Version 1.01 dated 08/24/1998

R-390A/URR Radio Receiver Frequency Crystals

Here's a quick rundown of which crystal goes where:

The IF deck contains one frequency crystal. It's a 455 khz one inside the shield of Z501 and is a **CR-45/U** series.

The Crystal Osc. module contains 15 of the **CR-36/U** series of crystals in the following layout:

Y412	17000.000 khz
Y402	10500.000 khz
Y403	11000.000 khz
Y404	11500.000 khz
Y411	16000.000 khz
Y415	15500.000 khz
Y410	15000.000 khz
Y414	14500.000 khz
Y409	14000.000 khz
Y413	9500.000 khz
Y408	9000.000 khz
Y401	10000.000 khz
Y407	13000.000 khz
Y406	12500.000 khz
Y405	12000.000 khz

Yep, only two different ones left and they're both in the plugin crystal oven HR202.

Y201 is a **CR-27A/U** series of 17.0 mhz

Y202 is a 200.0000 khz crystal of the **CR-47/U**

Comments, corrections, complaints, or beer can emailed to me at one of the following ISP's: nlee@gs.verio.net or nlee@acadiacom.net

thanks,
nolan

This is an advance copy of the dated document. The final document from Defense Printing Service may be slightly different in format due to electronic conversion processes. Actual technical content will be the same.

INCH POUND

MIL-PRF-3098/24D
27 August 1997
SUPERSEDING
MIL-C-3098/24C
23 June 1975

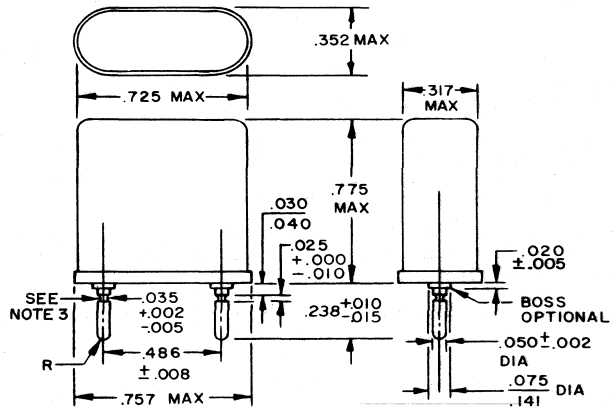
PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNIT, QUARTZ, CR45/U

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and MIL-PRF-3098.

Pertinent characteristics: 455 kHz; fundamental; noncontrolled; series resonance.



Inches	mm	Inches	mm	Inches	mm	Inches	mm
.002	.05	.020	.51	.050	1.27	.352	8.94
.005	.13	.025	.64	.075	1.91	.486	12.34
.008	.20	.030	.76	.141	3.58	.725	18.42
.010	.25	.035	.89	.238	6.05	.757	19.23
.015	.38	.040	1.02	.317	8.05	.775	38.76

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The pin undercut may be omitted.
4. Marking to be in accordance with MIL-PRF-3098.

FIGURE 1. Crystal unit - CR45/U.

REQUIREMENTS:

Dimensions, marking, and configuration: See figure 1.

Frequency range: 455 kHz.

Capacitance, shunt: 5.0 pF ±2.5 pF.

Mode of oscillation: Fundamental.

Rated drive level: 1.0 mW, maximum.

Resonance: Series.

Calibration values:

Equivalent resistance: 2,300 ohms.

Resistor voltage drop: 2.14 volts.

Operating temperature range (noncontrolled): -40°C to +70°C, inclusive.

Frequency tolerance: ±200 parts per million (ppm). There shall be a difference in frequency of 80 ±12 Hertz between operation at series resonance and operation at antiresonance into load capacitance of 32.0 pF ±0.5 pF. Both measurements for this purpose shall be made at room temperature.

Equivalent resistance: 3,300 ohms, maximum.

Shock (specified pulse):

Frequency change permitted: ± 30 ppm.

Equivalent resistance change permitted: ±15 percent.

Vibration: Method 201 of MIL-STD-202, amplitude 0.015 inch (0.030 inch total excursion).

Frequency change permitted: ±30 ppm.

Equivalent resistance change permitted: ±15 percent.

Temperature run:

Frequency change permitted: ±10 ppm.

Equivalent resistance change permitted: ±15 percent.

Bond strength: 500 grams, minimum.

Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI
Navy - AS, MC, SH
Air Force - 17, 19

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0697-11)

INCH POUND
MIL-PRF-3098/16G
27 August 1997
SUPERSEDING
MIL-C-3098/16F
4 October 1976

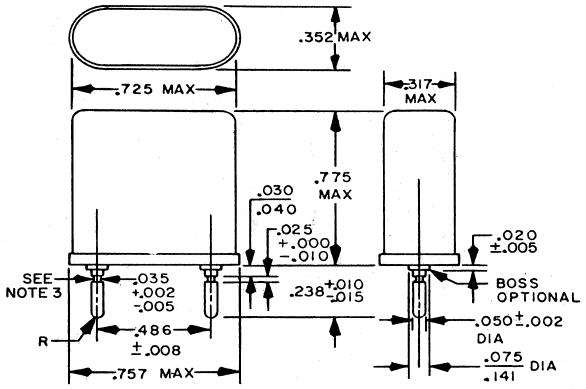
PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNIT, QUARTZ, CR36A/U

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and MIL-PRF-3098.

Pertinent characteristics: 0.8 MHz to 20 MHz; fundamental; controlled; antiresonance.



Inches	mm	Inches	mm
.002	.05	.050	1.27
.005	.13	.075	1.91
.008	.20	.141	3.58
.010	.25	.238	6.05
.015	.38	.317	8.05
.020	.51	.352	8.94
.025	.64	.486	12.34
.030	.76	.725	18.42
.035	.89	.757	19.23
.040	1.02	.775	19.69

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The pin undercut may be omitted.
4. Marking to be in accordance with MIL-PRF-3098.

FIGURE 1. Crystal unit - CR36A/U.

REQUIREMENTS:

Dimensions, marking, and configuration: See figure 1.

Frequency range: 0.8 MHz to 20 MHz, inclusive.

Capacitance, shunt: 7 pF, maximum.

Frequency tolerance:

Operating temperature range: ±20 parts per million (ppm).

Room temperature: ±80 ppm.

Frequency stability: ±5 ppm.

Equivalent resistance: See table I.

Antiresonance, load capacitance: 32.0 pF ±0.5 pF.

Mode of oscillation: Fundamental.

Reference temperature: +85°C ±1°C.

Temperature ranges:

Operable: -55°C to +80°C, inclusive.

Operating (controlled): +80°C to +90°C, inclusive.

Rated drive level: 1.0 mW, maximum.

Shock (specified pulse):

Frequency change permitted: ±5 ppm.

Equivalent resistance change permitted: Below 2MHz: ±15 percent
2.0 MHz and above: ±10 percent

Vibration: Method 201 of MIL-STD-202.

Frequency change permitted: ±5 ppm.

Equivalent resistance change permitted: Below 2MHz: ±15 percent
2.0 MHz and above: ±10 percent

Thermal shock:

Frequency change permitted: ±5 ppm.

Equivalent resistance change permitted: Below 2MHz: ±15 percent
2.0 MHz and above: ±10 percent

Aging:

Frequency change permitted: ±5 ppm.

TABLE II. Equivalent resistance.

Frequency range, inclusive	Maximum resistance
MHz	Ohms
0.80 to 0.85	620
0.85+ to 0.90	600
0.90+ to 1.00	570
1.00+ to 1.12	540
1.12+ to 1.25	490
1.25+ to 1.37	450
1.37+ to 1.50	410
1.50+ to 1.62	370
1.62+ to 1.75	330
1.75+ to 1.87	300
1.87+ to 2.00	290
2.00+ to 2.12	270
2.12+ to 2.25	240
2.25+ to 2.60	190
2.60+ to 3.00	150
3.00+ to 3.40	110
3.40+ to 3.75	90
3.75+ to 4.00	75
4.00+ to 5.00	60
5.00+ to 7.00	35
7.00+ to 10.00	24
10.00+ to 15.00	22
15.00+ to 20.00	20

Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI
Navy - AS, CG, MC, SH
Air Force - 17, 19
DLA - CC

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0697-08)

INCH-POUND
MIL-PRF-3098/16G
AMENDMENT 1
4 February 1998

PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNITS, QUARTZ, CR36A/U

This amendment forms a part of MIL-PRF-3098/16G, dated 27 August 1997, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

Title: Delete “CR36A/U” and substitute “CR36/U”.

