to request a quote, please go to

www.emresearch.com

Or contact our sales team via email at

sales@emresearch.com

Or phone us @ **775-345-2411**

PROGRAMMABLE FREQUENCY SYNTHESIZERS

SLX Series

Small LX Synthesizer

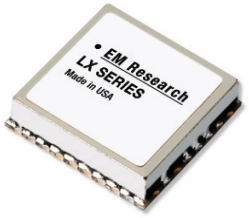
1.25" x 1.00" x 0.25"

- Sub-miniature, SMT package (0.5" Square)
- Programmable frequencies up to 8 GHz
- Buffered output power available
- Low power consumption

70 MHz to 8 GHz
Within Selected Bands

SURFACE-MOUNT

Model***	Frequency Range (MHz)		Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
	Minimum	Maximum				10 KHz	100 KHz	1 MHz	(V)	(mA)
SLX-200-05	120	200	+0	-15	10	-70	-90	-	+8	55
SLX-660-02	640	660	+0	-10	10	-90	-115	-	+5	35
SLX-1333-06	667	1333	+0	-15	10	-70	-90	-	+8	55
SLX-2665-02	2410	2665	+0	-15	10	-87	-90	-120	+5	55
SLX-2750-04	2010	2750	+7	-12	125	-80	-85	-110	+5	60
SLX-3450-02	1850	3450	+4	-15	10	-75	-75	-100	+15	80



LX Series

0.75" Synthesizer

1.25" x 1.00" x 0.25"

- Programmable frequencies up to 10.5 GHz
- Miniature, SMT package (0.75" Square)
- Optional internal reference
- Output power up to +10 dBm available

5 MHz to 10.5 GHz
Within Selected Bands

SURFACE-MOUNT

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)
LX-5-02	5	5.30	0	-20	10	-90	-100	-110	+5	95
LX-120-06	60	120	+7	-10	10	-70	-80	-100	+5	65
LX-860-03	760	860	+13	-20	50	-65	-80	-100	+5	85
LX-3050-04	2200	3050	+7	-15	10	-75	-80	-95	+5	60
LX-5850-03	4000	5850	+6	-10	125	-	-80	-83	+5	65
LX-10600-02	8000	10600	+3	-20	100	-60	-65	-85	+5	160

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

SURFACE-MOUNT

HLX Series

Hybrid LX

0.8" x 0.8" x 0.15"

- Ruggedized, SMT package (0.8" Square)
- Programmable frequencies up to 17 MHz
- Hermetic seal option per MIL-STD-883
- Extreme shock and vibration tolerance

100 MHz to 17 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)
HLX-765-03	590	765	+7	-12	10	-89	-90	-106	+5	70
HLX-940-03	765	940	+7	-12	10	-93	-93	-104	+5	70
HLX-2190-02	2095	2190	+7	-20	100	-	-87	-112	+5	100
HLX-10600-02	9000	10600	+10	-30	10	-75	-80	-80	+5	275

SURFACE-MOUNT

HFS Series

High Frequency Synthesizer

1.25" x 1.00" x 0.25"

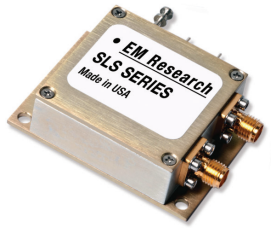
- Programmable frequencies up to 15 GHz
- Broadband designs available
- Optional internal reference
- Optional Reference Detect Switch
- Internal reference output available

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**

PROGRAMMABLE FREQUENCY SYNTHESIZERS



SLS Series

Single Loop Synthesizer

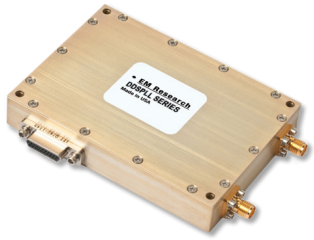
1.5" x 1.5" x 0.6"

- Programmable frequencies up to 14 GHz
- Output power up to +18 dBm
- Optional internal reference
- Compact, connectorized package

5 MHz to 14 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)
SLS-1100-06	650	1100	+10	-20	10	-75	-90	-110	+12	300
SLS-1800-07	1700	1800	0	-25	Internal	-55	-80	-100	+8	250
SLS-6200-02	5800	6200	+7	-30	10	-75	-75	-80	+12	180
SLS-9100-02	8700	9100	+7	-20	10	-70	-70	-75	+12	180



DDSPLL Series

DDS Phase Locked Synthesizer

2.5" x 4.5" x 0.6"

