



International Crystal
Manufacturing
CRYSTAL
OSCILLATOR
AND
FILTER
PRODUCTS

QUARTZ CRYSTALS

Quartz Crystal Selection Guide	5-7
Standard Microprocessor Crystals	8
Build A Crystal	9
T38 Micro Miniature "AT Strip" Crystal	10
HC49US/S Resistance Weld Low Profile Crystal	11
HC49U Resistance Weld Crystal	12
HC45U Resistance Weld Miniature Crystal	13
HC35U Resistance Weld Miniature Crystal	14
HC50U Resistance Weld Miniature Crystal	15
HC51U Low Frequency Crystal	16
T26W/T38W Tuning Fork Watch Crystal	17
S53 Micro Miniature Ceramic SMD Crystal	18
S75 Micro Miniature Ceramic SMD Crystal	19
SP94 Miniature SMD Watch Crystals	20
SMD Crystals Tape And Reel Specifications	21

CLOCK OSCILLATORS

Clock Oscillator Selection Guide	23-24
IT1100FSS HCMOS/TTL Clock Oscillator	25
IT1100FRT HCMOS/TTL Clock Oscillator	26
IT1100FRT3S HCMOS/TTL Tri-State Clock Oscillator	27
IT1100FSS3S HCMOS/TTL Tri-State Enable/Disable Oscillator	28
IE1100FRS ECL Oscillator	29
IT1100HRT3S Half Size HCMOS/TTL Tri-State Enable/Disable Oscillator	30
IT1100HSS3S Half Size HCMOS/TTL Tri-State Enable/Disable Oscillator	31
IC1100FRSV2 Voltage Controlled Crystal Oscillators - VCXO	32
ISO1410 Plastic SMD HCMOS/TTL Oscillators	33
ISO7.505A Miniature Ceramic SMD HCMOS/TTL Oscillators	34
Surface Mount OscillatorsTape and Reel Specifications	35
Clock Oscillator General Characteristics	36

TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS (TCXO)

TCXO Selection Guide	37
ITCXO1912/IVCTCXO1912 TCXO/VCTCXO	38
ISTCXO1110 SMDTCXO/VCTCXO	39
ISTCXO2112 SMDTCXO/VCTCXO	40

CRYSTAL FILTERS

Monolithic Crystal Filters	41
Standard Monolithic Crystal Filters	42-43
Surface Mount Packages	44

TECHNICAL DATA

Crystal Data	45
Crystal Oscillator Data	46-47



ORDER FORM



ICM CUSTOMER NUMBER
PO NUMBER

CUSTOMER NAME (PRINT)

STREET ADDRESS (PRINT)

CITY STATE ZIP

PHONE (AREA CODE FIRST) FAX

THIS IS MY HOME ADDRESS THIS IS MY BUSINESS ADDRESS

CHARGE CARD NUMBER EXP. DATE

NAME ON CARD (PRINT)

REMARKS

SIGNATURE

ALL ORDERS MUST BE SIGNED

NOTE: ALL OK RESIDENTS MUST ADD APPLICABLE SALES TAX TO ORDER TOTAL.

ITEM NO.	QUANTITY	ICM CATALOG NUMBER	CHANNEL FREQUENCY (MHz)	CRYSTAL FREQUENCY (MHz)	PRICE EA.	EXTENSION
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					TAX IF APPLICABLE	

IMPORTANT! IF THIS ORDER IS TO BE SENT BY FAX, PLEASE USE BLACK INK.

TOTAL

TERMS AND CONDITIONS OF SALE

A. ICM does not assume responsibility in collecting applicable state use taxes other than Oklahoma and those states with which Oklahoma has a reciprocal agreement. It is assumed that customers will declare and pay said use taxes to their respective state.

B. All sales are cash with order except where previous arrangements have been made for an approved open account.

C. All ICM crystals are custom made to order and are not stock items, therefore cannot be returned for credit and/or refund.

D. ICM crystals are guaranteed against defective materials and workmanship for a year when used in the oscillator circuit and/or equipment for which they were designed, except where harsh treatment or user negligence is the cause of failure.



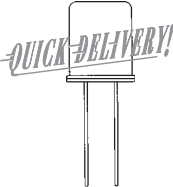
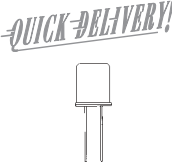
E. A claim for damage in transportation, erroneous count or incorrect product must be made within ten (10) days of receipt of order. Any claim made after this date will not be recognized.

F. Acknowledgments are mailed or faxed for each order, upon receipt please review and advise ICM of any error immediately so corrections can be made.


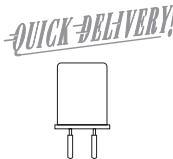
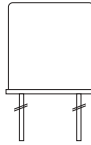
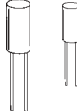


QUARTZ CRYSTAL SELECTION GUIDE

THRU-HOLE CRYSTALS

PRODUCT	T38	HC49US	HC49U	HC45U
				
Frequency Range	3.579545 ~ 70 MHz	3.200 ~ 70 MHz	1.800 ~ 200 MHz	3.579545 ~ 200 MHz
Frequency Tolerance	±50PPM	±30 PPM	±30 PPM	±30 PPM
Frequency Stability	±50PPM	±50 PPM	±50 PPM	±50 PPM
Temperature Range	-10°C ~ +70°C	0°C ~ +70°C	-20°C ~ +70°C	-10°C ~ +60°C
Key Features	<ul style="list-style-type: none"> ✓ Miniature Package ✓ Very Small Footprint ✓ Cost Effective ✓ High Shock Resistance ✓ "AT" Strip 	<ul style="list-style-type: none"> ✓ 3.6mm Profile ✓ Industry Standard ✓ Cost Effective ✓ "AT" Strip 	<ul style="list-style-type: none"> ✓ Low Cost ✓ Industry Standard ✓ Wide Freq. Range ✓ Tighter Tolerances 	<ul style="list-style-type: none"> ✓ Miniature Pkg. ✓ Wide Freq. Range ✓ Tighter Tolerances ✓ Small Footprint ✓ Excellent Aging
CATALOG PAGES	PAGE 10	PAGE 11	PAGE 12	PAGE 13

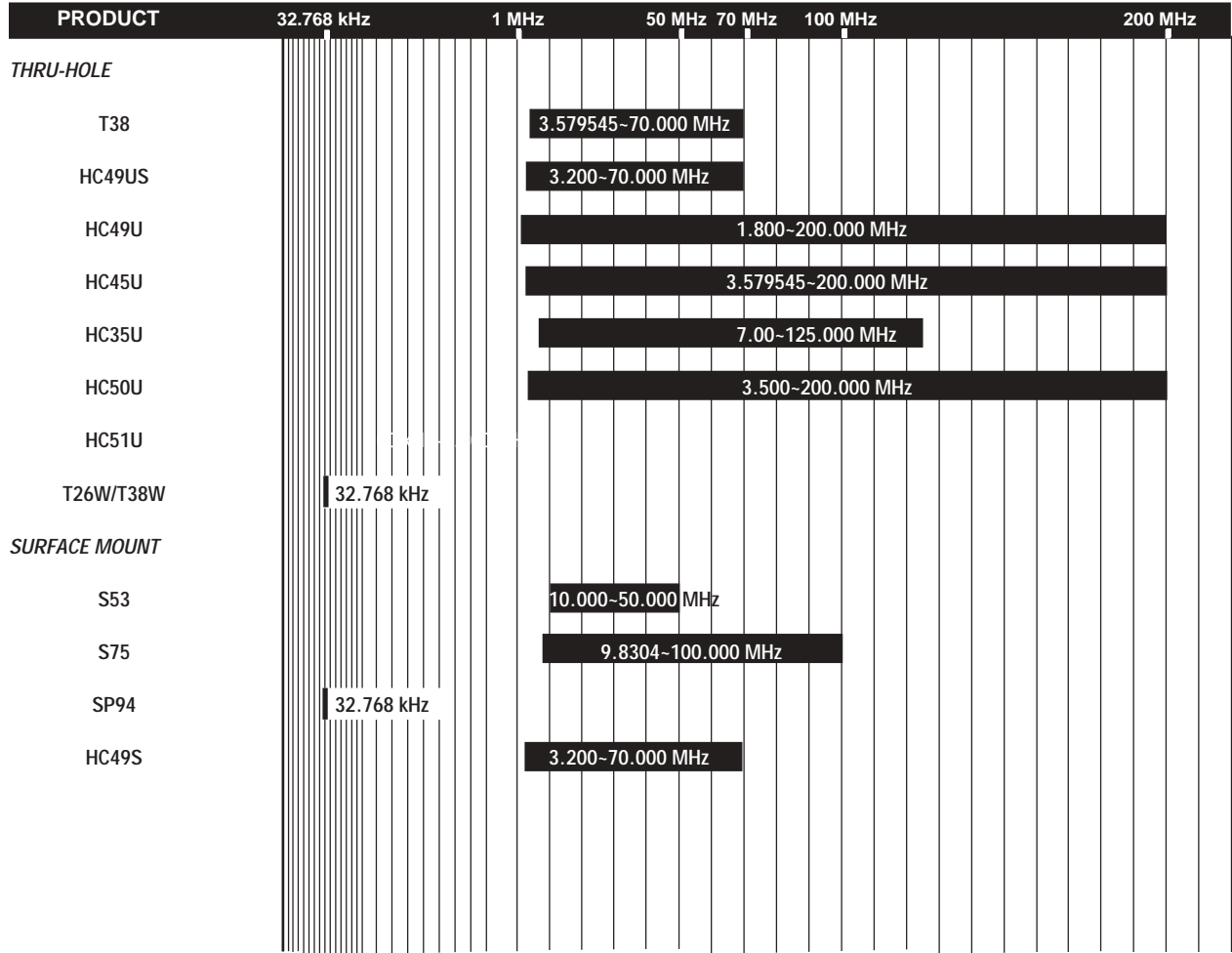
Check with ICM Customer Service for available frequencies.

PRODUCT	HC35/U	HC50/U	HC51/U	T26W/T38W
				
Frequency Range	7.000 ~ 125 MHz	3.500 ~ 200 MHz	100 kHz ~ 4.800 MHz	32.768 kHz
Frequency Tolerance	±30PPM	±30PPM	±50PPM	±20 PPM
Frequency Stability	±50PPM	±50PPM	±100PPM	±0.04 PPM / (Δ°C) ²
Temperature Range	-10°C ~ +60°C	-20°C ~ +70°C	-10°C ~ +60°C	-10°C ~ +60°C
Key Features	<ul style="list-style-type: none"> ✓ Miniature Package ✓ Very Small Footprint ✓ Tighter Tolerances ✓ Low Phase Noise ✓ Extended Temperature Range 	<ul style="list-style-type: none"> ✓ Low Cost ✓ Industry Standard ✓ Third Lead ✓ Wide Freq. Range ✓ Extended Temp. Range 	<ul style="list-style-type: none"> ✓ Low Frequency ✓ Excellent Reliability ✓ Third Lead Option 	<ul style="list-style-type: none"> ✓ Tuning Fork ✓ Miniature Pkgs. ✓ Low Cost ✓ Cold Weld Design ✓ Long Term Stability ✓ Tight Tolerance
CATALOG PAGES	PAGE 14	PAGE 15	PAGE 16	PAGE 17

Check with ICM Customer Service for available frequencies.






FREQUENCY RANGE BY PRODUCT




QUARTZ CRYSTAL SELECTION GUIDE

SURFACE MOUNT CRYSTALS

PRODUCT	S53	S75	
			
Frequency Range	10.000 ~ 50.000 MHz	9.8304 ~ 100 MHz	
Frequency Tolerance	±100 PPM	±50 PPM	
Frequency Stability	±50 PPM	±50 PPM	
Temperature Range	-20°C ~ +70°C	-10°C ~ +60°C	
Key Features	<ul style="list-style-type: none"> ✓ 1.0mm Profile ✓ Wide Freq. Range ✓ Tight Stability Option ✓ "AT" Cut 	<ul style="list-style-type: none"> ✓ 1.1mm Profile ✓ Wide Freq. Range ✓ Tight Stability Option ✓ "AT" Cut 	
CATALOG PAGES Page 18		Page 19	

PRODUCT	SP94	
	<p>BOTTOM VIEW</p> 	
Frequency Range	32.768 kHz	
Frequency Tolerance	±20 PPM	
Frequency Stability	-0.04 PPM / (Δ°C) ²	
Temperature Range	-40°C ~ +85°C	
Key Features	<ul style="list-style-type: none"> ✓ SMD Watch Crystal ✓ Miniature Package ✓ Long Term Stability ✓ 2 Pin Connection <p>Options</p> <ul style="list-style-type: none"> ✓ 2.5mm Profile 	
CATALOG PAGES PAGE 20		

All specifications subject to change without notice.

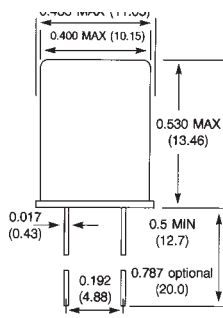
PRODUCT	HC49S	
	<p>BOTTOM VIEW</p> 	
Frequency Range	3.200~70 MHz	
Frequency Tolerance	±30 PPM	
Frequency Stability	±50 PPM	
Temperature Range	0°C ~ +70°C	
Key Features	<ul style="list-style-type: none"> ✓ Cost Effective ✓ "AT" Strip ✓ 4.5 mm Profile 	
CATALOG PAGES PAGE 11		

All specifications subject to change without notice.

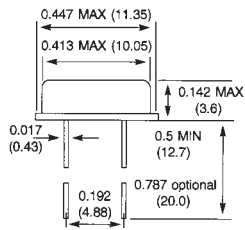


STANDARD MICROPROCESSOR CRYSTALS

HC49U Resistance Weld



HC49US Resistance Weld



SPECIFICATIONS

PARAMETER	HC49U*	HC49US
Frequency Tolerance @ 25°C	±30 PPM	±30 PPM
Frequency Stability over Operating Temperature	±50 PPM	±50 PPM
Operating Temp. Range	-20°C to +70°C	0°C to +70°C

*Optional third lead vinyl sleeves (HC49U only), and mylar spacer
 All specifications subject to change without notice.
 Inch dimensions shall govern
 All dimensions are in inches & parenthetically in millimeters.

FREQUENCY (MHz)	CL	HC49U Part No.	ESR Ω MAX	HC49US Part No.	ESR Ω MAX
1.000 **	SERIES	M49010S	3000		
1.8432	13PF	M49018-13	800		
2.000	20PF	M49020-20	500		
2.097152	20PF	M49021-20	500		
2.4576	32PF	M49024-32	300		
3.579545	18PF	M49036-18	120	M49US036S	200
3.6864	SERIES	M490368S	120	M49US0368S	200
3.6864	20PF	M490368-20	120	M49US0368-20	200
4.000	SERIES	M49040S	100	M49US040S	150
4.000	20PF	M49040-20	100	M49US040-20	150
4.096	20PF	M490496-20	100	M49US0496-20	150
4.194304	12PF	M49041-12	100	M49US041-12	150
4.433619	20PF	M490443-20	70	M49US0443-20	150
4.9152	SERIES	M49049S	55	M49US049S	150
4.9152	20PF	M49049-20	55	M49US049-20	150
5.000	20PF	M4905-20	50		
5.0688	SERIES	M49050S	50		
6.000	SERIES	M49060S	40		
6.000	20PF	M49060-20	40		
6.144	30PF	M49061-30	40		
6.144	20PF	M49061-20	40		
7.3728	SERIES	M49073S	40	M49US073S	80
7.3728	20PF	M49073-20	40	M49US073-20	80
8.000	SERIES	M49080S	35	M49US080S	80
8.000	20PF	M49080-20	35	M49US080-20	80
8.192	SERIES	M49081S	35		
8.192	20PF	M49081-20	35	M49US081-20	80
9.216	SERIES	M49092S	35		
9.8304	SERIES	M49098S	35	M49US098S	60
9.8304	20PF	M49098-20	35	M49US098-20	60
10.000	SERIES	M49100S	30	M49US100S	60
10.000	20PF	M49100-20	30	M49US100-20	60
11.000	SERIES	M4911S	30		
11.000	20PF	M4911-20	30		
11.0592	SERIES	M49115S	30	M49US115S	60
11.0592	20PF	M49115-20	30	M49US115-20	60
12.000	SERIES	M49120S	30	M49US120S	60
12.000	20PF	M49120-20	30	M49US120-20	60
12.288	SERIES	M49128S	30	M49US128S	60
12.288	20PF	M49128-20	30	M49US128-20	60
14.31818	SERIES	M49143S	25	M49US143S	40
14.31818	20PF	M49143-20	25	M49US143-20	40
14.7456	SERIES	M49147S	25	M49US147S	40
14.7456	20PF	M49147-20	25	M49US147-20	40
16.000	SERIES	M49160S	25	M49US160S	40
16.000	20PF	M49160-20	25	M49US160-20	40
18.432	SERIES	M49184S	20		
18.432	2 0PF	M49184-20	20	M49US184-20	40
19.6608	SERIES	M49196S	20		
19.6608	20PF	M49196-20	20	M49US196-20	40
20.000	SERIES	M49200S	20	M49US200S	30
20.000	20PF	M49200-20	20	M49US200-20	30
22.1184	SERIES	M49221S	20	M49US221S	30
22.1184	20PF	M49221-20	20		
24.000	SERIES	M49240S	20	M49US240S	30
24.000	20PF	M49240-20	20	M49US240S-20	30
32.000	SERIES	M49320S***	40		
32.000	20PF	M49320-20***	40		

** Frequency Tolerance = ±1000 PPM, Frequency Stability over -10°C to 60°C = ±1000 PPM (SL Cut)

***3rd Overtone



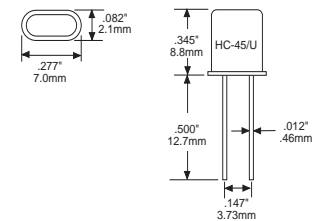
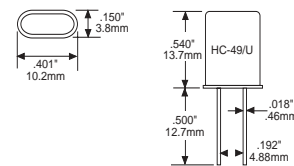
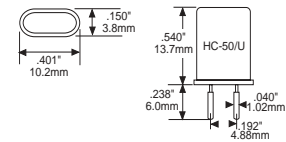
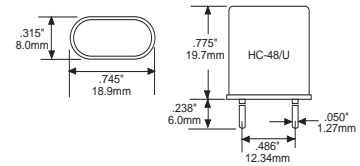
BUILD A CRYSTAL

SAMPLE PART NUMBER:

E	X	4	9	D	G	0	0
---	---	---	---	---	---	---	---

HOLDER STYLE		GRADE		FREQUENCY RANGE		LOAD	
CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION	CODE	DESCRIPTION
48	HC-48/U	H	GOOD	F	4.00-9.999 MHz Fundamental	00	Series Resonant
49	HC-49/U	D	BETTER	G	10.000-19.999 MHz Fundamental		
50	HC-50/U	A	BEST	H	20.000-24.999 MHz Fundamental	10 to 99	Load Capacitance
45	HC-45/U			L	20.000-59.999 MHz 3rd Overtone		In pF
				M	60.000-74.999 MHz 3rd Overtone		

Specifications:	Calibration Tolerance at 25°C and Specified Load	Temperature Tolerance Relative to 25°C from -30°C to +60°C
GOOD	± 50 PPM	± 50 PPM
BETTER	± 20 PPM	± 20 PPM
BEST	± 10 PPM	± 10 PPM



EQUIVALENT RESISTANCE BY FREQUENCY AND HOLDER

Standard Holder Style	Freq. Range in MHz	Mode of Operation	Resistance in OHMS*
HC-48/U	4.000 - 4.999	FUNDAMENTAL	150
HC-48/U	5.000 - 24.999	FUNDAMENTAL	30
HC-49/U, HC-50/U	4.000 - 5.749	FUNDAMENTAL	80
HC-49/U, HC-50/U	5.750 - 24.999	FUNDAMENTAL	30
HC-45/U	7.500 - 24.999	FUNDAMENTAL	30
HC-48/U	20.000 - 74.999	3RD OVERTONE	40
HC-49/U, HC-50/U	20.000 - 74.999	3RD OVERTONE	40
HC-45/U	20.000 - 74.999	3RD OVERTONE	50

* UNLESS OTHERWISE STATED, OUR STANDARD DRIVE LEVEL IS 1MW

SHUNT CAPACITANCE (CO) IS 7pF MAXIMUM.

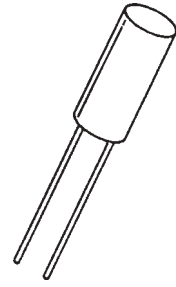


MICRO MINIATURE "AT STRIP" CRYSTAL

T38

FEATURES

- ✓ Very Small Footprint
- ✓ Miniature Package
- ✓ Cost Effective
- ✓ Rugged Cold Weld Design
- ✓ High Shock Resistance

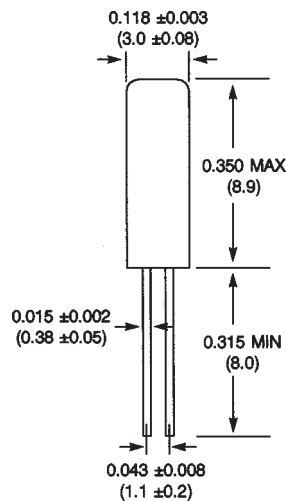


T38 STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		3.579545	70.000	MHz
Frequency Tolerance	Ta = 25°C	-50	+50	PPM
Frequency Stability, ref @ 25°C	Ta = -10°C ~ +70°C	-50	+50	PPM
Temperature Range				°C
Operating (TOPR)		-10	+70	
Storage (TSTG)		-40	+90	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	3.579545 ~ 70.000 MHz		0.1	mW
Aging	Ta = 25°C; per year	-5.0	+5.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
3.579 ~ 4.000	Fundamental	200	9.000 ~ 13.000	Fundamental	60
4.000 ~ 5.000	Fundamental	150	13.000 ~ 20.000	Fundamental	40
5.000 ~ 6.000	Fundamental	120	20.000 ~ 30.000	Fundamental	30
6.000 ~ 7.000	Fundamental	100	30.000 ~ 70.000	3rd OT	100
7.000 ~ 9.000	Fundamental	80			

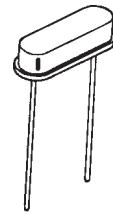
* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.

RESISTANCE WELD LOW PROFILE CRYSTALS

HC49US/S



FEATURES

- ✓ Low Profile
- ✓ Industry Standard
- ✓ Cost Effective
- ✓ "AT Strip"

OPTIONS

- ✓ Surface Mount HC49S
- ✓ Mylar Spacer (Leaded)
- ✓ Tape and Reel (1,000 pcs. STD)

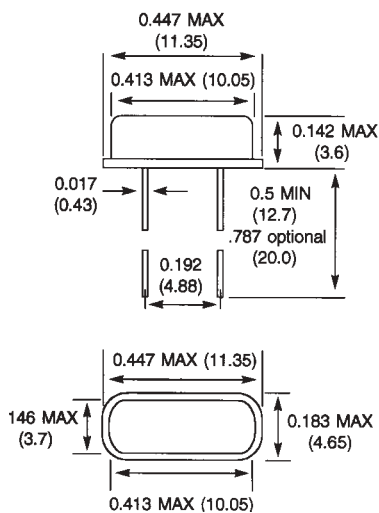
HC49US/S STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		3.200	70.000	MHz
Frequency Tolerance	Ta = 25°C	-30	+30	PPM
Frequency Stability, ref @ 25°C	Ta = 0°C ~ +70°C	-50	+50	PPM
Temperature Range				°C
Operating (TOPR)		0	+70	
Storage (TSTG)		-30	+85	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	3.200 ~ 70.000 MHz		0.5	mW
Aging	Ta = 25°C; per year	-5.0	+5.0	PPM

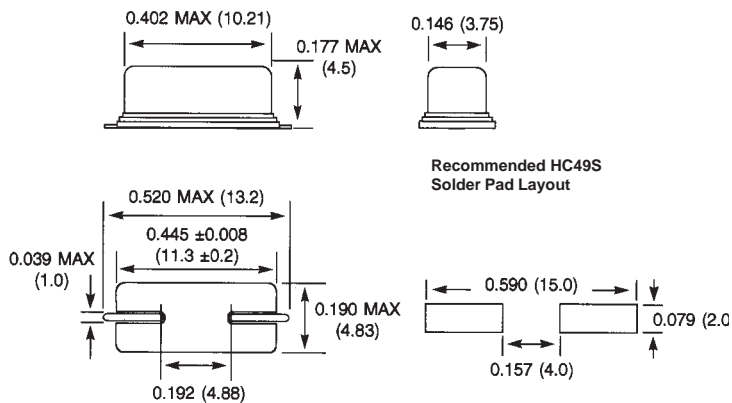
FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
3.200 ~ 3.500	Fundamental	300	7.000 ~ 9.000	Fundamental	80
3.500 ~ 4.000	Fundamental	200	9.000 ~ 13.000	Fundamental	60
4.000 ~ 5.000	Fundamental	150	13.000 ~ 20.000	Fundamental	40
5.000 ~ 6.000	Fundamental	120	20.000 ~ 30.000	Fundamental	30
6.000 ~ 7.000	Fundamental	100	27.000 ~ 70.000	3rd OT	100

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.

HC49US



HC49S



Recommended HC49S Solder Pad Layout

Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



RESISTANCE WELD CRYSTAL

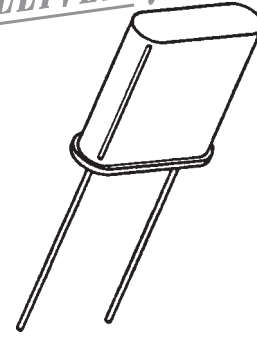
HC49U

FEATURES

- ✓ Industry Standard
- ✓ Low Cost
- ✓ Wide Frequency Range
- ✓ "AT" Cut Crystal
- ✓ Excellent Aging

OPTIONS

- ✓ Tighter Tolerances
- ✓ Extended Temperature Ranges
- ✓ Mylar Spacer
- ✓ Tape and Reel
- ✓ Vinyl Sleeve
- ✓ Third Lead

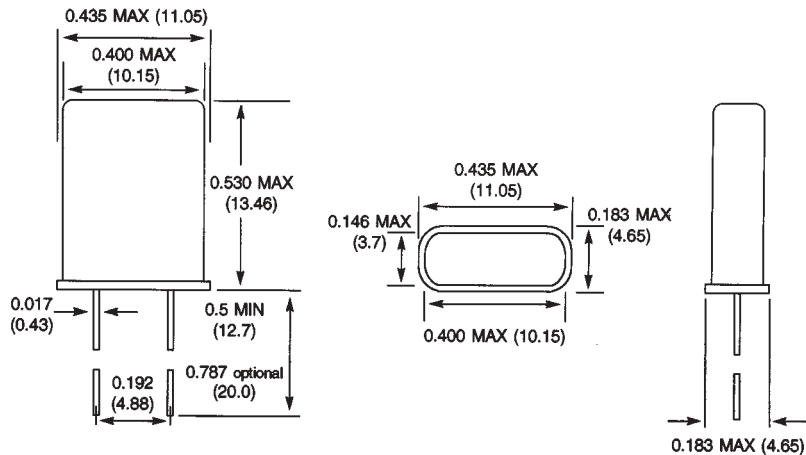
QUICK DELIVERY!

HC49U STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		1.800	200.000	MHz
Frequency Tolerance	Ta = 25°C	-30	+30	PPM
Frequency Stability, ref @ 25°C	Ta = -20°C ~ +70°C	-50	+50	PPM
Temperature Range				
Operating (TOPR)		-20	+70	°C
Storage (TSTG)		-30	+85	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	1.800 ~ 3.000 MHz 3.000 ~ 200.000 MHz		2.0 1.0	mW
Aging	Ta = 25°C; per year	-5.0	+5.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
1.800 ~ 2.000	Fundamental	750	8.000 ~ 10.000	Fundamental	35
2.000 ~ 2.400	Fundamental	500	10.000 ~ 12.500	Fundamental	30
2.400 ~ 3.000	Fundamental	300	12.500 ~ 16.000	Fundamental	25
3.000 ~ 3.200	Fundamental	200	16.000 ~ 25.000	Fundamental	20
3.200 ~ 3.700	Fundamental	120	16.000 ~ 23.000	3rd OT	60
3.700 ~ 4.200	Fundamental	100	23.000 ~ 65.000	3rd OT	40
4.200 ~ 4.900	Fundamental	70	60.000 ~ 110.000	5th OT	80
4.900 ~ 5.000	Fundamental	55	110.000 ~ 200.000	7th OT	120
5.000 ~ 6.000	Fundamental	50			
6.000 ~ 8.000	Fundamental	40			

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



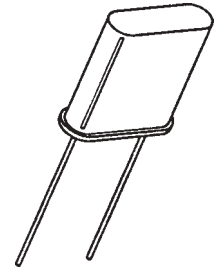
RESISTANCE WELD MINIATURE CRYSTAL

HC45U

FEATURES

- ✓ Low Profile
- ✓ Miniature Package
- ✓ Wide Frequency Range
- ✓ Small Footprint
- ✓ Excellent Aging

QUICK DELIVERY!



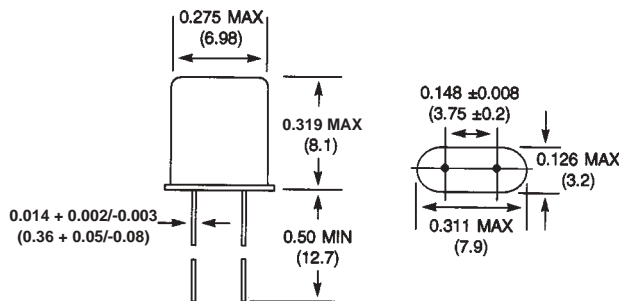
CRYSTALS

HC45U STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		3.579545	200.000	MHz
Frequency Tolerance	Ta = 25°C	-30	+30	PPM
Frequency Stability, ref @ 25°C	Ta=-10°C~+60°C	-50	+50	PPM
Temperature Range				°C
Operating (TOPR)		-10	+60	
Storage (TSTG)		-40	+85	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	3.579 ~ 200.000 MHz		1.0	mW
Aging	Ta = 25°C; per year	-3.0	+3.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
3.579 ~ 4.000	Fundamental	300	10.000 ~ 11.000	Fundamental	60
4.000 ~ 5.000	Fundamental	250	11.000 ~ 27.000	Fundamental	40
5.000 ~ 6.000	Fundamental	180	25.000 ~ 65.000	3rd OT	60
6.000 ~ 7.000	Fundamental	120	60.000 ~ 130.000	5th OT	100
7.000 ~ 8.000	Fundamental	100	130.000 ~ 200.000	7th OT	150
8.000 ~ 10.000	Fundamental	90			

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements. All specifications subject to change without notice.



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



RESISTANCE WELD MINIATURE CRYSTAL

HC35U

FEATURES

- ✓ High Stability
- ✓ Low Phase Noise
- ✓ Superior Shock & Vibration
- ✓ Tighter Tolerances
- ✓ Smaller Mass for Faster Warm-up in Oven Use
- ✓ Extended Temperature Range

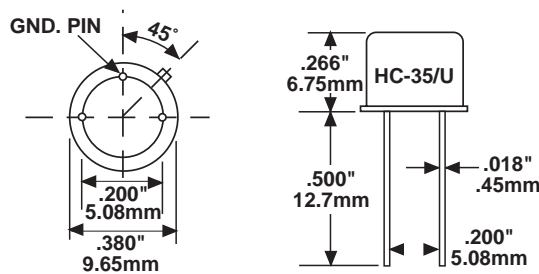
QUICK DELIVERY!

HC35U STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		7.00	125.000	MHz
Frequency Tolerance	Ta = 25°C	-30	+30	PPM
Frequency Stability, ref @ 25°C	Ta = -20°C ~ +70°C	-50	+50	PPM
Temperature Range				°C
Operating (TOPR)		-10	+60	
Storage (TSTG)		-30	+85	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	7.00 ~ 125.000 MHz		1.0	mW
Aging	Ta = 25°C; per year	-5.0	+5.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
7.000 ~ 10.999	Fundamental	30
11.000 ~ 20.000	Fundamental	25
21.000 ~ 61.000	3rd Overtone	40
50.000 ~ 125.000	5th Overtone	60

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.



RESISTANCE WELD MINIATURE CRYSTAL

HC50U

FEATURES

- ✓ Industry Standard
- ✓ Low Cost
- ✓ Wide Frequency Range
- ✓ "AT" Cut Crystal
- ✓ Excellent Aging
- ✓ Plug in Pins

OPTIONS

- ✓ Tighter Tolerances
- ✓ Extended Temperature Ranges
- ✓ Mylar Spacer
- ✓ Tape and Reel
- ✓ Vinyl Sleeve
- ✓ Third Lead



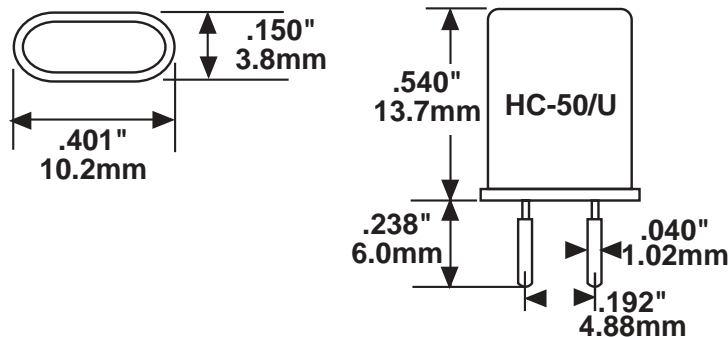
QUICK DELIVERY!

HC50U STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		3.500	200.000	MHz
Frequency Tolerance	Ta = 25°C	-30	+30	PPM
Frequency Stability, ref @ 25°C	Ta = -20°C ~ +70°C	-50	+50	PPM
Temperature Range				
Operating (TOPR)		-20	+70	°C
Storage (TSTG)		-30	+85	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	3.500 ~ 200.000 MHz		1.0	mW
Aging	Ta = 25°C; per year	-5.0	+5.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
3.500 ~ 3.700	Fundamental	120	8.000 ~ 10.000	Fundamental	35
3.700 ~ 4.200	Fundamental	100	10.000 ~ 12.500	Fundamental	30
4.200 ~ 4.900	Fundamental	70	12.500 ~ 16.000	Fundamental	25
4.900 ~ 5.000	Fundamental	55	16.000 ~ 25.000	Fundamental	20
5.000 ~ 6.000	Fundamental	50	16.000 ~ 23.000	3rd OT	60
6.000 ~ 8.000	Fundamental	40	23.000 ~ 65.000	3rd OT	40
			60.000 ~ 110.000	5th OT	80
			110.000 ~ 200.000	7th OT	120

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.