FIGURE 1, title: Delete “Crystal unit - CR36A/U” and substitute “Crystal unit - CR36/U”.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI
Navy - AS, CG, MC, SH
Air Force - 17, 19
DLA - CC

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0720-08)

INCH POUND
MIL-PRF-3098/9F
27 August 1997
SUPERSEDING
MIL-C-3098/9E
23 June 1975

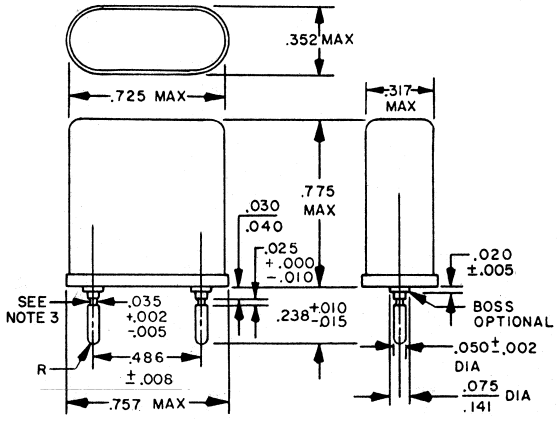
PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNIT, QUARTZ, CR27A/U

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and MIL-PRF-3098.

Pertinent characteristics: 0.8 MHz to 20 MHz; fundamental; controlled; antiresonance.



Inches	mm	Inches	mm
.002	.05	.050	1.27
.005	.13	.075	1.91
.008	.20	.141	3.58
.010	.25	.238	6.05
.015	.38	.317	8.05
.020	.51	.352	8.94
.025	.64	.486	12.34
.030	.76	.725	18.42
.035	.89	.757	19.23
.040	1.02	.775	19.69

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The pin undercut may be omitted.
4. Marking to be in accordance with MIL-PRF-3098.

FIGURE 1. Crystal unit - CR27A/U.

REQUIREMENTS:

Dimensions, marking, and configuration: See figure 1.

Frequency range: 0.8 MHz to 20 MHz, inclusive.

Capacitance, shunt: 7 pF, maximum.

Frequency tolerance, operating temperature range: ±20 parts per million (ppm).

Frequency stability: ±5 ppm.

Equivalent resistance: See table I.

Antiresonance, load capacitance: 32.0 pF ±0.5 pF.

Mode of oscillation: Fundamental.

Reference temperature: +75°C ±1°C.

Temperature ranges:

Operating (controlled): +70°C to +80°C, inclusive.

Operable: -55°C to +70°C, and +80°C to +90°C, inclusive.

Rated drive level: 1.0 mW, maximum.

Shock (specified pulse):

Frequency change permitted: ± 5 ppm.

Equivalent resistance change permitted: Below 2.0 MHz: ±15 percent
2.0 MHz and above: ±10 percent

Vibration: Method 201 of MIL-STD-202.

Frequency change permitted: ± 5 ppm.

Equivalent resistance change permitted: Below 2.0 MHz: ±15 percent
2.0 MHz and above: ±10 percent

Temperature run:

Frequency change permitted: ± 5 ppm.

Equivalent resistance change permitted: Below 2.0 MHz: ±15 percent
2.0 MHz and above: ±10 percent

Aging:

Frequency change permitted: ±5 ppm.

TABLE I. Equivalent resistance.

Frequency range, inclusive	Maximum resistance
MHz	Ohms
0.80 to 0.85	620
0.85+ to 0.90	600
0.90+ to 1.00	570
1.00+ to 1.12	540
1.12+ to 1.25	490
1.25+ to 1.37	450
1.37+ to 1.50	410
1.50+ to 1.62	370
1.62+ to 1.75	330
1.75+ to 1.87	300
1.87+ to 2.00	290
2.00+ to 2.12	270
2.12+ to 2.25	240
2.25+ to 2.60	190
2.60+ to 3.00	150
3.00+ to 3.40	110
3.40+ to 3.75	90
3.75+ to 4.00	75
4.00+ to 5.00	60
5.00+ to 7.00	35
7.00+ to 10.00	24
10.00+ to 15.00	22
15.00+ to 20.00	20

Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI,
Navy - AS, CG, MC, SH
Air Force - 17, 19

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0697-04)

INCH-POUND
MIL-PRF-3098/9F
AMENDMENT 1
4 February 1998

PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNITS, QUARTZ, CR27A/U

This amendment forms a part of MIL-PRF-3098/9F, dated 27 August 1997, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

Title: Delete “CR27A/U” and substitute “CR27/U”.

