

INDEX TO CHANNEL OSCILLATORS AND CRYSTALS

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Listing for Crystals and Channel Oscillator Modules have been made by the product and by application to either Transmitters or Receivers. Within the Charts for a specific product, the Part Ordering Number and other necessary information is given in order of operating frequency bands. To locate a specific crystal or channel oscillator, consult the index above for the page number of the product. On that page you will be able to determine from the desired operating frequency and application the required device.

When ordering Channel Crystals or oscillator modules, it is necessary to include:

- 1) The part number of the device you are ordering
- 2) The operating frequency in MHZ
- 3) The crystal or oscillator module frequency if so noted on chart and
- 4) Whether for T (Transmit) or R (Receive)

Fixed-Frequency IF crystals and modules are often shipped from stock, but items which must be made to order normally take from three to ten days to produce. You may want to "Rush" orders in an emergency situation. Expedited service is available.

For high-stability modules requiring an aging process of from ten to twenty-five days, "BASE STATION OFF-THE-AIR" emergencies can be handled by furnishing a temporary, "RED ICOM". The RED ICOM shortcuts the aging or compensating processes and can restore temporary operation while the properly aged and compensated device is made. The "Red ICOM" must be returned to EGE upon receipt of the standard item. This service is not supplied for frequency changes or new stations, but only for base stations suffering an oscillator module failure.

We prefer for all orders for modules to be manufactured to order on a specific frequency to be mailed or "faxed", since telephoned orders are subject to misunderstanding. We will, however, take emergency orders by phone.

CHANNEL ELEMENTS

SERVICE PARTS QUICK REFERENCES

All Channel elements listed here are for radio units with Standard IF Frequencies and Standard Channel Spacings. For radios with Alternate IF Frequencies and for Tertiary Channels (i.e., 12.5 KHz or 15 KHz channel spacing), please consult the radio maintenance manual or Service Parts ID.

		TRANSMITTER ORDER NO.	RECEIVER ORDER NO.	
DELTA	150-174MHz	19A701562G6	19A701562G6	Crystalled Only!
	450-470MHz	19A701562G6	19A701562G6	
PHOENIX	150-174MHz	19B233066G1	19B233066G2	Crystalled Only!
	450-470MHz	19B233066G5	19B233066G7	

EXECUTIVE II & BEACON MONITOR PAGERS

33-50MHz
150-174MHz
450-470MHz

S19/BQ124B-
S19/BQ119A-
S19/BQ111A-

TONE NETWORKS

S19/EFMR15M-
S19/EFMR15M-
S19/EFMR15M-

BEACON II PAGERS CRYSTALS & TONE NETWORKS

33-50MHz
150-174MHz
450-470MHz

19B801433G2
19B801433G2
19B801433G2

S19/EFMR15M-
S19/EFMR15M-
S19/EFMR15M-

MPI PERSONALS

VHF 136-174MHz
UHF 406-512MHz

19A702375G2
19A702375G1

19A702375G2
19A702375G2

PE/MPE

LOW BAND 30-36MHz
36-42MHz
42-50MHz
MID BAND 66-88MHz
75-88MHz
HIGH BAND 138-150.8MHz
150.8-174MHz
UHF BAND 406-420MHz
450-512MHz

4EG31A10
4EG31A10
4EG31A10
4EG27A13
4EG27A13
4EG27A10
4EG27A10
4EG27A11
4EG27A11

4EG28A17
4EG28A18
4EG28A17
4EG28A30
4EG28A31
4EG28A15
4EG28A11
4EG28A12
4EG28A13

MPX 800 MHz BAND

OFFSET Oscillator
REPEAT/DIRECT OFFSET

19D430310G1
19D433665G1

19A137645G13

MPR/MPX Channel Oscillators

VHF 138-174MHz
UHF 406-512MHz
406-512MHz

19A137646G1
19A137645G7
19A137646G3 (ONLY IF SEPARATE TX/RX)

19A137645G1
19A137645G7

MPR/MPX UHF (406-512 MHz) OFFSET OSCILLATORS

SIMPLEX (0 MHz Offset)
3.0 MHz Offset (Std. 470-512 MHz)
5.0 MHz Offset (Std. 450-470 MHz)
Other than 0,3, or 5MHz (See note below)

19D429739G2
19D429739G3
19D429739G4
19D429739G1

ACTUAL FREQ.

21.4 MHz (STOCKED)
24.4 MHz (STOCKED)
26.4 MHz (STOCKED)
(Formula) (ORDERED)

Note: It is not necessary to specify any frequency on the order for 19D429739G2, 19D429739G3, or 19D429739G4, since these are for the fixed frequencies defined by the group numbers. You must specify the frequency for 19D429739G1 using the formula:

OFFSET OSCILLATOR FREQ = (TRANSMIT FREQ. - RECEIVE FREQ. + IF FREQ.)

(The offset oscillator frequency must be between 14.85 MHz and 29.0 MHz).

MASTR II MOBILE AND STATIONS:

Because of the many variations in Stability, Mode of Modulation, and Type of ICOM, please consult the Service Parts "Parts and Accessories Catalog, Section 1, for determining the Ordering Numbers for these units.