- Direct digital synthesizer with phase locked loop
- Very fine step size, below 1 Hz
- Exceptional phase noise
- Typical jitter of 500 fsec
- Fast switching speed < 1 µsec
- Multi-octave capability
- Internal reference available

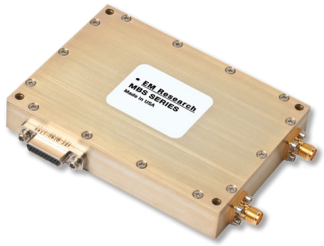
1 MHz to 1 GHz
Within Selected Bands

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)
DDSPLL-30-02	45	65	-3	-25	100	-155	-165	-168	+5	500
DDSPLL-65-02	3	30	+13	-25	10	-130	-145	-150	+5	500

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

CONNECTORIZED



MBS Series

Multiple Band Synthesizer

3.5" x 2.5" x 0.6"

- Produces multi-octave bandwidths
- Programmable frequencies up to 21 GHz
- Output power up to +14 dBm
- Low power consumption

10 MHz to 21 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)
MBS-250-08	20	250	+3	-20	10	-	-80	-90	+5	300
MBS-4000-13	250	4000	+3	-20	10	-	-80	-102	+5	300
MBS-5600-02	800	5600	+7	-20	10	-75	-80	-90	+15	300
MBS-10800-03	7700	10800	+7	-20	100	-80	-90	-120	+12	450

CONNECTORIZED

MBS-XC Series

Multiple Band Synth. - Extra Bandwidth

3.5" x 2.5" x 0.6"

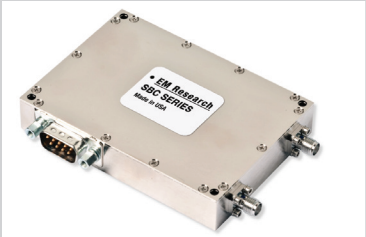
- Produces multi-octave bandwidths
- Programmable frequencies up to 6 GHz
- Output power up to +14 dBm
- Low power consumption

1 MHz to 6 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)
MBS-XC-6000-04	100	6000	+10	-25	Internal	-85	-90	-100	+5	600

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

PROGRAMMABLE FREQUENCY SYNTHESIZERS



SBC Series

Small Step Broadband Synthesizer

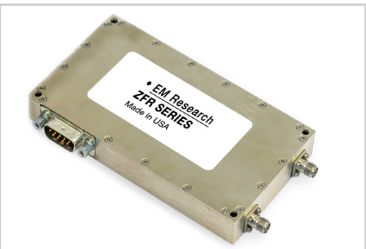
3.5" x 2.5" x 1.0"

- Fine resolution design (step sizes down to 1 Hz)
- Broadband designs available (up to 3 octaves)
- Low phase noise
- Ultra-low spurs
- Optional internal reference

10 MHz to 18 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)
SBC-520-03	340	520	+10	-20	Internal	-110	-117	-117	+5	820
SBC-2750-03	1600	2750	+7	-15	10	-95	-100	-105	+12	750
SBC-4860-03	1000	4860	+0	-15	Internal	-85	-95	-105	+5	770
SBC-8600-02	7800	8600	+10	-20	10	-	-90	-100	+5	650



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**

PROGRAMMABLE FREQUENCY SYNTHESIZERS

CONNECTORIZED

KB Series

Ka Band Synthesizer

5.5" x 2.5" x 0.6"

- 1 to 2 GHz of programmable range
- Step size down to 1 MHz
- Narrow-Band replacement for bulky bench-top generators
- Non-volatile memory of frequency set point
- Redundant internal reference with Reference Detect Switch

7.5 GHz to 46 GHz
Within Selected Bands

Model***	Frequency Range (MHz)		Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
	Minimum	Maximum				10 KHz	100 KHz	1 MHz	(V)	(mA)
KB-35500-02	34500	35500	+20	-20	10	-95	-95	-110	+12	1300

CONNECTORIZED

FMCW Series

Freq. Modulated Continuous Wave

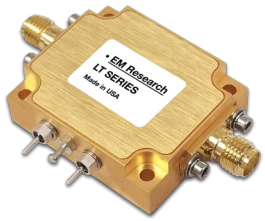
5.5" x 2.5" x 0.6"

- Ka band synthesizer
- Four swept FMCW bands each 250 MHz wide
- 250 MHz FM sweep in 220 seconds
- Automatic reset and ready to fire next sweep in less than 10 µSec

