REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVAL
—	Original	7/7/97	

SHEET REVISION STATUS

SH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REV	—	—	—	—	—	—	—	—												
SH	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REV																				

ORIGINATOR: Antonio Reyes/Fairchild	DATE 6/27/97	**FSC: 5905**
APPROVED: James Lohr	7-7-97	Resistor, Network - Film (Tantalum Nitride), Precision
CODE 311 APPROVAL: Michael Sampson	7/2/97	
CODE 311 SUPERVISORY APPROVAL: Ronald Chinnapongse	7/7/97	
ADDITIONAL APPROVAL: David Bergman	7/7/97	S-311-P-799/06

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

CAGE CODE: 25306

1. SCOPE

1.1 Scope This specification slash sheet covers the detail requirements for a precision resistor network packaged in a 16-lead flatpack. This slash sheet, in conjunction with GSFC procurement specification S-311-P-799, details the electrical, physical, and performance requirements for this component.

1.2 Part number. The GSFC part number for this device is: S-311-P-799/06H

2. APPLICABLE DOCUMENTS

2.1 Documents. The following documents, of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

MILITARY
MIL-PRF-83401 Resistor Networks, Fixed, Film, General Specification for

GSFC SPECIFICATION
S-311-P-799 Procurement Specification for Hermetically Sealed Resistor Networks, Base Specification

2.2 Order of precedence. In the event of any conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. However, nothing in this text shall supersede applicable laws and regulations unless a specific exemption has been obtained.

2.3 Copies of documents. Copies of federal and military documents can be obtained from the procuring activity.

3. REQUIREMENTS
This network shall meet the requirements of MIL-PRF-83401 and GSFC procurement specification S-311-P-799 to the extent specified in this detail slash sheet.

3.1 Package. The resistor networks are not hermetically sealed. Therefore, paragraph 3.4.7 of NASA/GSFC S-311-P-799 is not applicable. The package shall be capable of meeting the inspection requirements of MIL-PRF-83401.

3.1.1 Package outline. This device shall conform to the package outline shown in figure 1.

3.2 Schematic. The schematic for the network is shown in Figure 2.

3.3 Pin-out configuration. The pin-out configuration for the device is as shown in Table 1.

3.4 Performance requirements. The performance requirements, when tested in accordance with MIL-PRF-83401 and GSFC S-311-P-799, shall be as follows:

3.4.1 Operating temperature range. The operating temperature range is -55 ^{0}C to 125 ^{0}C ambient.

3.4.2 Individual power ratings. The power rating for individual resistors shall be as shown in Table 1 at 125 ^{0}C and linearly derated to 0W at 175 ^{0}C.

3.4.3 Package power ratings. The power rating for the package shall be 500 mW at 125 ^{0}C.

3.4.4 Voltage rating. Each resistor element shall have a continuous working voltage rating as calculated by the Voltage Rating formula specified in para. 3.5.2 of S-311-P-799 and the PD value specified in Table 1 herein. The maximum rated voltage shall be 50V.

3.4.5 Resistance value. The resistance of each resistor for the network is as defined in Table 1

3.4.6 Resistance tolerance. The resistance tolerance for this network shall be ±0.1%.

3.4.7 Temperature coefficient of resistance (TCR). The TCR shall not exceed 25 ppm/^{0}C when referenced to the resistance at 25 ^{0}C ambient.

3.4.8 Matching ratio and tracking. The matching ratio, when referenced to R1, shall be 0.01%, when measured at 25 ^{0}C and the TCR tracking shall not exceed 5 ppm/^{0}C maximum over the temperature range from -20 ^{0}C to 70 ^{0}C.

3.4.9 Dielectric withstanding voltage. The dielectric withstanding voltage shall be 100V with the leakage limit of 1.0 mA.

3.4.10 Insulation resistance. The insulation resistance shall not be less than 10,000 megohms.

3.4.11 Short time overload. When tested as specified in MIL-PRF-83401 para. 4.6.10, there shall be no evidence of arcing, burning, or charring. The change in resistance shall not exceed ±0.25%.

3.5 Burn-in. For burn-in (power conditioning), apply bias to resistor(s) to maintain the rated power dissipation of the devices at 125 ^{0}C. Part manufacturer shall provide burn-in test conditions and schematic to the procuring activity, if requested.