MPR PERSONAL

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---						
H,J,K	138-174	KT-167-A/B/C KT-168-A/B/C	$E\Omega$ 3	46.00-58.00 MHz	Crystal Module (5 ppm)	19A137645G1
N,R,S	406-512	KT-175-A/B/C KT-176-A/B/C	FT-FR+21.4	14.85-28.10 MHz	TX Offset	Standard 21.4 MHz Rx IF 19D429739G1
			FT-FR+23.0	14.85-28.10 MHz	Crystal Module TX Offset	Optional 23.0 MHz Rx IF 19D429739G11
					Crystal Module	

NOTE: Use the offset ordering information in the Quick Reference Chart, Page 1.02

--- RECEIVERS ---

H,J,K	138-174	ER-109-A/B/C	$E\Omega$ -21.4 2	58.30-76.35 MHz	Crystal Module (5 ppm)	Standard 21.4 MHz IF 19A137645G1
			$E\Omega$ -23.0 2	57.50-75.50 MHz	Crystal Module (5 ppm)	Optional 23.0 MHz IF 19A137645G5
N,R,S	406-512	ER-114-A/B/C	FR -21.4 6	64.10-81.77 MHz	Crystal Module (5 ppm)	Standard 21.4 MHz IF 19A137645G7
			FR -23.0 6	63.84-81.50 MHz	Crystal Module (5 ppm)	23.0 MHz IF 19A137645G11

(FT = Transmit frequency, FR = receive frequency)

MPX Personal

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY (MHz)	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---						
H,J,K	138-174	KT-167-A/B/C/D/E/F KT-168-A/B/C/D/E/F KT-191-D/E/F	$E\Omega$ 3	46-58	Osc. Module	19A137646G1

UHF Transmitter Oscillator modules only used with Independent TX/RX Option

N,R,S	406-512	(None)	$E\Omega$ 10	40.6-51.2	Osc. Module	19A137646G3
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--- TRANSMITTER OFFSET OSCILLATORS ---

N,R,S	406-512	KT-175-A/B/C & KT-176-A/B/C KT-176-A/B/C KT-176-A/B/C	Tx-Rx+IF	14.85-29	Offset Osc.	19D429739G1
N,R,S	406-512		Tx-Rx+IF	21.4	Zero Offset Osc.	19D429739G2
S	470-512		Tx-Rx+IF	24.4	3 MHz Offset Osc.	19D429739G3
R	450-470		Tx-Rx+IF	26.4	5 MHz Offset Osc.	19D429739G4
W	806-825	KT-181-A/B		16.6	Std. Offset Osc.	19D430310G1
W	806-825	KT-181-A/B		17.0	Alt. IF Offset Osc.	19D430310G2
W	806-825	KT-181-A/B		10.7	Zero Offset Osc. (Repeater Talk-Around)	19D433665G1

See the Offset Oscillator ordering information in the Quick Reference Chart, Page 1.02

--- RECEIVERS ---

H,J,K	138-174	ER-109-A/B/C	$E\Omega$ -21.4 2	58.3-76.3	5 ppm Standard Rx	19A137645G1
			$E\Omega$ -23 2	57.5-75.5	5 ppm Altr. IF Rx	19A137645G5
		ER1-121-A/B/C	$E\Omega$ -21.4 2	58.3-76.3	2 ppm Standard Rx	19A137645G2
			$E\Omega$ -23 2	57.5-75.5	2 ppm Altr. IF Rx	19A137645G6
N,R,S	406-512	ER-114-A/B/C	$E\Omega$ -21.4 6	64.1-81.77	5 ppm Standard Rx	19A137645G7
		ER-114-A/B/C	$E\Omega$ -23 6	63.83-81.5	5 ppm Altr. IF Rx	19A137645G11
		ER-114-A/B/C	$E\Omega$ -21.4 6	64.1-81.77	2 ppm Standard Rx	19A137645G8
		ER-114-A/B/C	$E\Omega$ -23 6	63.83-81.5	2 ppm Altr. IF Rx	19A137645G12
		ER-114-A/B/C	$E\Omega$ -21.4 6	64.1-81.77	± 12.5 kHz Std Rx	19A137645G8
		ER-114-A/B/C	$E\Omega$ -23 6	63.83-81.5	± 12.5 kHz Altr. IF Rx	19A137645G12
W	851-870	ER-115-A/B/C	$E\Omega$ +21.4 12	72.7-74.3	Standard Rx	19A137645G13
			$E\Omega$ +23 12	72.83-74.42	Alternate IF	19A137645G14

CRYSTALS

MPI Personal Portables

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY (In MHz)	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---						
H,J	136-174	TR-103-A, TR-120-A TR-122-A	F_o 3	45.33-58	Crystal	19A702375G2
M,N,R, S,T	403-512	TR-102-A, TR-121-A TR-121-B, TR-121-C	F_o 8	44.777-56.889	Crystal	19A702375G1
--- RECEIVERS ---						
H,J	136-174	TR-103-A, TR-120-A TR-122-A	$F_o-10.7$ 3	41.76-54.334 10.245	Crystal 2nd Osc. Crystal	19A702375G2 19A702284G1
M,N,R S,T	403-512	TR-102-A, TR-121-A TR-121-B, TR-121-C	$F_o-21.4$ 9	42.40-54.511 20.945	Crystal 2nd Osc. Crystal	19A702375G2 19A702284G3

EXECUTIVE II AND BEACON™ MONITOR PAGER

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (In MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY (In MHz)	DESCRIPTION	ORDERING NUMBER**
--- RECEIVERS ---						
B/J/C/D/E	33-50	ER-145-A/B/C	$F_o+10.7$	11.155* 10.245*	Crystal 2nd Osc. Crystal Alt. 2nd Osc. Crystal	SW/BQ124B SW/BQ62B SW/BQ62B SW/BQ119A
G/H/J/K	142-174	ER-146-A1/B1	$F_o-10.7$ 3	10.245* 11.155*	2nd Osc. Crystal Alt. 2nd Osc. Crystal	SW/BQ62B SW/BQ62B SW/BQ111A
M	406-430	-	$F_o-12.6$ 9	21.245* 22.055*	2nd Osc. Crystal Alt. 2nd Osc. Crystal	SW/BO62B SW/BO62B SW/BQ111A
P/S	450-512	ER-147-A1/B1	$F_o-21.6$ 9	21.245* 22.055*	2n Osc. Crystal Alt. 2nd Osc.	SW/BO62B SW/BO62B

*You must specify the exact frequency desired for the 2nd Oscillator Crystal.