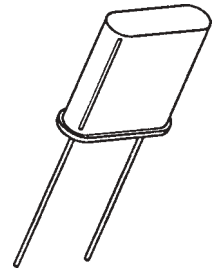


LOW FREQUENCY CRYSTAL

HC51U

FEATURES

- ✓ Excellent Reliability
- ✓ Low Frequency
- ✓ Third Lead Option



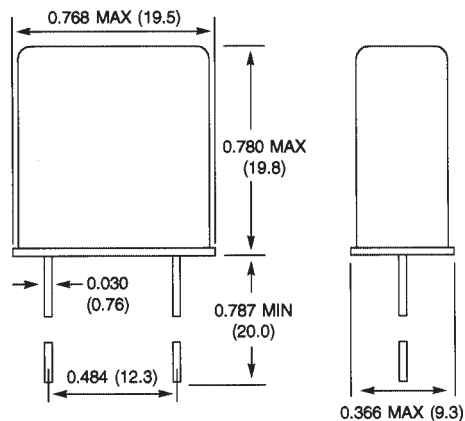
HC51U STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		100 kHz**	4.800	MHz
Frequency Tolerance	Ta = 25°C	-50	+50	PPM
Frequency Stability, ref @ 25°C	Ta = -10°C ~ +60°C	-100	+100	PPM
Temperature Range				°C
Operating (TOPR)		-10	+60	
Storage (TSTG)		-30	+85	
Shunt Capacitance (Co)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	100 kHz ~ 4.800 MHz		2.0	mW
Aging	Ta = 25°C; per year	-7.0	+7.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
0.100 ~ 0.160	Fundamental	5000	2.000 ~ 2.400	Fundamental	300
0.160 ~ 0.500	Fundamental	3000	2.400 ~ 3.000	Fundamental	250
0.500 ~ 0.800	Fundamental	3000	3.000 ~ 3.200	Fundamental	150
0.800 ~ 1.000	Fundamental	2000	3.200 ~ 4.000	Fundamental	120
1.000 ~ 1.250	Fundamental	800	4.000 ~ 4.400	Fundamental	80
1.250 ~ 1.800	Fundamental	500	4.400 ~ 4.800	Fundamental	70
1.800 ~ 2.000	Fundamental	400			

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.

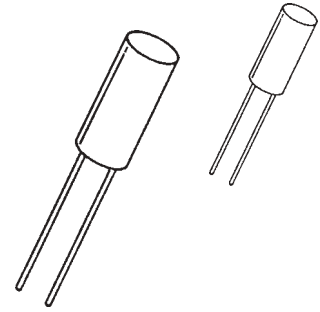
** Call ICM for specifications below 1 MHz



TUNING FORK WATCH CRYSTAL T26W/T38W

FEATURES

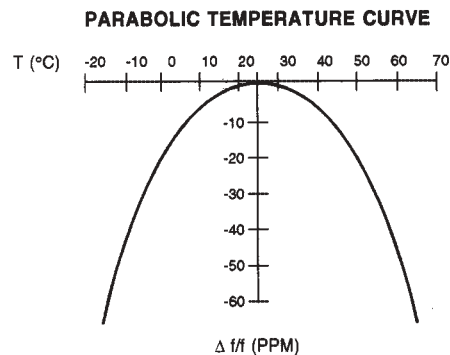
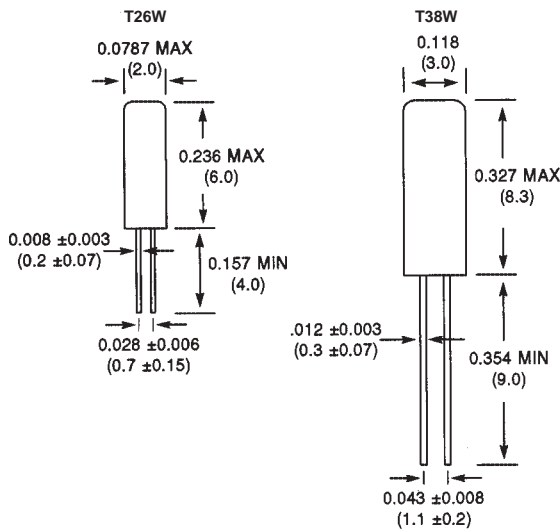
- ✓ Low Cost
- ✓ Miniature Packages
- ✓ Tight Tolerance
- ✓ Cold Weld Design
- ✓ Long Term Stability



T26W/T38W STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	T26W		T38W		UNITS
		MIN.	MAX.	MIN.	MAX.	
Frequency	32.768 kHz					
Frequency Tolerance	Ta = 25°C, CL=12.5pF	-20	+20	-20	+20	PPM
Frequency Stability	(K) Temperature Coefficient		-0.04		-0.04	PPM / (Δ°C) ²
Temperature Range						°C
Turnover (To)		+20	+30	+20	+30	
Operating (TOPR)		-10	+60	-10	+60	
Storage (TSTG)		-20	+70	-20	+70	
Equivalent Series Resistance (ESR)			50		35	kΩ
Insulation Resistance	100 VDC	500		500		MΩ
Drive Level			1.0		1.0	μW
Aging	Ta = 25°C; per year	-3.0	+3.0	-3.0	+3.0	PPM

All specifications subject to change without notice.



To determine frequency stability, use parabolic curvature
 For example: What is stability at 45°C?

- 1) Change in T (°C) = 45 - 25 = 20°C
- 2) Change in frequency = -0.04 PPM * (ΔT)²
 = -0.04 PPM * (20)²
 = -16.0 PPM

Inch dimensions shall govern.
 All dimensions are in inches & parenthetically in millimeters.

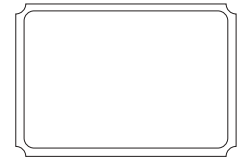


MICRO MINIATURE CERAMIC SMD CRYSTAL

S53

FEATURES

- ✓ Tight Stability Option
- ✓ Tight Tolerance Option
- ✓ Low Profile
- ✓ Wide Frequency Range
- ✓ "AT" Cut Crystal Blank
- ✓ Tape and Reel (3,000 pcs. STD)

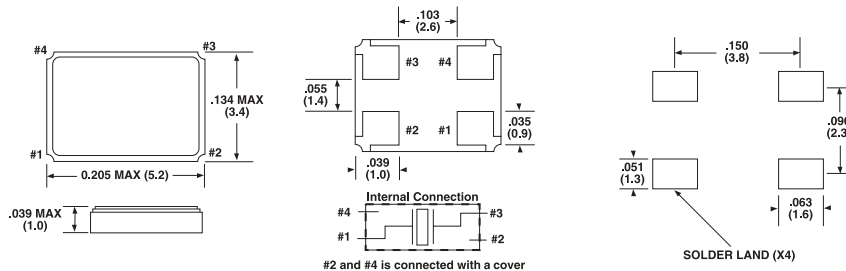


S53 STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		10.000	50.000	MHz
Frequency Tolerance	Ta = 25°C	- 50	+ 50	PPM
Frequency Stability, ref @ 25°C	Ta = -20°C ~ +70°C	- 100	+ 100	PPM
Temperature Range				°C
Operating (TOPR)		-20	+70	
Storage (TSTG)		-40	+90	
Shunt Capacitance (CO)			5.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF(18pF Standard)
Drive Level	10.000 ~ 50.000 MHz		10.0	μW
Aging	Ta = 25°C: per year	-5.0	+5.0	PPM

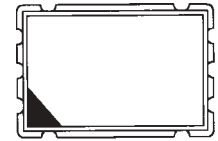
FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
10,000 ~ 15,999	Fundamental	60	16,000 ~ 50,000	Fundamental	50

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements.
All specifications subject to change without notice.



MICRO MINIATURE CERAMIC SMD CRYSTAL

S75



FEATURES

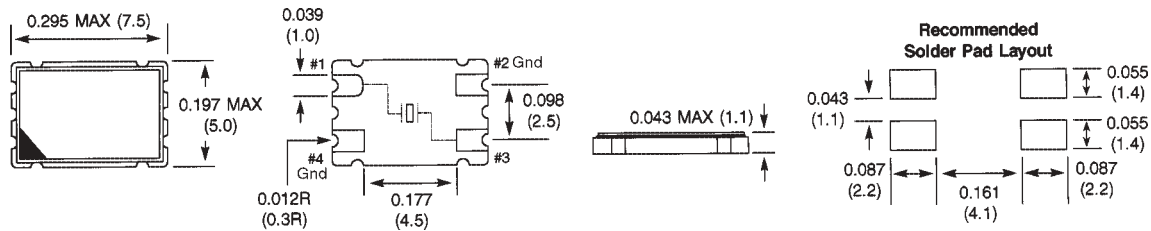
- ✓ Tight Stability Option
- ✓ Tight Tolerance Option
- ✓ Low Profile
- ✓ Wide Frequency Range
- ✓ "AT" Cut Crystal Blank
- ✓ Tape and Reel (3,000 pcs. STD)

S75 STANDARD SPECIFICATIONS*

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		9.8304	100.000	MHz
Frequency Tolerance	Ta = 25°C	- 50	+ 50	PPM
Frequency Stability, ref @ 25°C	Ta = -10°C ~ +60°C	- 50	+ 50	PPM
Temperature Range				°C
Operating (TOPR)		-10	+60	
Storage (TSTG)		-30	+85	
Shunt Capacitance (CO)			7.0	pF
Load Capacitance (CL)	Customer Specified	10.0	Series	pF
Drive Level	9.8304 ~ 100.000 MHz		0.5	mW
Aging	Ta = 25°C; per year	-5.0	+5.0	PPM

FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω	FREQUENCY RANGE (MHz)	OPERATIONAL MODE	MAX ESR Ω
9.8304 ~ 16.000	Fundamental	60	28.000 ~ 84.000	3rd OT	60
16.000 ~ 32.000	Fundamental	40	84.000 ~ 100.000	5th OT	80

* Other tolerances, stabilities & operating temperature ranges available. Call us for specific requirements. All specifications subject to change without notice.



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



MINIATURE SMD TUNING FORK WATCH CRYSTAL

SP94



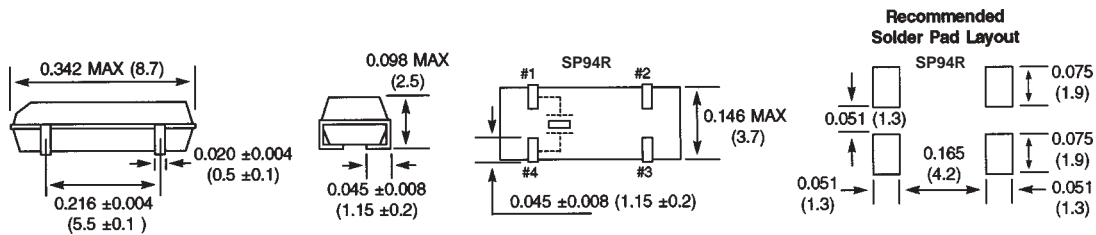
FEATURES

- ✓ Long Term Stability
- ✓ 2.5mm Height
- ✓ Miniature Package
- ✓ Two Pin Connection Types
- ✓ Tape and Reel (3,000 pcs. STD)

SP94 STANDARD SPECIFICATIONS

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency	32.768 kHz			
Frequency Tolerance	Ta = 25°C, CL=12.5 pF	-20	+20	PPM
Frequency Stability	Temperature Coefficient		-0.04	PPM / (Δ°C) ²
Temperature Range				°C
Turnover (To)		+20	+30	
Operating (TOPR)		-40	+85	
Storage (TSTG)		-55	+125	
Equivalent Series Resistance (RS)			60.0	kΩ
Insulation Resistance		100		MΩ
Drive Level			1.0	μW
Aging	Ta = 25°C; per year	-3.0	+3.0	PPM

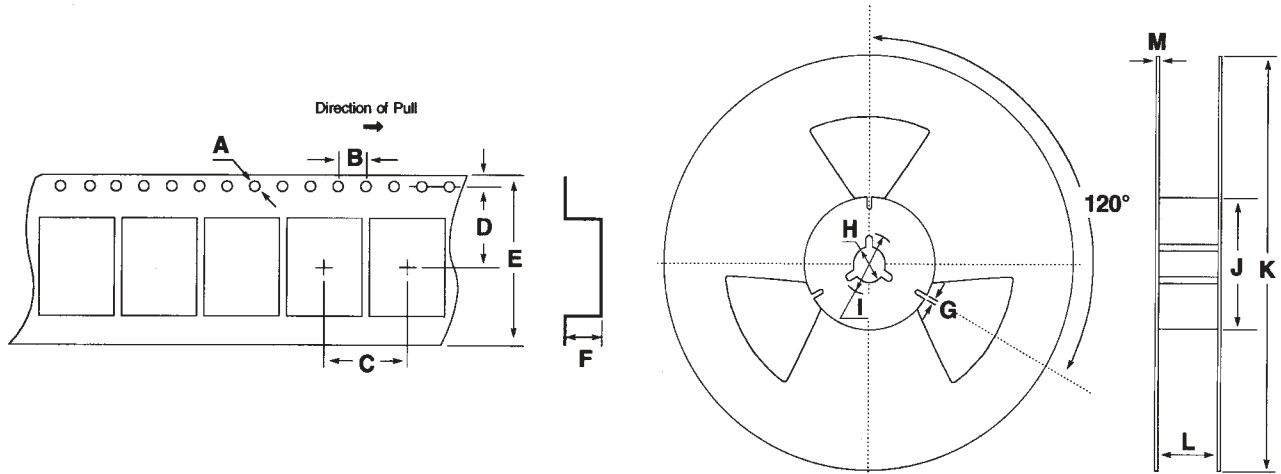
All specifications subject to change without notice.



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



SURFACE MOUNT CRYSTALS TAPE AND REEL SPECIFICATIONS



TAPE SPECIFICATIONS (Millimeters)

MODEL	A	B	C	D	E	F	STD. QTY*
S75	Ø1.5	4.0	8.0	7.5	16.0	1.7	3,000
SP94	Ø1.5	4.0	8.0	7.5	16.0	2.7	3,000
HC49S	Ø1.5	4.0	12.0	11.5	24.0	4.8	1,000

REEL SPECIFICATIONS (Millimeters)

MODEL	G	H	I	J	K	L	M
S75	2.0	Ø13	Ø21	Ø80	Ø250	17.5	2.0
SP94	2.0	Ø13	Ø21	Ø50	Ø330	16.4	2.0
HC49S	2.0	Ø13	Ø21	Ø80	Ø330	25.5	2.0

* Standard reel quantity.

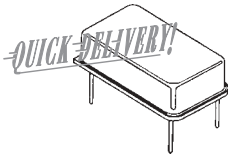
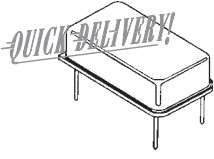

All tape and reel specifications are specified in millimeters.

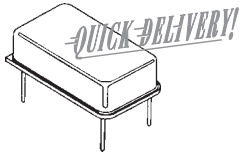
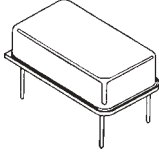
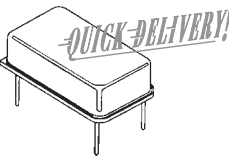
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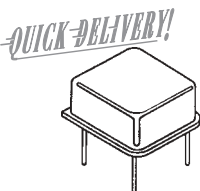
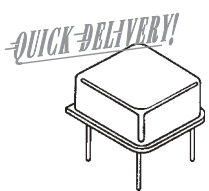


CLOCK OSCILLATOR SELECTION GUIDE

THRU-HOLE OSCILLATORS

PRODUCT	IT1100FSS	IT1100FRT	IT1100FRT3S
			
Frequency Range	0.032-160.000 MHz	1.800-80.000 MHz	1.800-80.000 MHz
Frequency Stability	±100 PPM	±100 PPM	±100 PPM
Temperature Range	0°C ~ +70°C	-10°C ~ +70°C	-10°C ~ +70°C
Key Features	<ul style="list-style-type: none"> ✓ Industry Standard ✓ Low Cost ✓ Drives Full 10 TTL Load ✓ Wide Frequency Range ✓ Rugged Resistance Weld 	<ul style="list-style-type: none"> ✓ 45/55 Symmetry up to 50 MHz ✓ Fast Rise/Fall Times ✓ -40°C to 85°C Option ✓ Low Current Consumption 	<ul style="list-style-type: none"> ✓ High Frequency TTL ✓ Fast Rise/Fall Times ✓ 45/55 Symmetry (1.8 ~ 80 MHz) ✓ Tri-state Enable/Disable
CATALOG PAGES	PAGE 25	PAGE 26	PAGE 27

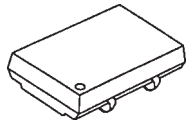

PRODUCT	IT1100FSS3S	IE1100FRS	IC1100FRSV2
			
Frequency Range	0.032-160.000 MHz	30.000-200.000 MHz	.032-160.000 MHz
Frequency Stability	±100 PPM	±100 PPM	±100 PPM
Temperature Range	0°C ~ +70°C	-10°C ~ +70°C	0°C ~ +70°C
Key Features	<ul style="list-style-type: none"> ✓ HCMOS/TTL ✓ Wide Frequency Range ✓ Tri-state Enable/Disable 	<ul style="list-style-type: none"> ✓ High Frequency ECL ✓ 10kh Logic Output ✓ Low Noise 	<ul style="list-style-type: none"> ✓ Low Power Consumption ✓ Tight Stabilities ✓ Rugged Resistance Weld ✓ Pullability
CATALOG PAGES	PAGE 28	PAGE 29	PAGE 32

PRODUCT	IT1100HRT3S	IT1100HSS3S
		
Frequency Range	1.8000- 80.000 MHz	0.032-100.000 MHz
Frequency Stability	±100 PPM	±100 PPM
Temperature Range	-10°C ~ +70°C	0°C ~ +70°C
Key Features	<ul style="list-style-type: none"> ✓ 8 Pin Dip ✓ 15pF HCMOS Load ✓ 10TTL Fanout ✓ Tri-state Enable/Disable ✓ Fast Rise Fall Times 	<ul style="list-style-type: none"> ✓ 8 Pin Dip ✓ 15pF HCMOS Load ✓ 10TTL Fanout ✓ Low Cost ✓ Tri-state Enable/Disable
CATALOG PAGES	PAGE 30	PAGE 31



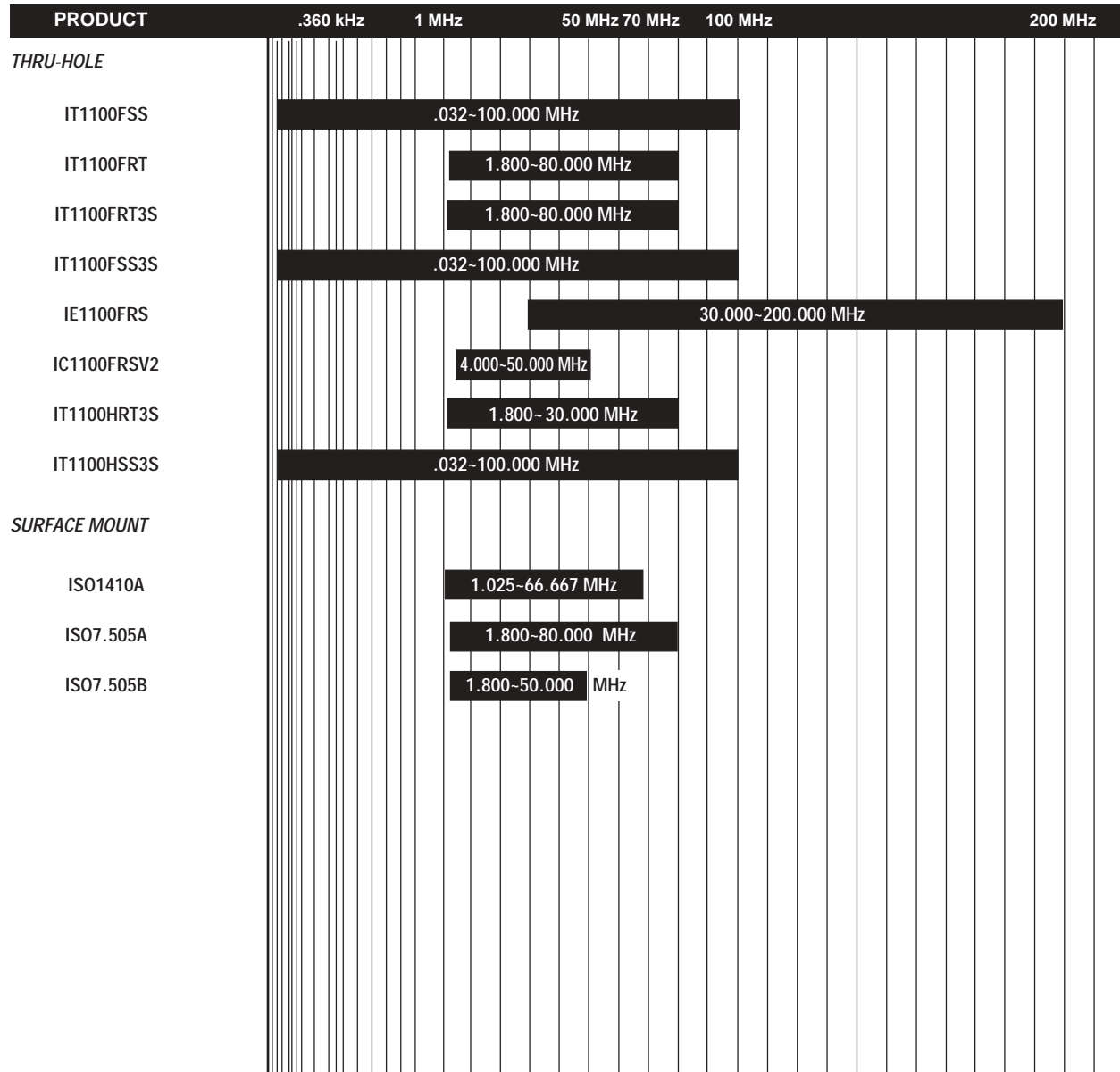
CLOCK OSCILLATOR SELECTION GUIDE

SURFACE MOUNT OSCILLATORS

PRODUCT	ISO1410	ISO7.505A/B
		
Freq. Range	1.025-66.667 MHz	SO7.505A 1.800-80.000 MHz ISO7.505B 1.800-50.000 MHz
Freq. Stability	±100 PPM -10 ~ +70°C ±200 PPM -40 ~ +85°C	±100 PPM
Temp. Range	-10°C ~ +70°C	-10°C ~ +70°C -40°C ~ +85°C Option
Key Features	<ul style="list-style-type: none"> ✓ Extended Temp. Range ✓ Solderable ~ 260°C for 10 sec. ✓ Tape and Reel 	<ul style="list-style-type: none"> ✓ Miniature Package ✓ Tri-State Enable/Disable ✓ Available -40° ~ +85°C ✓ 3000 G Shock Resistance ✓ Tape and Reel

CATALOG PAGES **PAGE 31** **PAGE 33**

FREQUENCY RANGE BY PRODUCT



TTL/HCMOS CLOCK OSCILLATOR

IT1100FSS

FEATURES

- ✓ Low Cost
- ✓ Industry Standard
- ✓ Wide Frequency Range
- ✓ Rugged Resistance Weld
- ✓ Drives Full 10 TTL Load
- ✓ Optional +3.3 VDC Supply

PART NUMBER SELECTION

Frequency Stability	Part Number
±100 PPM (STD)	IT1100FSS
±50PPM	IT1150FSS
±25PPM	IT1125FSS



QUICK DELIVERY!

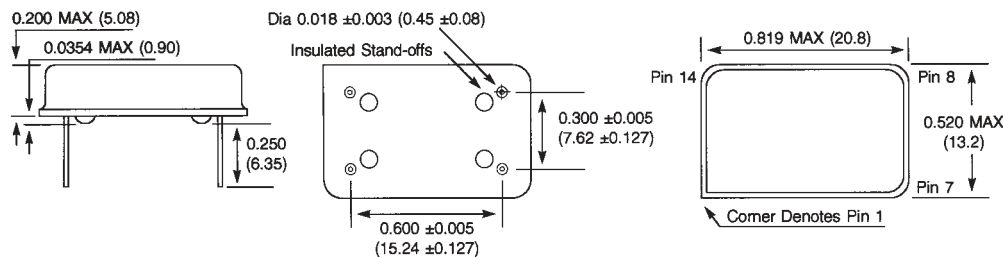
OSCILLATORS

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, RL = 400Ω, CL = 15pF)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			0.032	160.000	MHz
Frequency Stability	0.032 ~ 160.000	All Conditions*	-100	+100	PPM
Temperature Range	0.032 ~ 160.000				
Operating (TOPR)			0	+70	°C
Storage (TSTG)			-55	+125	
Supply Voltage (VDD)	0.032 ~ 160.000		+4.5	+5.5	V
Input Current (IDD)	0.032 ~ 160.000			45	mA
Output Symmetry	0.032 ~ 160.000		40	60	%
Rise Time (TR)	0.032 ~ 160.000			6	nS
Fall Time (TF)	0.032 ~ 160.000			6	
Output Voltage (VOL)	0.032 ~ 160.000			0.5	V
(VOH)				4.5	
Output Load	0.032 ~ 160.000	TTL Load		10	TTL
		HCMOS Load		15	pF

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration. See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



TTL/HCMOS CLOCK OSCILLATOR

IT1100FRT

FEATURES

- ✓ Fast Rise/Fall Times
- ✓ 45/55% Symmetry up to 50 MHz
- ✓ Low Current Consumption
- ✓ Optional +3.3 VDC Supply

PART NUMBER SELECTION

Frequency Stability	Part Number
±100 PPM (STD -10°C-70°C)	IT1100FRT
±50 PPM	IT1150FRT
±25 PPM	IT1125FRT

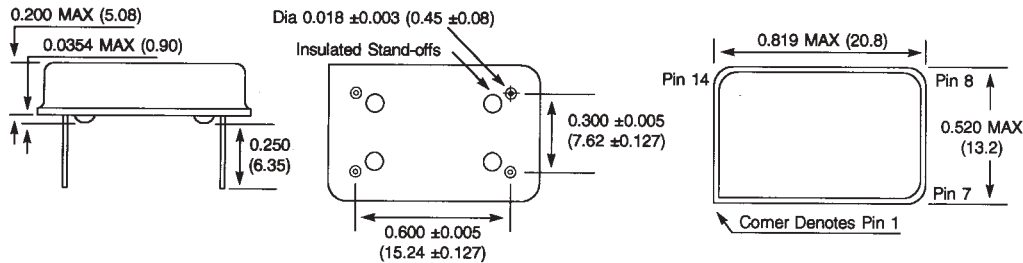


QUICK DELIVERY!

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, RL = noted below, CL = 15pF)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			1.800	80.000	MHz
Frequency Stability	1.800 - 80.000	All Conditions*	-100	+100	PPM
Temperature Range Operating (TOPR) Storage (TSTG)	1.800 - 80.000		-10 -55	+70 +125	°C
Supply Voltage (VDD)	1.800 - 80.000		+4.5	+5.5	V
Input Current (IDD)	1.800 - 80.000			45	mA
Output Symmetry	1.800 - 80.000	1.4 V Level	45	55	%
Rise Time (TR)	1.800 - 80.000	0.5 V to 4.5 V		6	nS
Fall Time (TF)		4.5 V to 0.5 V		6	
Output Voltage (VOL)	1.800 - 80.000			0.5	V
(VOH)				4.5	
Output Load	1.800 - 80.000	TTL Load HCMOS Load		10 15	TTL pF

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration
See page 35 for environmental/mechanical specifications, test circuits, and output waveform.
All specifications subject to change without notice.



Pin Connections
#1 N.C. #8 Output
#7 GND (Case) #14 +5 VDC

Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



TTL/HCMOS TRI-STATE HIGH FREQUENCY CLOCK OSCILLATOR IT1100FRT3S

FEATURES

- ✓ Fast Rise/Fall Times
- ✓ High Frequency TTL
- ✓ Tri-state Enable/Disable
- ✓ 45/55 Symmetry(1.8 ~ 80 MHz)
- ✓ Optional +3.3 VDC Supply

PART NUMBER SELECTION

Frequency Stability	Part Number
±100 PPM	IT1100FRT3S
±50 PPM	IT1150FRT3S
±25PPM (to 50 MHz)	IT1125FRT3S



QUICK DELIVERY!

OSCILLATORS

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, RL = 400Ω)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (FO)			1.800	80.000	MHz
Frequency Stability	1.800 ~ 80.000	All Conditions*	-100	+100	PPM
Temperature	1.800 ~ 80.000				
Operating (TOPR)			-10	+70	°C
Storage (TSTG)			-55	+125	
Supply Voltage (VDD)	1.800 ~ 80.000		+4.5	+5.5	V
Input Current (IDD)	1.800 ~ 80.000			45	mA
Output Symmetry	1.800 ~ 80.000	1.4 V Level	45	55	%
Rise Time (TR)	1.800 ~ 80.000	0.5 V to 4.5 V		6	nS
Fall Time (TF)		4.5 V to 0.5 V		6	
Output Voltage (VOL) (VOH)	1.800 ~ 80.000			0.5 4.5	V
Output Load	1.800 ~ 80.000	TTL Load HCMOS Load		10 15	TTL pF

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

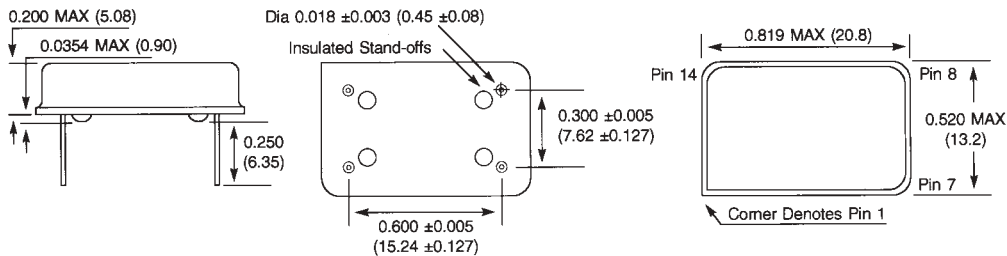
***An internal pullup resistor from pin 1 to pin 14 allows active output if pin 1 is left open.

See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.

ENABLE / DISABLE FUNCTION**

INH (Pin 1)	OUTPUT (Pin 8)
OPEN ***	ACTIVE
'1' Level VIH ≥ 2.2 V	ACTIVE
'0' Level VIL ≥ 0.8 V	High Z



Pin Connections
 #1 E/D ** #8 Output
 #7 GND (Case) #14 +5VDC

Inch dimensions shall govern.
 All dimensions are in inches &
 parenthetically in millimeters.



TTL/HCMOS TRI-STATE OSCILLATOR

IT1100FSS3S

FEATURES

- ✓ HCMOS/TTL
- ✓ Wide Frequency Range
- ✓ Tri-state Enable/Disable
- ✓ Industry Standard Footprint
- ✓ Grounded metal cover reduces EMI
- ✓ Internal Bypass Capacitors - no external components required
- ✓ Optional +3.3 VDC Supply

PART NUMBER SELECTION

Frequency Stability	Part Number
±100 PPM	IT1100FSS3S
±50 PPM	IT1150FSS3S
±25PPM	IT1125FSS3S



QUICK DELIVERY!

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, CL = Max load)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			0.032	160.000	MHz
Frequency Stability	0.032 ~ 160.000	All Conditions	-100	+100	PPM
Temperature Range					
Operating (TOPR)	0.032 ~ 160.000		0	+70	°C
Storage (TSTG)			-55	+125	
Supply Voltage (VDD)	0.032 ~ 160.000		+4.5	+5.5	V
Input Current (IDD)	0.032 ~ 160.000			45	mA
Output Symmetry	0.032 ~ 160.000	2.5V	40	60	%
Rise Time (TR)	0.032 ~ 160.000	0.5V ~ 4.5V		6	nS
Fall Time (TF)	0.032 ~ 160.000	4.5V ~ 0.5V		6	
Output Voltage (VOL)	0.032 ~ 160.000			0.5	V
(VOH)				4.5	
Output Load	0.032 ~ 160.000	TTL Load		10	TTL
		HCMOS Load		15	pF

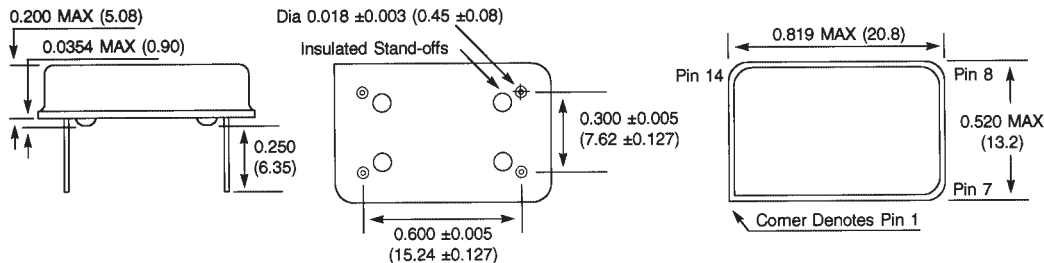
***An internal pullup resistor from pin 1 to pin 14 allows active output if pin 1 is floating.

See page 35 or environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.

ENABLE / DISABLE FUNCTION**

INH (Pin 1)	OUTPUT (Pin 8)
N.C. ***	ACTIVE
VIH ≤ 2.0 V	ACTIVE
VIL ≥ 0.8 V	High Z



Pin Connections
#1 E/D or N.C.** #8 Output
#7 GND (Case) #14 VDD

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Inch dimensions shall govern.

All dimensions are in inches & parenthetically in millimeters.