26.5 GHz to 36 GHz
Within Selected Bands

Model***	Frequency Range (MHz)		Power Out (dBm)	Harmonics (dBc)	Reference (MHz)	Phase Noise (dBc/Hz)			VCC	
	Minimum	Maximum				10 KHz	100 KHz	1 MHz	(V)	(mA)
FMCW-36000-02	35000	36000	+13	-20	10	-85	-92	-110	+12	650

CONNECTORIZED



LT Series

Little THOR

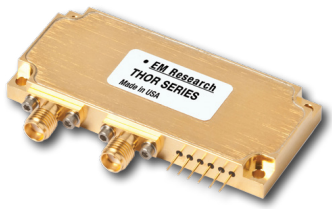
1.3" x 1.1" x 0.30"

- Ruggedized, modular-mount package
- Hermetic seal option per MIL-STD-883
- Extreme shock and vibration tolerance
- Fast switching units available (≤100 µSec)

10 MHz to 16.5 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)
LT-2300-04	2200	2300	+7	-20	80	-90	-97	-118	+5	130
LT-7000-02	5000	7000	+6	-20	50	-85	-90	-90	+5	110
LT-8000-05	5000	8000	+6	-20	50	-85	-85	-85	+5	210

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



THOR Series

Rugged Frequency Synthesizer

2.5" x 1.1" x 0.4"

- Ruggedized, modular-mount package
- Removable SMA connectors for surface mount-ability
- Fast switching units available (≤100 µSec)
- High shock and vibration tolerance
- Hermetic seal option

100 MHz to 25 GHz
Within Selected Bands

MODULE-MOUNT

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)
THOR-9500-07	8875	9500	+10	-20	Internal	-85	-95	-105	+5	400
THOR-10750-04	10125	10750	+10	-25	Internal	-85	-95	-103	+5	325
THOR-13960-03	12580	13690	+7	-20	10	-80	-86	-94	+5	500
THOR-18000-08	17000	18000	+10	-20	Internal	-85	-90	-93	+5	400

SPOTLIGHT PRODUCT

KB SERIES

The KB synthesizer line is a programmable RF synthesizer that acts as an excellent narrow-band replacement for bulky bench-top generators. Our KB synthesizers operate in a frequency range of 7.5 GHz to 46 GHz, offer 1 to 2 GHz of programmable range, and step size as low as 1 MHz. With a non-volatile memory of the frequency set point, the KB is a compact and reliable alternative to an outdated lab feature. **We designed the KB to streamline and revolutionize your workflow. Contact us today to learn more.**

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

FREQUENCY OSCILLATORS

EM Research's Frequency Oscillators series include phase locked crystal oscillators, reference oscillators, and a selection of innovative alternatives to these parts. With excellent performance across the board, our oscillators are available in a wide range of packages, including surface mount and connectorized options. Select series also have the capacity to be ruggedized for use under difficult conditions, using methods such as hermetic sealing of the external housing.

SPOTLIGHT PRODUCT

EMR's XLT, or "Exemplary Little THOR" is a revolutionary RF synthesizer designed to act as an alternative to traditional phase locked crystal oscillators. The XLT provides fixed frequency outputs with extremely low phase noise, while also exhibiting extreme shock and vibration tolerance, and ruggedization options such as hermetic sealing. EMR's XLT is the perfect solution for demanding environments in which a traditional crystal oscillator would pose design challenges.

Ready for More?

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Or contact our sales team via email at

sales@emresearch.com

Or phone us @ **775-345-2411**

PHASE LOCKED CRYSTAL OSCILLATORS

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

CONNECTORIZED

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

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

SURFACE-MOUNT

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

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

PHASE LOCKED CRYSTAL OSCILLATORS

SPECIAL CAPABILITIES

GDX Series

GPS Disciplined Oscillator

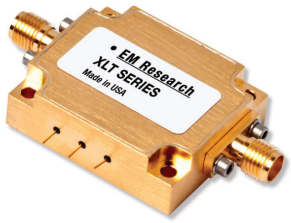
3.5" x 2.5" x 0.6"

- 1 PPS input from GPS receiver
- Up to four fixed-frequency RF outputs (5 MHz to 100 MHz)
- Optional loss of lock and holdover alarm outputs
- Extremely low phase noise