**You must specify operating frequency in MHz.

CRYSTALS

DELTA MOBILES (CRYSTALLED) (PCM4)

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (In MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---						
G	136-153	KT-215-A, KT-216-A	E_Q	45.33-51.00	Crystal	19A701562G6*
H	150.8-174	KT-217-A KT-215-A, KT-216-A KT-217-A	3 E_Q 3	50.266-58.00	Crystal	19A701562G6*
U	450-470	KT-218-A, KT-219-A, KT-220-A	E_Q 9	50.00-52.222	Crystal	19A701526G6*
--- RECEIVERS ---						
G	136-153	ER-139-A	E_Q -10.7	41.76-47.433	Crystal	19A701526G6*
H	150.8-174	ER-139-A	3 E_Q -10.7 3	47.433 48.70-54.43	Crystal	19A701526G6*
U	450-470	ER-140-A	E_Q -10.9 9	48.81-51.03	Crystal	19A701526G6*

*You must specify the operating frequency and whether for Transmit (T) or Receive (R)!

PHOENIX MOBILES (CRYSTALLED) (PCM3)

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (In MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---						
J	150-174	TR-100-A	E_Q	50.00-58.00	Crystal	19B233066G1
U	450-470	TR-101-D	3 E_Q 9	50.00-52.222	Crystal	19B233066G5
--- RECEIVERS ---						
J	150-174	TR-100-A	E_Q -10.7	46.64-54.43	Crystal	19B233066G2
U	450-470	TR-101-A	3 E_Q -21.4 9	47.622-49.844	Crystal	19B233066G7

CRYSTALS

MASTR II STATION TRANSMITTERS

COMB. NO. FREQ. RANGE DIGITS	FREQUENCY BAND (MHz)	FORMULA	CRYSTAL RANGE (MHz)	5ppm 5C ICOMS ORDER NO.	5 ppm EC ICOMS ORDER NO.	5ppm FCC TYPES KT-	2 ppm 2C ICOMS ORDER NO.	2 ppm FCC TYPES KT-	
12	25-30	E ₃	8.33-10	19A129393G19	19A129393G16	See List KT-1	19A129393G13	See List KT-2	
13	29.7-36	E ₃	9.9-12	19A129393G19	19A129393G16	See List KT-1	19A129393G13	See List KT-2	
23	36-42	E ₃	12-14	19A129393G19	19A129393G16	See List KT-1	19A129393G13	See List KT-2	
33	42-50	E ₃	14-16.67	19A129393G19	19A129393G16	See List KT-1	19A129393G13	See List KT-2	
44,45	66-88	E ₆	11-14.67	19A129393G40	19A129393G39	155-A, 156-A, 157-A	19A129393G38	155-A, 156-A, 157-A	
56	138-155	E ₁₂	11.5-12.92	STD	19A129393G20	19A129393G17	See List KT-3	19A129393G14	See List KT-4
				PLL-	19A130605G8	19A130605G14	See List KT-5	19A130605G1	See List KT-5
66	150.8-174	E ₁₂	12.56-14.5	STD	19A129393G20	19A129393G17	See List KT-3	19A129393G14	See List KT-4
				PLL-	19A130605G9	19A130605G15	See List KT-5	19A130605G2	See List KT-6
77	406-420	E ₃₆	11.27-11.66	STD	19A129393G21	19A129393G18	See List KT-7	19A129393G15	See List KT-8
				PLL-				19A130605G3	NO FCC TYPE#
78	420-450	E ₃₆	11.66-12.5	19A129393G21	19A129393G18	See List KT-7	19A129393G15	See List KT-8	
88	450-470	E ₃₆	12.5-13.05	STD	19A129393G21	19A129393G18	See List KT-7	19A129393G15	See List KT-8
				PLL-	19A130605G11	19A130605G17	NO FCC TYPE#	19A130605G4	See List KT-9
89	470-494	E ₃₆	13.05-13.72	STD	19A129393G21	19A129393G18	See List KT-7	19A129393G15	See List KT-8
				PLL-				19A130605G5	See KT-9
91	494-512	E ₃₆	13.72-14.222	STD	19A129393G21	19A129393G18	See List KT-7	19A129393G15	See List KT-8
				PLL-	19A130605G13		NO FCC TYPE#	19A130605G6	See List KT-9
96	851-870	E ₄₈	17.729-18.125				19A136999G6 (1 ppm)	150-A, 165-A 189-A	

The lists shown below contain the FCC Transmitter Type Numbers that may be applicable to the channel elements referencing that particular list. The letters "KT-" are assumed as a prefix for each type number listed. For an example, a listing of "30-A" would represent the FCC Transmitter Type "KT-30-A".

List KT-1: 30-A, 31-A, 39-A, 56-A, 58-A, 59-A, 60-A, 61-A, 70-A, 70-E, 71-A, 80-A, 80-E, 81-A.