14 PIN DIP ECL OSCILLATOR IE1100FRS



FEATURES

- ✓ 10 KH Logic Output
- ✓ High Frequency Range
- ✓ Low Noise

OPTIONS

- ✓ Various Pin Connections
- ✓ Complementary Output
- ✓ ±50PPM (IE1150FRS Series)
- ±25PPM (IE1125FRS Series)

ELECTRICAL CHARACTERISTICS (Ta = -10~70°C, VEE = 5.2 V ±5%** , VTT = 2.0 V** RT=50Ω**)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			30.000	200.000	MHz
Frequency Stability	30.000 ~ 200.000	All Conditions*	-100	+100	PPM
Temperature Range					
Operating (TOPR)			-10	+70	°C
Storage (TSTG)			-55	+125	
Supply Voltage (VEE)			-5.46	-4.94	V**
Input Current (IDD)	30.000 ~ 170.000			40	mA
	170.000 ~ 200.000	NOE, NOF, COE, COF		50	
		NOE, NOF, COE, COF		50	
		NOE, NOF, COE, COF		60	
Output Symmetry	30.000 ~ 200.000	50% Vp-p Level	40	60	%
Rise Time (TR)	30.000 ~ 170.000	20% Vp-p ~ 80% Vp-p Level		2.0	nS
	170.000 ~ 200.000			1.5	
Fall Time (TF)	30.000 ~ 170.000	80% Vp-p ~ 20% Vp-p Level		2.0	
	170.000 ~ 200.000			1.5	
Output Voltage (VOL)	30.000 ~ 200.000	'0' Logic Level	-1.95	-1.60	V
		NOE, NOF, COE, COF	+3.05	+3.42	
(VOH)	30.000 ~ 200.000	'1' Logic Level	-1.00	-0.75	
		NOE, NOF, COE, COF	+4.00	+4.45	
Output Load	30.000 ~ 200.000	ECL Load		5	Gates
Overlap Time	30.000 ~ 200.000	50% Vp-p (Complementary only)		0.5	nS
Start-up Time (Ts)	30.000 ~ 200.000			10	mS

PART NUMBER SELECTION / PIN CONNECTIONS

Single Output		Pull Up/Down			Complementary Output				Pull Up/Down		
Part#	Pin 1	Pin 7	Pin 8	Pin 14	Resistor	Part#	Pin 1	Pin 7	Pin 8	Pin 14	Resistor
IE1100FRSNOA	NC	GND	OUTPUT	-5.2V	Down [a]	IE1100FRSCOA	OUTPUT 1	GND	OUTPUT 2	-5.2V	Down [a]
IE1100FRSNOB	NC	GND	OUTPUT	-5.2V	None	IE1100FRSCOB	OUTPUT 1	GND	OUTPUT 2	-5.2V	None
IE1100FRSNOC	NC	-5.2V	OUTPUT	GND	Down [a]	IE1100FRSCOC	OUTPUT 1	-5.2V	OUTPUT 2	GND	Down [a]
IE1100FRSNOD	NC	-5.2V	OUTPUT	GND	None	IE1100FRSCOD	OUTPUT 1	-5.2V	OUTPUT 2	GND	None
IE1100FRSNOE	NC	GND	OUTPUT	+5.0V	Up [a]	IE1100FRSCOE	OUTPUT 1	GND	OUTPUT 2	+5.0V	Up [a]
IE1100FRSNOF	NC	GND	OUTPUT	+5.0V	None	IE1100FRSCOF	OUTPUT 1	GND	OUTPUT 2	+5.0V	None

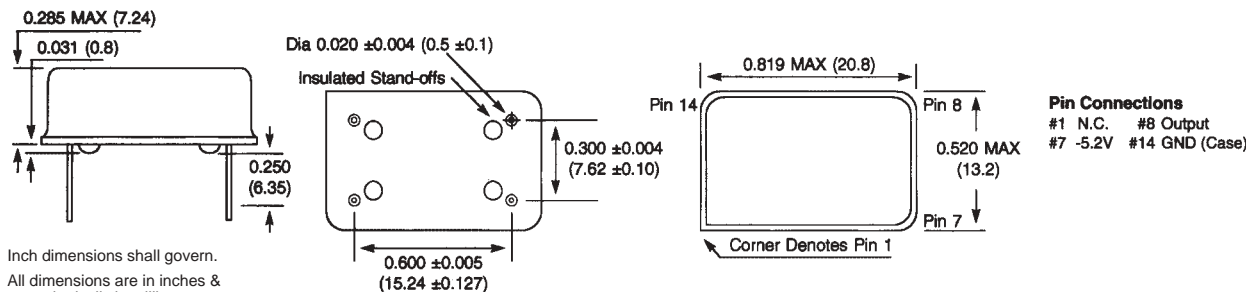
* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

[a] up to 1 70MHZ

** IE1100FRSNOF, IE1100FRSNOE VCC = 5.0 V ±0.25 V. Consult factory for test circuitry

See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.



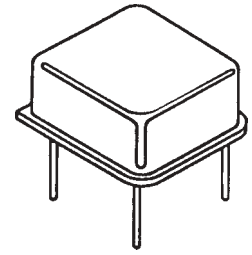
HALF SIZE TTL/HCMOS TRI-STATE ENABLE/DISABLE OSCILLATOR IT1100HRT3S

FEATURES

- ✓ 10 TTL Fanout
- ✓ 8 Pin Dip
- ✓ 15 pF HCMOS Load
- ✓ Tri-state Enable/Disable
- ✓ Fast Rise/Fall Times
- ✓ 45/55 Symmetry (To 80 MHz)
- ✓ Optional +3.3 VDC Supply

PART NUMBER SELECTION

Frequency Stability	Part Number
±100 PPM	IT1100HRT3S
±50 PPM	IT1150HRT3S
±25PPM (up to 50 MHz)	IT1125HRT3S



QUICK DELIVERY!

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, CL = 15pF)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			1.800	80.000	MHz
Frequency Stability	1.800 ~ 80.000	All Conditions *	-100	+100	PPM
Temperature Range Operating (TOPR) Storage (TSTG)	1.800 ~ 80.000		-10 -55	+70 +125	°C
Supply Voltage (VDD)	1.800 ~ 80.000		+4.5	+5.5	V
Input Current (IDD)	1.800 ~ 80.000			45	mA
Output Symmetry	1.800 ~ 80.000	1.4V Level	45	55	%
Rise Time (TR) Fall Time (TF)	1.800 ~ 80.000	0.5V ~ 4.5V 4.5V ~ 0.5V		6	nS
Output Voltage (VOL) (VOH)	1.800 ~ 80.000			0.5 4.5	V
Output Load	1.800 ~ 80.000	TTL HCMOS		10 15	TTL pF

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

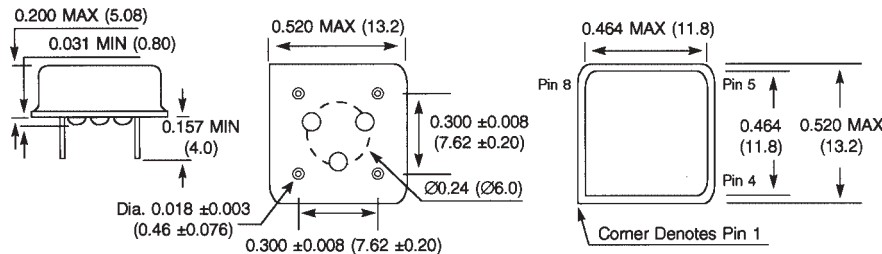
**An internal pullup resistor from pin 1 to pin 8 allows active output if pin 1 is left open.

See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.

ENABLE / DISABLE FUNCTION**

ENABLE / DISABLE FUNCTION**	OUTPUT (Pin 5)
INH (Pin 1)	OUTPUT (Pin 5)
OPEN ***	ACTIVE
'1' Level VIH ≤ 2.2 V	ACTIVE
'0' Level VIL ≥ 0.8 V	High Z



Pin Connections

- #1 E/D**
- #4 GND (Case)
- #5 Output
- #8 +5Vdc

Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



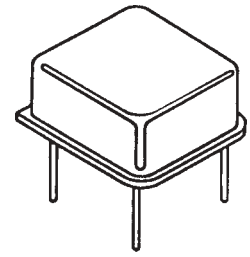
HALF SIZE TTL/HCMOS TRI-STATE ENABLE/DISABLE OSCILLATOR IT1100HSS3S

FEATURES

- ✓ 15pF HCMOS Load
- ✓ Low Cost
- ✓ 10TTL Loads
- ✓ 8 Pin Dip
- ✓ Tri-state Enable/Disable
- ✓ Optional +3.3 VDC Supply

PART NUMBER SELECTION

Frequency Stability	Part Number
±100 PPM	IT1100HSS3S
±50 PPM	IT1150HSS3S
±25PPM	IT1125HSS3S



QUICK DELIVERY!

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, CL = 15pF)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			0.032	100.000	MHz
Frequency Stability	0.032 ~ 100.000	All Conditions*	-100	+100	PPM
Temperature Range					
Operating (TOPR)			0	+70	°C
Storage (TSTG)			-55	+125	
Supply Voltage (VDD)			+4.5	+5.5	V
Input Current (IDD)	0.032 ~ 100.000			45	mA
Output Symmetry	0.032 ~ 100.000	2.5V	40	60	%
Rise Time (TR)	0.032 ~ 100.000	0.5V ~ 4.5V		6	nS
Fall Time (TF)	0.032 ~ 100.000	4.5V ~ 0.5V		6	
Output Voltage (VOL) (VOH)	0.032 ~ 100.000			0.5 4.5	V
Output Load	0.032 ~ 100.000	TTL HCMOS		10 15	TTL pF

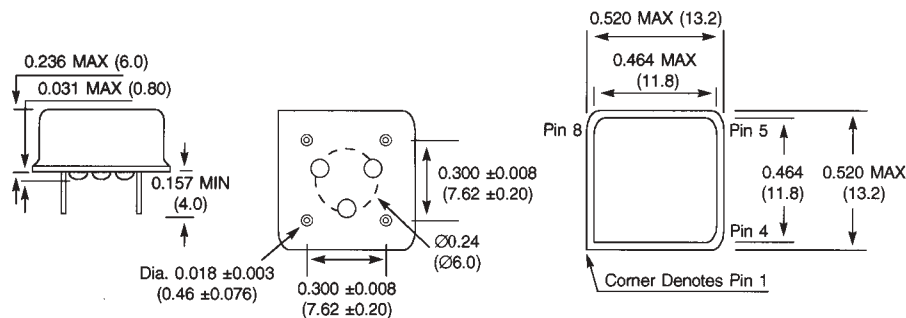
* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

***An internal pullup resistor from pin 1 to pin 8 allows active output if pin 1 is left open.

See page 35 for environmental/mechanical specifications, test circuits, and output waveform.
All specifications subject to change without notice.

ENABLE / DISABLE FUNCTION**

INH (Pin 1)	OUTPUT (Pin 5)
OPEN ***	ACTIVE
'1' Level VIH ≥ 2.2 V	ACTIVE
'0' Level VIL ≤ 0.8 V	High Z



Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



VOLTAGE CONTROLLED CRYSTAL OSCILLATOR

IC1100FRSV2

FEATURES

- ✓ Low Power Consumption
- ✓ Tight Stabilities
- ✓ Rugged Resistance Weld
- ✓ HCMOS/TTL Output
- ✓ Pullability

PART NUMBER SELECTION

Parts *	Stability (MAX) *	Pullability (MIN) Vc = 2.5 ±2V
IC1100FRSV2	±100 PPM	±150
IC1150FRSV2	±50 PPM	±150
IC1150FRSV1	±50 PPM	±100
IC1125FRSV1	±25 PPM	±100
IC1120FRSV5	±20 PPM	±50



QUICK DELIVERY!

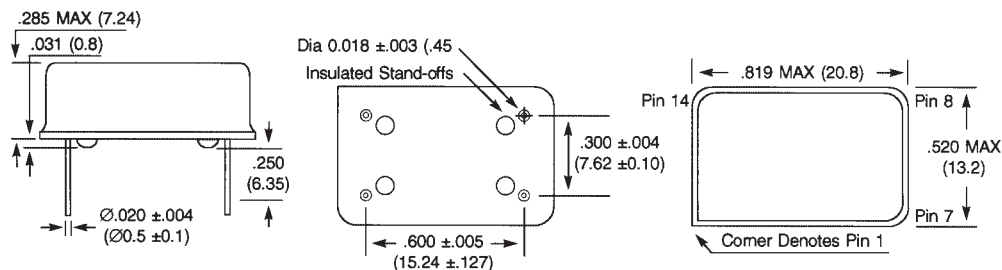
ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, CL = 15pF)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range (Fo)			4.000	160.000	MHz
Temperature Range					
Operating (TOPR)	4.000 ~ 160.000		-10	+70	°C
Storage (TSTG)			-30	+85	
Supply Voltage (VDD)	4.000 ~ 160.000		+4.75	+5.25	V
Control Voltage (Vc)	4.000 ~ 160.000		+0.5	+4.5	V
Input Current (IDD)	4.000 ~ 160.000			25	mA
Output Symmetry	4.000 ~ 160.000	2.5V	40	60	%
Rise Time (TR)	4.000 ~ 160.000	1.0V ~ 4.0V		10	nS
Fall Time (TF)	4.000 ~ 160.000	4.0V ~ 1.0V		10	
Output Voltage (VOL) (VOH)	4.000 ~ 160.000	IOl = 3.2 mA IOH = -1 mA	4.5	0.5	V
Output Load	4.000 ~ 160.000	TTL Load		10	TTL
	4.000 ~ 160.000	HCMOS Load		15	pF
Start-up Time (TS)	4.000 ~ 160.000			10	mS
Frequency Stability vs Voltage	4.000 ~ 160.000	VDD = 5.0V ±10%	-3.0	+3.0	PPM
Modulation Bandwidth	4.000 ~ 160.000			20	kHz

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, vibration, and Vc = 2.5V.

See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.

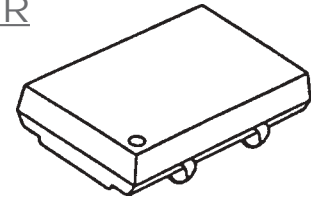


Inch dimensions shall govern.
 All dimensions are in inches & parenthetically in millimeters.



SURFACE MOUNT HCMOS CLOCK OSCILLATOR

ISO1410



FEATURES

- ✓ Extended Temperature Range
- ✓ Tape and Reel (1,000 pcs. STD)
- ✓ Solderable @ 260° for 10 sec.

ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, CL = 15pF)

PARAMETERS	CONDITIONS	ISO1410A		ISO1410B		ISO1410C		UNITS
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Frequency Range		1.025	26.000	26.000	66.667	26.000	66.667	MHz
Frequency Stability *	-10°C ~ +70°C -40°C ~ +85°C	-100 -200	+100 +200	-100 -200	+100 +200	-100 -	+100 -	PPM
Temperature Range								
Operating (TOPR)		-10	+70	-10	+70	-10	+70	°C
Storage (TSTG)		-55	+125	-55	+125	-55	+125	
Supply Voltage (VDD)		+4.5	+5.5	+4.5	+5.5	+4.5	+5.5	V
Input Current (IDD)	No Load Output Disabled (IZ)		23 12		35 28		35 20	mA
Output Symmetry	2.5V 1.4V	40 45	60 55	- 45	- 55	40 -	60 -	%
Rise Time (TR)	1.0V ~ 4.0V 0.4V ~ 2.4V		8 8		5 5		7 7	nS
Fall Time (TF)	4.0V ~ 1.0V 2.4V ~ 0.4V		8 8		5 5		7 7	
Output Voltage (VOL) (VOH)	IOL = MAX IOH = MAX	4.6	0.4	2.4	0.4	4.6	0.4	V
Output Current (IOL) (IOH)	VOL = MAX VOH = MIN		16 -0.4		8 -0.4		4.0 -4.0	mA
Output Load	HCMOS TTL		50 10		5		50	pF TTL
Start-up Time (TS)			4		10		10	mS
Output Enable/Disable Time			100		100		100	nS

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

***An internal pullup resistor from pin 1 to pin 4 allows active output if pin 1 is left open.

See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

Note: ±50 PPM frequency stability at -10 to +70°C also available.

Note: A 0.01 µF bypass capacitor should be placed between VDD (Pin 4) and GND (Pin 2)

to minimize power supply line noise.

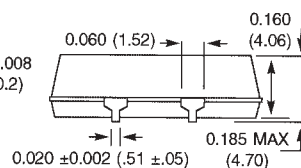
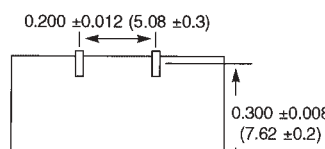
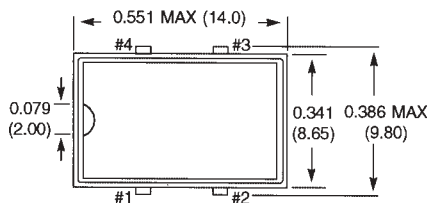
All specifications subject to change without notice.

ENABLE / DISABLE FUNCTION**

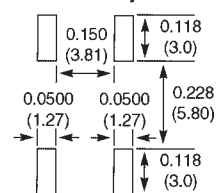
INH (Pin 1)	OUTPUT (Pin 5)
OPEN ***	ACTIVE
'1' Level VIH ≥ 2.0 V (ISO1410A/C)	ACTIVE
'1' Level VIH ≥ 3.5 V (ISO1410B)	ACTIVE
'0' Level VIL ≤ 0.8 V (ISO1410A/C)	High Z
'0' Level VIL ≤ 1.5 V (ISO1410B)	High Z

Pin Connections

- #1 E/D**
- #2 GND
- #3 Output
- #4 +5Voc



Recommended Solder Pad Layout



MINIATURE SMD HCMOS OSCILLATOR

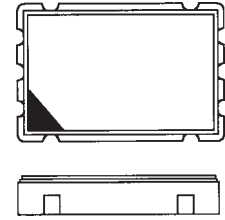
ISO7.505

FEATURES

- ✓ Miniature Package
- ✓ Available -40°C ~ +85°C
- ✓ 3000 G Shock Resistance
- ✓ Tri-State Enable/Disable
- ✓ Tape and Reel (2,000 pcs. STD)

PART NUMBER SELECTION

Frequency Stability	Part Number	
±100 PPM -10°C to +70°C	ISO7.505A	ISO7.505B
±100 PPM -40°C to +85°C	ISO7.505AE	ISO7.505BE
±50 PPM (up to 50 MHz)	ISO7.505A50	ISO7.505B50
±25 PPM (up to 50 MHz)	ISO7.505A25	ISO7.505B25



ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0 V, CL = Max load)

PARAMETERS	FREQUENCY RANGE	CONDITIONS	ISO7.505A		ISO7.505B		UNITS
			MIN.	MAX.	MIN.	MAX.	
Frequency Range (Fo)			1.800	80.000	1.800	50.000	MHz
Frequency Stability		All Conditions*	-100	+100	-100	+100	PPM
Temperature Range Operating (TOPR) Storage (TSTG)			-10 -55	+70 +125	-10 -55	+70 +125	°C
Supply Voltage (VDD)			+4.5	+5.5	+4.5	+5.5	V
Input Current (IDD)	1.800 ~ 25.000 25.000 ~ 50.000 50.000 ~ 67.000 67.000 ~ 80.000			25 45 60 73		20 35 -	mA
Output Symmetry	1.800 ~ 80.000	2.5V	45	55	45	55	%
Rise Time (TR) Fall Time (TF)	1.800 ~ 80.000	0.5V to 4.5V 4.5V to 0.5V		7 7		10 10	nS
Output Voltage (VOL) (VOH)	1.800 ~ 80.000	IOL = 16 mA / IOH = 4 mA IOH = -16 mA / IOH -4 mA	4.5	0.5	4.5	0.5	V
Output Current (IOL) (IOH)	1.800 ~ 80.000	VOL = 0.5V VOH = 4.5V		16 -16		4 -4	mA
Output Load	1.800 ~ 80.000	TTL HCMOS		10 50		10 LS 15	TTL pF
Start-up Time(Ts)	1.800 ~ 80.000			10		10	mS
Enable/Disable Time	1.800 ~ 80.000			100		100	nS

* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

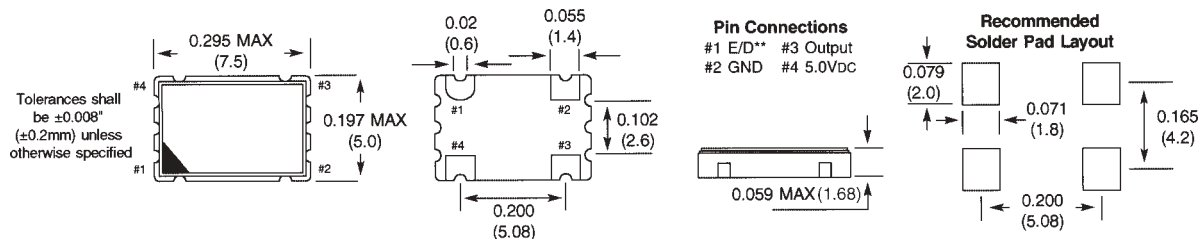
*** An internal pullup resistor from pin 1 to pin 4 allows active output if pin 1 is left open.

Note: A 0.01, µF bypass capacitor should be placed between VDD (Pin 4) and GND (Pin 2) to minimize power supply line noise. See page 35 for environmental/mechanical specifications, test circuits, and output waveform.

All specifications subject to change without notice.

ENABLE / DISABLE FUNCTION**

INH (Pin 1)	OUTPUT (Pin 3)
OPEN ***	ACTIVE
'1' Level VIH ≤ 2.2 V	ACTIVE
'0' Level VIL ≥ 0.8 V	High Z



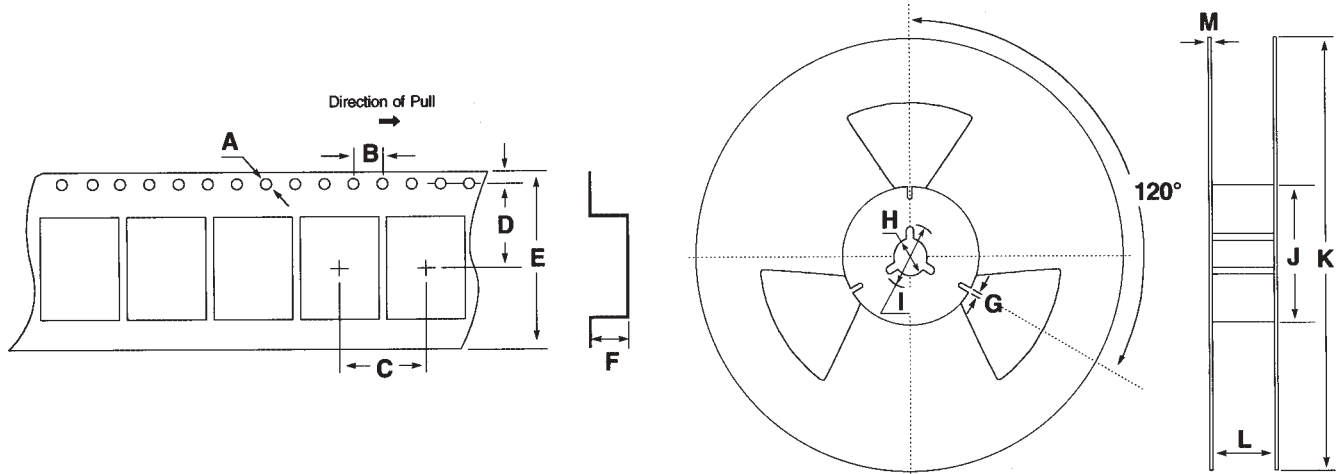
Inch dimensions shall govern.

All dimensions are in inches & parenthetically in millimeters.

See page 40 for tape and reel specifications.



SURFACE MOUNT OSCILLATORS TAPE AND REEL SPECIFICATIONS



MODEL	A	B	C	D	E	F	STD QTY *
ISO1410	Ø1.5	4.0	12.0	11.5	24.0	4.8	1,000
ISO7.505	Ø1.5	4.0	8.0	7.5	16.0	2.15	2,000
ISTCX01110	Ø1.5	4.0	16.0	11.5	24.0	4.4	1,000

MODEL	G	H	I	J	K	L	M
ISO1410	2.0	Ø13	Ø21	Ø80	Ø330	25.5	2.0
ISO7.505	2.0	Ø13	Ø21	Ø80	Ø250	17.5	2.0
ISTCX01110	3.0	Ø13	Ø21	Ø80	Ø330	24.4	3.0

* Standard reel quantity.

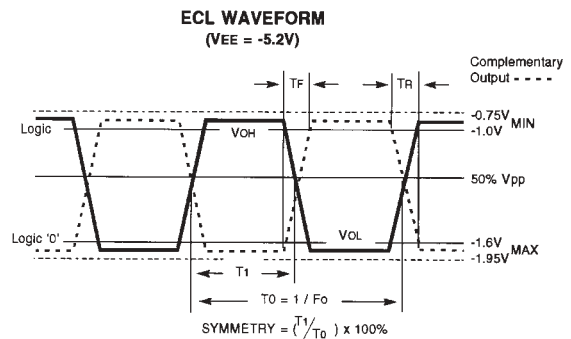
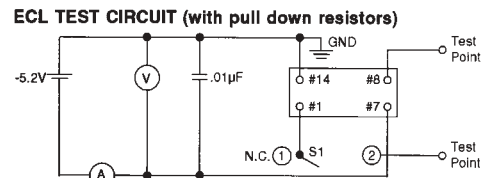
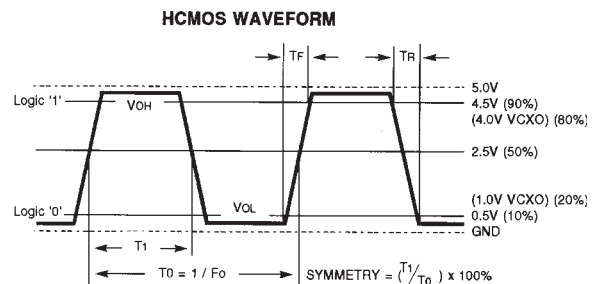
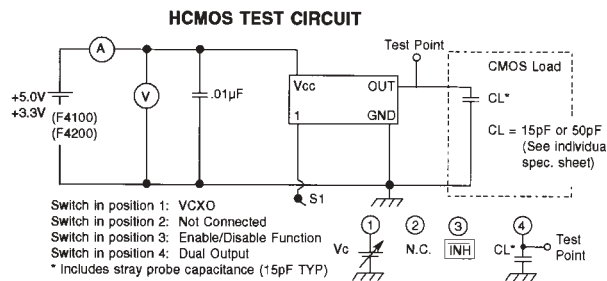
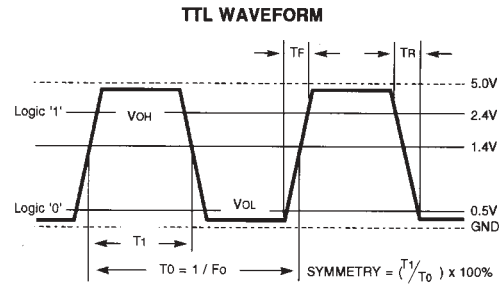
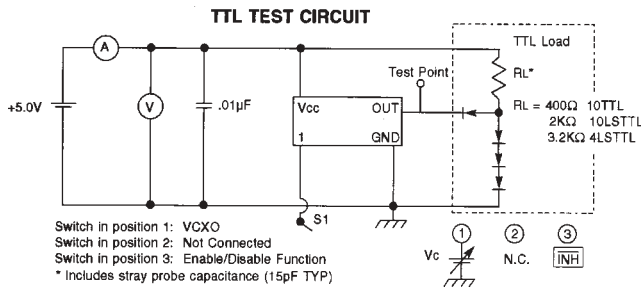
Inch dimensions shall govern.
All dimensions are in inches & parenthetically in millimeters.



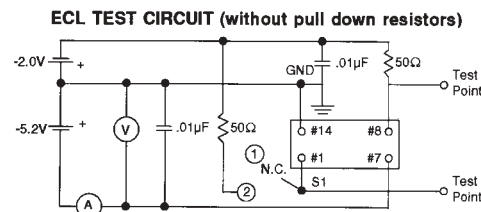
CLOCK OSCILLATOR GENERAL CHARACTERISTICS

ENVIRONMENTAL/MECHANICAL SPECIFICATIONS

Gross Leak Test	All units 100% leak tested in Fluorinert FC-43.
Hermetically Sealed Package	Mass spectrometer leak rate less than 2×10^{-8} Atm. CC/sec. of helium.
Seal Strength	2.27 Kg max. force perpendicular to top and bottom.
Bend Test (Pin Material)	Will withstand maximum bend of 90°, referenced to base, for 2 bends. (Iron and Nickel - Nickel coated, solder dipped.)
Solvent Resistance	Isopropyl Alcohol, Trichloroethane Note 1 - Ultrasonic cleaning not to be used. Note 2 - Unit can be cleaned in only one solvent listed.
Marking Ink	Epoxy, heat cured
Solderability	The terminals are considered solderable and acceptable for electrical connection if 95% of the cooled solder surface is uniform and free from breaks and pinholes. The other 5% of the cooled solder surface may show only pinholes, voids, or rough spots that are not concentrated in one area.
Maximum Soldering Temp.	270°C for 10 seconds on leads.
Shock Test	1000 G's, 0.35 ms, 1/2 sine wave, 3 shocks each plane
Vibration Test	10-55 Hz, 0.060" D. A., 55-2000 Hz, 20 G's, duration time 6 hours
Temperature Cycle	20 cycles from -55°C to +125°C, 1 hour per cycle, 25°C ref



S1 in Position 1: IE1100FRSNOC (IE1100FRSNOA except pin 7 is ground)
 S1 in Position 2: IE1100FRSNCOC (IE1100FRSCOA except pin 7 is ground)

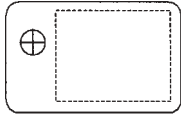


S1 in Position 1: IE1100FRSNOD (IE1100FRSNOB except pin 7 is ground)
 S1 in Position 2: IE1100FRSCOD (IE1100FRSCOB except pin 7 is ground)

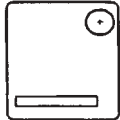
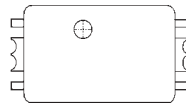


TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS SELECTION GUIDE

THRU HOLE TCXOs

PRODUCT	ITCXO1912/IVCTCXO1912	
		
Frequency Range	9.600 ~ 20.000 MHz	
Frequency Stability	±2.0 PPM -20°C ~ +70°C ±2.5 PPM -30°C ~ +70°C	
Key Features	<ul style="list-style-type: none"> ✓ Tight Stability over Wide Temp. Range ✓ Adjustable Frequency ✓ Superior Quality 	
CATALOG PAGES		
	PAGE 38	

SURFACE MOUNT TCXOs

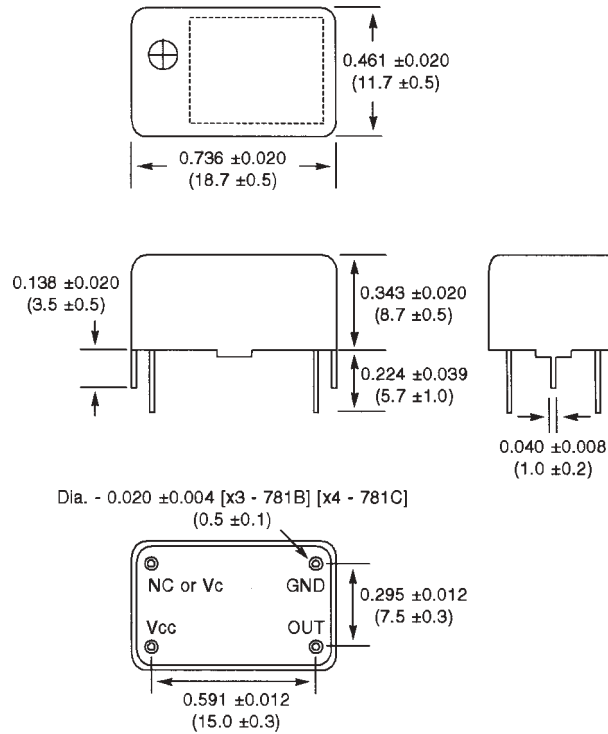
PRODUCT	ISTCXO1110	ISTCXO2112
		
Frequency Range	9.600 ~ 20.000 MHz	9.600 ~ 20.000 MHz
Frequency Stability	±2.5 PPM -30°C ~ 75°C	±2.5 PPM -30°C ~ 75°C
Key Features	<ul style="list-style-type: none"> ✓ SMD TCXO ✓ Low Profile ✓ Wide Temp. Range ✓ Opt. Voltage Control ✓ Opt. 3.0 V Supply Voltage 	<ul style="list-style-type: none"> ✓ SMD TCXO ✓ Wide Temp. Range ✓ Standard Footprint ✓ Opt. Voltage Control
CATALOG PAGES		
	PAGE 39	PAGE 40

FREQUENCY RANGE BY PRODUCT

PRODUCT	1 MHz	9MHz	20 MHz
THRU HOLE			
ITCXO1912/IVCTCXO1912			9.600 ~ 20.000MHz
SURFACE MOUNT			
ISTCXO1110			9.600 ~ 20.000MHz
ISTCXO2112			9.600 ~ 20.000MHz

TCXO THRU HOLE

ITCXO1912/IVCTCXO1912

Fully Supported
For New Designs

ELECTRICAL CHARACTERISTICS

PARAMETERS	CONDITIONS	MIN.	MAX.	UNITS
Frequency Range		9.600	20.000	MHz
Frequency Tolerance	Ta = 25°C	-0.5	+0.5	PPM
Frequency Stability	-20°C ~ +70°C -30°C ~ +75°C	-2.0 -2.5	+2.0 +2.5	PPM
Temperature Range (TOPR) (TSTG)	Operating Storage	-35 -55	+85 +125	°C
Supply Voltage (VDD)		4.7	5.3	V
Input Current (IDD)			2	mA
Output Waveform	(Clipped SineWave) Vp-p	1.0		V
Output Load			20 5	kΩ pF
Aging	Per Year @ 25°C	-1.0	+1.0	PPM
Frequency Stability vs Voltage Change	VDD = 5.0V±0.3V	-0.2	+0.2	PPM
Pullability (VCTCXO1912) Frequency Adjust Range	Vc = 2.5V ±2.0V Int. Trimmer	±4.0 (IVCTCXO1912) ±3.0		PPM PPM

Specifications available upon request.

* IVCTCXO1912- Voltage Control option.

All specifications subject to change without notice.

Inch dimensions shall govern.

All dimensions are in inches & parenthetically in millimeters.



TCXO SMD TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS

ISTCXO1110/ISVCTCXO1110

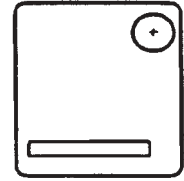
TCXO

FEATURES

- ✓ Tight Stability
- ✓ Miniature Size
- ✓ Wide Temperature Range
- ✓ 3V Supply Voltage - L Version

APPLICATIONS

- ✓ Communications Equipment
- ✓ Cellular Phones
- ✓ Cordless Phones
- ✓ Portable Instrumentation
- ✓ Aerospace



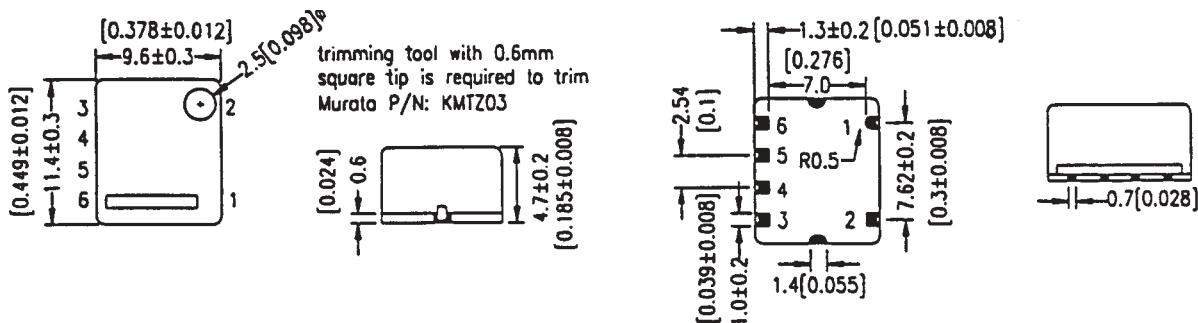
ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = +5.0 V, CL = Max load)

PARAMETERS	MIN.	MAX.	UNITS
Frequency Range* (Fo) (9.60, 12.00, 12.80, 15.36, 19.20 STD)	9.600	20.000	MHz
Frequency Stability			PPM
Over Temperature Range	-2.5	+2.5	
Over Supply Voltage Change (VDD ±5%)	-0.3	+0.3	
Over Load Change 10 kΩ ±10%, 15 pF ±10%	-0.3	+0.3	
Temperature Range			°C
Operating Temperature (TOPR)	-30	+75	
Storage Temperature (TSTG)	-35	+80	
Supply Voltage (VDD)	+4.75	+5.25	V
Output Waveform (Clipped Sine)			V
Peak-to-Peak Level (Vp-p)	1.0		
Input Current (IDD)		2.0	mA
Output Load		10 15	kΩ pF
Frequency Adjustment (Internal Trimmer)	±3.0		PPM
Aging (per year at 25°C)	-1.0	+1.0	PPM
Voltage Control Option VCTCXO - Version (2.5 V ±2.0 V)	±4.0		PPM

* Other frequencies available. Consult ICM for your requirements.
All specifications subject to change without notice.