FIGURE 1, title: Delete “Crystal unit - CR27A/U” and substitute “Crystal unit - CR27/U”.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI
Navy - AS, CG, MC, SH
Air Force - 17, 19

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0720-04)

INCH POUND
MIL-PRF-3098/26F
27 August 1997
SUPERSEDING
MIL-C-3098/26E
4 October 1976

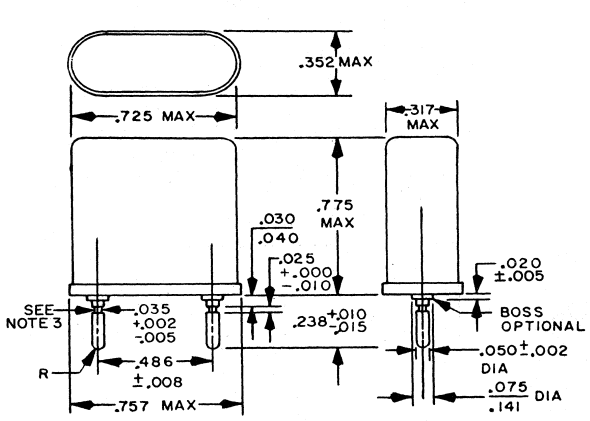
PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNIT, QUARTZ, CR47A/U

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and MIL-PRF-3098.

Pertinent characteristics: 190 kHz to 500 kHz; fundamental; controlled; antiresonance.



Inches	mm	Inches	mm
.002	.05	.050	1.27
.005	.13	.075	1.91
.008	.20	.141	3.58
.010	.25	.238	6.05
.015	.38	.317	8.05
.020	.51	.352	8.94
.025	.64	.486	12.34
.030	.76	.725	18.42
.035	.89	.757	19.23
.040	1.02	.775	19.69

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The pin undercut may be omitted.
4. Marking to be in accordance with MIL-PRF-3098.

FIGURE 1. Crystal unit - CR47A/U.

REQUIREMENTS:

Dimensions, marking, and configuration: See figure 1.

Frequency range: 190 kHz to 500 kHz, inclusive.

Frequency tolerance (operating temperature range): ±20 parts per million (ppm).

Frequency stability: ±5 ppm.

Equivalent resistance: See table II.

Mode of oscillation: Fundamental.

Antiresonance, load capacitance: 20.0 pF ±0.5 pF.

Reference temperature: +75°C ±1°C.

Temperature ranges:

Operable: -40°C to +70°C, inclusive.

Operating (controlled): +70°C to +80°C, inclusive.

Rated drive level: 1.0 mW, maximum.

Shock: (specified pulse):

Frequency change permitted: ±5 ppm.

Equivalent resistance change permitted: ±15 percent.

Vibration: Method 201 of MIL-STD-202, amplitude 0.015 inch (total excursion 0.030 inch).

Frequency change permitted: ±5 ppm.

Equivalent resistance change permitted: ±15 percent.

Thermal shock:

Frequency change permitted: ±10 ppm.

Equivalent resistance change permitted: ±15 percent.

Bond strength: See table I.

TABLE I. Bond strength.

Frequency range, inclusive (kHz)	Grams, minimum
190 to 250	700
250+ to 320	500
320+ to 370	400
370+ to 435	300
435+ to 500	250

TABLE II. Equivalent resistance.

Frequency range, inclusive	Maximum resistance
kHz	Ohms
190 to 225	5,300
225+ to 275	6,000
275+ to 325	6,500
325+ to 375	7,000
375+ to 425	7,500
425+ to 475	8,000
475+ to 500	8,500

NOTE: Frequency and resistance at room temperature (for controlled types) requirement is not applicable.

Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI
Navy - AS, MC, SH
Air Force - 17, 19

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0697-13)

INCH-POUND
MIL-PRF-3098/26F
AMENDMENT 1
4 February 1998

PERFORMANCE SPECIFICATION SHEET

CRYSTAL UNITS, QUARTZ, CR47A/U

This amendment forms a part of MIL-PRF-3098/26F, dated 27 August 1997, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

Title: Delete “CR47A/U” and substitute “CR47/U”.

FIGURE 1, title: Delete “Crystal unit - CR47A/U” and substitute “Crystal unit - CR47/U”.

Custodians:
Army - CR
Navy - EC
Air force - 85

Review activities:
Army - AR, MI
Navy - AS, MC, SH
Air Force - 17, 19

Preparing activity:
Army - CR

Agent:
DLA - CC

(Project 5955-0720-12)