List KT-2: 30-C, 31-C, 39-C, 56-C, 57-C, 58-C, 59-C, 60-C, 61-C, 70-C, 70-G, 71-C, 80-C, 80-G, 81-C.

List KT-3: 32B, 33-A, 34-A, 41-B, 42-A, 43-A, 44-B, 45-A, 46-A, 47-B, 48-A, 49-A, 72-B, 72-F, 73-A, 73-E, 74-A, 78-A, 79-A, 82-B, 82-F, 83-A, 83-E, 84-A, 100-B, 204-A.

List KT-4: 32-B, 33-C, 34-C, 41-B, 42-C, 43-C, 44-B, 45-C, 46-C, 47-B, 48-C, 49-C, 72-B, 72-F, 73-C, 73-G, 74-C, 78-A, 79-A, 82-B, 82-F, 83-C, 83-G, 84-C, 100-B, 204-A.

List KT-5: 32-K, 33-J, 34-J, 41-J, 42-J, 43-J, 44-J, 45-J, 46-J, 47-J, 48-J, 49-J, 72-J, 73-J, 73-K, 74-J, 78-J, 79-J, 204-J.

List KT-7: 35-B, 35-D, 36-B, 37-A, 75-B, 75-Fm, 76-Bm, 76-F, 77-Am, 85-B, 85-F, 86-B, 86-F, 87-A, 101-B, 102-B, 112-A, 119-A, 126-A.

List KT-8: 35-B, 35-D, 36-C, 36-D, 37-C, 50-D, 51-D, 52-D, 53-D, 54-D, 55-D, 75-D, 75-H, 76-D, 76-H, 77-C, 85-D, 85-H, 86-D, 86-H, 87-C, 88-C, 101-D, 102-D, 112-C, 113-C, 114-C, 115-C, 116-C, 117-C, 118-C, 119-C, 126-C, 200-C.

List KT-9: 50-K, 51-K, 52-K, 53-K, 54-K, 55-K, 113-K, 114-K, 115-K, 116-K, 117-K, 118-K, 200-K.

PLL: Phase-Locked-Loop Exciter Models with FM Modulated Oscillator Modules
STD: Standard Models

MASTR II STATION RECEIVERS

COMB. NO. FREQ. RANGE DIGITS	FREQUENCY BAND (MHz)	ICOM FORMULA	CRYSTAL RANGE (MHz)	5ppm 5C ICOMS ORDER NO.	5 ppm EC ICOMS ORDER NO.	2 ppm 2C ICOMS ORDER NO.	2 ppm FCC TYPES
12	25-30	$F_{o+11.2}$ 3	23.06-13.73	19A129393G10	19A129393G6	19A129393G2	ER-63-A
13	29.7-36	$F_{o+9.4}$ 3	13.13-15.13	19A129393G9	19A129393G5	19A129393G1	ER-63-A
23	36-42	$F_{o+11.2}$ 3	15.73-17.73	19A129393G10	19A129393G6	19A129393G2	ER-63-A
33	42-50	$F_{o+9.4}$ 3	17.13-19.8	19A129393G9	19A129393G5	19A129393G1	ER-63-A
44, 45	66-88	$F_{o+11.2}$ 6	12.86-16.54	19A129393G37	19A129393G36	19A129393G35	ER-101-A
56	138-155	$F_{o+11.2}$ 9	14.08-15.98	19A129393G11	19A129393G7	19A129393G3	ER-64-A
66	150.8-174	$F_{o+11.2}$ 9	15.51-18.08	19A129393G11	19A129393G7	19A129393G3	ER-64-A
	138-174 (NOTE 1)	$F_{o+11.2}$ 9	16.57-20.57	19A130283G5	19A130283G3	19A130283G1	ER-64-A
77	406-420	$F_{o+11.2}$ 27	14.62-15.14	19A129393G12	19A129393G8	19A129393G4	ER-65-A
78	420-450	$F_{o+11.2}$ 27	15.14-16.25	19A129393G12	19A129393G8	19A129393G4	ER-65-A
88	450-470	$F_{o+11.2}$ 27	16.25-16.99	19A129393G12	19A129393G8	19A129393G4	ER-65-A
89	470-494	$F_{o+11.2}$ 27	16.99-17.88	19A129393G12	19A129393G8	19A129393G4	ER-65-A
91	494-512	$F_{o+11.2}$ 27	17.88-18.54	19A129393G12	19A129393G8	19A129393G4	ER-65-A
	450-512 (NOTE 1)	$F_{o+11.2}$ 27	17.08-19.38	19A130283G6	19A130283G4	19A130283G2	ER-65-A
92	806-820	F_{o+45} 48	15.85-16.25			19A136999G7 (1ppm)	ER-97-D

NOTES

1. Formula is for high-side injection option and is required for MASTR II "E" Series when combination number 6th digit is A thru P and 7th digit is D or L; and, is not used for MASTR II stations. HB rcvrs (138-174 MHz) require Option 9054.
2. MASTR II radios may use either 5 ppm or 2 ppm ICOMS as follows:
 - a. Use all 2-C-ICOMs when 10th digit is B
 - b. In "M" Series radios, use only one 5C-ICOM (master) (normally in F1 position) and all others must be EC-ICOMs (slave). (The 5C-ICOM may be used in any xmtr or rcvr position.)
 - c. In "E" series (system package) mobiles using 5ppm ICOMs, a 5C-ICOM is required in each layer (top & bottom) and all others must be EC-ICOMs.
 - d. In all MASTR II stations using 5 ppm ICOMs, a 5C-ICOM is required in the xmtr and one in the rcvr. EXCEPTION - only one 5C-ICOM is required in the Intermittent Duty, Local Control Station.
3. For MASTR II DFE receivers with non-matching IF's, a second mixer/converter (19C320691G1) is used to convert the 9.4 MHz IF to 11.2 MHz. Use Xtal 19B226002G1 (1.8 MHz).