PIN CONNECTIONS

ISTCXO1110	
#1 GND	#4 GND
#2 GND	#5 N.C. or Vc
#3 OUTPUT	#6 VDD



Inch dimensions shall govern.

All dimensions are in inches & parenthetically in millimeters.

See page 36 for tape and reel specifications.



TCXO SMD TEMPERATURE COMPENSATED CRYSTAL OSCILLATORS

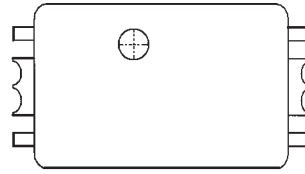
ISTCXO2112

FEATURES

- ✓ Miniature Size
- ✓ Surface Mount
- ✓ Wide Temperature Range
- ✓ Tight Stability
- ✓ Optional Voltage Control

APPLICATIONS

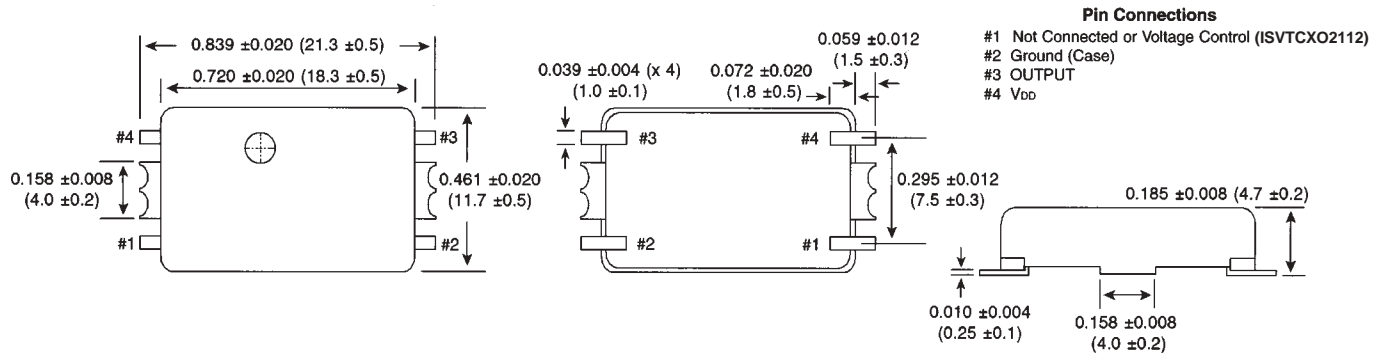
- ✓ Communications Equipment
- ✓ Cellular Phones
- ✓ Cordless Phones
- ✓ Aerospace
- ✓ Portable Instrumentation



ELECTRICAL CHARACTERISTICS (Ta = 25°C, VCC = +5.0 V, CL = 10 kΩ//10 pF)

PARAMETERS		MIN.	MAX.	UNITS
Frequency Range	(Fo)	9.600	20.000	MHz
Frequency Stability				PPM
Over -30°C to +75°C		-2.5	+2.5	
Over Supply Voltage Change (5.0 V ±0.3 V)		-0.3	+0.3	
Temperature Range				°C
Operating	(TOPR)	-30	+75	
Storage	(TSTG)	-35	+80	
Supply Voltage	(VDD)	+4.75	+5.25	V
Output Waveform	(Clipped Sine)			
Peak-to-Peak Level	(Vp-p)	1.0		V
Input Current	(IDD)		2.0	mA
Output Load			10	kΩ
			10	pF
Frequency Adjustment	(Internal Trimmer)	±3.0		PPM
Aging	(per year at 25°C)	-1.0	+1.0	PPM
Voltage Control Option	VCTCXO - (pin 1: 2.5 V ±2.0 V)	±5.0		PPM

All specifications subject to change without notice.



Inch dimensions shall govern.

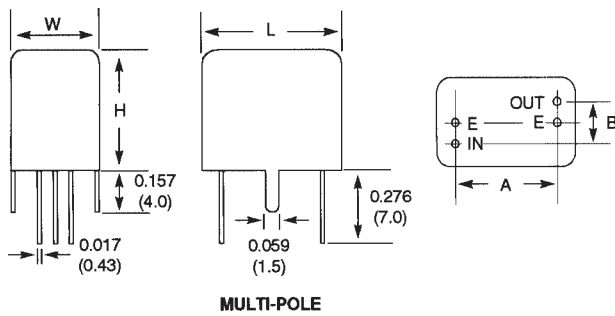
All dimensions are in inches & parenthetically in millimeters.



MONOLITHIC CRYSTAL FILTERS

ICM filters offer excellent features such as sharp cut off characteristics, low loss and high stability over a wide temperature range which are superior to LC Filters and Ceramic Filters.

The basic building block for all custom built ICM filters is the two-pole monolithic filter available in standard package as shown. Two-pole monolithic filters are cascaded to produce four, six and eight pole filter responses with the addition of coupling capacitors between two-pole sections. Standard ICM filters are available with center frequencies from 10.7 MHz to 90 MHz, and from two to eight poles.

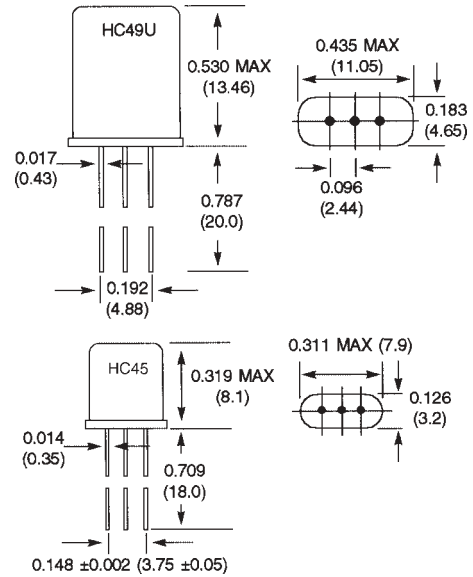


MULTI-POLE

For custom made filters, please specify the following:

- Holder Size
- Insertion Loss
- Ripple
- Nominal Frequency
- Attenuation
- Terminating Impedance
- Pass Bandwidth
- Spurious Response
- Operating Temp. Range

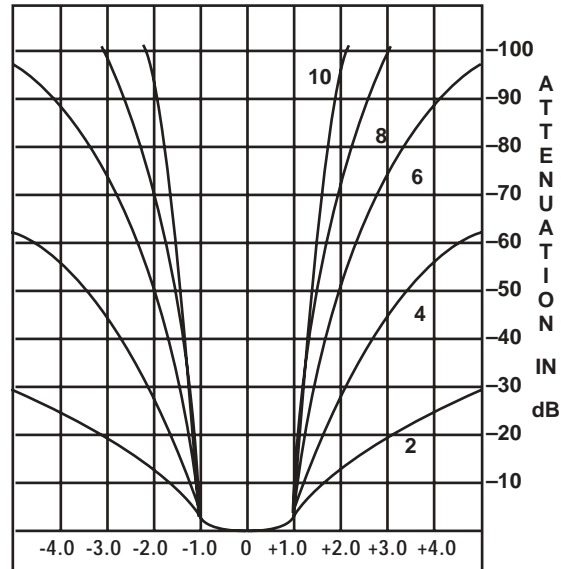
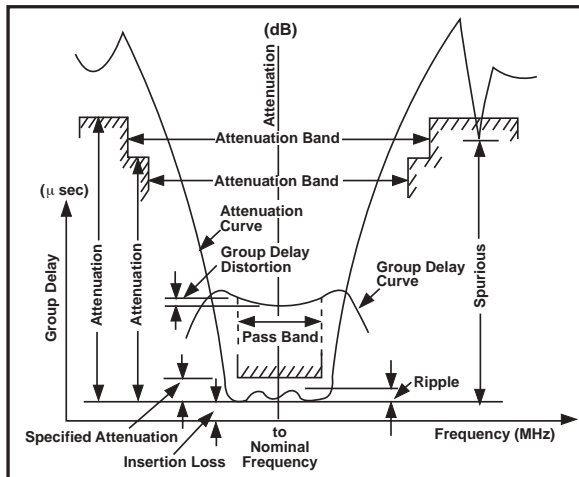
Note: 45F Series 45.000 MHz fundamental is a special filter designed for mobile radio and cellular phone applications.



TWO-POLE

MULTI-POLE PACKAGE DIMENSIONS

CASE TYPE	L	W	H	A	B
SF101	0.590 (15.0)	0.472 (12.0)	0.591 (15.0)	0.354 (9.0)	0.197 (5.0)
SF102	0.728 (18.5)	0.472 (12.0)	0.591 (15.0)	0.531 (13.5)	0.197 (5.0)
SF103	0.433 (11.0)	0.335 (8.5)	0.453 (11.5)	0.291 (7.4)	0.148 (3.75)
SF104	0.527 (13.4)	0.335 (8.5)	0.453 (11.5)	0.386 (9.8)	0.148 (3.75)



SHAPE FACTOR VS NUMBER OF POLES



CRYSTAL FILTERS

Monolithic Crystal Filters (MCF)

10.7MHz

Model No.	Nominal Frequency (MHz)	Pole	Pass Band		Attenuation Band		Ripple Max. (dB)	Loss Max. (dB)	Attenuation Guaranteed		Terminating Impedance (ohm/pF)	Operating Temperature (C)	Package Style
			(dB)	(kHz)	(dB)	(kHz)			(dB)	(Fo±kHz)			
✓ 12.5 kHz Channel Spacing													
10M7A	10.700	2	3	±3.75	20	±18.0	0.5	1.5	35/40	+300~+1000 -200~-1000	1.8K//6.0	-20~+70	HC-49/U
10M7B	10.700	4	3	±3.75	40	±14.0	1.0	2.5	50/70	+300~+1000 -200~-1000	1.8K//5.0	-20~+70	HC-49/Ux2
10M7C	10.700	6	3	±3.75	65	±12.5	2.0	3.5	65	±12.5~±300	1.8K//5.0	-20~+70	SF 101
10M7D	10.700	8	3	±3.75	90	±12.5	2.0	4.0	90	±12.5~±300	1.8K//5.0	-20~+70	SF 102

✓ 20 kHz Channel Spacing

10M12A	10.700	2	3	±6.0	20	±25.0	0.5	1.5	35/40	+300~+1000 -200~-1000	3.3K//1.5	-20~+70	HC-49/U
10M12B	10.700	4	3	±6.0	40	±20.0	1.0	2.5	50/70	+300~+1000 -200~-1000	3.3K//1.5	-20~+70	HC49/UX2
10M12C	10.700	6	3	±6.0	65	±20.0	2.0	3.0	65	±20.0~±300	3.3K//2.0	-20~+70	SF 101
10M12D	10.700	8	6	±6.0	90	±20.0	2.0	3.5	90	±20.0~±300	3.3K//2.0	-20~+70	SF 102

✓ 25 kHz Channel Spacing

10M15A	10.700	2	3	±7.5	18	+25.0	0.5	1.5	35/40	+300~+1000 -200~-1000	3.0K//2.0	-20~+70	HC-49/U
10M15B	10.700	4	3	±7.5	40	+25.0	1.0	2.5	50/70	+300~+1000 -200~-1000	3.0K//2.0	-20~+70	HC-49/Ux2
10M15C	10.700	6	3	±7.5	65	±25.0	2.0	3.0	65	±25.0~±300	3.3K//1.5	-20~+70	SF 101
10M15D	10.700	8	6	±7.5	90	+25.0	2.0	3.5	90	±25.0~±300	3.3K//1.5	-20~+70	SF 102

✓ 50 kHz Channel Spacing

10M30A	10.700	2	3	±15.0	15	±50.0	0.5	1.5	30/35	+300~+1000 -200~-1000	5.0K//0	-20~+70	HC-49/U
10M30B	10.700	4	3	±15.0	30	±40.0	1.0	2.5	65/80	+300~+1000 -200~-1000	5.0K//-1.0	-20~+70	HC-49/Ux2
10M30C	10.700	6	3	±15.0	60	±45.0	2.0	2.5	60	±45.0~±300	5.0K//-1.0	-20~+70	SF 101
10M30D	10.700	8	6	±15.0	80	±40.0	2.0	3.0	80	±40.0~±300	5.0K//-1.0	-20~+70	SF 102

21.4 MHz

Model No.	Nominal Frequency (MHz)	Pole	Pass Band		Attenuation Band		Ripple Max. (dB)	Loss Max. (dB)	Attenuation Guaranteed		Terminal Impedance (ohm/pF)	Operating Temperature (C)	Package Style
			(dB)	(kHz)	(dB)	(kHz)			(dB)	(Fo±kHz)			

✓ 12.5 kHz Channel Spacing

21M7A	21.400	2	3	±3.75	20	±18.0	0.5	1.5	35/50	+350~+1000 -200~-1000	850//6.0	-20~+70	HC-45
21M7B	21.400	4	3	±3.75	40	±14.0	1.0	2.5	65/80	+350~+1000 -200~-1000	850//5.0	-20~+70	HC-45x2
21M7C	21.400	6	3	±3.75	65	±12.5	2.0	3.0	65	±12.5~±300	850//5.0	-20~+70	SF 103
21M7D	21.400	8	3	±3.75	90	±12.5	2.0	4.0	90	±12.5~±300	850//5.0	-20~+70	SF 104

✓ 20 kHz Channel Spacing

21M12A	21.400	2	3	±6.0	20	±25.0	0.5	1.5	35/50	+350~+1000 -200~-1000	1.2K//3.0	-20~+70	HC-45
21M12B	21.400	4	3	±6.0	40	±20.0	1.0	2.5	65/80	+350~+1000 -200~-1000	1.2K//2.5	-20~+70	HC-45x2
21M12C	21.400	6	3	±6.0	65	±20.0	2.0	3.5	65	±20.0~±300	1.2K//2.5	-20~+70	SF 103
21M12D	21.400	8	3	±6.0	90	±20.0	2.0	3.0	90	±20.0~±300	1.2K//2.5	-20~+70	SF104

✓ 25 kHz Channel Spacing

21M15A	21.400	2	3	±7.5	18	+25.0	0.5	1.5	35/50	+350~+1000 -200~-1000	1.5K//2.0	-20~+70	HC-45
21M15B	21.400	4	3	±7.5	40	+25.0	1.0	2.5	65/80	+350~+1000 -200~-1000	1.5K//2.0	-20~+70	HC-45x2
21M15C	21.400	6	3	±7.5	65	±25.0	2.0	2.5	65	±25.0~±300	1.5K//2.0	-20~+70	SF 103
21M15D	21.400	8	3	±7.5	90	+25.0	2.0	3.5	90	±25.0~±300	1.5K//2.0	-20~+70	SF 104

✓ 50 kHz Channel Spacing

21M30A	21.400	2	3	±15.0	15	±45.0	0.5	1.5	35/40	+350~+1000 -300~-1000	3.0K//0.5	-20~+70	HC 45
21M30B	21.400	4	3	±15.0	40	±50.0	1.0	2.5	65/80	+350~+1000 -300~-1000	3.0K//0.5	-20~+70	HC-45x2
21M30C	21.400	6	3	±15.0	65	±50.0	2.0	2.5	65	±50.0~±300	2.2K//0.5	-20~+70	SF 103
21M30D	21.400	8	3	±15.0	80	±50.0	2.0	3.0	80	±50.0~±300	2.2K//0.5	-20~+70	SF 104



HIGH FREQUENCY SERIES

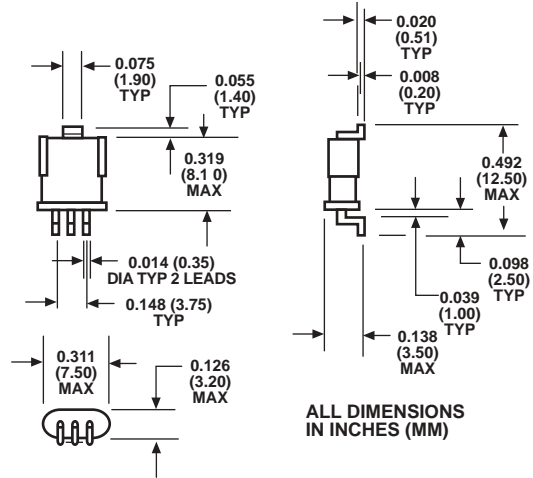
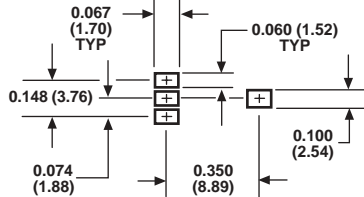
Model No.	Nominal Frequency (MHz)	Pole	Pass Band		Attenuation Band		Ripple Max. (dB)	Loss Max. (dB)	Attenuation Guaranteed		Terminating Impedance (ohm//pF)	Operating Temperature (C)	Package Style
			(dB)	(kHz)	(dB)	(kHz)			(dB)	(Fo \pm kHz)			
✓ Fundamental Tone													
45MF7A	45.000	2	3	± 3.75	10	± 12.5	1.0	2.5	65	± 910	300//10.0	-20~+70	HC-45
45MF7B	45.000	4	3	± 3.75	30	± 12.5	1.0	4.0	90	± 910	300// 8.0	-20~+70	HC-45x2
45MF15A	45.000	2	3	± 7.5	15	± 25.0	1.0	2.0	35 40	$\frac{+500-+1000}{-200-1000}$	650// 4.5	-20~+70	HC-45
45MF15B	45.000	4	3	± 7.5	30	± 25.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	650// 1.5	-20~+70	HC-45x2
45MF20A	45.000	2	3	± 10.0	15	± 34.0	1.0	2.0	35 40	$\frac{+500-+1000}{-200-1000}$	700// 2.5	-20~+70	HC-45
45MF20B	45.000	4	3	± 10.0	40	± 48.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	700// 1.5	-20~+70	HC-45x2
45MF30A	45.000	2	3	± 15.0	15	± 50.0	1.0	2.0	35	$\frac{+500-+1000}{-300-1000}$	800// 1.5	-20~+70	HC-45
45MF30B	45.000	4	3	± 15.0	40	± 60.0	1.0	3.0	70	$\frac{+500-+1000}{-300-1000}$	800// 1.0	-20~+70	HC-45x2
✓ 3rd Overtone													
45M7A	45.000	2	3	± 3.75	10	± 12.5	1.0	2.5	35	± 910	2.5K// -0.5	-20~+70	HC-45
45M7B	45.000	4	3	± 3.75	30	± 12.5	1.0	4.0	75	± 910	2.5K// -0.5	-20~+70	HC-45x2
45M15A	45.000	2	3	± 7.5	18	± 28.0	1.0	2.0	35	$\frac{+500-+1000}{-200-1000}$	4K// -1.0	-20~+70	HC-45
45M15B	45.000	4	3	± 7.5	40	± 30.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	4K// -1.0	-20~+70	HC-45x2
45M20A	45.000	2	3	± 10.0	15	± 30.0	1.0	2.0	35	$\frac{+500-+1000}{-200-1000}$	5K// -1.0	-20~+70	HC-45
45M20B	45.000	4	3	± 10.0	35	± 40.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	5K// -1.0	-20~+70	HC-45x2
45M30A	45.000	2	3	± 15.0	15	± 50.0	1.0	2.0	30	$\frac{+500-+1000}{-300-1000}$	8K// -1.0	-20~+70	HC-45
45M30B	45.000	4	3	± 15.0	30	± 50.0	1.0	3.0	70	$\frac{+500-+1000}{-300-1000}$	8K// -1.0	-20~+70	HC-45x2
70M15A	70.000	2	3	± 7.5	15	± 30.0	1.0	2.0	35	$\frac{+500-+1000}{-200-1000}$	2.0K// -1.0	-20~+70	HC-45
70M15B	70.000	4	3	± 7.5	25	± 25.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	2.0K// -1.0	-20~+70	HC-45x2
70M20A	70.000	2	3	± 10.0	15	± 40.0	1.0	2.0	35	$\frac{+500-+1000}{-200-1000}$	2.5K// -1.0	-20~+70	HC-45
70M20B	70.000	4	3	± 10.0	35	± 40.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	2.5K// -1.0	-20~+70	HC-45x2
90M15A	90.000	2	3	± 7.5	15	± 30.0	1.0	2.0	35	$\frac{+500-+1000}{-200-1000}$	1.4K// 0	-35~+70	HC-45
90M15B	90.000	4	3	± 7.5	25	± 25.0	1.0	3.5	70	$\frac{+500-+1000}{-200-1000}$	1.4K// 0	-35~+70	HC-45x2
90M20A	90.000	2	3	± 10.0	15	± 40.0	1.0	2.0	35	$\frac{+500-+1000}{-200-1000}$	1.5K// -1.0	-35~+70	HC-45
90M20B	90.000	4	3	± 10.0	35	± 40.0	1.0	3.0	70	$\frac{+500-+1000}{-200-1000}$	1.5K// -1.0	-35~+70	HC-45x2
90M30A	90.000	2	3	± 15.0	15	± 50.0	1.0	2.0	35	$\frac{+500-+1000}{-300-1000}$	4K// -1.0	-35~+70	HC-45
90M30B	90.000	4	3	± 15.0	25	± 50.0	1.0	3.0	70	$\frac{+500-+1000}{-300-1000}$	4K// -1.0	-35~+70	HC-45x2



SURFACE MOUNT PACKAGES

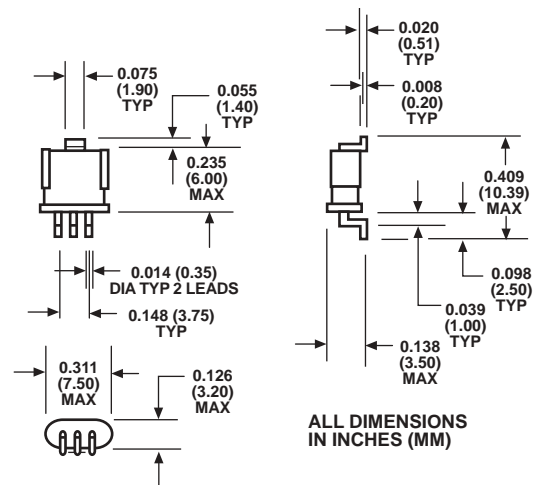
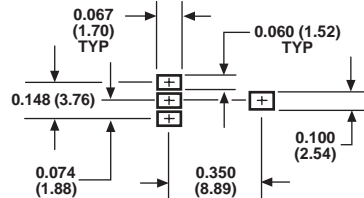
UM-1 Surface Mount Option

SUGGESTED SOLDER PAD LAYOUT



UM-5 Surface Mount Option

SUGGESTED SOLDER PAD LAYOUT



CRYSTAL DATA

Typical Crystal Design

Before beginning a design or purchase of a crystal there are system parameters which must be considered. Below are questions which need to be determined by your system. These parameters will determine the crystal specifications.

1. On what crystal frequency do you wish to operate?
2. How much can the frequency be off at room temperature (+25C)?
3. What is the temperature range over which the crystal will operate?
4. How much can the crystal change frequency over the temperature range?
5. Is the crystal to be operated at Series or Parallel resonant?
6. If operated at parallel. What is the parallel capacitance in picofarads (pF)?
7. Is pullability important?
8. What holder type or can size do you require?

The Quartz Crystal

The quartz crystal may be represented by the L, C, R circuit (Below).

CO is the capacitance formed by the crystal electrodes plus any holder capacitance. The LI, CI, RI branch is called the "motional arm". The motional capacitance, CI, controls the "pullability" of the crystal. The shift of a crystal can be calculated by the following formula...

$$\text{PPm fr Series} = \frac{C1}{2 * (C0+CL)}$$

Knowing two different loads on the crystal, we can look at the differences between each shift from series to calculate total trim range.

Example: given a 0.020 pF CI and a CO of 4.26 pF the shift from series of a 20 pF load is 412.2 ppm and the shift of a 27 pF load is 319.9 ppm. This gives us a tune range of 92.3 ppm between 20 pF and 27 pF loads.

CI and RI can be specified on any crystal. Typical values of RI are 10 to 25 ohms on the fundamental mode and higher on overtones. Typical motional capacitance values are between 0.016 pF and 0.034 pF for a fundamental crystal. Motional capacitance is divided by the overtone squared. Static capacitance (CO) is about 213 times CI on the fundamental mode.

Frequency

The quartz crystal can be made on frequencies between 70 kHz and 200 MHz. The quartz crystal is designed to operate on its fundamental frequency or one of its overtones. The overtones are related to the fundamental frequency and

occur at odd harmonic intervals. (1, 3, 5, 7, etc.) This becomes important between the 15 MHz to 30 MHz Range. Crystals in that frequency range can be made as either a fundamental or 3rd overtone. Fundamental mode crystals at these frequencies become very expensive as the quartz blank is extremely thin and difficult to handle, and therefore causing a higher rate of breakage in processing. If you specify an overtone mode instead of the fundamental, the cost savings may be significant.

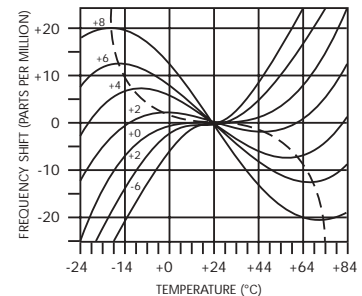
Calibration

Crystals are the key components in an oscillator circuit and they are affected by ambient conditions, particularly the temperature.

The most common calibration specification is ± 10 ppm or $\pm 0.001\%$ at + 25°C and your specific load, it is also the least expensive.

Temperature Calibration

The chart to the right shows the change in frequency with respect to temperature. The various curves are dependent on the angle at which the quartz is cut from the original crystal. The angle of cut is controlled by x-ray diffraction techniques. The curves in this chart show that as the tolerance becomes tighter. The operation temperature range is reduced.

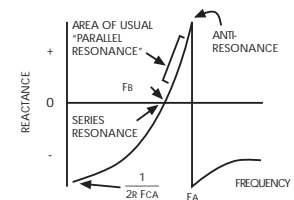


Crystal Load Series Resonance

When a crystal is operating at series resonance (fs), it looks resistive in the circuit. Thus, its impedance at fs is near zero. In a well designed series resonant circuit, correlation is not a problem and load capacitance does not have to be specified.

Parallel Resonance (antiresonance)

The crystal's impedance values will have the effect of pulling the frequency of the crystal. If the crystal is to be used at parallel resonance, the load capacity (in picofarads) should always be specified. Load capacity is the dynamic capacity of the total circuit measured or computed across the crystal terminals. It is selected to operate the crystal at a stable point on fs-fa reactance curve (10pf to close to fs). For more information on computing the load capacity of a circuit see our Oscillator Data sheet.



CRYSTAL OSCILLATOR DATA

Typical Crystal Oscillator Design

An oscillator is an amplifier with a feedback loop from output to input. Barkhausen criteria states that for oscillation to occur the product of the gains around a loop must be equal to or greater than unity and that the sum of the phase shifts around the loop must be a multiple of 360°.

Before beginning a design or purchase of an oscillator there are system parameters which the oscillator will need to conform to. Below are questions which need to be determined by your system. These parameters will determine the type of oscillator you will require (TCXO, TCVCXO, VCXO, Clock, Ovenized).

- 1) What frequency do you wish to operate on?
- 2) How much can the frequency vary in your system?
- 3) What is the temperature range the oscillator will operate in?
- 4) What power is available to operate the oscillator?
 - a) What is the voltage level and its tolerance?
 - b) How much current can the oscillator consume?
- 5) How large can this oscillator be physically?
- 6) What output wave shape is required in your system?

(TTL, CMOS, ECL, Sine Wave)

 - a) Sinewave level and harmonic levels required
- 7) What type of load will the output of the oscillator experience?

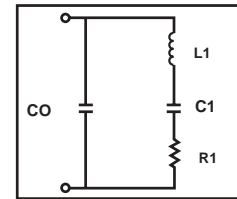
(ex. 50 ohms)
- 8) How closely does the oscillator need to be set to frequency?
- 9) Do you need a trimmer to compensate for aging or crystal differences?
- 10) How much can the oscillator shift frequency over time?
- 11) Does your system require control of the frequency by a voltage?
 - a) What is the direction of frequency vs. voltage?
 - b) Is the control AC or DC (modulation or PLL)?
 - c) What is the voltage control range?
 - d) What is the minimum and maximum frequency change required?
 - e) Do you need the frequency change vs. the voltage change to be linear?

The Quartz Crystal

The quartz crystal may be represented by the L,C,R circuit (Upper Right).

CO is the capacitance formed by the crystal electrodes plus any holder capacitance. The LI, CI,

RI branch is called the "motional arm". The motional capacitance, CI, controls the "pullability" of the crystal. The shift of a crystal can be calculated by the following formula....



$$\text{PPm fr Series} = \frac{C1}{2 * (C0 + C1)}$$

Knowing two different loads on the crystal, we can look at the differences between each shift from series to calculate the total trim range.

C1 and R1 can be specified on any crystal. Typical values of R1 are 10 to 25 ohms on the fundamental mode and higher on overtones. Typical motional capacitance values are between 0.018 pf and 0.024 pf for a fundamental crystal. Motional capacitance is divided by the overtone squared. Static capacitance (CO) is about 213 times C1 on the fundamental mode.

L1 can be calculated knowing the series frequency of the crystal.

Example: given a 0.020 pf C1 and a C0 of 4.26pf the shift from series of a 20pf load is 412.2 ppm and the shift of a 27pf load is 319.9 ppm. This gives us a tune range of 92.3ppm between 20 pf and 27 pf loads.

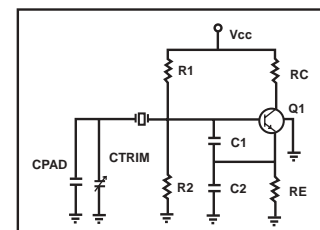
Fundamental Oscillators

MODIFIED COLPITTS OSCILLATOR

The oscillating loop C1, C2 in parallel with RE, Ctrim in parallel with Cpad and the crystal can be isolated from load effects in the colpitts oscillator by keeping RC≪RE. The output waveform at the collector is highly distorted due to the self limiting of the oscillator drawing pulses of collector current. The trimmer in this design has only a second order effect

on loop gain. The loop gain in this circuit is controlled by the gain of the transistor and the reactance and ratio of C1 and C2. To begin with the reactance of C2

should be -j75 ohms and the reactance of C1 should be slightly larger.

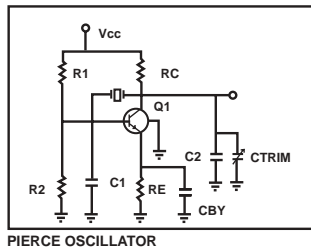


MODIFIED COLPITTS OSCILLATOR

$$\text{Crystal load capacity} = \frac{1}{\frac{1}{C1} + \frac{1}{C2} + \frac{1}{(Cpad + Ctrim)}}$$

PIERCE OSCILLATOR

The oscillating loop C1 in parallel with R2, Ctrim in parallel with C2 & Rc and the crystal is directly tied to the load causing poor load stability. The trimmer is across one of the feedback capacitors and directly effects loop gain. The output waveform at the collector is relatively sinusoidal.



PIERCE OSCILLATOR

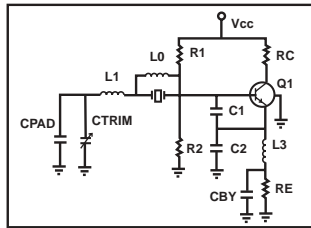
$$\text{Crystal load capacity} = \frac{1}{\frac{1}{C1} + \frac{1}{(Cpad + Ctrim)}}$$

Overtone Oscillators

C1 (C2 + Ctrim)

OVERTONE COLPITTS OSCILLATOR

The design considerations are the same as the modified colpitts oscillator. Tune C2 and L3 to the frequency directly between the desired overtone and the overtone just below. Choose values of C2 and L3 such that X_{C2} in parallel with $X_{L3} = -j75$ ohms. The static capacitance of the crystal can be canceled by placing an inductor across the crystal, from the crystal to ground or from the crystal to the emitter of the transistor. This will increase the drive on the crystal. Cby is used to increase the Q of the trap.



OVERTONE COLPITTS

$$\text{Load} = \frac{1}{W * (X_{Cpad+Ctrim} + X_{L1} + X_{C1} + \frac{1}{\frac{1}{X_{L3}} + \frac{1}{X_{C2}}})}$$

$$W = 2\pi F$$

OVERTONE PIERCE

L1//C2 form a trap in the same manner as C2//L3 in the colpitts oscillator. Choose L1 and C2 in the manner outlined in the "Overtone Colpitts" design. As in the colpitts design an inductor can be added to tone out the effect of the crystal's static capacitance (C0).

$$\text{Load} = \frac{1}{W * (X_{C1} + \frac{1}{\frac{1}{X_{Cpad+Ctrim}} + \frac{1}{X_{L1}}})}$$

Nth Overtone Oscillators

GROUNDING BASE CONFIGURATIONS

These oscillators may be tuned initially by placing an AC short across the crystal and tuning Ctrim. These are basically amplifiers with a tapped capacitor resonant circuit in the collector. The tapped capacitor should match the impedances of the input and output. In the "Grounded Base Butler" Oscillator the loop gain may be increased by shunting Re.

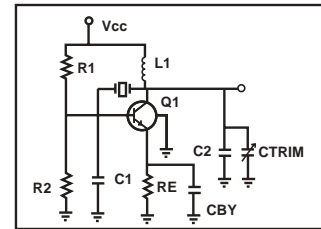
Crystal Load Capacity = Series

TWO TRANSISTOR BUTLER

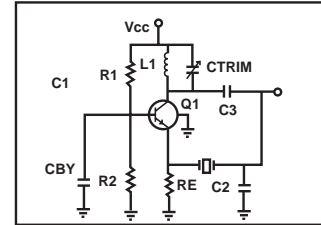
The butler oscillator has the ability of high frequency good load stability and output amplitude gain.

This circuit is commonly used in wide pull VCXOs and TCVCXOs.

