

INCHES

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REQUIREMENT 2.8.11). ALL TEMPERATURES SHALL BE HELD WITHIN PLUS OR MINUS 3 DEGREES CEN

### 3. DESIGN REQUIREMENTS:

- A. SHELF LIFE: UNITS SHALL BE CAPABLE OF OPERATING WITHIN THE REQUIREMENTS SPECIFIED HEREIN AFTER ONE YEAR OF UNPACKAGED STORAGE UNDER THE FOLLOWING CONDITIONS: RELATIVE HUMIDITY UP TO 95 PERCENT, TEMPERATURES AS LOW AS MINUS 18 DEGREES CENTIGRADE OR AS HIGH AS PLUS 52 DEGREES CENTIGRADE, AND AT ALTITUDES AS HIGH AS 10,000 FEET. IT SHALL BE ASSUMED THAT THE UNITS WILL BE EXPOSED TO AMBIENT ATMOSPHERE DURING THE ONE YEAR PERIOD.
- B. PACKAGED STORAGE: UNITS SHALL BE CAPABLE OF OPERATING WITHIN THE REQUIREMENTS SPECIFIED HEREIN AFTER 3 YEARS OF DEAD STORAGE WHEN PACKAGED FOR OVERSEAS SHIPMENT IN ACCORDANCE WITH SPECIFICATION JAN-P-100-1. ENVIRONMENTAL CONDITIONS FOR PACKAGED STORAGE SHALL BE AS INDICATED FOR ALL NON-OPERATING CONDITIONS SPECIFIED ABOVE EXCEPT THE STORAGE TEMPERATURE MAY BE AS HIGH AS PLUS 71 DEGREES CENTIGRADE OR AS LOW AS MINUS 40 DEGREES CENTIGRADE, THERE MAY BE VIBRATORY ACCELERATION FOR PERIODS OF 25 HOURS OF 1.0G FROM 2 TO 30 CYCLES PER SECOND AND THERE MAY BE OCCASIONAL SHOCKS UP TO 10G.
- C. SPURIOUS MODES: ALL SPURIOUS MODES SHALL BE AT LEAST 3.5 DECIBELS DOWN FOR PLUS OR MINUS 100 KILOCYCLES FROM THE DRIVE LEVEL AT 2.048 MEGACYCLES OVER THE TEMPERATURE RANGE FROM ZERO DEGREES CENTIGRADE TO PLUS 85 DEGREES CENTIGRADE.
- D. CRYSTAL ELEMENT: QUARTZ, "AT" CUT, GOLD OR ALUMINUM PLATED. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
- E. ENVIRONMENTAL REQUIREMENTS: UNITS SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING ENVIRONMENTAL TESTS. MECHANICAL TESTS (VIBRATION, SHOCK AND ACCELERATION) SHALL BE CONDUCTED WITH THE UNIT MOUNTED BY MEANS OF AN APPROPRIATE FIXTURE WITH THE BODY RESTRAINED FROM MOVEMENT.
- (1) VIBRATION: WHILE OPERATING FROM 15 TO 31 CYCLES PER SECOND AT 0.2 INCH DOUBLE AMPLITUDE; FROM 31 TO 2,000 CYCLES PER SECOND AT PLUS OR MINUS 10G. FREQUENCY CHANGE DURING VIBRATION SHALL BE NO GREATER THAN PLUS OR MINUS ONE (1) PART PER 10<sup>7</sup>. A RESONANCE SEARCH SHALL BE MADE THROUGHOUT THE FREQUENCY RANGE SPECIFIED AND A 15 MINUTE FATIGUE VIBRATION TEST SHALL BE PERFORMED AT EACH MAJOR RESONANCE. PERMANENT FREQUENCY CHANGE AFTER VIBRATION SHALL BE NO GREATER THAN PLUS OR MINUS ONE (1) PART PER 10<sup>8</sup>.

- (2) MECHANICAL SHOCK: WHILE OPERATING, 50G FOR 11 MILLI-SECONDS PLUS OR MINUS ONE (1) MILLISECOND DURATION SIMILAR TO THAT OBTAINED WITH A BARRY TYPE SHOCK MACHINE PER MIL-STD-202 3 SHOCKS IN EACH OF THE 3 MUTUALLY PERPENDICULAR PLANES FOR A TOTAL OF 18 SHOCKS. PERMANENT FREQUENCY CHANGE AFTER SHOCK SHALL BE NO GREATER THAN PLUS OR MINUS 2 PARTS PER 10<sup>8</sup>.
- (3) ACCELERATION: WHILE OPERATING AND NON-OPERATING, PLUS OR MINUS 20G IN ANY DIRECTION FOR 5 MINUTES. PERMANENT FREQUENCY CHANGE AFTER ACCELERATION SHALL BE NO GREATER THAN 1 PART PER 10<sup>8</sup>.

F.

- G. AGING: PLUS 1 PART PER 10<sup>8</sup> PER WEEK MAXIMUM AT PLUS 60 DEGREES CENTIGRADE 50 MICROWATTS CRYSTAL DRIVE.

- (1) TEMPERATURE SHOCK: MINUS 40 DEGREES CENTIGRADE FOR 30 MINUTES AND PLUS 85 DEGREES CENTIGRADE FOR 30 MINUTES. TIME INTERVAL CHANGING FROM ONE TEMPERATURE EXTREME TO THE OTHER SHALL NOT EXCEED 15 SECONDS. PERMANENT FREQUENCY CHANGE AFTER TEMPERATURE SHOCK SHALL BE NO GREATER THAN 1 PART 10<sup>7</sup>.

REVISIONS 03/67			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 04005	1/28/63	WR
B	REVISED PER TDRR 06010	2/4/64	WR

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			
MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.		MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DRAWN <i>By [signature]</i> DATE <i>15 Sept 63</i> CHECKED <i>J. Ruggieri</i> DATE <i>10 Sept 63</i> APPROVAL <i>[signature]</i> APPROVAL <i>Edna C Hall 13 Sept 63</i>		CRYSTAL UNIT, QUARTZ	
HEAT TREATMENT		SPECIFICATION CONTROL DRAWING	
NASA APPROVAL <i>[signature]</i>		CODE IDENT NO.	NASA DRAWING NO.
MIT APPROVAL <i>[signature]</i>		SIZE C	1006847
SCALE NONE		WT	SHEET 2 OF 2