CRYSTALS

MASTR EXECUTIVE II MOBILES & STATIONS

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (F _o MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
— TRANSMITTERS —						
13	30-36	KT-120-A/B, KT-123-A/B	F_o 3	10-12 MHz	Crystal Module (5 ppm)	19B226962G1
23	36-42	KT-128-A, KT-138-A/B	F_o 3	12-14 MHz	Crystal Module (5 ppm)	19B226962G2
33	42-50	KT-120-A/B, KT-123-A/B	F_o 3	14-16.66 MHz	Crystal Module (5 ppm)	19B226962G3
44	66-78	KT-158-A/B, KT-159-A	F_o 6	11.00-13.00 MHz	Crystal Module (5 ppm)	19B226962G31
45	77-88	KT-158-A/B, KT-159-A	F_o 6	12.83-14.67 MHz	Crystal Module (5 ppm)	19B226962G32
55	138-150.8	KT-121-A/B, KT-124-A/B	F_o 12	11.5-12.56 MHz	Crystal Module (5 ppm)	19B226962G4
66	150.8-174	KT-129-A, KT-139-A/B	F_o 12	12.58-14.5 MHz	Crystal Module (5 ppm)	19B226962G5
77	406-420	KT-122-A/B, KT-125-A/B/C	F_o 36	11.27-11.66 MHz	Crystal Module (5 ppm)	19B226962G6
78	420-450	KT-130-A/C, KT-140-A/B	F_o 36	11.66-12.50 MHz	2C-ICOM (2 ppm)	19A129393G15
88	450-470	KT-122-A/B, KT-125-A/B/C	F_o 36	12.5-13.05 MHz	Crystal Module (5 ppm)	19B226962G7
89	470-404	KT-130-A/C, KT-140-A/B	F_o 36	12.5-13.05 MHz	2C-ICOM (2 ppm)	19A129393G15
91	494-512	KT-141-A/B	F_o 36	13.05-13.72 MHz	Crystal Module (5 ppm)	19B226962G8
		KT-122-A/B, KT-125-A/B/C	F_o 36	13.05-13.72 MHz	2C-ICOM (2 ppm)	19A129393G15
		KT-130-A/C, KT-140-A/B	F_o 36	13.05-13.72 MHz	2C-ICOM (2 ppm)	19A129393G15
92	808-825	KT-141-A/B	F_o 36	13.782-14.22 MHz	Crystal Module (5 ppm)	19B226962G9
		KT-130-A/C, KT-140-A/B	F_o 36	13.782-14.22 MHz	2C-ICOM (2 ppm)	19A129393G15
		KT-147-C/D, KT-148-C	F_i 48	16.79-17.18 MHz	FM Oscillator (2 ppm)	19A130605G7
		KT-140-C/D, KT-154-C/D	F_i 48	16.79-17.18 MHz	FM Oscillator (2 ppm)	19A130605G7
— RECEIVERS —						
13	30-36	ER-88-A	$F_o+9.4$ 3	13.13-15.2 MHz	Crystal Module (5 ppm)	19B226962G10
23	36-42	ER-88-A	$F_o+11.2$ 3	15.8-17.8 MHz	Crystal Module (5 ppm)	19B226962G11
33	42-50	ER-88-A	$F_o+9.4$ 3	17.13-19.8 MHz	Crystal Module (5 ppm)	19B226962G12
44	66-76	ER-108-A	$F_o+11.2$ 6	12.86-14.87 MHz	Crystal Module (5 ppm)	19B226962G33
45	77-88	ER-108-A	$F_o+11.2$ 6	14.70-16.54 MHz	Crystal Module (5 ppm)	19B226962G34
55	138-150.8	ER-89-A	$F_o-11.2$ 9	14.08-15.51 MHz	Crystal Module (5 ppm)	19B226962G13
66	150.8-174	ER-89-A	$F_o-11.2$ 9	16.57-18 MHz	Crystal Module (5 ppm)	19B226962G19
		ER-89-A	$F_o-11.2$ 9	15.51-18.08 MHz	Crystal Module (5 ppm)	19B226962G14
		ER-89-A	$F_o+11.2$ 9	18-20.57 MHz	Crystal Module (5 ppm)	19B226962G20
77	406-420	ER-90-A	$F_o-11.2$ 27	14.62-15.14 MHz	Crystal Module (5 ppm)	19B226962G15
		ER-90-A	$F_o+11.2$ 27	15.45-15.97 MHz	Crystal Module (5 ppm)	19B226962G21
78	420-450	ER-90-C	$F_o-11.2$ 27	14.62-15.1 MHz	2C-ICOM (2 ppm)	19A129393G4
		ER-90-A	$F_o-11.2$ 27	15.14-16.26 MHz	Crystal Module (5 ppm)	19B226962G29
		ER-90-A	$F_o-11.2$ 27	15.14-16.26 MHz	2C-ICOM (2 ppm)	19A129393G4
88	450-470	ER-90-A	$F_o-11.2$ 27	16.25-16.99 MHz	Crystal Module (5 ppm)	19B226962G16
		ER-90-A	$F_o+11.2$ 27	17.08-17.82 MHz	Crystal Module (5 ppm)	19B226962G22
88	470-494	ER-90-C	$F_o-11.2$ 27	16.25-16.99 MHz	2C-ICOM (2 ppm)	19A129393G4
		ER-90-A	$F_o-11.2$ 27	16.99-17.88 MHz	Crystal Module (5 ppm)	19B226962G17
		ER-90-A	$F_o+11.2$ 27	17.82-18.71 MHz	Crystal Module (5 ppm)	19B226962G23
		ER-90-C	$F_o-11.2$ 27	16.99-17.88 MHz	2C-ICOM (2 ppm)	19A129393G4