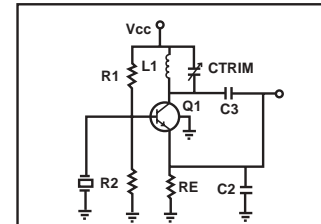
Crystal Load Capacity = Series



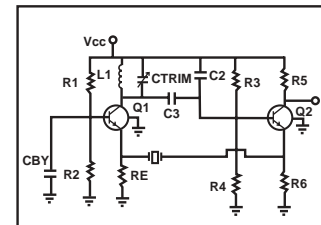
OVERTONE PIERCE



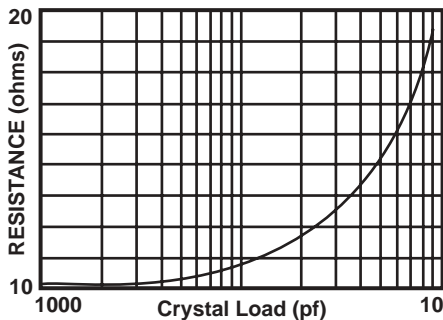
GROUNDING BASE BUTLER OSCILLATOR



GROUNDING BASE OSCILLATOR



TWO TRANSISTOR BUTLER OSCILLATOR



NOTE: Crystal loads should be kept between series and 10 pf. The lighter the load the higher the apparent series resistance. Tolerances at lighter loads cause more variations in crystal calibration tolerance.

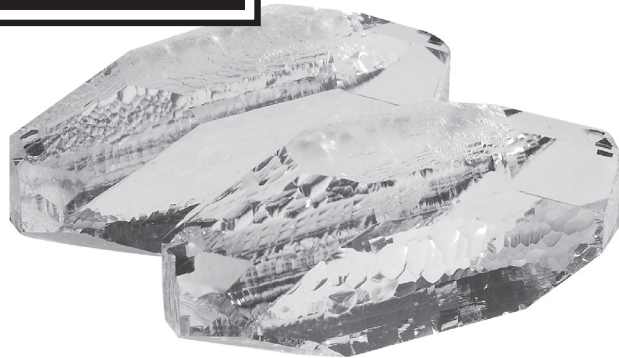


NOTES



LAND MOBILE RADIO

Original manufacturer's equipment numbers
referenced to ICM crystal catalog numbers for
commercially manufactured land mobile equipment.



International Crystal Manufacturing, Inc. P.O. Box 1768 • Oklahoma City, OK 73101-1768 • Phone (405) 236-3741
Fax (405) 235-1904 • Toll Free 1-800-725-1426 • 24 Hr. Toll Free Fax 1-800-322-9426 • www.icmfg.com • E-mail freeland@icmfg.com

CONTENTS

AEROTRON			
VHF-LO BAND (25-54MHZ)	7		
VHF-HI BAND (144-174MHZ)	7		
UHF BAND (440-512MHZ)	7,8		
EG&G			
800/950MHZ BAND	8		
FANON			
VHF-HI BAND (144-174MHZ)	8		
FORCE (UNIDEN)			
VHF-LO BAND (25-54MHZ)	8		
VHF-HI BAND (144-174MHZ)	8,9		
UHF BAND (440-512MHZ)	9		
GENERAL ELECTRIC			
2ND OSCILLATOR CRYSTALS/REFERENCE OSCILLATORS	9		
GENERAL ELECTRIC			
VHF-LO BAND (25-54MHZ)	9-11		
MID-BAND (66-88MHZ)	11,12		
VHF-HI BAND (132-174MHZ)	12-15		
VHF BAND .. (ABOVE 174MHZ)	15		
UHF BAND (406-512MHZ)	15-19		
800/950MHZ BAND	19		
JOHNSON			
VHF-LO BAND (25-54MHZ)	19		
VHF-HI BAND (144-174MHZ)	19,20		
UHF BAND (420-512MHZ)	20		
800/950MHZ BAND	20,21		
MAXON			
VHF-HI BAND (144-174MHZ)	21		
UHF BAND (406-512MHZ)	21		
MIDLAND			
VHF-LO BAND (25-54MHZ)	21		
VHF-HI BAND ... (132-174MHZ)	21,22		
VHF BAND .. (ABOVE 174MHZ)	22		
MIDLAND			
UHF BAND (406-512MHZ)	22		
MOTOROLA			
2ND OSCILLATOR CRYSTALS/REFERENCE OSCILLATOR	23		
MARINE BAND	23		
VHF-LO BAND (25-54MHZ)	24-27		
MID-BAND (66-88MHZ)	27		
VHF-HI BAND (132-174MHZ)	27-33		
VHF BAND .. (ABOVE 174MHZ)	33		
UHF BAND (400-512MHZ)	33-37		
800/950MHZ BAND	38		
2GHZ BAND	38		
2GHZ/6GHZ BAND	38,39		
NEC			
VHF-HI BAND (132-174MHZ)	39		
UHF BAND (406-512MHZ)	39,40		
NEULINK/CELLTRONICS			
800/950MHZ BAND	40		
OVENAIRE			
REFERENCE OSCILLATOR CRYSTALS	40		
RCA			
VHF-LO BAND (25-54MHZ)	40		
VHF-HI BAND ... (132-174MHZ)	40		
UHF BAND (406-512MHZ)	40,41		
REGENCY			
VHF-LO BAND (25-54MHZ)	41		
VHF-HI BAND ... (132-174MHZ)	41,42		
UHF BAND (440-512MHZ)	42		
REPCO			
VHF-LO BAND (25-54MHZ)	42		
VHF-HI BAND (132-174MHZ)	42,43		
VHF BAND .. (ABOVE 174MHZ)	43		
UHF BAND (440-512MHZ)	43		
950MHZ BAND	43		
RF COMM/HARRIS			
VHF-HI BAND ... (144-174MHZ)	43		
RITRON			
2ND OSCILLATOR CRYSTAL	43		
VHF-LO BAND (24-54MHZ)	43		
VHF-HI BAND ... (144-174MHZ)	43,44		
UHF BAND (420-512MHZ)	44		
STANDARD			
VHF-LO BAND (30-56MHZ)	44		
VHF-HI BAND (132-174MHZ)	45		
UHF BAND (406-512MHZ)	45		
800MHZ BAND	45		
TEMPO			
VHF-LO (30-54MHZ)	45		
VHF-HI (138-174MHZ)	45		
TRILECTRIC/CELLTRONICS			
MID-BAND (66-88MHZ)	46		
UHF BAND (450-512MHZ)	46		
UNIDEN			
UHF BAND (406-467MHZ)	46		
WILSON			
VHF-LO BAND (25-54MHZ)	46		
VHF-HI BAND (132-174MHZ)	46,47		
UHF BAND (440-512MHZ)	47		

Original Manufacturer To ICM Crossover Lists General Information

This book contains the ICM catalog number for crystals used in the most common land mobile radio equipment. The manufacturers are listed alphabetically and each group is divided into specific frequency ranges such as VHF-LO, VHF-HI etc.

If no listing or reference is found for the desired crystal type, please call or write ICM Sales Department for specific information. ICM maintains an extensive list of crystal data in our data base and it is not possible to list all the data in this publication.

How to Use The Crossover Lists

Listings within each manufacturer's Group. Each band of operation (operating frequency) is listed separately. **In some cases the original manufacturer's crystal part number or oscillator part number must be known.** Some listings are referenced to actual manufacturer's radio model numbers. Some manufacturer's use more than one series of part numbers; for the same crystal type, it may be necessary to cross numbers within the manufacturer's systems before attempting to cross to ICM numbers.

Exceptions. Due to a variation in requirements, such as low or high side injection options on receivers, multiplier factors, or oven/non oven use, etc., ICM may have two or more catalog numbers assigned for one particular manufacturer's number. **Please refer to the notes column for clarification.** The NOTES column should be reviewed carefully since most common errors in ordering are made when this information is disregarded.

Frequency of operation. Figures in parenthesis () indicate the operating frequency range in MHz. In some cases, the crystal formula is given to help in determining the proper catalog number.

Select the proper frequency range. There are several frequency groups listed. **Some manufacturer's use the same part number for crystals in two or more bands. Review the notes column carefully** to insure proper crystal specifications required. For second oscillator crystals and off-set crystals, please give the actual oscillation frequency needed. Also, if you desire a **non standard multiplier**, or receiver injection OPPOSITE to the figure noted, it **must be clearly indicated on your order.**

Data not listed. If you do not find data in this book for the crystal you require, please forward as much information as possible, such as equipment make, model, revision number, multiplier factor, receiver first IF and crystal physical size. If possible, forward a set of sample working crystals for evaluation. These crystals will be returned unharmed.

Every effort has been made to insure that these lists are accurate. Due to the complexity involved in establishing actual crystal parameters for all models, plus revisions, some errors may have occurred. ICM is concerned about the accuracy of the information contained in this publication and welcomes corrective information. Please direct all correspondence, inquiries, and orders to the attention of our sales department.

Expedited Service

ICM offers an "expedited" service on almost any type of crystal unit. ICM recommends using this service **ONLY FOR THE MOST**

TIME CRITICAL SITUATIONS. Call our Sales Department for price and Delivery times.

Pricing and Delivery

Delivery for most crystal orders in quantities of fifty or less is normally about two to three weeks. Recrystallizing of oscillator modules is normally three to four weeks. Call our Sales Department for current Pricing and Delivery time.

Terms and Conditions

Effective January 1st, 2003

1. ACCEPTANCE OF ORDER BY ICM

A. Terms and Conditions. Buyer's order to purchase crystals is accepted upon the terms and conditions stated in this Agreement. None of the terms and conditions set forth in Buyer's order to purchase that are additional to or conflict with the terms and conditions set forth in this Agreement shall be binding upon International Crystal Manufacturing, Inc. ("ICM") and ICM hereby rejects such inconsistent and additional terms and conditions, unless otherwise agreed to in writing by an authorized ICM representative.

B. Acknowledgement

Upon receipt of Buyer's order to purchase, ICM will send Buyer confirmation of Buyer's order along with the terms and conditions of the order to purchase. If Buyer objects to any terms and conditions of the order to purchase or if there is a discrepancy in Buyer's order, Buyer must notify ICM within five (5) business days of the date of confirmation. Buyer acknowledges that if it fails to notify ICM of any objections or discrepancies within five (5) days that Buyer accepts and is bound by all terms and conditions contained in this Agreement.

C. Governing Law

The terms of this Agreement and all rights and obligations under it shall be governed by the laws of the state of Oklahoma.

2. CANCELLATIONS

All orders are non-cancellable and non-returnable to ICM and cannot be changed by Buyer after such order has been acknowledged by ICM, unless otherwise agreed to in writing by an authorized ICM representative. Buyer shall be responsible for the full purchase price of any crystals any time after the order is entered for production by ICM.

3. MODIFICATIONS

Unless otherwise provided, ICM reserves the right to modify the specifications of crystals ordered by Buyer if the modifications do not materially affect the form, fit or function of the crystals.

4. PRICES

A. Price Change

Unless otherwise agreed to in writing by an authorized ICM representative, all prices are subject to change without notice and will be established by ICM at the time of the order acceptance.

B. Errors

ICM will not be responsible for errors occurring during the transmission of the order to ICM or errors made by Buyer.

C. Taxes and Other Charges

Unless otherwise stated in writing by ICM all prices quoted shall be exclusive of transportation, taxes, and insurance (including without limitation any sales, use or similar tax). Such taxes and other charges will appear as separate additional items on ICM invoices.

5. PAYMENT

Unless otherwise agreed to in writing by an authorized ICM representative, payment for any order to purchase is due prior to or at the time of the submission of the order to purchase.

A. Late Payment. A one percent (1%) service charge will be added for every month that the amount due remains unpaid after the due date.

B. Security Interest. ICM retains a purchase money security interest under the Uniform Commercial Code as enacted in the state of Oklahoma in the crystals purchased from ICM until Buyer has paid in full. In the event of default by Buyer under these terms and conditions, ICM shall have the rights and remedies of a secured creditor under the Uniform Commercial Code.

C. Termination. In the event Buyer fails to comply with any payment obligation to ICM, ICM shall have the right to cancel orders to purchase of Buyer. In the event ICM shall have reasonable grounds to doubt, at any time, Buyer's financial responsibility to perform under the contract, ICM shall demand in writing adequate assurances of performance from Buyer and shall, until such assurances are received from Buyer, suspend its performance under the contract. Upon receipt of a justified demand, as provided hereunder, Buyer's failure to provide adequate assurances of performance, acceptable to ICM, within two (2) business days of receipt of such notice, shall be considered a repudiation of the contract.

6. SHIPMENT

A. F.O.B. Point. All prices are F.O.B. ICM's plant unless otherwise agreed to in writing by an authorized ICM representative. Buyer shall pay all transportation costs.

B. Method of Shipment. Normally ICM will ship in accordance with Buyer's shipping instructions. In absence of specific instructions or if Buyer's instructions are deemed unsuitable, ICM reserves the right to ship by the most appropriate methods.

7. RISK OF LOSS

Unless otherwise agreed to in writing by an authorized ICM representative, all sales under this Agreement shall be F.O.B. ICM's plant and title to the crystals and risk of loss and damage shall pass to Buyer upon delivery to the carrier at ICM's plant.

8. DELIVERY DATES

ICM will make every reasonable effort to meet delivery date(s) quoted. However, ICM will not be liable for its failure to meet the quoted delivery date(s) or for any other delay in performance due to unforeseen circumstances or causes beyond ICM's control including, but not limited to, any delays due to strikes, riots, acts of God, shortages of labor or materials, terrorist strikes, war, governmental laws, regulations, or restrictions, or any other causes of any kind.

9. PACKING

All crystals shall be packed, if appropriate, for shipment and storage in accordance with standard commercial practice. All packing will conform to requirements of carrier's tariffs.

10. COPYRIGHTED MATERIAL

ICM's copyrighted material may not be copied onto any media, for any purpose without ICM's approval in writing.

11. WARRANTY

ICM warrants to Buyer that its crystals substantially conform to all specifications, which may be contained in the ICM

publications and are free from defects in material and manufacture as of the date the crystals are shipped by ICM. ICM's guarantee provides that:

A. The crystal will be within tolerance and will be guaranteed only to work in the equipment or oscillator load.

B. All ICM crystals are guaranteed against defective materials and workmanship for one (1) year when used in the correct equipment or oscillator load.

C. All crystals should be checked immediately upon receipt. Buyer must report any discrepancies in the packing slip to ICM within five (5) days of receipt of order. The crystals should then be returned for inspection and replacement.

D. All crystals are guaranteed to meet the specifications as listed on ICM's current catalog crystal information sheets.

E. IMPORTANT. Please keep the packing slip until the crystals have been checked for proper operation in your equipment. If there are any questions please return the packing slip with the crystals since it gives the ICM catalog number, factory order number, etc. so that we may follow through with your questions. Without this information your inquiry may be delayed.

12. RETURN CRYSTAL POLICY

A. These crystals were custom made to Buyer's order and are not stock items, therefore, the guarantee applies only when the crystals have been returned to ICM, and the tests applied by our ICM technicians indicate that the crystals are defective. When it is necessary for Buyer to request that replacement crystals be sent before the original crystals are returned, the replacement crystals will be forwarded and billed.

B. If replacements are ordered, the defective crystals, when returned, will be tested and inspected for operation in the circuit for which they were originally processed, and if found to be defective because of defective materials or poor workmanship, ICM will repair or replace the crystals on a no-charge basis, and return the crystals to Buyer, freight prepaid and insured by ICM.

C. Any products deemed not defective and not qualifying for warranty work will be returned at Buyer's risk and expense. ICM may charge Buyer its standard rates for any handling of such products.

13. LIMITATION OF WARRANTY

This warranty is extended to Buyer only. The foregoing warranty shall not apply to defects resulting from:

A. Physical damage to the crystal if it has been opened or broken in the field.

B. Discrepancies in the packing slip that Buyer fails to report within the five (5) days of receipt of the crystals.

C. Crystals found defective because of operation in circuits producing excessive drive.

D. Customer error other than those circumstances covered by warranty.

14. ASSIGNMENT

Any attempt to assign or transfer any of the rights, duties or obligations under this agreement shall render such assignment or transfer to be null and void.

15. SEVERABILITY

In the event that any term or condition contained in this Agreement should for any reason be declared invalid, the

remaining terms and conditions shall remain in full force and effect.

16. ADDITIONAL TERMS

No U.S. Government Procurement Regulations or Foreign Government Regulations required to be included hereunder shall be binding on either party unless specifically agreed to in writing prior to incorporation herein.

17. DISCLAIMER OF WARRANTY

THE WARRANTIES SET FORTH IN THIS AGREEMENT ARE EXCLUSIVE AND EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR STATUTORY, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NONINFRINGEMENT, ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM A COURSE OF DEALING OR TRADE OR ANY OTHER OBLIGATION OF ICM.

18. REMEDIES AND LIMITATION OF LIABILITY

BUYERS, SOLE AND EXCLUSIVE REMEDY, AND ICM'S SOLE LIABILITY, WITH RESPECT TO ANY BREACH OF WARRANTY, SHALL BE AT ICM'S OPTION: (A) REPAIR OR REPLACEMENT OF THE DEFECTIVE OR NONCONFORMING CRYSTALS OR (B) REFUND OF BUYER'S PURCHASE PRICE FOR THE DEFECTIVE OR NONCONFORMING CRYSTALS.

IN NO EVENT WILL ICM'S TOTAL LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES ARISING OUT OF ANY CAUSE (INCLUDING, BUT NOT LIMITED TO, CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER TORT) EXCEED THE PURCHASE COST OF THE CRYSTALS OR AT THE OPTION OF ICM THE REPLACEMENT COST OF THE CRYSTALS. IN NO EVENT SHALL ICM BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES RESULTING FROM SUCH CAUSE. This warranty does not cover damages that occur during shipment. Claims for damages in shipment should be made in accordance with the terms of the shipping agreements.

19. SUBSEQUENT PURCHASERS

The terms and conditions of this Agreement, including but not limited to the disclaimer of warranties, remedies and limitations of liability, extend to all subsequent purchasers of ICM's crystals, including where the crystals are a component of a product. BUYER SHALL INCLUDE A COPY OF THESE TERMS AND CONDITIONS IN ANY SALE TO A SUBSEQUENT PURCHASER. If Buyer fails to include this notice to any subsequent purchaser, Buyer shall indemnify ICM for any liability resulting from Buyer's failure to include such notice.

20. ENTIRE AGREEMENT

This Agreement constitutes the entire agreement and understanding between the parties with respect to the subject matter hereof and cannot be amended, waived, or modified unless the parties so agree in writing. This Agreement supersedes all prior agreements or assertions whether oral or written in all communications between parties.

Oscillator Module Service

ICM can recrystal customer supplied oscillator modules

(channel elements) used in most modern commercial two-way communications equipment. The service we offer includes the following steps:

1. Testing the element upon receipt
2. Removing existing crystal
3. Installing new crystal
4. Checking RF output and trimmability (where applicable)
5. Zeroing to center frequency (where applicable)
6. Testing for accuracy over specified temperature range (where applicable)
7. Relabeling element for new frequency

The oscillator modules (elements) are checked for proper operation when received. If repair is needed (transistor, capacitor, etc.), it will be replaced at a nominal charge. An oscillator that has been damaged and/or unrepairable will not be accepted for frequency modification, and will be returned to the customer with no action taken.

After the new crystal has been installed, the module is tested for nominal frequency and trimmability at room temperature, overall frequency specifications over the specified temperature range and RF output. If the module uses a compensation network, ICM will make adjustments necessary to insure that the frequency drift due to temperature does not exceed the original manufacturer's tolerances. Some modules have the crystal and a few compensation components only, not the entire oscillator assembly; in these cases the unit is spot checked using an oscillator of the required type. In addition, some modules such as offset type units are actively modulated; these units are set up on a test fixture and tested to insure proper deviation.

ICM will evaluate questionable modules for proper operation and supply a written report of condition for a nominal fee.

For pricing and delivery of complete channel elements modules (TCXOs) contact ICM Sales Department.

Oscillator module recrystalling can be performed utilizing ICM's "EXPEDITED" service. Call or write ICM Sales Department for pricing and delivery times.

Note: The ICM stock of reconditioned elements changes daily. We cannot guarantee that all types are available at all times. Please contact ICM Sales concerning availability of type and quantity of element needed.

MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
AEROTRON VHF-LO BAND (25-54MHZ)					
AEROTRON	AEROCOM 7	T		(36-54)	231041
AEROTRON	1939-1081-101	T		(36-54)	231041
AEROTRON	2314-0722-049	T		(36-54)	231041
AEROTRON	MPAC-7	T		(36-54)	231041
AEROTRON	70TT50	T		(36-54)	231041
AEROTRON	70RT50	T		(36-54)	231041
AEROTRON	AEROCOM 7	R	5PPM	(42-54)	231121
AEROTRON	2314-0722-040	R	5PPM	(42-54)	231121
AEROTRON	1939-1081-102	R	5PPM	(42-54)	231121
AEROTRON	70TT50	R	5PPM	(42-54)	231121
AEROTRON	70RT50	R	5PPM	(42-54)	231121
AEROTRON	MPAC-7	R	5PPM	(42-54)	231121
AEROTRON VHF-HI BAND (144-174MHZ)					
AEROTRON	MPAC-6	R		(132-148)	230871
AEROTRON	1939-0802	R		(132-148)	230871
AEROTRON	2323-0648-041	R		(132-148)	230871
AEROTRON	60RT60	R		(132-148)	230871
AEROTRON	60RT100	R		(132-148)	230871
AEROTRON	600TT30	R		(132-148)	230871
AEROTRON	MPAC-6	T		(132-174)	230791
AEROTRON	1939-0802	T		(132-174)	230791
AEROTRON	2323-0645-079	T		(132-174)	230791
AEROTRON	60RT60	T		(132-174)	230791
AEROTRON	600TT30	T		(132-174)	230791
AEROTRON	60RT100	T		(132-174)	230791
AEROTRON	MPAC-6	T		(144-174)	231196
AEROTRON	1939-0739-102	T		(144-174)	231196
AEROTRON	MPAC-6	R		(144-174)	231197
AEROTRON	1939-0739-103	R		(144-174)	231197
AEROTRON	MPAC-6	R		(148-174)	231061
AEROTRON	1932-0802	R		(148-174)	231061
AEROTRON	2323-0648-041	R		(148-174)	231061
AEROTRON	60RT60	R		(148-174)	231061
AEROTRON	60RT100	R		(148-174)	231061
AEROTRON	600TT30	R		(148-174)	231061
AEROTRON UHF BAND (440-512MHZ)					
AEROTRON	CONCEPT	T		(440-512)	231161
AEROTRON	1939-0824-113	T		(440-512)	231161
AEROTRON	80CD30	T		(440-512)	231161
AEROTRON	80CD20	T		(440-512)	231161
AEROTRON	APC9RB80CD20	T		(440-512)	231161
AEROTRON	CONCEPT	R		(440-512)	231162
AEROTRON	1939-0824-112	R		(440-512)	231162

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
AEROTRON UHF BAND (440-512MHZ) continued					
AEROTRON	80CD30	R		(440-512)	231162
AEROTRON	80CD20	R		(440-512)	231162
AEROTRON	APC9RB80CD20	R		(440-512)	231162
AEROTRON	MPAC-8	T		(440-512)	231165
AEROTRON	1939-0802-110	T		(440-512)	231165
AEROTRON	80BT90	T		(440-512)	231165
AEROTRON	DTM800	T		(440-512)	231165
AEROTRON	MPAC-8	R		(440-512)	231166
AEROTRON	1932-0802-134	R		(440-512)	231166
AEROTRON	80BT90	R		(440-512)	231166
AEROTRON	DTM800	R		(440-512)	231166
AEROTRON	800TT25	T		(440-512)	231169
AEROTRON	1939-0802-110	T		(440-512)	231169
AEROTRON	PAC II	T		(440-512)	231172
AEROTRON	APC9RC80PM2	T		(440-512)	231172
AEROTRON	PAC II	R		(440-512)	231173
AEROTRON	APC9RC80PM2	R		(440-512)	231173
AEROTRON	MPAC-8	T	2PPM	(440-512)	231177
AEROTRON	1939-0802-110	T	2PPM	(440-512)	231177
AEROTRON	MPAC-8	R	2PPM	(440-512)	231178
AEROTRON	1939-0802-134	R	2PPM	(440-512)	231178

EG&G 800/950 MHZ BAND

EG&G	26-1119A04	T		(903-960)	565127
EG&G	26-1000A05	R		(903-960)	565128

FANON VHF-HI BAND (144-174MHZ)

FANON	M-54	T		(144-174)	580035
FANON	COURIER	T		(144-174)	580035
FANON	PROCOM	T		(144-174)	580035
FANON	M-54	R		(144-174)	580036
FANON	COURIER	R		(144-174)	580036
FANON	PROCOM	R		(144-174)	580036

FORCE (UNIDEN) VHF-LO BAND (25-54MHZ)

FORCE (UNIDEN)	AXT-30L	T		(29.7-54)	585120
FORCE (UNIDEN)	AXR-40L	R		(29.7-54)	585121

FORCE (UNIDEN) VHF-HI BAND (144-174MHZ)

FORCE (UNIDEN)	AXT-50L	T		(144-174)	585112
FORCE (UNIDEN)	APU	T		(144-174)	585112
FORCE (UNIDEN)	ABU	T		(144-174)	585112
FORCE (UNIDEN)	AMU	T		(144-174)	585112
FORCE (UNIDEN)	IMH	T		(144-174)	585112
FORCE (UNIDEN)	APH	T		(144-174)	585112
FORCE (UNIDEN)	AMH	T		(144-174)	585112
FORCE (UNIDEN)	AXR-60L	R		(144-174)	585113

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
FORCE (UNIDEN) VHF-HI BAND (144-174MHZ) continued					
FORCE (UNIDEN)	ARH	R		(144-174)	585113
FORCE (UNIDEN)	ARU	R		(144-174)	585113
FORCE (UNIDEN)	IMH	R		(144-174)	585113
FORCE (UNIDEN)	APU	R		(144-174)	585113
FORCE (UNIDEN)	ABU	R		(144-174)	585113
FORCE (UNIDEN)	AMU	R		(144-174)	585113
FORCE (UNIDEN)	AMH	R		(144-174)	585113
FORCE (UNIDEN)	APH	R		(144-174)	585113
FORCE (UNIDEN) UHF BAND (440-512MHZ)					
FORCE (UNIDEN)	AXT-50L	T		(406-512)	585105
FORCE (UNIDEN)	ABH	T		(406-512)	585105
FORCE (UNIDEN)	ABU	T		(406-512)	585105
FORCE (UNIDEN)	APH	T		(406-512)	585105
FORCE (UNIDEN)	ARH	T		(406-512)	585105
FORCE (UNIDEN)	IMU	T		(406-512)	585105
FORCE (UNIDEN)	AMU	T		(406-512)	585105
FORCE (UNIDEN)	AMH	T		(406-512)	585105
FORCE (UNIDEN)	AXR-60L	R		(406-512)	585106
FORCE (UNIDEN)	ABH	R		(406-512)	585106
FORCE (UNIDEN)	ABU	R		(406-512)	585106
FORCE (UNIDEN)	ARH	R		(406-512)	585106
FORCE (UNIDEN)	ARU	R		(406-512)	585106
FORCE (UNIDEN)	IMU	R		(406-512)	585106
FORCE (UNIDEN)	APH	R		(406-512)	585106
FORCE (UNIDEN)	AXT-70L	T		(406-512)	585122
GENERAL ELECTRIC 2ND OSCILLATOR CRYSTALS/REFERENCE OSCILLATORS					
GENERAL ELECTRIC	19B233066G8		2ND OSCILLATOR CRYSTAL	(45.455)	23773
GENERAL ELECTRIC	CENTURY II		2ND OSCILLATOR CRYSTAL	(45.455)	23773
GENERAL ELECTRIC	19A136999G11		REF OSCILLATOR	(10.00)	19A136999G11
GENERAL ELECTRIC VHF-LO BAND (25-54MHZ)					
GENERAL ELECTRIC	19A129393G6	R	"EC,5C +11.2/3"	(25-30 & 36-42)	20630
GENERAL ELECTRIC	19A129393G10	R	"EC,5C +11.2/3"	(25-30 & 36-42)	20630
GENERAL ELECTRIC	MASTER II	R	"EC,5C +11.2/3"	(25-30 & 36-42)	20630
GENERAL ELECTRIC	MASTR II	R	"EC,5C +11.2/3"	(25-30 & 36-42)	20630
GENERAL ELECTRIC	19A129393G9	R	"EC,5C +11.2/3"	(25-30 & 36-42)	20630
GENERAL ELECTRIC	19A129393G2	R	2C	(25-30 & 36-42)	23831
GENERAL ELECTRIC	MASTER II	R	2C	(25-30 & 36-42)	23831
GENERAL ELECTRIC	MASTR II	R	2C	(25-30 & 36-42)	23831
GENERAL ELECTRIC	7489151P1	R	FC-3.2	(25-34.9)	20171
GENERAL ELECTRIC	7489151P3	R	FC-3.2	(25-34.9)	20171
GENERAL ELECTRIC	4ER24A1	R	FC-3.2	(25-34.9)	20171
GENERAL ELECTRIC	4ER24A2	R	FC-3.2	(25-34.9)	20171
GENERAL ELECTRIC	4ER24B1	R	FC-3.2	(25-34.9)	20171

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC VHF-LO BAND (25-54MHZ) continued					
GENERAL ELECTRIC	4ER24B2	R	FC-3.2	(25-34.9)	20171
GENERAL ELECTRIC	PROGRESS	R	FC-3.2	(25-34.9)	20171
GENERAL ELECTRIC	MASTER PRO	T		(25-35.9)	20480
GENERAL ELECTRIC	MASTR PRO	T		(25-35.9)	20480
GENERAL ELECTRIC	19B206175P1	T		(25-35.9)	20480
GENERAL ELECTRIC	19B206175P11	T		(25-35.9)	20480
GENERAL ELECTRIC	19B206576P1	R	5.3/3	(25-42)	20510
GENERAL ELECTRIC	19B206576P2	R	5.3/3	(25-42)	20510
GENERAL ELECTRIC	MASTER PRO	R	5.3/3	(25-42)	20510
GENERAL ELECTRIC	MASTR PRO	R	5.3/3	(25-42)	20510
GENERAL ELECTRIC	19A129393G16	T	"EC,5C"	(25-54)	20620
GENERAL ELECTRIC	19A129393G19	T	"EC,5C"	(25-54)	20620
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(25-54)	20620
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(25-54)	20620
GENERAL ELECTRIC	KT31A	T	"EC,5C"	(25-54)	20620
GENERAL ELECTRIC	19B226962G1	T	5PPM	(25-54)	23011
GENERAL ELECTRIC	19B226962G2	T	5PPM	(25-54)	23011
GENERAL ELECTRIC	19B226962G3	T	5PPM	(25-54)	23011
GENERAL ELECTRIC	MASTER EXEC II	T	5PPM	(25-54)	23011
GENERAL ELECTRIC	MASTR EXEC II	T	5PPM	(25-54)	23011
GENERAL ELECTRIC	19A137763G16	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	19A137763G19	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT30	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT31	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT39	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT56	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT57	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT58	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT60	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	KT61	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(25-54)	23650
GENERAL ELECTRIC	19A129393G13	T	2C	(25-54)	23830
GENERAL ELECTRIC	MASTER II	T	2C	(25-54)	23830
GENERAL ELECTRIC	MASTR II	T	2C	(25-54)	23830
GENERAL ELECTRIC	19A129393G5	R	"EC,5C"	(30-36 & 42-54)	20640
GENERAL ELECTRIC	19A129393G9	R	"EC,5C"	(30-36 & 42-54)	20640
GENERAL ELECTRIC	MASTER II	R	"EC,5C"	(30-36 & 42-54)	20640
GENERAL ELECTRIC	MASTR II	R	"EC,5C"	(30-36 & 42-54)	20640
GENERAL ELECTRIC	ER63A	R	"EC,5C"	(30-36 & 42-54)	20640
GENERAL ELECTRIC	19A137763G5	R	"EC,5C +9.4/3"	(30-36 & 42-54)	23660
GENERAL ELECTRIC	19A137763G9	R	"EC,5C +9.4/3"	(30-36 & 42-54)	23660
GENERAL ELECTRIC	MASTER II	R	"EC,5C +9.4/3"	(30-36 & 42-54)	23660
GENERAL ELECTRIC	MASTR II	R	"EC,5C +9.4/3"	(30-36 & 42-54)	23660

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC VHF-LO BAND (25-54MHZ) continued					
GENERAL ELECTRIC	19A129393G1	R	2C	(30-36 & 42-54)	23832
GENERAL ELECTRIC	MASTER II	R	2C	(30-36 & 42-54)	23832
GENERAL ELECTRIC	MASTR II	R	2C	(30-36 & 42-54)	23832
GENERAL ELECTRIC	19B226962G10	R	9.4/3	(30-36)	23360
GENERAL ELECTRIC	ER88A	R	9.4/3	(30-36)	23360
GENERAL ELECTRIC	MASTER EXEC II	R	9.4/3	(30-36)	23360
GENERAL ELECTRIC	MASTR EXEC II	R	9.4/3	(30-36)	23360
GENERAL ELECTRIC	19B206357G18	R	-5.3/2	(33-42)	20400
GENERAL ELECTRIC	19B206357G15	R	-5.26/2	(33-42)	20590
GENERAL ELECTRIC	ER43	R	-5.26/2	(33-42)	20590
GENERAL ELECTRIC	ER51	R	-5.26/2	(33-42)	20590
GENERAL ELECTRIC	MONITOR	R	-5.26/2	(33-42)	20590
GENERAL ELECTRIC	7147191P1	T	NON OVEN USE	(36-54)	20150
GENERAL ELECTRIC	4ET22	T	NON OVEN USE	(36-54)	20150
GENERAL ELECTRIC	4ET23	T	NON OVEN USE	(36-54)	20150
GENERAL ELECTRIC	PROGRESS	T	NON OVEN USE	(36-54)	20150
GENERAL ELECTRIC	MASTER PRO	T		(36-54)	20470
GENERAL ELECTRIC	MASTR PRO	T		(36-54)	20470
GENERAL ELECTRIC	19B206175P2	T		(36-54)	20470
GENERAL ELECTRIC	19B206175P3	T		(36-54)	20470
GENERAL ELECTRIC	19B206175P21	T		(36-54)	20470
GENERAL ELECTRIC	19B206175P31	T		(36-54)	20470
GENERAL ELECTRIC	19B206576P3	R	-5.3/3	(42-54)	20520
GENERAL ELECTRIC	MASTER PRO	R	-5.3/3	(42-54)	20520
GENERAL ELECTRIC	MASTR PRO	R	-5.3/3	(42-54)	20520
GENERAL ELECTRIC	19B206357G16	R	-5.26/3	(42-54)	20610
GENERAL ELECTRIC	ER43	R	-5.26/3	(42-54)	20610
GENERAL ELECTRIC	ER51	R	-5.26/3	(42-54)	20610
GENERAL ELECTRIC	MONITOR	R	-5.26/3	(42-54)	20610
GENERAL ELECTRIC	19B226962G12	R	9.4/3	(42-54)	23380
GENERAL ELECTRIC	ER88A	R	9.4/3	(42-54)	23380
GENERAL ELECTRIC	MASTER EXEC II	R	9.4/3	(42-54)	23380
GENERAL ELECTRIC	MASTR EXEC II	R	9.4/3	(42-54)	23380

GENERAL ELECTRIC MID-BAND (66-88MHZ)