10 MHz to 100 MHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Spurs (dBc)	Phase Noise (dBc/Hz)			VCC	
					1 KHz	10 KHz	100 KHz	(V)	(mA)
GDX-10-13	10	+10	-30	-70	-130	-150	-154	+12	400
GDX-64-02	64	+3	-20	-80	-140	-150	-150	+12	300
GDX-100-03	100	+13	-30	-70	-131	-151	-154	+15	350

SPECIAL CAPABILITIES



XLT Series

Exemplary Little THOR

1.3" x 1.1" x 0.4"

- Ruggedized, modular-mount package
- Removable SMA connectors for surface mount-ability
- Hermetic sealed option per MIL-STD-883
- Extreme shock and vibration tolerance

5 MHz to 1000 MHz
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)
XLT-100-05	100	+6	-20	-	-135	-155	-155	+5	180
XLT-200-04	200	+7	-20	10	-120	-145	-155	+5	155
XLT-400-02	400	+7	-20	10	-120	-144	-145	+5	85
XLT-500-03	500	+17	-20	10	-100	-115	-137	+5	175

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

REF Series

Reference Oscillator (Connectorized)

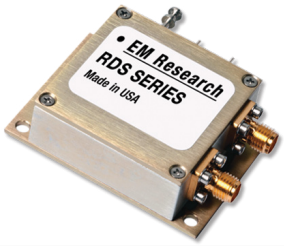
2.0" x 1.5" x 0.6"

- Standard internal TCXO (±2.5 ppm, stability)
- Optional internal OCXO (±30 ppm, stability)
- Fixed frequencies up to 500 MHz

5 to 500 MHz
Within Selected Bands

CONNECTORIZED

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Temp, Stability (ppm)	Phase Noise (dBc/Hz)			VCC	
					10 Hz	100 Hz	1 KHz	(V)	(mA)
REF-10-131	10	+3	-15	±2.5	-110	-130	-150	+5	70
REF-40-05	40	+5	-15	±2.5	-90	-105	-135	+12	80
REF-60-06	60	+3	-20	±5.0	-80	-125	-140	+5	80
REF-100-124	100	+10	-15	±2.5	-90	-110	-140	+5	50



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

CONNECTORIZED

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**

REFERENCE OSCILLATORS

SURFACE-MOUNT

REF Series

Reference Oscillator (SMT)

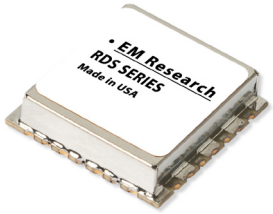
2.0" x 1.5" x 0.6"

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

5 to 500 MHz
Within Selected Bands

Model***	Frequency (MHz)	Power Out (dBm)	Harmonics (dBc)	Stability (PPM)	Phase Noise (dBc/Hz)			VCC	
					100 Hz	1 KHz	10 KHz	(V)	(mA)
REF-10-130	10	+5	-12	±2.5	-115	-145	-150	+5	100
REF-50-06	50	+7	-20	±2.5	-100	-135	-150	+5	100
REF-100-125	100	10	-15	±5	-100	-135	-160	+5	100

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

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

SIGNAL CONVERSION

EM Research's Signal Conversion options include a wide range of multipliers, dividers, and up/down converters. Our most popular products for SatCom are our block up and block down converters, named BUC and BDC, which operate with low power consumption as well as low phase noise and spurs, and can provide up to 4 switchable bands in one convenient package. We also have low noise block down converters showcased in the LNB series.

These converters can be built to be extremely hardy, and are suitable for use in numerous satellite projects and other airborne applications.

Ready for More?

For inquiries about any of our products or to request a quote, please go to

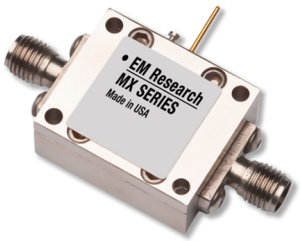
www.emresearch.com

Or contact our sales team via email at

sales@emresearch.com

Or phone us @ **775-345-2411**

MODULE-MOUNT



M10X Series

X10 Frequency Multiplier

1.3" x 1.1" x 0.4"

- 10 MHz input to 100 MHz output (x10 Multiplication)
- Ruggedized, module-mount package
- Removable SMA connectors for surface mount-ability
- Extreme shock and vibration tolerance

10 MHz to 100 MHz

Model***	Frequency In (MHz)	Frequency Out (MHz)	RF Input (dBm)	RF Output (dBm)	Harmonics (dBc)	Sub Harmonics (dBc)	VCC	
							(V)	(mA)
M10X-100-21	10	100	0	+3	-20	-40	+5	150
M10X-100-22	10	100	0	+10	-20	-40	+5	175
M10X-100-23	10	100	0	+3	-20	-40	+5	175
M10X-100-24	10	100	0	+10	-20	-40	+5	175