CRYSTALS

EXECUTIVE II MOBILES & STATIONS

(For IMTS/RCC Mobiles see IMTS or RCC Tables)

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (F _o MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- RECEIVERS ---						
91	494-512	ER-90-A	$F_o - 11.2$ 27	17.88-18.54 MHz	Crystal Module (5 ppm)	19B226962G18
		ER-90-C	$*F_o + 11.2$ 27	17.88-18.54 MHz	Crystal Module (5 ppm)	19B226962G24
92	851-870	ER-96-C/D	$F_o - 11.2$ 27	17.88-18.54 MHz	2C ICOM (2 ppm)	19A129393G4
			$F_r - 45$ 48	(See Note) 35.6 MHz	2nd Osc. Crystal	19B206221G3

*Crystal formula for highside injection. H.B. (138-174 MHz) receivers requires Option 9054. Not used for stations.

NOTE: The receiver frequency is always exactly 45 MHz above the transmitter frequency.

The transmitter oscillator sets both transmit and receive frequency. (F_r = receive frequency) (F_t = transmit frequency)

GE-MARC V MASTR MOBILE & BASE CRYSTAL ELEMENT FREQUENCY CONTROL

OPERATING FREQUENCY (F _o MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---					
806-825	KT-147-D KT-154-D	F_o 48	16.79-17.19 MHz	2C-FM-ICOM (2 ppm)	19A130605G7
--- RECEIVERS ---					
851-870	ER-96-D	$F_r - 45$ 48	(See Note 1) 5.600 MHz	2nd Osc. Crystal	19B206221G3

SYNTHESIZED FREQUENCY CONTROL

--- TRANSMITTERS ---					
806-825	KT-187-A		All transmit operating frequencies required.	PROM	19A143246G2
--- RECEIVERS ---					
851-870	ER-96-D		(See Note 1) 35.600 MHz	2nd Osc. Crystal	19B206221G3

NOTE: The receiver frequency is always 45 MHz above the transmitter frequency and is also controlled from the transmitter frequency module.

MASTR CUSTOM EXECUTIVE

(Specify exact crystal frequency in kHz when ordering)

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (F _o MHz)	FCC TYPE NO.	FIG.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---							
66	150.8-174	KT-25-A	B	F_o 24	6.28-7.25 MHz	Crystal	19B206204P1
--- RECEIVERS ---							
66	150.8-174	ER-48-C	E	$F_o - 10.7$	46.7-54.4 MHz	1st Osc. Crystal	19B206221P1
				3	10.245 MHz	2nd Osc. Crystal	19A110215P1

CRYSTALS

MASTR CUSTOM MVP TRANSMITTERS

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
13	30-36	KT-133-A	F_o 3	10-12 MHz	Crystal Module (5 ppm)	19B226962G1
23	36-42	KT-133-A	F_o 3	12-14 MHz	Crystal Module (5 ppm)	19B226962G2
33	42-50	KT-133-A	F_o 3	14-16.66 MHz	Crystal Module (5 ppm)	19B226962G3
44	66-78	KT-160-A	F_o 6	11.00-13.00 MHz	Crystal Module (5 ppm)	19B226962G31
45	77-88	KT-160-A	F_o 6	12.83-14.67 MHz	Crystal Module (5 ppm)	19B226962G32
55	138-150.8	KT-134-A, KT-151-A	F_o 12	11.5-12.56 MHz	Crystal Module (5 ppm)	19B226962G4
66	150.8-174	KT-134-A, KT-151-A	F_o 12	12.56-14.5 MHz	Crystal Module (5 ppm)	19B226962G5
77	406-420	KT-135-A, KT-136-C	F_o 36	11.27-11.66 MHz	Crystal Module (5 ppm) *2C-ICOM (2 ppm)	19B226962G6 19A129393G15
88	450-470	KT-135-A, KT-142-A KT-136-C	F_o 36	12.5-13.05 MHz	Crystal Module (5 ppm) *2C-ICOM (2 ppm)	19B226962G7 19A129393G15
89	470-494	KT-135-A, KT-142-A KT-136-C	F_o 36	13.05-13.72 MHz	Crystal Module (5 ppm) *2C-ICOM (2 ppm)	19B226962G8 19A129383G15
91	494-512	KT-135-A, KT-142-A KT-136-C	F_o 36	13.72-14.22 MHz	Crystal Module (5 ppm) *2C-ICOM (2 ppm)	19B226962G9 19A129393G15
92	806-825	KT-153-C (See Note)	F_t 48	16.79-17.9 MHz	FM Oscillator	19A130605G7