3.6 Markings. The resistor networks shall be permanently marked and legible marked in accordance with MIL-PRF-38534 and herein. The markings shall include the following instructions:

a. Manufacturer's identification or symbol.
b. GSFC part number: S-311-P-799/06H.
c. Manufacturer's lot date code (year and week of final seal).
d. Serial number.
e. Pin identifier.

3.7 Certification of conformance. A certification of conformance in accordance with this specification shall be provided with each lot of resistor networks.

4. QUALITY ASSURANCE PROVISIONS

The quality assurance provisions for this device are as detailed in GSFC procurement specification S-311-P-799 and herein.

4.1 Screening. Screening test consists of the tests and inspections specified in Table 2 herein and shall be performed in the order shown on each device supplied to this drawing.

4.2 Qualification. The approved source of supply listed in 6.3 herein shall be certified in accordance with MIL-PRF-83401.

4.3 Quality conformance inspection (QCI). Quality conformance inspection shall consist of Table 3, subgroup 1 herein and Group A and C inspections per NASA/GSFC S-311-799. Group B and D inspections are not applicable to this construction.

4.3.1 Existing data. MIL-PRF-83401, Groups B and C test data may be used in lieu of performing the Group A and C tests of this specification. Existing data shall be on the same manufacturer's similar part number and completed within one year of the date code on the parts supplied to this specification. In addition, the tests and inspections specified in Table 3 herein shall be performed in the order shown.

4.3.2 Group A and C inspections. If generic Group B and C data is not available, then the manufacturer shall perform the test inspections specified in Table 3, subgroup 1 herein, Group A and C inspections in accordance with NASA/GSFC S-311-P-799 and as modified herein:

a. Test samples shall be considered destroyed.
b. Ship test samples separately from the deliverable product in a package indicating the origin of contents.
c. Constant acceleration, PIND, Seal, and Radiographic inspections are not applicable to this device type.
d. Prior to the start of the Steady-state life test, devices must be subjected to and successfully pass the screening requirements as specified in Table 2 herein.

5. PACKAGING REQUIREMENTS.
The requirements for packaging shall be in accordance with MIL-PRF-83401.

6. NOTES

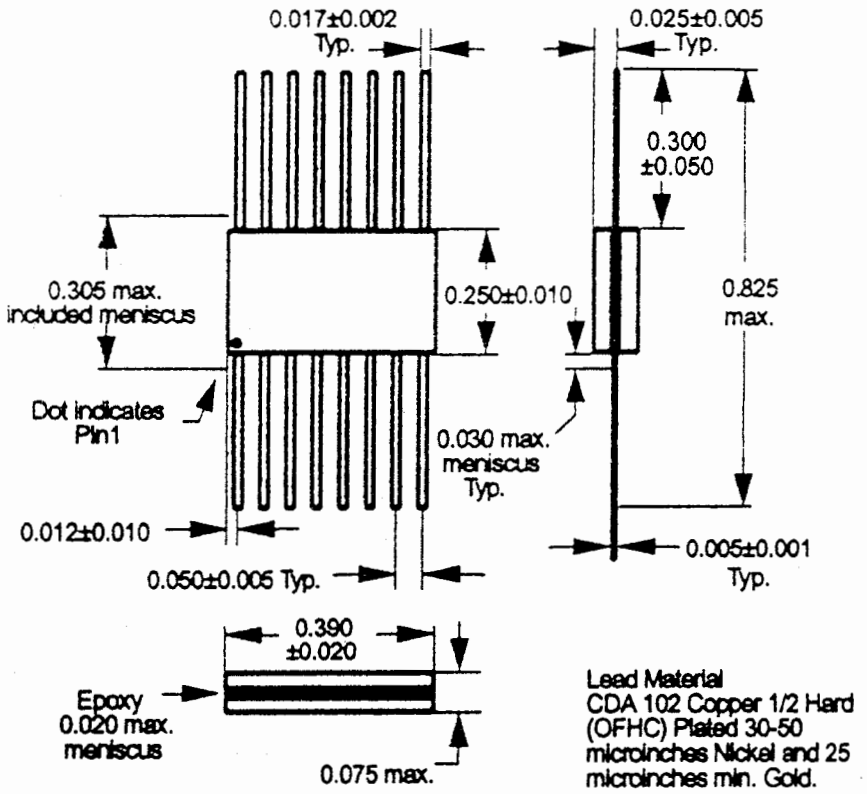
6.1 Intended use. Resistor networks described herein are intended for use in electronic circuits where high reliability and precision are required.