GENERAL ELECTRIC	19B206175P4	T		(66-88)	20780
GENERAL ELECTRIC	19B206175P5	T		(66-88)	20780
GENERAL ELECTRIC	Master Professional	T		(66-88)	20780
GENERAL ELECTRIC	Mastr Professional	T		(66-88)	20780
GENERAL ELECTRIC	ET56	T		(66-88)	20780
GENERAL ELECTRIC	19B206576P6	R		(66-88)	20790
GENERAL ELECTRIC	19B206576P7	R		(66-88)	20790
GENERAL ELECTRIC	Master Professional	R		(66-88)	20790
GENERAL ELECTRIC	Mastr Professional	R		(66-88)	20790
GENERAL ELECTRIC	19A129393G39	T	"EC,5C"	(66-88)	20885
GENERAL ELECTRIC	19A129393G40	T	"EC,5C"	(66-88)	20885

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC MID-BAND (66-88MHZ) continued					
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(66-88)	20885
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(66-88)	20885
GENERAL ELECTRIC	19A129393G36	R	"EC,5C"	(66-88)	20886
GENERAL ELECTRIC	19A129393G37	R	"EC,5C"	(66-88)	20886
GENERAL ELECTRIC	MASTER II	R	"EC,5C"	(66-88)	20886
GENERAL ELECTRIC	MASTR II	R	"EC,5C"	(66-88)	20886
GENERAL ELECTRIC	19B226962G33	R		(66-88)	23600
GENERAL ELECTRIC	19B226962G34	R		(66-88)	23600
GENERAL ELECTRIC	MASTER EXEC II	R		(66-88)	23600
GENERAL ELECTRIC	MASTR EXEC II	R		(66-88)	23600
GENERAL ELECTRIC	19A129393G35	R	2C	(66-88)	23781
GENERAL ELECTRIC	MASTER II	R	2C	(66-88)	23781
GENERAL ELECTRIC	MASTR II	R	2C	(66-88)	23781

GENERAL ELECTRIC VHF-HI BAND (132-174MHZ)					
GENERAL ELECTRIC	19B206221P1	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	ER52	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	ER48	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	ER51	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	ER44	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	MASTER EXEC	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	MASTR EXEC	R	-10.7/3	(132-174)	21320
GENERAL ELECTRIC	SICOM	T		(136-174)	21340
GENERAL ELECTRIC	ET59	T		(136-174)	21340
GENERAL ELECTRIC	ET90	T		(136-174)	21340
GENERAL ELECTRIC	ET95	T		(136-174)	21340
GENERAL ELECTRIC	ET96	T		(136-174)	21340
GENERAL ELECTRIC	4EG27A10	T		(136-174)	21340
GENERAL ELECTRIC	19A129393G(XX)	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	MASTER EXEC	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	19A129393G17	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	19A129393G20	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	MASTR EXEC	T	"EC,5C"	(138-174)	21410
GENERAL ELECTRIC	19A130605G(XX)	T	"EC,5C"	(138-174)	23450
GENERAL ELECTRIC	19A130605G15	T	"EC,5C"	(138-174)	23450
GENERAL ELECTRIC	19A130605G9	T	"EC,5C"	(138-174)	23450
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(138-174)	23450
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(138-174)	23450
GENERAL ELECTRIC	19A129393G(XX)	T	2C	(138-174)	23480
GENERAL ELECTRIC	19A129393G14	T	2C	(138-174)	23480
GENERAL ELECTRIC	MASTER II	T	2C	(138-174)	23480
GENERAL ELECTRIC	MASTR II	T	2C	(138-174)	23480
GENERAL ELECTRIC	19A137763G(XX)	T	"EC,5C"	(138-174)	23560

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC VHF-HI BAND (132-174MHZ) continued					
GENERAL ELECTRIC	19A137763G17	T	"EC,5C"	(138-174)	23560
GENERAL ELECTRIC	19A137763G20	T	"EC,5C"	(138-174)	23560
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(138-174)	23560
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(138-174)	23560
GENERAL ELECTRIC	19A137763G(XX)	R	"EC,5C"	(138-174)	23570
GENERAL ELECTRIC	19A137763G7	R	"EC,5C"	(138-174)	23570
GENERAL ELECTRIC	19A137763G11	R	"EC,5C"	(138-174)	23570
GENERAL ELECTRIC	MASTER II	R	"EC,5C"	(138-174)	23570
GENERAL ELECTRIC	MASTR II	R	"EC,5C"	(138-174)	23570
GENERAL ELECTRIC	19A130605G(XX)	T	2C	(138-174)	23640
GENERAL ELECTRIC	19A130605G2	T	2C	(138-174)	23640
GENERAL ELECTRIC	MASTER II	T	2C	(138-174)	23640
GENERAL ELECTRIC	MASTR II	T	2C	(138-174)	23640
GENERAL ELECTRIC	19A137763G(XX)	T	2C	(138-174)	23700
GENERAL ELECTRIC	19A137763G14	T	2C	(138-174)	23700
GENERAL ELECTRIC	MASTER II	T	2C	(138-174)	23700
GENERAL ELECTRIC	MASTR II	T	2C	(138-174)	23700
GENERAL ELECTRIC	19A137763G(XX)	R	2C	(138-174)	23710
GENERAL ELECTRIC	19A137763G3	R	2C	(138-174)	23710
GENERAL ELECTRIC	MASTER II	R	2C	(138-174)	23710
GENERAL ELECTRIC	MASTR II	R	2C	(138-174)	23710
GENERAL ELECTRIC	19A129393GXX	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	19A129393G11	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	19A129393G7	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	ER64A	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	MASTER EXEC II	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	MASTR EXEC II	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	MASTER II	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	MASTR II	R	"EC,5C HIGH SIDE +11.2/9"	(138-174)	21420H
GENERAL ELECTRIC	19A129393GXX	R	2C HIGH SIDE +11.2/9	(138-174)	23490H
GENERAL ELECTRIC	19A129393G3	R	2C HIGH SIDE +11.2/9	(138-174)	23490H
GENERAL ELECTRIC	MASTER II	R	2C HIGH SIDE +11.2/9	(138-174)	23490H
GENERAL ELECTRIC	MASTR II	R	2C HIGH SIDE +11.2/9	(138-174)	23490H
GENERAL ELECTRIC	19B206175P6	T		(144-174)	21230
GENERAL ELECTRIC	19B206175P7	T		(144-174)	21230
GENERAL ELECTRIC	19B206175P70	T		(144-174)	21230
GENERAL ELECTRIC	Master Professional	T		(144-174)	21230
GENERAL ELECTRIC	Mastr Professional	T		(144-174)	21230
GENERAL ELECTRIC	19B206576P4	R	-5.3/9	(144-174)	21240
GENERAL ELECTRIC	19B206576P5	R	-5.3/9	(144-174)	21240
GENERAL ELECTRIC	Master Professional	R	-5.3/9	(144-174)	21240
GENERAL ELECTRIC	Mastr Professional	R	-5.3/9	(144-174)	21240
GENERAL ELECTRIC	19B226962G(XX)	T	5PPM	(144-174)	22960
GENERAL ELECTRIC	CUSTOM MVP	T	5PPM	(144-174)	22960

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC VHF-HI BAND (132-174MHZ) continued					
GENERAL ELECTRIC	KT137	T	5PPM	(144-174)	22960
GENERAL ELECTRIC	KT121	T	5PPM	(144-174)	22960
GENERAL ELECTRIC	KT124	T	5PPM	(144-174)	22960
GENERAL ELECTRIC	KT134	T	5PPM	(144-174)	22960
GENERAL ELECTRIC	19B226962G5	T	5PPM	(144-174)	22960
GENERAL ELECTRIC	19B226962G(XX)	R	-11.2/9	(144-174)	22970
GENERAL ELECTRIC	19B226962G14	R	-11.2/9	(144-174)	22970
GENERAL ELECTRIC	CUSTOM MVP	R	-11.2/9	(144-174)	22970
GENERAL ELECTRIC	ER92	R	-11.2/9	(144-174)	22970
GENERAL ELECTRIC	ER89	R	-11.2/9	(144-174)	22970
GENERAL ELECTRIC	19B233066G1	T		(144-174)	23530
GENERAL ELECTRIC	19B233066G3	T		(144-174)	23530
GENERAL ELECTRIC	KT172	T		(144-174)	23530
GENERAL ELECTRIC	KT171	T		(144-174)	23530
GENERAL ELECTRIC	CENTURY II	T		(144-174)	23530
GENERAL ELECTRIC	PHOENIX	T		(144-174)	23530
GENERAL ELECTRIC	19B233066G2	R	5PPM	(144-174)	23540
GENERAL ELECTRIC	ER111A	R	5PPM	(144-174)	23540
GENERAL ELECTRIC	CENTURY II	R	5PPM	(144-174)	23540
GENERAL ELECTRIC	PHOENIX	R	5PPM	(144-174)	23540
GENERAL ELECTRIC	19A701562G6	T		(144-174)	23800
GENERAL ELECTRIC	19A701562G1	T		(144-174)	23800
GENERAL ELECTRIC	KT215A	T		(144-174)	23800
GENERAL ELECTRIC	DELTA	T		(144-174)	23800
GENERAL ELECTRIC	19A701562G6	R		(144-174)	23810
GENERAL ELECTRIC	19A701562G1	R		(144-174)	23810
GENERAL ELECTRIC	ER139	R		(144-174)	23810
GENERAL ELECTRIC	DELTA	R		(144-174)	23810
GENERAL ELECTRIC	19A702375G1	T		(144-174)	23864
GENERAL ELECTRIC	MPI	T		(144-174)	23864
GENERAL ELECTRIC	19A702375G2	R		(144-174)	23865
GENERAL ELECTRIC	MPI	R		(144-174)	23865
GENERAL ELECTRIC	19B226962GXX	R	HIGH SIDE INJECTION +11.2/9	(144-174)	22970H
GENERAL ELECTRIC	19B226962G14	R	HIGH SIDE INJECTION +11.2/9	(144-174)	22970H
GENERAL ELECTRIC	ER89	R	HIGH SIDE INJECTION +11.2/9	(144-174)	22970H
GENERAL ELECTRIC	ER92	R	HIGH SIDE INJECTION +11.2/9	(144-174)	22970H
GENERAL ELECTRIC	MVP	R	HIGH SIDE INJECTION +11.2/9	(144-174)	22970H
GENERAL ELECTRIC	4034643P1	T	FC/12	(146-174)	21500
GENERAL ELECTRIC	PACER	T	FC/12	(146-174)	21500
GENERAL ELECTRIC	4EG15A10	T	FC/12	(146-174)	21500
GENERAL ELECTRIC	4034643P2	R	-4.3/12	(146-174)	21510
GENERAL ELECTRIC	PACER	R	-4.3/12	(146-174)	21510
GENERAL ELECTRIC	SICOM	R	-20/9	(150.8-174)	21360
GENERAL ELECTRIC	4EG36A10	R	-20/9	(150.8-174)	21360

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC VHF-HI BAND (132-174MHZ) continued					
GENERAL ELECTRIC	4EG28A11	R	-20/9	(150.8-174)	21360
GENERAL ELECTRIC	ER59	R	-20/9	(150.8-174)	21360
GENERAL ELECTRIC	19A129393G(XX)	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	MASTER II	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	MASTR II	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	MASTR EXEC II	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	MASTER EXEC II	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	19A129393G11	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	19A129393G7	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	ER64A	R	"EC,5C -11.2/9"	(150.8-174)	21420
GENERAL ELECTRIC	19A129393G(XX)	R	2C -11.2/9	(150.8-174)	23490
GENERAL ELECTRIC	19A129393G3	R	2C -11.2/9	(150.8-174)	23490
GENERAL ELECTRIC	MASTER II	R	2C -11.2/9	(150.8-174)	23490
GENERAL ELECTRIC	MASTR II	R	2C -11.2/9	(150.8-174)	23490
GENERAL ELECTRIC	EXEC II/ BEACON	R		(150-174)	23867
GENERAL ELECTRIC	BQ119A	R		(150-174)	23867
GENERAL ELECTRIC	19A704781P2	R		(150-174)	23867
GENERAL ELECTRIC VHF BAND (ABOVE 174MHZ)					
GENERAL ELECTRIC	19A130605GXX	T	2C	(190-240)	23551
GENERAL ELECTRIC	MASTER II	T	2C	(190-240)	23551
GENERAL ELECTRIC	MASTR II	T	2C	(190-240)	23551
GENERAL ELECTRIC	19A129393GXX	R	2C	(210-240)	23641
GENERAL ELECTRIC	MASTER II	R	2C	(210-240)	23641
GENERAL ELECTRIC	MASTR II	R	2C	(210-240)	23641
GENERAL ELECTRIC	19A129393GXX	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	MASTER II	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	MASTR II	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	MASTER EXEC II	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	MASTR EXEC II	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	19A129393G11	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	19A129393G7	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC	ER64A	R	"EC,5C"	(220-240)	21421
GENERAL ELECTRIC UHF BAND (406-512MHZ)					
GENERAL ELECTRIC	19A130605G4	T	2C	(400-478)	23877
GENERAL ELECTRIC	MASTER II	T	2C	(400-478)	23877
GENERAL ELECTRIC	MASTR II	T	2C	(400-478)	23877
GENERAL ELECTRIC	19A137763G(XX)	T	"EC,5C"	(405-512)	23670
GENERAL ELECTRIC	19A137763G18	T	"EC,5C"	(405-512)	23670
GENERAL ELECTRIC	19A137763G21	T	"EC,5C"	(405-512)	23670
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(405-512)	23670
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(405-512)	23670
GENERAL ELECTRIC	19A129393GXX	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23410H
GENERAL ELECTRIC	MASTER II	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23410H

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC UHF BAND (406-512MHZ) continued					
GENERAL ELECTRIC	MASTR II	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23410H
GENERAL ELECTRIC	ER90	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23410H
GENERAL ELECTRIC	19A129393G4	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23410H
GENERAL ELECTRIC	19B206175P6A	T		(406-512)	21710
GENERAL ELECTRIC	19B206175P7A	T		(406-512)	21710
GENERAL ELECTRIC	19B206175P7B	T		(406-512)	21710
GENERAL ELECTRIC	19B206175P7C	T		(406-512)	21710
GENERAL ELECTRIC	MASTER PROGRESS	T		(406-512)	21710
GENERAL ELECTRIC	MASTR PROGRESS	T		(406-512)	21710
GENERAL ELECTRIC	19B206576P6A	R	-12.4/24	(406-512)	21720
GENERAL ELECTRIC	19B206576P7A	R	-12.4/24	(406-512)	21720
GENERAL ELECTRIC	19B206576P7B	R	-12.4/24	(406-512)	21720
GENERAL ELECTRIC	19B206576P7C	R	-12.4/24	(406-512)	21720
GENERAL ELECTRIC	MASTER PROGRESS	R	-12.4/24	(406-512)	21720
GENERAL ELECTRIC	MASTR PROGRESS	R	-12.4/24	(406-512)	21720
GENERAL ELECTRIC	19B206890P1	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	ER50A10	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	ER50A11	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	ER50A12	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	ER49A10	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	ER49A11	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	ER49A12	R	-12.4/9	(406-512)	21820
GENERAL ELECTRIC	19A129393G(XX)	T	"EC,5C"	(406-512)	21960
GENERAL ELECTRIC	19A129393G18	T	"EC,5C"	(406-512)	21960
GENERAL ELECTRIC	19A129393G21	T	"EC,5C"	(406-512)	21960
GENERAL ELECTRIC	KT86A	T	"EC,5C"	(406-512)	21960
GENERAL ELECTRIC	MASTER II	T	"EC,5C"	(406-512)	21960
GENERAL ELECTRIC	MASTR II	T	"EC,5C"	(406-512)	21960
GENERAL ELECTRIC	19A129393G(XX)	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	19A129393G12	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	19A129393G8	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	ER93A	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	ER65A	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	MASTER II	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	MASTR II	R	"EC,5C -11.2/27"	(406-512)	21970
GENERAL ELECTRIC	19B226962G(XX)	T		(406-512)	23340
GENERAL ELECTRIC	19B226962G7	T		(406-512)	23340
GENERAL ELECTRIC	19B226962G8	T		(406-512)	23340
GENERAL ELECTRIC	19B226962G9	T		(406-512)	23340
GENERAL ELECTRIC	KT135A	T		(406-512)	23340
GENERAL ELECTRIC	CUSTOM MVP	T		(406-512)	23340
GENERAL ELECTRIC	19B226962G(XX)	R	STANDARD -11.2/27	(406-512)	23350
GENERAL ELECTRIC	19B226962G16	R	STANDARD -11.2/27	(406-512)	23350

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC UHF BAND (406-512MHZ) continued					
GENERAL ELECTRIC	19B226962G18	R	STANDARD -11.2/27	(406-512)	23350
GENERAL ELECTRIC	ER93A	R	STANDARD -11.2/27	(406-512)	23350
GENERAL ELECTRIC	CUSTOM MVP	R	STANDARD -11.2/27	(406-512)	23350
GENERAL ELECTRIC	19B226962G(XX)	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	19B226962G21	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	19B226962G22	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	19B226962G23	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	19B226962G24	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	19B226962G36	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	CUSTOM MVP	R	HIGH SIDE INJECTION +11.2/27	(406-512)	23351
GENERAL ELECTRIC	19A129393G(XX)	T	2C	(406-512)	23400
GENERAL ELECTRIC	19A129393G15	T	2C	(406-512)	23400
GENERAL ELECTRIC	KT130	T	2C	(406-512)	23400
GENERAL ELECTRIC	MASTER II	T	2C	(406-512)	23400
GENERAL ELECTRIC	MASTR II	T	2C	(406-512)	23400
GENERAL ELECTRIC	19A129393G(XX)	R	2C	(406-512)	23410
GENERAL ELECTRIC	19A129393G4	R	2C	(406-512)	23410
GENERAL ELECTRIC	ER90	R	2C	(406-512)	23410
GENERAL ELECTRIC	MASTER II	R	2C	(406-512)	23410
GENERAL ELECTRIC	MASTR II	R	2C	(406-512)	23410
GENERAL ELECTRIC	19A137763G(XX)	R	"EC,5C -11.2/27"	(406-512)	23680
GENERAL ELECTRIC	19A137763G12	R	"EC,5C -11.2/27"	(406-512)	23680
GENERAL ELECTRIC	19A137763G8	R	"EC,5C -11.2/27"	(406-512)	23680
GENERAL ELECTRIC	MASTER II	R	"EC,5C -11.2/27"	(406-512)	23680
GENERAL ELECTRIC	MASTR II	R	"EC,5C -11.2/27"	(406-512)	23680
GENERAL ELECTRIC	19A129393GX	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	19A129393G12	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	19A129393G8	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	ER93A	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	ER65A	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	MASTER II	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	MASTR II	R	"EC,5C HIGH SIDE +11.2/27"	(406-512)	21970H
GENERAL ELECTRIC	19B233066G6	R	+21.4/9	(420-450)	23510
GENERAL ELECTRIC	CENTURY II	R	+21.4/9	(420-450)	23510
GENERAL ELECTRIC	PHOENIX	R	+21.4/9	(420-450)	23510
GENERAL ELECTRIC	ER116A	R	+21.4/9	(420-450)	23510
GENERAL ELECTRIC	19B233066G5	T		(420-474)	23500
GENERAL ELECTRIC	KT179A	T		(420-474)	23500
GENERAL ELECTRIC	KT180A	T		(420-474)	23500
GENERAL ELECTRIC	CENTURY II	T		(420-474)	23500
GENERAL ELECTRIC	PHOENIX	T		(420-474)	23500
GENERAL ELECTRIC	19B233066G7	R	-21.4/9	(420-474)	23520
GENERAL ELECTRIC	CENTURY II	R	-21.4/9	(420-474)	23520
GENERAL ELECTRIC	PHOENIX	R	-21.4/9	(420-474)	23520

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC UHF BAND (406-512MHZ) continued					
GENERAL ELECTRIC	ER116A	R	-21.4/9	(420-474)	23520
GENERAL ELECTRIC	19A137763G(XX)	T	2C	(420-512)	23580
GENERAL ELECTRIC	19A137763G15	T	2C	(420-512)	23580
GENERAL ELECTRIC	MASTER II	T	2C	(420-512)	23580
GENERAL ELECTRIC	MASTR II	T	2C	(420-512)	23580
GENERAL ELECTRIC	19A137763G(XX)	R	2C	(420-512)	23590
GENERAL ELECTRIC	19A137763G4	R	2C	(420-512)	23590
GENERAL ELECTRIC	MASTER II	R	2C	(420-512)	23590
GENERAL ELECTRIC	MASTR II	R	2C	(420-512)	23590
GENERAL ELECTRIC	19A137763GXX	R	2C HIGH SIDE +11.2/27	(420-512)	23876
GENERAL ELECTRIC	19A137763G4	R	2C HIGH SIDE +11.2/27	(420-512)	23876
GENERAL ELECTRIC	MASTER II	R	2C HIGH SIDE +11.2/27	(420-512)	23876
GENERAL ELECTRIC	MASTR II	R	2C HIGH SIDE +11.2/27	(420-512)	23876
GENERAL ELECTRIC	19A130283G(XX)	R	"EC,5C +11.2/27"	(424-512)	23440
GENERAL ELECTRIC	19A130283G6	R	"EC,5C +11.2/27"	(424-512)	23440
GENERAL ELECTRIC	19A130283G4	R	"EC,5C +11.2/27"	(424-512)	23440
GENERAL ELECTRIC	MASTER II	R	"EC,5C +11.2/27"	(424-512)	23440
GENERAL ELECTRIC	MASTR II	R	"EC,5C +11.2/27"	(424-512)	23440
GENERAL ELECTRIC	19A130283G(XX)	R	2C	(424-512)	23441
GENERAL ELECTRIC	19A130283G2	R	2C	(424-512)	23441
GENERAL ELECTRIC	MASTER II	R	2C	(424-512)	23441
GENERAL ELECTRIC	MASTR II	R	2C	(424-512)	23441
GENERAL ELECTRIC	4EG26A10A	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	4EG26A10B	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	ER42C	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	ER42D	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	ER42G15	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	Master Professional	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	Mastr Professional	R	2PPM ICOM -12.4/24	(440-474)	21780
GENERAL ELECTRIC	19A702375G1	T		(440-512)	23860
GENERAL ELECTRIC	MPI	T		(440-512)	23860
GENERAL ELECTRIC	DL100	T		(440-512)	23860
GENERAL ELECTRIC	19A702375G2	R		(440-512)	23861
GENERAL ELECTRIC	MPI	R		(440-512)	23861
GENERAL ELECTRIC	DL100	R		(440-512)	23861
GENERAL ELECTRIC	19B206890P6	R	-20/9	(448-512)	21920
GENERAL ELECTRIC	19B206890P8	R	-20/9	(448-512)	21920
GENERAL ELECTRIC	4ER95A	R	-20/9	(448-512)	21920
GENERAL ELECTRIC	4ER69A10	R	-20/9	(448-512)	21920
GENERAL ELECTRIC	40131994P3	T	FOR OVEN USE MAY USE 4EG25A10 ELEMENT	(450-470)	21680
GENERAL ELECTRIC	ET24	T	FOR OVEN USE MAY USE 4EG25A10 ELEMENT	(450-470)	21680
GENERAL ELECTRIC	PROGRESS LINE	T	FOR OVEN USE MAY USE 4EG25A10 ELEMENT	(450-470)	21680

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
GENERAL ELECTRIC UHF BAND (406-512MHZ) continued					
GENERAL ELECTRIC	4EG25A10	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	ICOM	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	ET99A	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	ET60A	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	ET60C	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	ET59C	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	Master Professional	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	Mastr Professional	T	2PPM ICOM	(450-474)	21770
GENERAL ELECTRIC	EXEC II/ BEACON	R		(450-474)	23870
GENERAL ELECTRIC	BQ111A	R		(450-474)	23870
GENERAL ELECTRIC	19A704781P1	R		(450-474)	23870
GENERAL ELECTRIC 800/950MHZ BAND					
GENERAL ELECTRIC	19A136999G7	R	HEATED	(800-836)	23443
GENERAL ELECTRIC	MASTER II	R	HEATED	(800-836)	23443
GENERAL ELECTRIC	MASTR II	R	HEATED	(800-836)	23443
GENERAL ELECTRIC	19A136999G2	R	1PPM -45/48	(806-950)	23430
GENERAL ELECTRIC	CUSTOM MVP	R	1PPM -45/48	(806-950)	23430
GENERAL ELECTRIC	19A136999G6	T	HEATED	(851-871)	23442
GENERAL ELECTRIC	MASTER II	T	HEATED	(851-871)	23442
GENERAL ELECTRIC	MASTR II	T	HEATED	(851-871)	23442
GENERAL ELECTRIC	19A136999G1	T	1PPM FC/48	(851-976)	23420
GENERAL ELECTRIC	CUSTOM MVP	T	1PPM FC/48	(851-976)	23420
JOHNSON VHF-LO BAND (25-54MHZ)					
JOHNSON	521-80XX-XXX	R		(25-50)	41500
JOHNSON	PPL6040	R		(25-50)	41500
JOHNSON	521-30XX-XXX	T		(25-54)	41515
JOHNSON	PPL6040	T		(25-54)	41515
JOHNSON VHF-HI BAND (144-174MHZ)					
JOHNSON	520-0XXX-XXX	T		(118-136)	40030
JOHNSON	COMCO 727	T		(118-136)	40030
JOHNSON	520-7XXX-XXX	R		(118-136)	40150
JOHNSON	521-4XXX-XXX	R		(118-136)	40151
JOHNSON	COMCO 727	R		(118-136)	40151
JOHNSON	920-0500-002	T		(118-136)	40280
JOHNSON	920-0500-002	R		(118-136)	40290
JOHNSON	521-0XXX-XXX	T		(142-159.99)	41440
JOHNSON	PPL6050	T		(142-159.99)	41440
JOHNSON	PPL6000	T		(142-159.99)	41440
JOHNSON	521-6XXX-XXX	R	-10.7/9	(142-175)	41450
JOHNSON	PPL6050	R	-10.7/9	(142-175)	41450
JOHNSON	FLEETCOM II	R	-10.7/9	(142-175)	41450
JOHNSON	PPL6000	R	-10.7/9	(142-175)	41450
JOHNSON	521-6XXX-XXX	R	HIGH SIDE INJECTION +10.7/9	(142-175)	41450H

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
JOHNSON VHF-HI BAND (144-174MHZ) continued					
JOHNSON	PPL6050	R	HIGH SIDE INJECTION +10.7/9	(142-175)	41450H
JOHNSON	FLEETCOM II	R	HIGH SIDE INJECTION +10.7/9	(142-175)	41450H
JOHNSON	520-1XXX-XXX	R		(150-174)	41470
JOHNSON	520-9XXX-XXX	T		(150-175)	40990
JOHNSON	519-5XXX-XXX	R		(150-179)	40074
JOHNSON	DL-3420	R		(150-179)	40074
JOHNSON	520-4XXX-XXX	T		(160-175)	40111

JOHNSON UHF BAND (420-512MHZ)					
JOHNSON	519-0XXX-XXX	T		(420-474)	40071
JOHNSON	CHALLENGER	T		(420-474)	40071
JOHNSON	DL-3470	T		(420-474)	40071
JOHNSON	DL-3420	T		(420-474)	40071
JOHNSON	519-5XXX-XXX	R		(420-474)	40072
JOHNSON	CHALLENGER	R		(420-474)	40072
JOHNSON	DL-3470	R		(420-474)	40072
JOHNSON	DL-3420	R		(420-474)	40072
JOHNSON	521-6XXX-XXX	R		(433-512)	41430
JOHNSON	FLEETCOM II	R		(433-512)	41430
JOHNSON	PPL6000	R		(433-512)	41430
JOHNSON	PPL6060	R		(433-512)	41430
JOHNSON	CR1100	R		(433-512)	41430
JOHNSON	521-0XXX-XXX	T		(438-479.99)	41420
JOHNSON	FLEETCOM II	T		(438-479.99)	41420
JOHNSON	PPL6000	T		(438-479.99)	41420
JOHNSON	PPL6060	T		(438-479.99)	41420
JOHNSON	CR1100	T		(438-479.99)	41420
JOHNSON	521-2	R		(440-474)	41533
JOHNSON	CR1010	R		(440-474)	41533
JOHNSON	521-3	T		(440-474)	41534
JOHNSON	CR1010	T		(440-474)	41534
JOHNSON	520-4XXX-XXX	T		(440-479.99)	40120
JOHNSON	520-1XXX-XXX	R		(440-512)	40070
JOHNSON	521-5XXX-XXX	R		(440-512)	41380
JOHNSON	CR-1000	T	REPEATER	(440-512)	41518
JOHNSON	CR-1000	R	REPEATER	(440-512)	41519

JOHNSON 800/950MHZ BAND					
JOHNSON	8900	T	REPEATER	(800-950)	41543
JOHNSON	520-9	T	REPEATER	(800-950)	41543
JOHNSON	8900	R	REPEATER	(800-950)	41544
JOHNSON	520-8	R	REPEATER	(800-950)	41544
JOHNSON	521-8000-XXX	R		(806-826)	41522
JOHNSON	518-48XX-XXX	R		(806-826)	41526
JOHNSON	518-8	R	REPEATER OLD VERSION	(806-831)	41531
JOHNSON	518-4XXX-XXX	T		(851-871)	41521

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
JOHNSON 800/950MHZ BAND continued					
JOHNSON	LTR-8000	T		(851-871)	41521
JOHNSON	518-8	T	REPEATER OLD VERSION	(851-876)	41532
MAXON VHF-HI BAND (144-174MHZ)					
MAXON	CP-0510	T		(144-174)	725242
MAXON	CP-0511	T		(144-174)	725242
MAXON	CP-0515	T		(144-174)	725242
MAXON	CP-0510	R		(144-174)	725243
MAXON	CP-0511	R		(144-174)	725243
MAXON	CP-0515	R		(144-174)	725243
MAXON	CM-4010	T		(144-174)	725360
MAXON	CM-4010	R		(144-174)	725361
MAXON UHF BAND (406-512MHZ)					
MAXON	CP-0520	T		(420-512)	725278
MAXON	CP-0521	T		(420-512)	725278
MAXON	CP-0530	T		(420-512)	725278
MAXON	CP-0520	R		(420-512)	725279
MAXON	CP-0521	R		(420-512)	725279
MAXON	CP-0530	R		(420-512)	725279
MAXON	CM-4020	T		(430-512)	725312
MAXON	CM-4021	T		(430-512)	725312
MAXON	CM-4020	R		(430-512)	725313
MAXON	CM-4021	R		(430-512)	725313
MIDLAND VHF-LO BAND (25-54MHZ)					
MIDLAND	70-043A	T		(30-50)	110832
MIDLAND	70-043B	T		(30-50)	110832
MIDLAND	70-043C	T		(30-50)	110832
MIDLAND	70-043A	R		(30-50)	110833
MIDLAND	70-043B	R		(30-50)	110833
MIDLAND	70-043C	R		(30-50)	110833
MIDLAND VHF-HI BAND (132-174MHZ)					
MIDLAND	BASE-TECH	R		(136-174)	110945
MIDLAND	SHOWA	R		(136-174)	110945
MIDLAND	71BS	R		(136-174)	110945
MIDLAND	70-115B	R		(140-155.99)	110886
MIDLAND	70-150B	R		(140-155.99)	110886
MIDLAND	70-805B	R		(144-155.99)	110910
MIDLAND	70-834B	R		(144-155.99)	110910
MIDLAND	70-335	T		(144-174)	110881
MIDLAND	70-435	T		(144-174)	110881
MIDLAND	70-315	T		(144-174)	110881
MIDLAND	70-835	T		(144-174)	110881
MIDLAND	70-115B	T		(144-174)	110885
MIDLAND	70-150B	T		(144-174)	110885

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MIDLAND VHF-HI BAND (132-174MHZ) continued					
MIDLAND	70-805B	T		(144-174)	110909
MIDLAND	70-834B	T		(144-174)	110909
MIDLAND	70-143	R		(148-156.39)	110915
MIDLAND	70-143	T		(148-174)	110914
MIDLAND	70-335	R		(150-154)	110896
MIDLAND	70-435	R		(150-154)	110896
MIDLAND	70-315	R		(150-154)	110896
MIDLAND	70-132	T		(150-174)	110937
MIDLAND	70-132	R		(150-174)	110938
MIDLAND	70-335	R		(154-166)	110882
MIDLAND	70-435	R		(154-166)	110882
MIDLAND	70-315	R		(154-166)	110882
MIDLAND	70-805B	R		(156-163.9)	110911
MIDLAND	70-834B	R		(156-163.9)	110911

MIDLAND VHF BAND (ABOVE 174MHZ)

MIDLAND	13-509	T		(220-240)	110100
MIDLAND	13-509	R		(220-240)	110110

MIDLAND UHF BAND (406-512MHZ)

MIDLAND	BASE-TECH	T		(406-430)	110924
MIDLAND	SHOWA	T		(406-430)	110924
MIDLAND	71BS	T		(406-430)	110924
MIDLAND	TXO-1605A	T		(406-430)	110924
MIDLAND	71-4050	T		(406-430)	110924
MIDLAND	71-4120	T		(406-430)	110924
MIDLAND	BASE-TECH	R		(406-470)	110926
MIDLAND	SHOWA	R		(406-470)	110926
MIDLAND	71BS	R		(406-470)	110926
MIDLAND	TXO-1605A	R		(406-470)	110926
MIDLAND	71-4050	R		(406-470)	110926
MIDLAND	71-4120	R		(406-470)	110926
MIDLAND	13-921	R		(420-512)	110430
MIDLAND	13-927	R		(420-512)	110430
MIDLAND	13-934	R		(420-512)	110430
MIDLAND	13-944	R		(420-512)	110430
MIDLAND	70-905	T		(440-512)	110906
MIDLAND	70-924B	T		(440-512)	110906
MIDLAND	70-905	R		(450-470)	110907
MIDLAND	70-924B	R		(450-470)	110907
MIDLAND	BASE-TECH	T		(450-470)	110925
MIDLAND	SHOWA	T		(450-470)	110925
MIDLAND	71BS	T		(450-470)	110925
MIDLAND	TXO-1605A	T		(450-470)	110925
MIDLAND	71-4050	T		(450-470)	110925
MIDLAND	71-4120	T		(450-470)	110925