MASTR CUSTOM MVP RECEIVERS AND MONITOR RECEIVERS

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
13	30-36	ER-91-A, ER-105-A	$F_o+9.4$ 3	13.13-15.13 MHz	Crystal Module (5 ppm)	19B226962G10
23	36-42	ER-910-A, ER-105-A	$F_o+11.2$ 3	15.73-17.73 MHz	Crystal Module (5 ppm)	19B226962G11
33	42-50	ER-910-A, ER-105-A	$F_o+9.4$ 3	17.13-19.8 MHz	Crystal Module (5 ppm)	19B226962G12
44	66-78	ER-103-A, ER-108-A	$F_o+11.2$ 6	12.86-14.87 MHz	Crystal Module (5 ppm)	19B226962G33
45	77-88	ER-103-A, ER-108-A	$F_o+11.2$ 6	14.70-16.54 MHz	Crystal Module (5 ppm)	19B226962G34
55	138-150.8	ER-92-A, ER-106-A	$F_o+11.2$ 9	140.8-15.51 MHz	Crystal Module (5 ppm)	19B226962G13
66	150.8-174	ER-92-A, ER-106-A	$**F_o+11.2$ 9	16.57-18 MHz	Crystal Module (5 ppm)	19B226962G19
			$F_o+11.2$ 9	15.51-18.08 MHz	Crystal Module (5 ppm)	19B226962G14
			$**F_o+11.2$ 9	18-20.57 MHz	Crystal Module (5 ppm)	19B226962G20
77	406-420	ER-93-A, ER-107-A	$F_o+11.2$ 27	14.62-15.14 MHz	Crystal Module (5 ppm)	19B226962G15
88	450-470	ER-93-A, ER-107-A	$**F_o+11.2$ 27	14.62-15.97 MHz	Crystal Module (5 ppm)	19B226962G21
			$F_o+11.2$ 27	16.25-16.99 MHz	Crystal Module (5 ppm)	19B226962G16
			$**F_o+11.2$ 27	17.08-17.82 MHz	Crystal Module (5 ppm)	19B226962G22
89	470-494	ER-93-A, ER-107-A	$F_o+11.2$ 27	16.99-17.88 MHz	Crystal Module (5 ppm)	19B226962G17
91	494-512	ER-93-A, ER-107-A	$**F_o+11.2$ 27	17.82-18.71 MHz	Crystal Module (5 ppm)	19B226962G23
			$F_o+11.2$ 27	17.88-18.54 MHz	Crystal Module (5 ppm)	19B226962G18
92	851-870	ER-104-C (See Note)	F_t 48	35.6 MHz	2nd Osc. Crystal	19B206221G3

*Not available for low-power (5-watt) unit. **Crystal Formula for high side injection. H.B. (138-174 MHz) receivers require Option 1917.

Note: the receiver frequency is always exactly 45 MHz above the transmitter frequency.

The transmitter oscillator sets both the transmit and receive frequency. (Fr = receive frequency) (Ft = transmit frequency)

CRYSTALS

PORTA-MOBILE™ II PORTABLE, MOBILE & MOTORCYCLE RADIOS (PORTA-MOBILE™ II COMBINATION NUMBERS HAVE NINE DIGITS)

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (F _o MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
-- TRANSMITTERS --						
A	30-36	KT-28-A/B	F_o 3	10-12 MHz	SICOM	4EG31A10
B	36-42	KT-24-A/B	F_o 3	12-14 MHz	SICOM	4EG31A10
C	42-50	KT-23-A/B	F_o 3	14-16.66 MHz	SICOM	4EG31A10
D	66-76		F_o 6	11-12.66 MHz	SICOM	4EG27A13
E	76-88		F_o 6	12.66-14.66 MHz	SICOM	4EG27A13
G,H	138-174	KT-132-A/B	F_o 12	11.5-14.5 MHz	SICOM	4EG27A10
K,M	406-470	KT-131-A/B	F_o 24	16.91-19.58 MHz	SICOM	4EG37A10
N	470-494	KT-131-A/B	F_o 24	19.58-20.58 MHz	SICOM	4EG37A10
R	494-512	KT-131-A/B	F_o 24	20.5-21.33 MHz	SICOM	4EF37A10

(Refer to Note 1 for F_{IF})

-- RECEIVERS --

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (F _o MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY (Std IF = 20 MHz)	DESCRIPTION	ORDERING NUMBER (20 MHz IF)	ORDERING NUMBER (20.2 MHz IF)	ORDERING NUMBER (23 MHz IF)
A	30-36	ER-61-A, ER-73-A	$F_o \pm F_{IF}$ 3	16.66-18.66 MHz	SICOM	4EF28A17	4EG28A37	4EG28A18
B	36-42	ER-61-A, ER-73-A	$F_o \pm 23$ 3	19.66-21.66 MHz (23 MHz IF only)	SICOM	-	-	4EG28A18
C	42-50	ER-61-A, ER-73-A ER-83-A	$F_o \pm F_{IF}$ 3	20.66-23.33 MHz	SICOM	4EB28A17	4EF28A37	4EG28A18
D	66-76	ER-87-A	$F_o \pm F_{IF}$ 5	17.2-19.2 MHz	SICOM	4EG28A30	-	-
E	75-88	ER-87-A	$F_o \pm 23$ 5	19.6-22.2 MHz (23 MHz IF only)	SICOM	-	-	4EG28A31
G	138-150.8	ER-59-A	$F_o - F_{IF}$ 8	14.75-16.35 MHz	SICOM	4EG38A13	4EG28A36	4EG28A29
H	150.8-174	ER-59-C, ER-83-A ER-84-A, ER-85-A ER-86-A	$F_o - F_{IF}$ 9	14.53-17.11 MHz	SICOM	4EG38A14	4EG28A33	4EG29A26
K	406-420	ER-60-A	$F_o \pm F_{IF}$ 21	20.28-20.95 MHz	SICOM	4EG38A10	4EG28A34	4EG28A27
M	450-470	ER-60-A, ER-80-A ER-81-A, ER-85-A	$F_o \pm F_{IF}$ 21	20.47-21.42 MHz	SICOM	4EG38A11	4EG28A35	4EG28A28
N	470-494	ER-62-A, ER-81-A ER-82-A	$F_o - F_{IF}$ 21	21.42-22.57 MHz	SICOM	4EG38A11	4EG28A35	4EG28A28
R	494-512	ER-62-A, ER-81-A ER-82-A	$F_o - F_{IF}$ 21	22.57-23.42 MHz	SICOM	4EG38A11	4EG28A35	4EG28A28