6.2 Data package. The data package is detailed in GSFC procurement specification S-311-P-799.

6.3 Approved source(s) of supply.

NASA/GSFC Part Number	Manufacturer's Part Number	Manufacturer's Name and Address
S-311-P-799/06H	8999-07-XXXX-B-T	IRC, Inc. 4222 South Staple St. Corpus Christi, TX 78411 **CAGE CODE**: 57027

Figure 1. Package Outline.



All dimensions are shown in inches

Figure 2. Device Schematic.

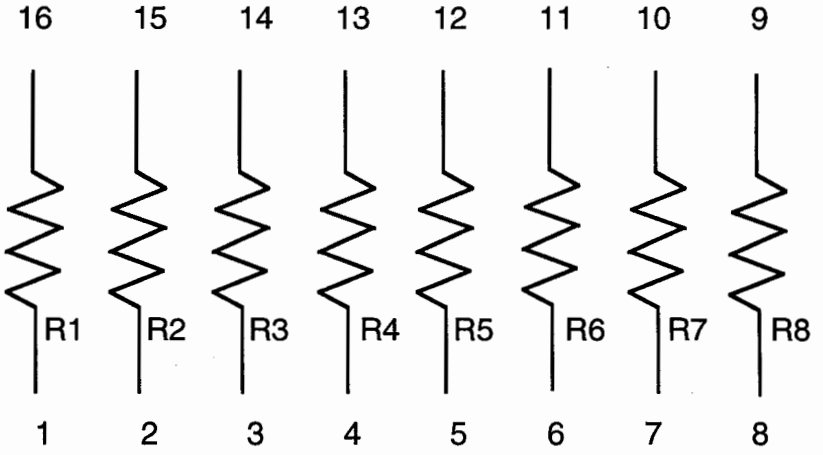


Table 1. Pin-out Configuration

Resistor Number	Resistance Value (Ohms)	Power Rating (mW)	Resistor Connections
R1	5K	50	1-16
R2	5K	50	2-15
R3	5K	50	3-14
R4	5K	50	4-13
R5	5K	50	5-12
R6	5K	50	6-11
R7	5K	50	7-10
R8	5K	50	8-9

Table 2. 100% Screening

Step	Test/Inspection	MIL-STD-883 Method (1)	Requirements
1	External Visual Inspection	2009	3X magnification (minimum)
2	Stabilization bake	1008, Condition C	24 hours at T_A = 150 °C
3	Temperature cycling	1010, Condition C	10 cycles
4	Serialization		
5	Initial dc resistance measurement (DCR)		Read and record
6	Burn-in	1015	240 hours at T_A = 125 °C (2)
7	Final dc resistance measurement (DCR)		Read and record
8	PDA calculation	5004	10%, use delta DCR = 0.7%
9	External visual inspection	2009	3X magnification (minimum)

(1) Test methods and procedures are defined in Table X of MIL-PRF-38534.

(2) Adjust bias to each resistor so that the power dissipation reaches the maximum value specified herein for 125 °C. Bias conditions and test figure shall be included in the data package.

Table 3. Physical-Characteristics Tests

Test/Inspection (1)	MIL-STD-202 Method	Requirements
Subgroup 1		
Solderability	208	Sample size: 5 samples Exceptions per MIL-PRF-83401
Terminal strength (2)	211, Conditions A and C	MIL-PRF-83401
External visual inspection	MIL-STD-883, Method 2009	3X magnification (minimum). Verify no evidence of mechanical damage
Subgroup 2		
Short time overload		Paragraph 3.4.11 Sample size: 5 samples $\Delta R = \pm 0.25\%$
External visual inspection	MIL-STD-883, Method 2009	3X magnification (minimum). Verify no evidence of mechanical damage

(1) Test may be performed on electrical rejects.
(2) The Same parts used for solderability shall be used for the terminal strength test. Perform the solderability test first to see if that weakens terminal strength.