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA 2ND OSCILLATOR CRYSTALS/REFERENCE OSCILLATOR					
MOTOROLA	48-80008K02			(44.645)	48-80008K02
MOTOROLA	MAXTRAC			(44.645)	48-80008K02
MOTOROLA	NXN6116A	2ND OSC FOR HT90		(18.355)	167624
MOTOROLA	KXN6215AB	2ND OSC FOR HT90		(18.355)	167624
MOTOROLA	HT-90	2ND OSC FOR HT90		(18.355)	167624
MOTOROLA	48-80114R02			(16.8)	167308
MOTOROLA	GP300			(16.8)	167308
MOTOROLA	GP110			(16.8)	167308
MOTOROLA	48-02245J49			(16.8)	48-02245J49
MOTOROLA	CT250			(16.8)	48-02245J49
MOTOROLA	HT750			(16.8)	48-02245J49
MOTOROLA	HT1250			(16.8)	48-02245J49
MOTOROLA	48-80114R02			(16.8)	48-80114R02
MOTOROLA	GP-300			(16.8)	48-80114R02
MOTOROLA	P110			(16.8)	48-80114R02
MOTOROLA	P1225			(16.8)	48-80114R02
MOTOROLA	KXN6316			(12.8)	168025
MOTOROLA	G21	2ND OSCILLATOR CRYSTAL HC-18/U		(12.155)	164444
MOTOROLA	G21	2ND OSCILLATOR CRYSTAL HC-6/U		(12.155)	164445
MOTOROLA	YNW	2ND OSCILLATOR CRYSTAL		(11.245)	164421
MOTOROLA	G19	2ND OSCILLATOR CRYSTAL		(6.155)	164441

MOTOROLA MARINE BAND

MOTOROLA	KXN1032A	MUST GIVE FX BETWEEN 4.0 TO 7.5 MHZ FX=FC+OR-5.2 MHZ		(4-7.5)	167250
MOTOROLA	MODEM	MUST GIVE FX BETWEEN 4.0 TO 7.5 MHZ FX=FC+OR-5.2 MHZ		(4-7.5)	167250
MOTOROLA	MC-400	MUST GIVE FX BETWEEN 4.0 TO 7.5 MHZ FX=FC+OR-5.2 MHZ		(4-7.5)	167250
MOTOROLA	KXN6123AA	+10.8 FOR OVEN USE		(1.6-9.0)	167120
MOTOROLA	TRITON	+10.8 FOR OVEN USE		(1.6-9.0)	167120
MOTOROLA	MODAR	+10.8 FOR OVEN USE		(1.6-9.0)	167120
MOTOROLA	MICOM	+10.8 FOR OVEN USE		(1.6-9.0)	167120
MOTOROLA	MICOM 100	+10.8 FOR OVEN USE		(1.6-9.0)	167120
MOTOROLA	KXN6123AA	+10.8/2 FOR OVEN USE		(12.3-18)	167130
MOTOROLA	TRITON	+10.8/2 FOR OVEN USE		(12.3-18)	167130
MOTOROLA	MODAR	+10.8/2 FOR OVEN USE		(12.3-18)	167130
MOTOROLA	MICOM	+10.8/2 FOR OVEN USE		(12.3-18)	167130
MOTOROLA	MICOM 100	+10.8/2 FOR OVEN USE		(12.3-18)	167130
MOTOROLA	KXN6123AG	+11.4 FOR OVEN USE		(2-8.59)	167570
MOTOROLA	TRITON	+11.4 FOR OVEN USE		(2-8.59)	167570
MOTOROLA	MICOM	+11.4 FOR OVEN USE		(2-8.59)	167570
MOTOROLA	MODAR	+11.4 FOR OVEN USE		(2-8.59)	167570
MOTOROLA	MICOM 100	+11.4 FOR OVEN USE		(2-8.59)	167570

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-LO BAND (25-54MHZ)					
MOTOROLA	TLN1082A	T	FC/4	(25-27.99)	160039
MOTOROLA	TLN1022A	T	FC/4	(25-27.99)	160039
MOTOROLA	TLN1023A	T	FC/4	(25-27.99)	160039
MOTOROLA	TLN1069A	T	FC/4	(25-27.99)	160039
MOTOROLA	KXN6002A	R	+2.5/3	(25-30 & 36-42)	160075
MOTOROLA	MOCOM 70	R	+2.5/3	(25-30 & 36-42)	160075
MOTOROLA	ANT59	R	+2.5/3	(25-30 & 36-42)	160075
MOTOROLA	CONSOLETTA	R	+2.5/3	(25-30 & 36-42)	160075
MOTOROLA	TLN1020	R	+2.5/3 OR +2.54/3 PLEASE SPECIFY	(25-30 & 36-42)	160042
MOTOROLA	TLN1081	R	+2.5/3 OR +2.54/3 PLEASE SPECIFY	(25-30 & 36-42)	160042
MOTOROLA	TLN1085	R	+2.5/3 OR +2.54/3 PLEASE SPECIFY	(25-30 & 36-42)	160042
MOTOROLA	K1003A	R	+5.26/2	(25-30)	160035
MOTOROLA	MICOR	R	+5.26/2	(25-30)	160035
MOTOROLA	KXN6158AA	T	FC/2	(25-35.99)	167260
MOTOROLA	MOXY	T	FC/2	(25-35.99)	167260
MOTOROLA	MAXAR	T	FC/2	(25-35.99)	167260
MOTOROLA	RM14	R	FOR OVEN USE	(25-42)	163367
MOTOROLA	RN19	T	FOR OVEN USE	(25-54)	163393
MOTOROLA	KXN6126AA	R		(25-54)	167210
MOTOROLA	KXN6126AB	R		(25-54)	167210
MOTOROLA	KXN6126AC	R		(25-54)	167210
MOTOROLA	MINITOR	R		(25-54)	167210
MOTOROLA	PAGECOM	R		(25-54)	167210
MOTOROLA	DIRECTOR	R		(25-54)	167210
MOTOROLA	KXN1028B	T	FC/3	(25-54)	167240
MOTOROLA	MICOR	T	FC/3	(25-54)	167240
MOTOROLA	KXN6159AA	R		(25-54)	167280
MOTOROLA	MOXY	R		(25-54)	167280
MOTOROLA	MAXAR	R		(25-54)	167280
MOTOROLA	KXN1044A	T	FC/6	(25-54)	167430
MOTOROLA	KXN1087A	T	FC/3	(25-54)	167475
MOTOROLA	MITREK	T	FC/3	(25-54)	167475
MOTOROLA	MSR2000	T	FC/3	(25-54)	167475
MOTOROLA	KXN1085A	R		(25-54)	167476
MOTOROLA	MITREK	R		(25-54)	167476
MOTOROLA	MSR2000	R		(25-54)	167476
MOTOROLA	KXN1093A	R		(25-54)	167585
MOTOROLA	KXN1093B	R		(25-54)	167585
MOTOROLA	MITREK	R		(25-54)	167585
MOTOROLA	KXN1094A	T	FC/3	(25-54)	167590
MOTOROLA	MITREK	T	FC/3	(25-54)	167590
MOTOROLA	K1004A	T	FC/6	(29-54)	160034
MOTOROLA	MICOR	T	FC/6	(29-54)	160034

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-LO BAND (25-54MHZ) continued					
MOTOROLA	KXN6197AA	R	FC+8.4	(30-35.9)	167574
MOTOROLA	MT500	R	FC+8.4	(30-35.9)	167574
MOTOROLA	KXN6193AA	R	FC+8.4	(30-35.9)	167574
MOTOROLA	KXN6194AA	T		(30-35.99)	167572
MOTOROLA	MT500	T		(30-35.99)	167572
MOTOROLA	ZMM-58	R	FOR OVEN USE	(30-36 & 42-50)	160017
MOTOROLA	ZMM-58A	R	FOR OVEN USE	(30-36 & 42-50)	160017
MOTOROLA	KXN6002A	R	-2.5/3	(30-36 & 42-50)	160074
MOTOROLA	MOCOM 70	R	-2.5/3	(30-36 & 42-50)	160074
MOTOROLA	ANT60	R	-2.5/3	(30-36 & 42-50)	160074
MOTOROLA	CONSOLETTTE	R	-2.5/3	(30-36 & 42-50)	160074
MOTOROLA	TLN1020	R	-2.5/3 OR -2.54/3 PLEASE SPECIFY	(30-36 & 42-54)	160043
MOTOROLA	TLN1081	R	-2.5/3 OR -2.54/3 PLEASE SPECIFY	(30-36 & 42-54)	160043
MOTOROLA	TLN1085	R	-2.5/3 OR -2.54/3 PLEASE SPECIFY	(30-36 & 42-54)	160043
MOTOROLA	KXN6235AA	R		(30-36.9)	167625
MOTOROLA	ENVOY	R		(30-36.9)	167625
MOTOROLA	MINITOR II	R		(30-36.9)	167625
MOTOROLA	BRAVO	R		(30-36.9)	167625
MOTOROLA	KXN6344	T		(30-39)	167387
MOTOROLA	RADIUS	T		(30-39)	167387
MOTOROLA	P10	T		(30-39)	167387
MOTOROLA	P50	T		(30-39)	167387
MOTOROLA	HT10	T		(30-39)	167387
MOTOROLA	AN-95	R	+5.7/3	(30-42)	160006
MOTOROLA	MO3NB	R	+5.7/3	(30-42)	160006
MOTOROLA	MO1CN	R	+5.7/3	(30-42)	160006
MOTOROLA	ALERT MONITOR	R	+5.7/3	(30-42)	160006
MOTOROLA	YMW-45	R		(30-42)	160009
MOTOROLA	HT200	R		(30-42)	160009
MOTOROLA	PT300	R		(30-42)	160009
MOTOROLA	K1003A	R	+5.26/3	(30-42)	160036
MOTOROLA	MICOR	R	+5.26/3	(30-42)	160036
MOTOROLA	AB-2	T		(30-48)	160001
MOTOROLA	ABS-2	T		(30-48)	160001
MOTOROLA	ABX-2	T		(30-48)	160001
MOTOROLA	PT200	T		(30-48)	160001
MOTOROLA	HT200	T		(30-48)	160001
MOTOROLA	PT300	T		(30-48)	160001
MOTOROLA	ANT-928	R		(30-50)	160056
MOTOROLA	KXN6000	R		(30-50)	160056
MOTOROLA	MOCOM 10	R		(30-50)	160056
MOTOROLA	KXN6341	R		(30-50)	167386
MOTOROLA	RADIUS	R		(30-50)	167386

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-LO BAND (25-54MHZ) continued					
MOTOROLA	P10	R		(30-50)	167386
MOTOROLA	P50	R		(30-50)	167386
MOTOROLA	HT10	R		(30-50)	167386
MOTOROLA	ANT-98	T	FC/3	(30-54)	160069
MOTOROLA	KXN6000	T	FC/3	(30-54)	160069
MOTOROLA	MOCOM 10	T	FC/3	(30-54)	160069
MOTOROLA	MOCOM 70	T	FC/3	(30-54)	160069
MOTOROLA	KXN6001A	T		(30-54)	160072
MOTOROLA	MOCOM	T		(30-54)	160072
MOTOROLA	ANT58	T		(30-54)	160072
MOTOROLA	ANT38	T		(30-54)	160072
MOTOROLA	R28	R	FOR OVEN USE	(30-54)	163353
MOTOROLA	ZNN-3	T	FOR OVEN USE	(36-50)	160019
MOTOROLA	ZNN-3A	T	FOR OVEN USE	(36-50)	160019
MOTOROLA	KXN6158AA	T	FC/3	(36-54)	167270
MOTOROLA	MOXY	T	FC/3	(36-54)	167270
MOTOROLA	MAXAR	T	FC/3	(36-54)	167270
MOTOROLA	KXN6194AA	T	FC/2	(36-54)	167573
MOTOROLA	MT500	T	FC/2	(36-54)	167573
MOTOROLA	KXN6197AA	R	FC-8.4	(36-54)	167575
MOTOROLA	MT500	R	FC-8.4	(36-54)	167575
MOTOROLA	KXN6193AA	R	FC-8.4	(36-54)	167575
MOTOROLA	RN-3	T	FOR OVEN USE	(36-54)	167730
MOTOROLA	RN-3	T	NON OVEN USE	(36-54)	167740
MOTOROLA	KXN6235AB	R		(37-50)	167626
MOTOROLA	ENVOY	R		(37-50)	167626
MOTOROLA	MINITOR II	R		(37-50)	167626
MOTOROLA	BRAVO	R		(37-50)	167626
MOTOROLA	KXN6344	T		(39-50)	167385
MOTOROLA	RADIUS	T		(39-50)	167385
MOTOROLA	P10	T		(39-50)	167385
MOTOROLA	P50	T		(39-50)	167385
MOTOROLA	HT10	T		(39-50)	167385
MOTOROLA	GO-2			(40-53)	162276
MOTOROLA	ANT-101	R		(42-45.5)	160065
MOTOROLA	KXN6000	R		(42-45.5)	160065
MOTOROLA	MOCOM 10	R		(42-45.5)	160065
MOTOROLA	AN-96	R	-5.7/3	(42-50)	160007
MOTOROLA	MO3NB	R	-5.7/3	(42-50)	160007
MOTOROLA	MO1CN	R	-5.7/3	(42-50)	160007
MOTOROLA	ALERT MONITOR	R	-5.7/3	(42-50)	160007
MOTOROLA	K1003A	R	-5.26/3	(42-50)	160037
MOTOROLA	MICOR	R	-5.26/3	(42-50)	160037
MOTOROLA	TLN1082A	T	FC/6	(42-50)	160041

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-LO BAND (25-54MHZ) continued					
MOTOROLA	TLN1022A	T	FC/6	(42-50)	160041
MOTOROLA	TLN1023A	T	FC/6	(42-50)	160041
MOTOROLA	TLN1069A	T	FC/6	(42-50)	160041
MOTOROLA	ZMM-15	R	NON OVEN USE	(42-54)	160022
MOTOROLA	ZMM-15A	R	NON OVEN USE	(42-54)	160022
MOTOROLA	ZMM-15	R	FOR OVEN USE	(42-54)	160023
MOTOROLA	ZMM-15A	R	FOR OVEN USE	(42-54)	160023
MOTOROLA	RM15	R	FOR OVEN USE	(42-54)	163369
MOTOROLA	RM15	R	NON OVEN USE	(42-54)	163370
MOTOROLA	ANT-98	T		(42-55)	160071
MOTOROLA	KXN6000	T		(42-55)	160071
MOTOROLA	MOCOM 10	T		(42-55)	160071
MOTOROLA	MOCOM 70	T		(42-55)	160071
MOTOROLA	RO4	T	FOR OVEN USE	(48-54)	167894
MOTOROLA MID-BAND (66-88MHZ)					
MOTOROLA	KXN1028B	T		(66-88)	167566
MOTOROLA	KXN1028A	T		(66-88)	167566
MOTOROLA	MICOR	T		(66-88)	167566
MOTOROLA	K1003A	R	+5.26/6	(66-88)	167567
MOTOROLA	MICOR	R	+5.26/6	(66-88)	167567
MOTOROLA	KXN1114A	T		(72-78)	167627
MOTOROLA VHF-HI BAND (132-174MHZ)					
MOTOROLA	KXN6235	R		(132-147.99)	167660
MOTOROLA	ENVOY	R		(132-147.99)	167660
MOTOROLA	MINITOR II	R		(132-147.99)	167660
MOTOROLA	DIRECTOR II	R		(132-147.99)	167660
MOTOROLA	KXN1019A	T		(132-174)	162204
MOTOROLA	MICOR	T		(132-174)	162204
MOTOROLA	KXN1041A	T		(132-174)	167140
MOTOROLA	KXN1041B	T		(132-174)	167140
MOTOROLA	KXN1099A	T		(132-174)	167140
MOTOROLA	MX SERIES	T		(132-174)	167140
MOTOROLA	KXN1040A	R	-21.4/2	(132-174)	167150
MOTOROLA	KXN1040B	R	-21.4/2	(132-174)	167150
MOTOROLA	MX SERIES	R	-21.4/2	(132-174)	167150
MOTOROLA	KXN1018C	T		(132-174)	167380
MOTOROLA	KXN1088A	T		(132-174)	167450
MOTOROLA	MITREK	T		(132-174)	167450
MOTOROLA	MSR2000	T		(132-174)	167450
MOTOROLA	KXN1086A	R	-10.7/3	(132-174)	167460
MOTOROLA	MITREK	R	-10.7/3	(132-174)	167460
MOTOROLA	KXN1086B	R	-10.7/3	(132-174)	167460
MOTOROLA	MSR2000	R	-10.7/3	(132-174)	167460

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-HI BAND (132-174MHZ) continued					
MOTOROLA	KXN1086BA	R	-10.8/3 DUAL	(132-174)	167462
MOTOROLA	MITREK	R	-10.8/3 DUAL	(132-174)	167462
MOTOROLA	KXN6206A	T		(132-174)	167594
MOTOROLA	HT-90	T		(132-174)	167594
MOTOROLA	HT-440	T		(132-174)	167594
MOTOROLA	KXN1086A	R	HIGH SIDE INJECTION +10.7/3	(132-174)	167460H
MOTOROLA	KXN1086B	R	HIGH SIDE INJECTION +10.7/3	(132-174)	167460H
MOTOROLA	MSR2000	R	HIGH SIDE INJECTION +10.7/3	(132-174)	167460H
MOTOROLA	MITREK	R	HIGH SIDE INJECTION +10.7/3	(132-174)	167460H
MOTOROLA	Q-2415-A	R	REMOTE RADIO SWITCH	(135-174)	167299
MOTOROLA	KXN6206A	T		(136-150.799)	167595
MOTOROLA	HT-90	T		(136-150.799)	167595
MOTOROLA	HT-440	T		(136-150.799)	167595
MOTOROLA	ZMM-66	R	FOR OVEN USE	(136-150.8)	161137
MOTOROLA	ZMM-66A	R	FOR OVEN USE	(136-150.8)	161137
MOTOROLA	K1005A	R	+11.7/9	(136-150.8)	161185
MOTOROLA	K1006A	R	+11.7/9	(136-150.8)	161185
MOTOROLA	MICOR	R	+11.7/9	(136-150.8)	161185
MOTOROLA	TLN1081A	R	+8/12	(136-150.8)	162210
MOTOROLA	TLN1020A	R	+8/12	(136-150.8)	162219
MOTOROLA	KXN1075A	R	"-17.9/2 Replacement crystal must be calculated using same formula as existing crystal in element, regardless of range."	(136-150.8)	167395
MOTOROLA	KXN1034A	R	"-17.9/2 Replacement crystal must be calculated using same formula as existing crystal in element, regardless of range."	(136-150.8)	167395
MOTOROLA	MT500	R	"-17.9/2 Replacement crystal must be calculated using same formula as existing crystal in element, regardless of range."	(136-150.8)	167395
MOTOROLA	YVSR83	T		(136-174)	161115
MOTOROLA	HT-220	T		(136-174)	161115
MOTOROLA	HT-210	T		(136-174)	161115
MOTOROLA	KXN6018A	T		(136-174)	161115
MOTOROLA	KXN6017A	T		(136-174)	161115
MOTOROLA	YBSR83	T		(136-174)	161115
MOTOROLA	YMRX109	R	-16.8/3	(136-174)	161116
MOTOROLA	HT-220	R	-16.8/3	(136-174)	161116
MOTOROLA	HT-210	R	-16.8/3	(136-174)	161116
MOTOROLA	K1049A	T		(136-174)	161194
MOTOROLA	K1061A	T		(136-174)	161194
MOTOROLA	K1043A	T		(136-174)	161194
MOTOROLA	MOCOM 35	T		(136-174)	161194
MOTOROLA	MOCOM 10	T		(136-174)	161194

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-HI BAND (132-174MHZ) continued					
MOTOROLA	KXN1042A	T		(136-174)	167400
MOTOROLA	KXN1083A	T		(136-174)	167400
MOTOROLA	MT500	T		(136-174)	167400
MOTOROLA	KXN1019B	T		(136-174)	167550
MOTOROLA	MICOR	T		(136-174)	167550
MOTOROLA	KXN6207A	R		(136-174)	167596
MOTOROLA	HT-90	R		(136-174)	167596
MOTOROLA	HT-440	R		(136-174)	167596
MOTOROLA	KXN6222AA	T		(136-174)	167612
MOTOROLA	EXPO	T		(136-174)	167612
MOTOROLA	KXN6121AA	T		(136-174)	167950
MOTOROLA	MAXAR	T		(136-174)	167950
MOTOROLA	KXN6121AG	T		(136-174)	167950
MOTOROLA	FLEXAR	T		(136-174)	167950
MOTOROLA	MOXY	T		(136-174)	167950
MOTOROLA	MAXAR 80	T		(136-174)	167950
MOTOROLA	KXN6122AA	R		(136-174)	167960
MOTOROLA	MAXAR	R		(136-174)	167960
MOTOROLA	KXN6122AG	R		(136-174)	167960
MOTOROLA	MOXY	R		(136-174)	167960
MOTOROLA	FLEXAR	R		(136-174)	167960
MOTOROLA	MAXAR 80	R		(136-174)	167960
MOTOROLA	KXN6300AA	R		(138-148.59)	167651
MOTOROLA	KEYNOTE	R		(138-148.59)	167651
MOTOROLA	PR3000	R		(138-148.59)	167651
MOTOROLA	RADIUS	R		(138-148.59)	167651
MOTOROLA	BRAVO	R		(138-148.59)	167651
MOTOROLA	DIRECTOR	R		(138-148.59)	167651
MOTOROLA	ADVISOR	R		(138-148.59)	167651
MOTOROLA	DIRECTOR II	R		(138-148.59)	167651
MOTOROLA	TLN1083A	T		(138-174)	162209
MOTOROLA	TLN1083B	T		(138-174)	162209
MOTOROLA	KXN6330	T	RADIUS	(138-174)	167656
MOTOROLA	RADIUS	T	RADIUS	(138-174)	167656
MOTOROLA	P10	T	RADIUS	(138-174)	167656
MOTOROLA	P50	T	RADIUS	(138-174)	167656
MOTOROLA	HT10	T	RADIUS	(138-174)	167656
MOTOROLA	KXN6341	T	RADIUS	(138-174)	167656
MOTOROLA	SPIRIT II	T	RADIUS	(138-174)	167656
MOTOROLA	R-NET	T	RADIUS	(138-174)	167656
MOTOROLA	R-NET 150	T	RADIUS	(138-174)	167656
MOTOROLA	R-NET 450	T	RADIUS	(138-174)	167656
MOTOROLA	R-NET 9600	T	RADIUS	(138-174)	167656
MOTOROLA	KXN6331	R	RADIUS	(138-174)	167657

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-HI BAND (132-174MHZ) continued					
MOTOROLA	RADIUS	R	RADIUS	(138-174)	167657
MOTOROLA	P10	R	RADIUS	(138-174)	167657
MOTOROLA	P50	R	RADIUS	(138-174)	167657
MOTOROLA	HT10	R	RADIUS	(138-174)	167657
MOTOROLA	KXN6344	R	RADIUS	(138-174)	167657
MOTOROLA	SPIRIT II	R	RADIUS	(138-174)	167657
MOTOROLA	R-NET	R	RADIUS	(138-174)	167657
MOTOROLA	R-NET 150	R	RADIUS	(138-174)	167657
MOTOROLA	R-NET 450	R	RADIUS	(138-174)	167657
MOTOROLA	R-NET 9600	R	RADIUS	(138-174)	167657
MOTOROLA	TLN1087A	T		(140-174)	162212
MOTOROLA	K1056A	R		(142-174)	161195
MOTOROLA	K1057A	R		(142-174)	161195
MOTOROLA	MOCOM 70	R		(142-174)	161195
MOTOROLA	CONSOLETTA	R		(142-174)	161195
MOTOROLA	KXN6097AB	R		(143-148)	162200
MOTOROLA	METRUM II	R		(143-148)	162200
MOTOROLA	TLN8602A	R	+8/12	(144-150.8)	161182
MOTOROLA	RES-61	R	+8/12	(144-150.8)	161182
MOTOROLA	RES-62	R	+8/12	(144-150.8)	161182
MOTOROLA	KXN6266	T		(144-162.1)	167634
MOTOROLA	MAXAR 50	T		(144-162.1)	167634
MOTOROLA	KXN6266AA	T		(144-162.1)	167634
MOTOROLA	KXN6279	R		(144-162.1)	167635
MOTOROLA	MAXAR 50	R		(144-162.1)	167635
MOTOROLA	KXN6279AA	R		(144-162.1)	167635
MOTOROLA	RM807	T	NON OVEN USE	(144-174)	160096
MOTOROLA	RO3	T	NON OVEN USE	(144-174)	160096
MOTOROLA	RO9	T	NON OVEN USE	(144-174)	160096
MOTOROLA	YVNW19	T	HT-200	(144-174)	161147
MOTOROLA	NLD6230A	T	HT-200	(144-174)	161147
MOTOROLA	HT-200	T	HT-200	(144-174)	161147
MOTOROLA	PT-200	T	HT-200	(144-174)	161147
MOTOROLA	PT-300	T	HT-200	(144-174)	161147
MOTOROLA	PT-400	T	HT-200	(144-174)	161147
MOTOROLA	KXN6034A	R		(144-174)	161166
MOTOROLA	MU-70	R		(144-174)	161166
MOTOROLA	MH-70	R		(144-174)	161166
MOTOROLA	HANDIE COM	R		(144-174)	161166
MOTOROLA	PAC/RT	R		(144-174)	161166
MOTOROLA	KXN6048A	R		(144-174)	161170
MOTOROLA	MINITOR	R		(144-174)	161170
MOTOROLA	DIRECTOR	R		(144-174)	161170
MOTOROLA	PAGECOM	R		(144-174)	161170

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-HI BAND (132-174MHZ) continued					
MOTOROLA	K1007A	T		(144-174)	161184
MOTOROLA	KXN1078A	T		(144-174)	161184
MOTOROLA	MICOR	T		(144-174)	161184
MOTOROLA	K1036A	T		(144-174)	161190
MOTOROLA	K1017A	T		(144-174)	161199
MOTOROLA	MOCOM 70	T		(144-174)	161199
MOTOROLA	CONSOLETTA	T		(144-174)	161199
MOTOROLA	K1040A	R		(144-174)	162202
MOTOROLA	K1048A	R		(144-174)	162202
MOTOROLA	MOCOM 10	R		(144-174)	162202
MOTOROLA	MOCOM 35	R		(144-174)	162202
MOTOROLA	KXN6004A	R		(144-174)	162203
MOTOROLA	AM-13	R		(144-174)	162252
MOTOROLA	RO3	T	NON OVEN USE	(144-174)	162284
MOTOROLA	RM10	R	FOR OVEN USE	(144-174)	163365
MOTOROLA	RM10	R	NON OVEN USE	(144-174)	163366
MOTOROLA	RN-1A	T	FOR OVEN USE	(144-174)	163389
MOTOROLA	RN-1A	T	NON OVEN USE	(144-174)	163390
MOTOROLA	YMW35	R		(144-174)	164414
MOTOROLA	HT-200	R		(144-174)	164414
MOTOROLA	PT-300	R		(144-174)	164414
MOTOROLA	PT-400	R		(144-174)	164414
MOTOROLA	KXN1052A	T		(144-174)	167588
MOTOROLA	MICOR	T		(144-174)	167588
MOTOROLA	KXN1112A	R		(144-174)	167639
MOTOROLA	MSR2000	R		(144-174)	167639
MOTOROLA	MITREK	R		(144-174)	167639
MOTOROLA	ZNN-3	T	FOR OVEN USE	(144-175)	161121
MOTOROLA	ZNN-3A	T	FOR OVEN USE	(144-175)	161121
MOTOROLA	TRITON	R	-21.4/3	(145-174)	161196
MOTOROLA	MODAR	R	-21.4/3	(145-174)	161196
MOTOROLA	KXN6046A	R	-21.4/3	(145-174)	161196
MOTOROLA	KXN1095A	T		(145-174)	167628
MOTOROLA	MSR2000	T		(145-174)	167628
MOTOROLA	MITREK	T		(145-174)	167628
MOTOROLA	RO9	T	FOR OVEN USE	(146-170)	162295
MOTOROLA	R21	R	FOR OVEN USE	(146-170)	163339
MOTOROLA	KXN6300AA	R		(148.6-174)	167652
MOTOROLA	KEYNOTE	R		(148.6-174)	167652
MOTOROLA	PR3000	R		(148.6-174)	167652
MOTOROLA	RADIUS	R		(148.6-174)	167652
MOTOROLA	BRAVO	R		(148.6-174)	167652
MOTOROLA	DIRECTOR	R		(148.6-174)	167652
MOTOROLA	ADVISOR	R		(148.6-174)	167652

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-HI BAND (132-174MHZ) continued					
MOTOROLA	DIRECTOR II	R		(148.6-174)	167652
MOTOROLA	KXN6086AC	R		(148-174)	167583
MOTOROLA	PAGEBOY II	R		(148-174)	167583
MOTOROLA	SPIRIT	R		(148-174)	167583
MOTOROLA	DIMENSION	R		(148-174)	167583
MOTOROLA	BPR2000	R		(148-174)	167583
MOTOROLA	AO3FNC	R		(148-174)	167583
MOTOROLA	KXN6235A	R		(148-174)	167629
MOTOROLA	ENVOY	R		(148-174)	167629
MOTOROLA	DIRECTOR II	R		(148-174)	167629
MOTOROLA	MINITOR II	R		(148-174)	167629
MOTOROLA	KXN6236A	R		(148-174)	167629
MOTOROLA	KXN6364AA	R		(148-174)	168028
MOTOROLA	ADVISOR GOLD	R		(148-174)	168028
MOTOROLA	K1005A	R	-11.7/9	(150.8-174)	161186
MOTOROLA	K1006A	R	-11.7/9	(150.8-174)	161186
MOTOROLA	MICOR	R	-11.7/9	(150.8-174)	161186
MOTOROLA	K1018A	R	-11.7/9	(150.8-174)	161192
MOTOROLA	K1019A	R	-11.7/9	(150.8-174)	161192
MOTOROLA	K1058A	R	-11.7/9	(150.8-174)	161192
MOTOROLA	MOCOM 70	R	-11.7/9	(150.8-174)	161192
MOTOROLA	TLN1081A	R	-8/12	(150.8-174)	162211
MOTOROLA	TLN1086A	R	-8/12	(150.8-174)	162214
MOTOROLA	TLN1020A	R	-8/12	(150.8-174)	162220
MOTOROLA	KXN1075A	R	"-17.9/3 Replacement crystal must be calculated using same formula as existing crystal in element, regardless of range."	(150.8-174)	167390
MOTOROLA	KXN1034A	R	"-17.9/3 Replacement crystal must be calculated using same formula as existing crystal in element, regardless of range."	(150.8-174)	167390
MOTOROLA	MT500	R	"-17.9/3 Replacement crystal must be calculated using same formula as existing crystal in element, regardless of range."	(150.8-174)	167390
MOTOROLA	KXN6224AA	R		(150.8-174)	167614
MOTOROLA	EXPO	R		(150.8-174)	167614
MOTOROLA	GO-1	R	+455/17	(150-170)	162273
MOTOROLA	MONITOR	R	+455/17	(150-170)	162273
MOTOROLA	ALERT	R	+455/17	(150-170)	162273
MOTOROLA	AN-94	R		(150-174)	161101
MOTOROLA	ALERT MONITOR	R		(150-174)	161101
MOTOROLA	MO3	R		(150-174)	161101
MOTOROLA	MO3CNB	R		(150-174)	161101
MOTOROLA	KXN1013B	T		(150-174)	161165
MOTOROLA	MU-70	T		(150-174)	161165

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA VHF-HI BAND (132-174MHZ) continued					
MOTOROLA	MH-70	T		(150-174)	161165
MOTOROLA	HANDIE COM	T		(150-174)	161165
MOTOROLA	PAC/RT	T		(150-174)	161165
MOTOROLA	TLN1024A	T		(150-174)	162206
MOTOROLA	TLN1062A	T		(150-174)	162206
MOTOROLA	TLN1025A	T		(150-174)	162224
MOTOROLA	RM27	R	NON OVEN USE	(150-174)	163384
MOTOROLA	KXN1045A	T		(150-174)	167300
MOTOROLA VHF BAND (ABOVE 174MHZ)					
MOTOROLA	K1007A	T		(220-240)	161187
MOTOROLA	MICOR	T		(220-240)	161187
MOTOROLA	K1005A	R		(220-240)	161188
MOTOROLA	K1006A	R		(220-240)	161188
MOTOROLA	MICOR	R		(220-240)	161188
MOTOROLA UHF BAND (400-512MHZ)					
MOTOROLA	KXN1039A	R	NORMAL SPLIT -21.4/6	(400-512)	167220
MOTOROLA	KXN1067A	R	NORMAL SPLIT -21.4/6	(400-512)	167220
MOTOROLA	MX330	R	NORMAL SPLIT -21.4/6	(400-512)	167220
MOTOROLA	YVNW69	T	WITH THERMISTOR	(402-512)	165590
MOTOROLA	HT-200	T	WITH THERMISTOR	(402-512)	165590
MOTOROLA	NLE6040	T	WITH THERMISTOR	(402-512)	165590
MOTOROLA	KXN6331	R		(403-424)	167984
MOTOROLA	RADIUS	R		(403-424)	167984
MOTOROLA	HT10	R		(403-424)	167984
MOTOROLA	P10	R		(403-424)	167984
MOTOROLA	P50	R		(403-424)	167984
MOTOROLA	KXN6344	R		(403-424)	167984
MOTOROLA	SPIRIT II	R		(403-424)	167984
MOTOROLA	R-NET	R		(403-424)	167984
MOTOROLA	R-NET 150	R		(403-424)	167984
MOTOROLA	R-NET 450	R		(403-424)	167984
MOTOROLA	R-NET 9600	R		(403-424)	167984
MOTOROLA	KXN6236AA	R	-45/6	(403-431)	167647
MOTOROLA	DIRECTOR II	R	-45/6	(403-431)	167647
MOTOROLA	MINITOR II	R	-45/6	(403-431)	167647
MOTOROLA	PAGEBOY II	R	-45/6	(403-431)	167647
MOTOROLA	BPR2000	R	-45/6	(403-431)	167647
MOTOROLA	TLN8967A	R		(405-512)	166614
MOTOROLA	TLN8968A	R		(405-512)	166614
MOTOROLA	RES-106A	R		(405-512)	166614
MOTOROLA	RES-106B	R		(405-512)	166614
MOTOROLA	TLN1190A	T		(405-512)	166625
MOTOROLA	KXN1088A	T		(405-512)	167490
MOTOROLA	MITREK	T		(405-512)	167490