SURFACE-MOUNT

M10X Series

X10 Frequency Multiplier (SMT)

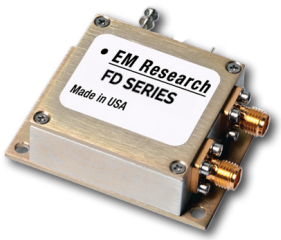
0.9" x 0.9" x 0.21"

- 10 MHz input to 100 MHz output (x10 Multiplication)
- Small, SMT package (0.9" Square)

100 MHz to 400 MHz

Model***	Frequency In (MHz)	Frequency Out (MHz)	RF Input (dBm)	RF Output (dBm)	Harmonics (dBc)	Sub Harmonics (dBc)	VCC	
							(V)	(mA)
M10X-100-25	10	100	0 ± 3 dB	0 ± 3 dB	-20	-50	+5	150
M10X-100-26	10	100	0 ± 3 dB	0 ± 3 dB	-20	-50	+5	120

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



FD Series
Frequency Divider

1.5" x 1.5" x 0.6"

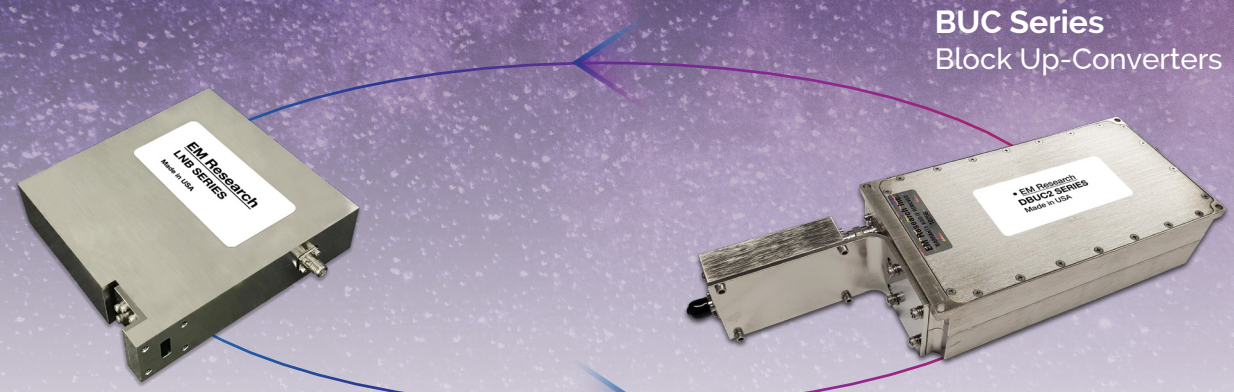
- Frequency divider
- Integrated signal conditioning, amplification, supply regulation
- Wide input power range
- Greater harmonic rejection and square wave outputs available
- 5 V, 8 V, or 12 V operation
- Vibration testing available

10 MHz to 3 GHz
Within Selected Bands

CONNECTORIZED

Model***	Frequency In (MHz)	Frequency Out (MHz)	Divide By	Harmonics (dBc)	Phase Noise (dBc/Hz)			VCC	
					100 Hz	1 KHz	10 KHz	(V)	(mA)
FD-9-03	216.66	9.028	24	-15	-	-	-	+5	185
FD-10-08	100	10	10	-15	-	-	-	+12	125
FD-80-02	80	10	8	-15	-125	-145	-150	+12	125

FULL SPECTRUM SIGNAL CONVERSION



BUC Series
Block Up-Converters

LNB
Low Noise Block Down-Converter

EM Research has developed a robust ecosystem of high-performance Block Up Converters and Low Noise Block Down Converters. As an essential component of any satellite communications system, our signal conversion options can take any radio signal through its full lifecycle with high reliability and industry-leading performance.