NOTE

- Standard IF is 20 MHz (F_{IF} = 20)
With Option 4473, IF is 23 MHz (F_{IF} = 23)
With Option 4673, IF is 20.2 MHz (F_{IF} = 20.2)
For frequency ranges 36-42 MHz and 75-88 MHz, IF is always 23.

CRYSTALS

MASTR PERSONAL PE SERIES, MPE SERIES

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY	DESCRIPTION	ORDERING NUMBER
--- TRANSMITTERS ---						
A	30-36	KT-17-A, KT-18-A	F_0 3	10-12 MHz	SICOM	4EG31A10
B	36-42	KT-17-A, KT-18-A	F_0 3	12-14 MHz	SICOM	4EG31A10A
C	42-50	KT-17-A, KT18-A	F_0 3	14-16.66 MHz	SICOM	4EG31A10B
D	66-76	KT-127-A	F_0 6	11-12.666 MHz	SICOM	4EG27A13
E	76-88	KT-127-A	F_0	12.66-14.66 MHz	SICOM	4EG27A13
G,H	138-174	KT-19-A, KT-20-A ET-95-A, ET-96-A KT-107-A, KT-106-A	F_0	11.5-14.5 MHz	SICOM	4EG27A10
K,L, M	406-470	KT-22-A, ET-98-A	F_0 24	16.916-19.583 MHz	SICOM	4EG27A11
	(450-470) (450-470) 470-494	KT-104-A, KT-105-A				
N		KT-26-A/B, KT-100-A KT-111-A	F_0 24	19.586-20.583 MHz	SICOM	4EG27A11
R	494-512	KT-26-A/B, KT-110-A KT-111-A	F_0 24	20.583-21.333 MHz	SICOM	4EF27A11

--- RECEIVERS ---

COMB NO. FREQ RANGE DIGITS	OPERATING FREQUENCY (Fo MHz)	TYPE NO.	FORMULA	CRYSTAL FREQUENCY (Std IF 20 MHz)	DESCRIPTION	ORDERING STD NUMBER (20 MHz IF)	ORDERING NUMBER (20.2 MHz IF)	ORDERING NUMBER (23 MHz IF)
A	30-36	ER-61-A/B, ER-73-A	$F_0 \pm F_{IF}$ 3	16.666-18.666 MHz	SICOM	4EG28A17	4EG28A37	4EG28A18
B	36-42	ER-61-A/B, ER-73-A	$F_0 \pm 23$ 3	19.666-21.666 MHz (23 MHz IF)	SICOM	-	-	4EG28A18
C	42-50	ER-61-A/B, ER-73-A ER-83-A/B	$F_0 \pm F_{IF}$ 3	20.666-23.333 MHz	SICOM	4EG28A17A	4EG28A37	4EG28A18
D	66-76	ER-87-A/B	$F_0 \pm F_{IF}$ 5	17.2-19.2 MHz	SICOM	4EG28A30	-	-
E	75-88	ER-87-A/B	$F_0 \pm 23$ 5	19.6-22.3 MHz (23 MHz IF)	SICOM	-	-	4EG28A31
G	138-150.8	ER-59-A/B	$F_0 - F_{IF}$ 8	14.750-16.35 MHz	SICOM	4EG28A15	4EG28A36	4EG28A29
H	150.8-174	ER-59-C/D, ER-71-A ER-84-A, ER-85-A, ER-86-A	$F_0 - F_{IF}$ 9	14.533-17.111 MHz	SICOM	4EG28A11	4EG28A33	4EG29A26
K	406-420	ER-60-A/B	$F_0 \pm F_{IF}$ 21	20.285-20.976 MHz	SICOM	4EG28A12	4EG28A34	4EG28A27
M	450-470	ER-60-A/B, ER-72-A ER-80-A, ER-81-A ER-85-A	$F_0 - F_{IF}$ 21	20.476-21.428 MHz	SICOM	4EG28A13	4EG28A35	4EG28A28
N	470-494	ER-62-A/B ER-82-A	$F_0 - F_{IF}$ 21	21.428-22.571 MHz	SICOM	4EG28A13	4EG28A35	4EG28A28
R	494-512	ER-62-A/B, ER-81-A	$F_0 - F_{IF}$ 21	22.571-23.428 MHz	SICOM	4EG28A13	4EG28A35	4EG28A28

NOTE

- Standard IF is 20 MHz ($F_{IF} = 20$)
 With Option 4473, IF is 23 MHz ($F_{IF} = 23$)
 With Option 4673, IF is 20.2 MHz ($F_{IF} = 20.2$)
 For frequency ranges 36-42 MHz and 75-88 MHz, IF is always 23.