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA UHF BAND (400-512MHZ) continued					
MOTOROLA	MSR2000	T		(405-512)	167490
MOTOROLA	KXN1086A	R		(405-512)	167500
MOTOROLA	KXN1086B	R		(405-512)	167500
MOTOROLA	MITREK	R		(405-512)	167500
MOTOROLA	MSR2000	R		(405-512)	167500
MOTOROLA	RES106A	R	HIGH SIDE INJECTION +11.7/24	(405-512)	166614H
MOTOROLA	RES106B	R	HIGH SIDE INJECTION +11.7/24	(405-512)	166614H
MOTOROLA	TLN8967A	R	HIGH SIDE INJECTION +11.7/24	(405-512)	166614H
MOTOROLA	TLN8968A	R	HIGH SIDE INJECTION +11.7/24	(405-512)	166614H
MOTOROLA	TLN8968B	R	HIGH SIDE INJECTION +11.7/24	(405-512)	166614H
MOTOROLA	CER106M	R	HIGH SIDE INJECTION +11.7/24	(405-512)	166614H
MOTOROLA	KXN1086A	R	HIGH SIDE INJECTION +10.7/9	(405-512)	167500H
MOTOROLA	KXN1086B	R	HIGH SIDE INJECTION +10.7/9	(405-512)	167500H
MOTOROLA	MSR2000	R	HIGH SIDE INJECTION +10.7/9	(405-512)	167500H
MOTOROLA	MITREK	R	HIGH SIDE INJECTION +10.7/9	(405-512)	167500H
MOTOROLA	TLN1146B	T		(406-512)	166623
MOTOROLA	KXN6095AA	R	-17.9/9	(406-512)	167000
MOTOROLA	UPKA	R	-17.9/9	(406-512)	167000
MOTOROLA	SPIRIT	R	-17.9/9	(406-512)	167000
MOTOROLA	PAGEBOY II	R	-17.9/9	(406-512)	167000
MOTOROLA	KXN1052A	T	REPEATER	(406-512)	167200
MOTOROLA	MICOR	T	REPEATER	(406-512)	167200
MOTOROLA	NLE6975A		21.4 TO 16.4MHZ MX SERIES	(406-512)	167310
MOTOROLA	MX SERIES		21.4 TO 16.4MHZ MX SERIES	(406-512)	167310
MOTOROLA	NLE6973A		26.4 TO 24.4MHz	(406-512)	167520
MOTOROLA	MX SERIES		26.4 TO 24.4MHz	(406-512)	167520
MOTOROLA	NLE6972A		26.4 TO 24.4MHz	(406-512)	167520
MOTOROLA	KXN6222AA	T		(406-512)	167609
MOTOROLA	EXPO	T		(406-512)	167609
MOTOROLA	KXN6330	T	RADIUS	(406-512)	167654
MOTOROLA	RADIUS	T	RADIUS	(406-512)	167654
MOTOROLA	P10	T	RADIUS	(406-512)	167654
MOTOROLA	P50	T	RADIUS	(406-512)	167654
MOTOROLA	HT10	T	RADIUS	(406-512)	167654
MOTOROLA	KXN6341	T	RADIUS	(406-512)	167654
MOTOROLA	SPIRIT II	T	RADIUS	(406-512)	167654
MOTOROLA	R-NET	T	RADIUS	(406-512)	167654
MOTOROLA	R-NET 150	T	RADIUS	(406-512)	167654
MOTOROLA	R-NET 450	T	RADIUS	(406-512)	167654
MOTOROLA	R-NET 9600	T	RADIUS	(406-512)	167654
MOTOROLA	KXN6331	R	RADIUS	(406-512)	167655
MOTOROLA	RADIUS	R	RADIUS	(406-512)	167655
MOTOROLA	P10	R	RADIUS	(406-512)	167655
MOTOROLA	P50	R	RADIUS	(406-512)	167655
MOTOROLA	HT10	R	RADIUS	(406-512)	167655

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA UHF BAND (400-512MHZ) continued					
MOTOROLA	KXN6344	R	RADIUS	(406-512)	167655
MOTOROLA	SPIRIT II	R	RADIUS	(406-512)	167655
MOTOROLA	R-NET	R	RADIUS	(406-512)	167655
MOTOROLA	R-NET 150	R	RADIUS	(406-512)	167655
MOTOROLA	R-NET 450	R	RADIUS	(406-512)	167655
MOTOROLA	R-NET 9600	R	RADIUS	(406-512)	167655
MOTOROLA	KXN1024A	R	Use FC(RX)-11.7/24 MICOR	(406-512)	167908
MOTOROLA	MICOR	R	Use FC(RX)-11.7/24 MICOR	(406-512)	167908
MOTOROLA	TLE8043A	R	Use FC(RX)-11.7/24 MICOR	(406-512)	167908
MOTOROLA	TLE8045A	R	Use FC(RX)-11.7/24 MICOR	(406-512)	167908
MOTOROLA	KXN6317	T		(406-512)	167993
MOTOROLA	SECURE NET	T		(406-512)	167993
MOTOROLA	EXPO	T		(406-512)	167993
MOTOROLA	KXN1024A	R	HIGH SIDE INJECTION +11.7/24	(406-512)	167908H
MOTOROLA	TLE8043A	R	HIGH SIDE INJECTION +11.7/24	(406-512)	167908H
MOTOROLA	TLE8045A	R	HIGH SIDE INJECTION +11.7/24	(406-512)	167908H
MOTOROLA	MICOR	R	HIGH SIDE INJECTION +11.7/24	(406-512)	167908H
MOTOROLA	KXN6207A	R		(408-430)	167621
MOTOROLA	HT-90	R		(408-430)	167621
MOTOROLA	HT-440	R		(408-430)	167621
MOTOROLA	KXN6206A	T		(408-512)	167591
MOTOROLA	HT-90	T		(408-512)	167591
MOTOROLA	HT-440	T		(408-512)	167591
MOTOROLA	YVSW142	R		(430-470)	166601
MOTOROLA	MONITOR	R		(430-470)	166601
MOTOROLA	MO4CNB	R		(430-470)	166601
MOTOROLA	ALERT	R		(430-470)	166601
MOTOROLA	KXN6236AA	R	-45/8	(431-474)	167648
MOTOROLA	MINITOR II	R	-45/8	(431-474)	167648
MOTOROLA	PAGEBOY II	R	-45/8	(431-474)	167648
MOTOROLA	DIRECTOR II	R	-45/8	(431-474)	167648
MOTOROLA	BPR2000	R	-45/8	(431-474)	167648
MOTOROLA	KXN6121AA	T		(434-512)	167970
MOTOROLA	MAXAR	T		(434-512)	167970
MOTOROLA	MAXAR 80	T		(434-512)	167970
MOTOROLA	MOXY	T		(434-512)	167970
MOTOROLA	FLEXAR	T		(434-512)	167970
MOTOROLA	KXN6122AA	R		(434-512)	167980
MOTOROLA	MAXAR	R		(434-512)	167980
MOTOROLA	MOXY	R		(434-512)	167980
MOTOROLA	MAXAR 80	R		(434-512)	167980
MOTOROLA	FLEXAR	R		(434-512)	167980
MOTOROLA	KXN6064A	T	WITH THERMISTOR	(440-474)	165594
MOTOROLA	YVNR	T	WITH THERMISTOR	(440-474)	165594
MOTOROLA	HT-220	T	WITH THERMISTOR	(440-474)	165594

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA UHF BAND (400-512MHZ) continued					
MOTOROLA	NLE6110A	T	WITH THERMISTOR	(440-474)	165594
MOTOROLA	YVNR118	T	WITH THERMISTOR	(440-474)	165594
MOTOROLA	KXN6054A	R		(440-474)	167565
MOTOROLA	PAC RT	R		(440-474)	167565
MOTOROLA	KXN1002A	T		(440-512)	166606
MOTOROLA	MOCOM 70	T		(440-512)	166606
MOTOROLA	CONSOLETTTE	T		(440-512)	166606
MOTOROLA	KXN1007A	T		(440-512)	166607
MOTOROLA	KXN1005A	T		(440-512)	166607
MOTOROLA	MOCOM 35	T		(440-512)	166607
MOTOROLA	TLN8603A	T		(440-512)	166613
MOTOROLA	RES-4	T		(440-512)	166613
MOTOROLA	CET-4	T		(440-512)	166613
MOTOROLA	K1018A	R		(440-512)	166616
MOTOROLA	MOCOM 70	R		(440-512)	166616
MOTOROLA	CONSOLETTTE	R		(440-512)	166616
MOTOROLA	YVNR117	R	-11.7/9 HT-220	(440-512)	166620
MOTOROLA	HT-220	R	-11.7/9 HT-220	(440-512)	166620
MOTOROLA	KXN6065A	R	-11.7/9 HT-220	(440-512)	166620
MOTOROLA	HT-210	R	-11.7/9 HT-220	(440-512)	166620
MOTOROLA	TLN1081A	R		(440-512)	166622
MOTOROLA	TLN1086A	R	2PPM	(440-512)	166626
MOTOROLA	KXN6047A	R		(440-512)	166628
MOTOROLA	VAJB	R		(440-512)	166628
MOTOROLA	MINITOR	R		(440-512)	166628
MOTOROLA	DIRECTOR	R		(440-512)	166628
MOTOROLA	KXN1035A	T	MT500	(440-512)	167410
MOTOROLA	MT500	T	MT500	(440-512)	167410
MOTOROLA	KXN1034A	R	MT500	(440-512)	167420
MOTOROLA	MT500	R	MT500	(440-512)	167420
MOTOROLA	KXN1013B	T		(440-512)	167564
MOTOROLA	PAC RT	T		(440-512)	167564
MOTOROLA	KXN1095A	T		(440-512)	167582
MOTOROLA	MSR2000	T		(440-512)	167582
MOTOROLA	MITREK	T		(440-512)	167582
MOTOROLA	KXN6166	T		(440-512)	167582
MOTOROLA	KXN6207A	R		(440-512)	167592
MOTOROLA	HT-90	R		(440-512)	167592
MOTOROLA	HT-440	R		(440-512)	167592
MOTOROLA	KXN1112A	R		(440-512)	167603
MOTOROLA	MITREK	R		(440-512)	167603
MOTOROLA	MSR2000	R		(440-512)	167603
MOTOROLA	KXN6224AA	R		(440-512)	167611
MOTOROLA	EXPO	R		(440-512)	167611

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA UHF BAND (400-512MHZ) continued					
MOTOROLA	KXN6318	R		(440-512)	167994
MOTOROLA	SECURE NET	R		(440-512)	167994
MOTOROLA	EXPO	R		(440-512)	167994
MOTOROLA	KXN6266	T		(441-474)	167643
MOTOROLA	MAXAR 50	T		(441-474)	167643
MOTOROLA	KXN6266AA	T		(441-474)	167643
MOTOROLA	KXN6279	R		(444-474)	167644
MOTOROLA	MAXAR 50	R		(444-474)	167644
MOTOROLA	KXN6279AA	R		(444-474)	167644
MOTOROLA	KXN1029A	R	-11.7/24 STANDARD	(444-512)	166641
MOTOROLA	KXN1026A	R	-11.7/24 STANDARD	(444-512)	166641
MOTOROLA	TLN1124A	T		(445-512)	166627
MOTOROLA	TLN1134A	T		(445-512)	166627
MOTOROLA	TLN1136A	T		(445-512)	166627
MOTOROLA	KMM-126A	R	FOR OVEN USE -21/9	(445-512)	166638
MOTOROLA	YVNW70	R	WITH THERMISTOR	(450-512)	165591
MOTOROLA	HT-200	R	WITH THERMISTOR	(450-512)	165591
MOTOROLA	NLE6032	R	WITH THERMISTOR	(450-512)	165591
MOTOROLA	KXN1006A	R		(450-512)	166608
MOTOROLA	MOCOM 35	R		(450-512)	166608
MOTOROLA	TLN1083A	T		(450-512)	166621
MOTOROLA	KXN1003A	T		(450-512)	166629
MOTOROLA	KXN1003B	T		(450-512)	166629
MOTOROLA	CONSOLETTTE	T		(450-512)	166629
MOTOROLA	KXN6236AB	R	-17.9/9	(450-512)	167630
MOTOROLA	EXPO	R	-17.9/9	(450-512)	167630
MOTOROLA	ENVOY	R	-17.9/9	(450-512)	167630
MOTOROLA	MINITOR II	R	-17.9/9	(450-512)	167630
MOTOROLA	KXN6301	R		(450-512)	167658
MOTOROLA	BRAVO	R		(450-512)	167658
MOTOROLA	MINITOR II	R		(450-512)	167658
MOTOROLA	ADVISOR	R		(450-512)	167658
MOTOROLA	KEYNOTE	R		(450-512)	167658
MOTOROLA	PR3000	R		(450-512)	167658
MOTOROLA	RADIUS	R		(450-512)	167658
MOTOROLA	MEMO	R		(450-512)	167658
MOTOROLA	KXN1003B	T		(450-512)	167981
MOTOROLA	MAXAR 80	T		(450-512)	167981
MOTOROLA	KXN1067A		SPECIAL TX OFFSET USE (PLEASE GIVE FORMULA)	(400-512)	167422
MOTOROLA	KXN6064A	T	LESS THERMISTOR	(440-474)	167860
MOTOROLA	YVNR	T	LESS THERMISTOR	(440-474)	167860
MOTOROLA	HT-220	T	LESS THERMISTOR	(440-474)	167860
MOTOROLA	NLE6110A	T	LESS THERMISTOR	(440-474)	167860

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA 800/950MHZ BAND					
MOTOROLA	KXN1029A	R		(800-932)	167578
MOTOROLA	MICOR	R		(800-932)	167578
MOTOROLA	KXN1026A	R		(800-932)	167578
MOTOROLA	KXN1071A	T	HEATED	(800-975)	167579
MOTOROLA	MICOR	T	HEATED	(800-975)	167579
MOTOROLA	KXN1101A	T		(806-828)	167606
MOTOROLA	MAXAR 80	T		(806-828)	167606
MOTOROLA	KXN1052A	T		(850-960)	167645
MOTOROLA	MICOR	T		(850-960)	167645
MOTOROLA	KXN1089A	R		(851-871)	167586
MOTOROLA	MX	R		(851-871)	167586
MOTOROLA	KXN1089AB	R		(851-871)	167586
MOTOROLA	KXN1068A	R		(851-875)	167470
MOTOROLA	MICOR	R		(851-875)	167470
MOTOROLA	CONSOLETTTE	R		(851-875)	167470
MOTOROLA	KXN1103A	R		(851-876)	167598
MOTOROLA	MITREK	R		(851-876)	167598
MOTOROLA	KXN1100A	R		(851-880)	167607
MOTOROLA	MAXAR 80	R		(851-880)	167607
MOTOROLA	RN20	T	FOR OVEN USE	(890-960)	163395
MOTOROLA	KXN6370AA	R	-17.9/12 NEW STYLE CONFIRM FORMULA	(928-932)	167670
MOTOROLA	BRAVO	R	-17.9/12 NEW STYLE CONFIRM FORMULA	(928-932)	167670
MOTOROLA	MEMO EXPRESS	R	-17.9/12 NEW STYLE CONFIRM FORMULA	(928-932)	167670

MOTOROLA 2GHZ BAND

MOTOROLA	4883450F23		PILOT CRYSTAL	(4.725)	4883450F23
MOTOROLA	STAR POINT		PILOT CRYSTAL	(4.725)	4883450F23
MOTOROLA	MXN6002A		PILOT CRYSTAL	(4.725)	4883450F23
MOTOROLA	4883450F10		PILOT CRYSTAL	(.607)	4883450F10
MOTOROLA	STAR POINT		PILOT CRYSTAL	(.607)	4883450F10
MOTOROLA	MXN6002A		PILOT CRYSTAL	(.607)	4883450F10

MOTOROLA 2GHZ/6GHZ BAND

MOTOROLA	KXN6148AA		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587
MOTOROLA	KXN6148AB		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587
MOTOROLA	KXN6148AC		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587
MOTOROLA	KXN6148AD		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587
MOTOROLA	KXN6148AE		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587
MOTOROLA	KXN6148AF		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
MOTOROLA 2GHZ/6GHZ BAND continued					
MOTOROLA	STARPOINT		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167587
MOTOROLA	KXN6149AA		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
MOTOROLA	KXN6149AB		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
MOTOROLA	KXN6149AC		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
MOTOROLA	KXN6149AD		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
MOTOROLA	KXN6149AE		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
MOTOROLA	KXN6149AF		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
MOTOROLA	STARPOINT		MUST GIVE MOT # AND CRYSTAL FREQUENCY	(2G & 6G)	167589
NEC VHF-HI BAND (132-174MHZ)					
NEC	MK3	R		(138-174)	745063
NEC	MK4	R		(138-174)	745063
NEC	PR-150B5-4A	R		(138-174)	745063
NEC	PR-150V2-10A	R		(138-174)	745063
NEC	R3D3-1A	R		(138-174)	745063
NEC	R3D3-1B	R		(138-174)	745063
NEC	R3V2-2A	R		(138-174)	745063
NEC	R3V2-2B	R		(138-174)	745063
NEC	R3V5-1A	R		(138-174)	745063
NEC	MPS-Q-206A2	R		(138-174)	745063
NEC	MPS-Q-2016A	R		(138-174)	745063
NEC	PR-150B5-4A	R		(138-174)	745063
NEC	R3D3-2A	R		(138-174.8)	745087
NEC	R3D3-2B	R		(138-174.8)	745087
NEC	R3D4-2A	R		(138-174.8)	745087
NEC	R3D4-2B	R		(138-174.8)	745087
NEC	R3D3-2C	R		(138-174.8)	745087
NEC	R3D3-2D	R		(138-174.8)	745087
NEC	R3D4-2C	R		(138-174.8)	745087
NEC	R3D4-2D	R		(138-174.8)	745087
NEC	R3D3-4C	R		(138-174.8)	745087
NEC	R3D4-4C	R		(138-174.8)	745087
NEC	R3D4-3A	R		(138-174.8)	745087
NEC	R3D4-4A	R		(138-174.8)	745087
NEC	R3D4-4B	R		(138-174.8)	745087
NEC	MPS-Q-2011A	R		(138-174.8)	745087
NEC UHF BAND (406-512MHZ)					
NEC	D4N	R		(406-512)	745100
NEC	R4D3-4C	R		(406-512)	745100

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
NEC UHF BAND (406-512MHZ) continued					
NEC	R4D4-4C	R		(406-512)	745100
NEC	R4D4-3A	R		(406-512)	745100
NEC	MPS-Q-2020A	R		(406-512)	745100
NEC	NEC INDEX	R		(406-512)	745100
NEULINK/CELLTRONICS 800/950MHZ BAND					
NEULINK/CELLTRONICS	XT-96T	T		(800-960)	865460
NEULINK/CELLTRONICS	DCL SERIES	T		(800-960)	865460
NEULINK/CELLTRONICS	XT-96R	R		(800-960)	865461
NEULINK/CELLTRONICS	DCL SERIES	R		(800-960)	865461
OVENAIRE REFERENCE OSCILLATOR CRYSTALS					
OVENAIRE	22-19		FOR OVEN USE	(5.00)	765048
OVENAIRE	XGL-105-Y		FOR OVEN USE	(5.00)	765048
OVENAIRE	59-22		FOR OVEN USE	(3.0-4.0)	765050
OVENAIRE	XGL-97X-B		FOR OVEN USE	(3.0-4.0)	765050
OVENAIRE	83-12		FOR OVEN USE	(3-3.999)	765026
OVENAIRE	XGL-286		FOR OVEN USE	(3-3.999)	765026
OVENAIRE	83-12		FOR OVEN USE	(4.5-5.5)	765028
OVENAIRE	XGL-286		FOR OVEN USE	(4.5-5.5)	765028
OVENAIRE	XGL-283		FOR OVEN USE	(4.5-5.5)	765028
OVENAIRE	74-14-1		FOR OVEN USE	(4.5-5.5)	765067
OVENAIRE	QT4201		FOR OVEN USE	(4.5-5.5)	765067
OVENAIRE	83-12		FOR OVEN USE	(4-4.999)	765027
OVENAIRE	XGL-286		FOR OVEN USE	(4-4.999)	765027
OVENAIRE	74-14-1		FOR OVEN USE	(4-4.999)	765032
OVENAIRE	QT4201		FOR OVEN USE	(4-4.999)	765032
RCA VHF-LO BAND (25-54MHZ)					
RCA	BTE-10C			(44-55)	311850
RCA VHF-HI BAND (132-174MHZ)					
RCA	MI559230	T		(132-174)	310880
RCA	ML-1000	T		(132-174)	310880
RCA	MI594008G	T		(132-174)	312350
RCA	643139	T		(132-174)	312350
RCA	TAC-200	T		(132-174)	312350
RCA	MI559766	R		(148-174)	311040
RCA	TAC-100	R		(148-174)	311040
RCA	TACTEC	R		(148-174)	311040
RCA	MI559706	R		(148-174)	311040
RCA	MI594008B	R		(148-174)	312360
RCA	643134	R		(148-174)	312360
RCA	TAC-200	R		(148-174)	312360
RCA UHF BAND (406-512MHZ)					
RCA	MI559230	T		(406-512)	311190
RCA	MI559241	T		(406-512)	312370

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
RCA UHF BAND (406-512MHZ) continued					
RCA	643011	T		(406-512)	312370
RCA	MI559500	R		(440-512)	311201
RCA	16S200	R		(440-512)	312190
RCA	MI559499	R		(440-512)	312380
RCA	643013	R		(440-512)	312380
RCA	3720716-504	R		(440-512)	312380
RCA	3728195-1	T		(440-512)	312400
RCA	TAC-300	T		(440-512)	312400
RCA	643146	T		(440-512)	312400
RCA	TAC-500	T		(440-512)	312400
RCA	3728194-1	R		(440-512)	312410
RCA	TAC-300	R		(440-512)	312410
RCA	643145	R		(440-512)	312410
RCA	TAC-500	R		(440-512)	312410

REGENCY VHF-LO BAND (25-54MHZ)					
REGENCY	BTL SERIES	T		(25-43.99)	90030
REGENCY	301-542	R		(30-50)	90480
REGENCY	HX-650	R		(30-50)	90480
REGENCY	ACT	R		(30-50)	90480
REGENCY	BTL SERIES	R		(30-54)	90040
REGENCY	BTL SERIES	T		(44-54)	90031
REGENCY	HR-6	T		(50-54)	90420
REGENCY	HR-6	R		(50-54)	90430

REGENCY VHF-HI BAND (132-174MHZ)					
REGENCY	301-616	R		(118-127.9)	90740
REGENCY	FLIGHT SCAN	R		(118-127.9)	90740
REGENCY	ACT	R		(118-127.9)	90740
REGENCY	301-616	R		(128-136)	90750
REGENCY	FLIGHT SCAN	R		(128-136)	90750
REGENCY	ACT	R		(128-136)	90750
REGENCY	HR-2	T		(144-154)	90360
REGENCY	HR-2	R		(144-154)	90370
REGENCY	BTH SERIES	T		(144-174)	90010
REGENCY	301-741	T		(144-174)	90010
REGENCY	MICRO-COM	T		(144-174)	90010
REGENCY	BTH SERIES	R		(144-174)	90020
REGENCY	301-740	R		(144-174)	90020
REGENCY	MICRO-COM	R		(144-174)	90020
REGENCY	HR-2B	T		(144-174)	90380
REGENCY	301-532	R		(144-174)	90490
REGENCY	HX-650	R		(144-174)	90490
REGENCY	ACT	R		(144-174)	90490
REGENCY	MCH SERIES	T		(144-174)	90680
REGENCY	MCH SERIES	R		(144-174)	90690

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
REGENCY VHF-HI BAND (132-174MHZ) continued					
REGENCY	UC102	T		(144-174)	90790
REGENCY	TRPH-102	T		(144-174)	90790
REGENCY	UTILICOM	T		(144-174)	90790
REGENCY	UC-2200	T		(144-174)	90790
REGENCY	UC-202	T		(144-174)	90790
REGENCY	UC102	R		(144-174)	90791
REGENCY	TRPH-102	R		(144-174)	90791
REGENCY	UTILICOM	R		(144-174)	90791
REGENCY	UC-2200	R		(144-174)	90791
REGENCY	UC-202	R		(144-174)	90791
RELM/REGENCY	UC-2200	R		(144-174)	825234

REGENCY UHF BAND (440-512MHZ)					
REGENCY	301-603	R		(440-470)	90500
REGENCY	HX-650	R		(440-470)	90500
REGENCY	ACT	R		(440-470)	90500
REGENCY	MCU SERIES	T		(440-474)	90630
REGENCY	MCU SERIES	R		(440-474)	90640
REGENCY	MCCU	T		(440-512)	90796
REGENCY	MCBU	T		(440-512)	90796
REGENCY	302-539	T		(440-512)	90796
REGENCY	MCCU-15	T		(440-512)	90796
REGENCY	MCCU	R		(440-512)	90797
REGENCY	MCBU	R		(440-512)	90797
REGENCY	302-540	R		(440-512)	90797
REGENCY	MCCU-15	R		(440-512)	90797
REGENCY	301-603	R		(470-512)	90580
REGENCY	HX-650	R		(470-512)	90580
REGENCY	ACT	R		(470-512)	90580

REPCO VHF-LO BAND (25-54MHZ)					
REPCO	23-10-003	R		(25-42)	820408

REPCO VHF-HI BAND (132-174MHZ)					
REPCO	23-10-006	T		(132-174)	820411
REPCO	23-10-016	R		(138-174)	820459
REPCO	PC150	R		(138-174)	820459
REPCO	23-11-002	T		(138-174)	820460
REPCO	XJ-300	T		(138-174)	820460
REPCO	23-09-019	T		(144-174)	820425
REPCO	RMX-150	T		(144-174)	820425
REPCO	DIMENSION	T		(144-174)	820425
REPCO	23-09-018	R		(144-174)	820426
REPCO	RMX-150	R		(144-174)	820426

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
REPCO VHF-HI BAND (132-174MHZ) continued					
REPCO	DIMENSION	R		(144-174)	820426
REPCO	23-10-007	R		(150.8-174)	820416
REPCO	23-10-015	T		(150-174)	820458
REPCO	PC150	T		(150-174)	820458
REPCO VHF BAND (ABOVE 174MHZ)					
REPCO	23-10-015	T		(220-243)	820474
REPCO UHF BAND (440-512MHZ)					
REPCO	23-10-015	T		(440-474)	820449
REPCO	PC400	T		(440-474)	820449
REPCO	23-10-016	R		(440-474)	820450
REPCO	PC400	R		(440-474)	820450
REPCO	23-10-016	R	HIGH SIDE INJECTION +21.4/9	(440-474)	820450H
REPCO	PC400	R	HIGH SIDE INJECTION +21.4/9	(440-474)	820450H
REPCO	23-09-018	R		(440-512)	820423
REPCO	RMX-450	R		(440-512)	820423
REPCO	DIMENSION	R		(440-512)	820423
REPCO	23-09-019	T		(440-512)	820424
REPCO	RXM-450	T		(440-512)	820424
REPCO	DIMENSION	T		(440-512)	820424
REPCO	23-10-013	T	REPEATER FOR OVEN USE	(440-512)	820456
REPCO 950MHZ BAND					
REPCO	23-10-020	T	FOR OVEN USE	(900-960)	820463
REPCO	23-10-019	R		(900-960)	820464
RF COMM/HARRIS VHF-HI BAND (144-174MHZ)					
RF COMM/HARRIS	RF1500	T		(144-174)	260010
RF COMM/HARRIS	RF1500	R		(144-174)	260512
RITRON 2ND OSCILLATOR CRYSTAL					
RITRON	2300019		2ND OSCILLATOR CRYSTAL	(10.245)	825167
RITRON	JOB COM		2ND OSCILLATOR CRYSTAL	(10.245)	825167
RITRON VHF-LO BAND (24-54MHZ)					
RITRON	RT-50	T		(25-54)	825155
RITRON	JOB COM	T		(25-54)	825155
RITRON	2300015	T		(25-54)	825155
RITRON	RT-50	R		(25-54)	825156
RITRON	2300016	R		(25-54)	825156
RITRON	JOB COM	R		(25-54)	825156
RITRON VHF-HI BAND (144-174MHZ)					
RITRON	RT-150	T		(144-174)	825147
RITRON	RT-151	T		(144-174)	825147

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
RITRON VHF-HI BAND (144-174MHZ) continued					
RITRON	RT-152	T		(144-174)	825147
RITRON	RT-153	T		(144-174)	825147
RITRON	RT-154	T		(144-174)	825147
RITRON	RT-156	T		(144-174)	825147
RITRON	JOBCOM	T		(144-174)	825147
RITRON	RT-150	R		(144-174)	825148
RITRON	RT-151	R		(144-174)	825148
RITRON	RT-152	R		(144-174)	825148
RITRON	RT-153	R		(144-174)	825148
RITRON	RT-154	R		(144-174)	825148
RITRON	RT-156	R		(144-174)	825148
RITRON	JOBCOM	R		(144-174)	825148
RITRON UHF BAND (420-512MHZ)					
RITRON	RT-450	T		(420-512)	825165
RITRON	RT-451	T		(420-512)	825165
RITRON	RT-456	T		(420-512)	825165
RITRON	RT-457	T		(420-512)	825165
RITRON	2300022	T		(420-512)	825165
RITRON	JOBCOM	T		(420-512)	825165
RITRON	RT-450	R	LATER VERSION 21.4MHZ IF	(440-512)	825169
RITRON	2300400	R	LATER VERSION 21.4MHZ IF	(440-512)	825169
RITRON	RT-451	R	LATER VERSION 21.4MHZ IF	(440-512)	825169
RITRON	RT-456	R	LATER VERSION 21.4MHZ IF	(440-512)	825169
RITRON	RT-457	R	LATER VERSION 21.4MHZ IF	(440-512)	825169
RITRON	JOBCOM	R	LATER VERSION 21.4MHZ IF	(440-512)	825169
RITRON	RT-450	T		(450-474)	825149
RITRON	RT-451	T		(450-474)	825149
RITRON	RT-456	T		(450-474)	825149
RITRON	RT-457	T		(450-474)	825149
RITRON	JOBCOM	T		(450-474)	825149
RITRON	2300001	T		(450-474)	825149
RITRON	RT-450	R		(450-474)	825150
RITRON	RT-451	R		(450-474)	825150
RITRON	RT-456	R		(450-474)	825150
RITRON	RT-457	R		(450-474)	825150
RITRON	2300030	R		(450-474)	825150
RITRON	2300100	R		(450-474)	825150
RITRON	JOBCOM	R		(450-474)	825150
STANDARD VHF-LO BAND (30-56MHZ)					
STANDARD	C934L	R		(30-56)	141018

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
STANDARD VHF-HI BAND (132-174MHZ)					
STANDARD	RPT-10	R		(136-174)	141033
STANDARD	C890L	T		(144-174)	140690
STANDARD	C890L	R		(144-174)	140700
STANDARD	C834L	T		(144-174)	140900
STANDARD	C834L	R		(144-174)	140910
STANDARD	C867L	T		(144-174)	140840
STANDARD	C867L	R		(150-174)	140850
STANDARD	HX-SERIES	T		(150-174)	141025
STANDARD	HX-SERIES	R		(150-174)	141026
STANDARD UHF BAND (406-512MHZ)					
STANDARD	RPT21	T		(406-512)	141040
STANDARD	RPT21	R		(406-512)	141041
STANDARD	C768L	T		(420-474)	141012
STANDARD	C768L	R		(420-474)	141013
STANDARD	RPT-20	T		(432-474)	141016
STANDARD	RPT-20	R		(432-474)	141017
STANDARD	RP70U	T		(440-474)	141028
STANDARD	RP70U	R		(440-474)	141029
STANDARD	HX-SERIES	T		(450-474)	141014
STANDARD	HX-SERIES	R		(450-474)	141015
STANDARD 800MHZ BAND					
STANDARD	RP70K	R		(806-821)	141039
STANDARD	RP70K	T		(851-866)	141038
TEMPO VHF-LO (30-54MHZ)					
TEMPO	TEMPO ONE			(30-54)	860101
TEMPO	FT200			(30-54)	860101
TEMPO	FT250			(30-54)	860101
TEMPO VHF-HI (138-174MHZ)					
TEMPO	FMH-2	T		(138-174)	860112
TEMPO	FMH-5	T		(138-174)	860112
TEMPO	FMH-12	T		(138-174)	860112
TEMPO	FMH-15	T		(138-174)	860112
TEMPO	FMH-2	R		(138-174)	860113
TEMPO	FMH-5	R		(138-174)	860113
TEMPO	FMH-12	R		(138-174)	860113
TEMPO	FMH-15	R		(138-174)	860113

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
TRILECTRIC/CELLTRONICS MID-BAND (66-88MHZ)					
TRILECTRIC/ CELLTRONICS	XT-05T	T	RFL-TM	(66-88)	865187
TRILECTRIC/ CELLTRONICS	RFL-TM	T	RFL-TM	(66-88)	865187
TRILECTRIC/ CELLTRONICS	XT-05R	R	RFL-RM	(66-88)	865188
TRILECTRIC/ CELLTRONICS	RFL-RM	R	RFL-RM	(66-88)	865188
TRILECTRIC/CELLTRONICS UHF BAND (450-512MHZ)					
TRILECTRIC/ CELLTRONICS	XT-25T	T	EARLY RFL-TU	(450-512)	865185
TRILECTRIC/ CELLTRONICS	RFL-TU	T	EARLY RFL-TU	(450-512)	865185
TRILECTRIC/ CELLTRONICS	XT-25R	R	EARLY RFL-RU	(450-512)	865186
TRILECTRIC/ CELLTRONICS	RFL-RU	R	EARLY RFL-RU	(450-512)	865186
UNIDEN UHF BAND (406-467MHZ)					
UNIDEN	850-501-000	T		(406-467)	585200
UNIDEN	850-501-000	R		(406-467)	585201
WILSON VHF-LO BAND (25-54MHZ)					
WILSON	WL-604A	T		(29-50)	925108
WILSON	WL-604B	T		(29-50)	925108
WILSON	WL-604C	T		(29-50)	925108
WILSON	CITICOM II	T		(29-50)	925108
WILSON	WL-604A	R		(29-50)	925109
WILSON	WL-604B	R		(29-50)	925109
WILSON	WL-604C	R		(29-50)	925109
WILSON	CITICOM II	R		(29-50)	925109
WILSON	HH-505-D	T		(33-54)	925203
WILSON	MCPL	T		(33-54)	925203
WILSON	HH-505-D	R		(33-54)	925204
WILSON	MCPL	R		(33-54)	925204
WILSON VHF-HI BAND (132-174MHZ)					
WILSON	WH-404B	T		(132-174)	925106
WILSON	WH-404C	T		(132-174)	925106
WILSON	CITICOM II	T		(132-174)	925106
WILSON	WH-404A	R		(132-174)	925107
WILSON	WH-404B	R		(132-174)	925107
WILSON	WH-404C	R		(132-174)	925107
WILSON	CITICOM II	R		(132-174)	925107
WILSON	T-1402SM	T		(144-174)	925057
WILSON	T-1405SM	T		(144-174)	925057

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MANUFACTURER	OEM REFERENCE NUMBER	FUNCTION	NOTES	FREQ. RANGE	ICM CATALOG NO.
WILSON VHF-HI BAND (132-174MHZ) continued					
WILSON	T-1402SM	R		(144-174)	925058
WILSON	T-1405SM	R		(144-174)	925058
WILSON	HH-15XX SERIES	T		(144-174)	925102
WILSON	MINICOM	T		(144-174)	925102
WILSON	HH-15XX SERIES	R		(144-174)	925103
WILSON	MINICOM	R		(144-174)	925103
WILSON	1550	T		(144-174)	925120
WILSON	1550	R		(144-174)	925121
WILSON	WH-100R	T		(144-174)	925218
WILSON	WH-100R	R		(144-174)	925219
WILSON UHF BAND (440-512MHZ)					
WILSON	WU-451	T		(440-512)	925104
WILSON	WU-354	T		(440-512)	925104
WILSON	CITICOM II	T		(440-512)	925104
WILSON	WU-451	R		(440-512)	925105
WILSON	WU-354	R		(440-512)	925105
WILSON	CITICOM II	R		(440-512)	925105

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