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

BLOCK UP-CONVERTERS

CONNECTORIZED

BUC Series

Block Up-Converter

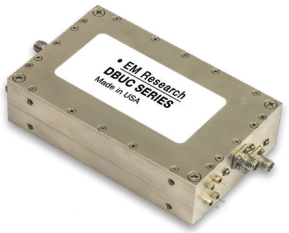
5.0" x 2.5" x 0.6"

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

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

DBUC2 Series

Frequency Divider

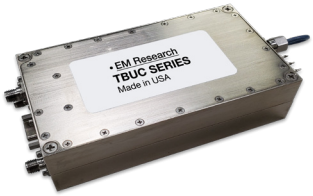
1.5" x 1.5" x 0.6"

- Integrated filters
- Gain control
- Low phase noise and spurs
- Full 27500-30000 MHz coverage
- CAN, RS-232, I2C or SPI control
- Internal / external reference

27500 to 30000 MHz
Within Selected Bands

CONNECTORIZED

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

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
Within Selected Bands

CONNECTORIZED

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

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

BLOCK DOWN-CONVERTERS

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

BDC Series

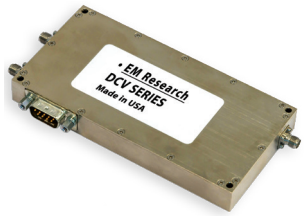
Block-Down Converter

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-4200-03	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

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



DCV Series

Channelized Down-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
DCV-1450-03	950 to 1450	52 to 88	Channelized, 125 KHz Steps
DCV-2150-03	950 to 2150	52 to 88	Channelized, 125 KHz Steps
DCV-2150-04	950 to 2150	104 to 176	Channelized, 125 KHz Steps

CONNECTORIZED

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

CONNECTORIZED

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

INTEGRATED MICROWAVE ASSEMBLIES

EM Research's Integrated Microwave Assemblies, or "IMAs" represent some of the best and most complex collaborative works we've designed with a client's specific needs in mind. Ranging from our versatile laboratory-focused rack mounts to highly specialized transceiver assemblies, EMR's IMA line can be used as a base from which to tackle even the toughest challenges.

If you need custom solutions to unique design problems, our engineers are ready to work with you to design the ideal custom solution.

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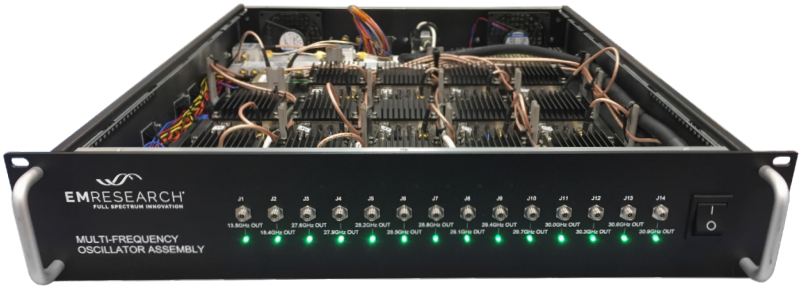
MTS Series | Multi-Tone Source

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.

IQM Series | IQ Modulator

Features

- Capable of receiving from DC to 500 MHz, and LO inputs and outputting RF frequencies
- Internal low noise oscillator
- Internal reference
- Buffered modulator
- Balanced IQ
- Optimized for low EVM

Options

- Internal Reference Detect Switch (EM Research RDS series).
- Internal low noise LO
- Up to 250 mega symbols per second

Models

Model***	Input Frequency (MHz)	Output Frequency (MHz)	Output Waveform (QAM/QPSK)	Output Power (dBm)	Phase Noise (dBc/Hz)		
					1 KHz	10 KHz	100 KHz
IQM-1250-02	1150	1150 ± 500	256	-20	-115	-120	-125
IQM-1650-02	1525	1525 ± 500	256	-20	-110	-115	-130

IQD Series | IQ Demodulator

Features

- Capable of receiving RF and LO frequency inputs, and outputting from DC to 500 MHz
- Internal low noise oscillator
- Internal reference
- Buffered demodulator
- Balanced IQ
- Optimized for low EVM

Options

- Internal Reference Detect Switch (EM Research RDS Series).
- Internal low noise LO
- Up to 250 mega symbols per second

Models

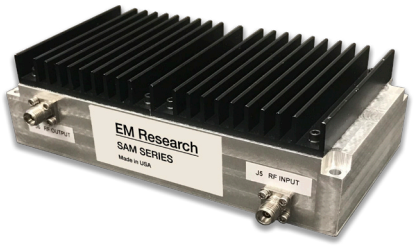
Model***	Input Frequency (MHz)	Output Frequency (MHz)	Output Waveform (QAM/QPSK)	Output Power (dBm)	Phase Noise (dBc/Hz)		
					1 KHz	10 KHz	100 KHz
IQD-1250-02	1150	1150 ± 500	256	-20	-115	-120	-125
IQD-1650-02	1525	1525 ± 500	256	-20	-110	-115	-130

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

SAM Series | Synthesizer Amplifier Modulator

Features

- Compact universal amplifier
- Frequency output range tuned to match choice of synthesizer
- Low harmonics



Options

- Optional gain level select
- Tight gain flatness ±1 dB over 100 MHz to 6 GHz
- Extended temperature range available
- 0.5, 1, or 2 watts of power
- 5 watt design in development

Optimally paired with EM Research multi-band synthesizers including the MBS, MBS-XC, and the SBC Series. The SAM Series of amplifiers boosts output power over the same bandwidth as a connected synthesizer. The powerful SAM Series has a minimum RF output power of 0.5 watts.

MOX Series | Master Oscillator Multiplexer

Features

- Low phase noise OCXO
- Reference (1-100 MHz)
  L-Band (900-2200 MHz)
  DC (to +48 V @ 4 A) Bias Tee/Multiplexer
- Interface between VSAT Modems and Frequency Converters
- Robust housing is gasket sealed for weather resistance

Options

- Available in various OXCO frequencies: 10, 50, 100, 120 MHz
- OCXO with low G-sensitivity available
- Single or Dual Multiplexer
- Single or Dual Bias Tee

Models

Model***	Frequency (MHz)	Stability (ppb)	Aging (ppb/year)	Phase Noise (dBc/Hz)			VCC (V)	ICE (mA)
				1 KHz	10 KHz	100 KHz		
MOX-10-02	10	±5e^-8 (0C to 50C)	± 1e^-9	-157	-160	-160	+15	350
MOX-50-02	50	±10 (-15C to +55C)	± 200	-160	-165	-170	+15	600

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

TCVR Series | Transceiver

Features

- 4 watts linear power
- Transceiver pair support dual polarization
- Low EVM
- Outdoor unit IP68 compliant
- Compliant to RTCA-DO-160G
- Concept/Eval unit tested to 1024-QAM

General Specifications

- Digital interface: 4-wire SPI (3.3 V Logic)
- Supply voltage: +12 VDC, ±0.25 V
- Operating temperature range: -45 C° to +85 C°
- Current:
  - 2400 mA TYP, 20 dBm Out
  - 3500 mA TYP, 33.5 dBm Out

The TCVR Series is a Ka band transceiver, utilizing extremely high digital modulation levels resulting in exceptionally fast broadband data rates. It is in a compact, easy to install configuration. The TCVR Series has been unit tested up to 1024 QAM, 230 MHz channels.

SUPPORT PRODUCTS

EM Research's Support products include a range of tools designed to assist your team in installing and calibrating our products. These include programming modules, demo boards, and our exciting new programming kit; a compact device loaded with software that enables synthesizers to be programmed using a computer interface.

HIGHEST QUALITY • COMPREHENSIVE SERVICE • BEST PERFORMANCE

Comprehensive Customer 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 equipment to ensure an exceptional customer experience.

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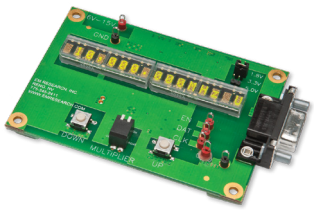
SUPPORT



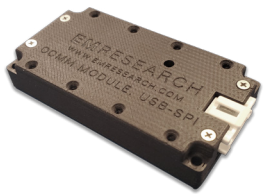
PM Series
Programming Module

- Standalone board that allows a synthesizer to be tested on the bench or in the field without the need for a computer.
- Programming conducted via buttons located on the module with the frequency displayed on bright LED's for reference.
- All that is needed is a power source, adapter cable (or clippie leads), and synthesizer to step through the frequencies.

SUPPORT

DB Series
Demo Board

- EM Research Demo Board

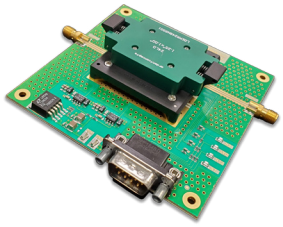


ProgKit Series

Synthesizer Programming Kit

- Comprised of hardware and software set that allows a synthesizer to be programmed via a computer.
- Featured hardware is the EMR Serial Programmer; a USB-SPI dongle that interfaces between a computer and frequency synthesizer.
- Included software is compatible with Windows operating systems XP and up.

SUPPORT



TF Series

Test Fixture

- Test Fixtures can be configured for specific product series.
- Product shown is a Test Fixture for the HFS series
- Verify product performance before installation
- Troubleshoot part performance
- Can be used for bread boarding and engineering prototyping

SUPPORT

MANUFACTURING
THE EMR WAY

EM Research: A Full-Spectrum Approach to Manufacturing

At EM Research, we know that maintaining an efficient manufacturing pipeline is essential to fulfilling our client's orders quickly and with the highest quality standards. All EM Research products are made in the United States, built in our state of the art 20,000-square foot facility. We are responsible for our parts through every step of production, increasing accountability and our capacity to monitor and fine-tune the production process.
EM Research is ISO 9001:2015 certified, and adheres to strict industry-standard quality guidelines in every aspect of our operations.

Equipment and Capabilities

- On-site CNC Machining
- Two Pick-N-Place machines
- Reflow Ovens
- Aqueous Cleaning
- Automated Lidding
- Manual and automatic test stations
- Spectrum analyzers and related performance testing equipment.
- Environmental testing chambers
- Temperature testing facilities
- Vibration/shock testing lab
- Burn-in Chambers
- Hermetic-Seal (Leak) Testing

Fast Prototype CNC Machining is available on-site, resulting in significantly increased production speed.

THE EMR ADVANTAGE

EM Research is proud to provide high-quality frequency generation and signal converison solutions that give our clients a competitive advantage. With our unique focus on quality, comprehensive customer service, and high-performing products, EMR is your best choice to trust with long-term production partnerships and new challenges alike.

Interested in EMR Products? Meet the team you'll be working with.

Matt Eiting:
President & VP of Engineering

Sandi Renden:
Vice President Administration & Marketing

Susan Zandonella:
Director of QMS

Cathy Gustavson:
Customer Service Specialist

Annie Paquette:
Marketing and Sales Associate

- **Over 190 years of combined RF design and engineering experience**
- **30+ years of excellence in engineering**
- **Specialized in-house manufacturing environment**

Customer satisfaction is our highest priority, and we look forward to fostering strong partnerships dedicated to unlocking the full spectrum of engineering innovation. For more information about our company or any of the products we offer, feel free to reach out to us at sales@emresearch.com, or at 775-345-2411.

learn more at
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HIGHEST QUALITY • COMPREHENSIVE SERVICE • BEST PERFORMANCE

COMMITMENT TO SUSTAINABILITY

EM Research: Doing the Right Thing

EMR understands how important it is to follow sustainable manufacturing and operations practices to ensure the long-term health of both our company and the industries we work with. Because of this, we incorporate sustainabilty considerations at every level of our planning, decision-making, and day-to day operations in an effort to reduce our environmental footprint.

EMR's sustainability policy focuses on three essential concepts:

Corporate Responsibility, Social Responsibility, and Environmental Responsibility.

Corporate Responsibility

- Supporting small business and local partnerships to strengthen local manufacturing networks.
- Working with suppliers that have sustainable business and manufacturing practices.
- Commitment to the responsible and ethical sourcing of minerals.
- Working with nationally and internationally accredited sustainabilty programs such as ROHS, REACH, and CAProp65.

Social Responsibility

- Working with in-state universities to arrange career fairs, facility tours, internships and other networking opportunities for incoming talent.
- Equal-opportunity employer with a diverse and representative management team.
- Employees recieve fair and competitive compensation plans, offering quality of life benefits such as a 401K program, health and welfare programs, and parental leave.
- Compliant with OSHA safety standards.

Environmental Responsibility

- Recycling program for paper waste created on-site.
- Annual check for water leaks in the plumbing system.
- Installation of LED lightbulbs in all EMR buildings.
- Energy waste reduced by running only essential machines.
- Commitment to recycle / reclaim all factory chemical waste.

30 Years of EM Research

A Message from our President

EM Research has been a proud provider of high performance frequency generation and signal conversion solutions since 1991, and in 2021 we are celebrating our 30th year in business. We value the importance of our client's work in keeping supply chains and high-priority projects running smoothly, which is why we focus on providing the highest quality products to our customers above all else.

EMR products are trusted by industry leaders on a global scale due to our rigorous attention to quality control, our comprehensive customer service, and our dedication to creating both well-established solutions and innovative new products with the best performance.

We strongly believe that our greatest strength is the spirit of partnership we've been able to foster within the RF engineering industry for the past three decades.
Thank you to our team, our business partners, and all of our wonderful customers for making 30 years of innovation possible.

Matt Eiting,
President and VP of Engineering

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