

INCH-POUND

MIL-DTL-28837/5B

7 November 2006

SUPERSEDING

MIL-M-28837/5A

7 February 1985

DETAIL SPECIFICATION SHEET

MIXER STAGES, RADIO FREQUENCY, DOUBLE BALANCED, SMA FEMALE CONNECTORS

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 sheet and MIL-DTL-28837.

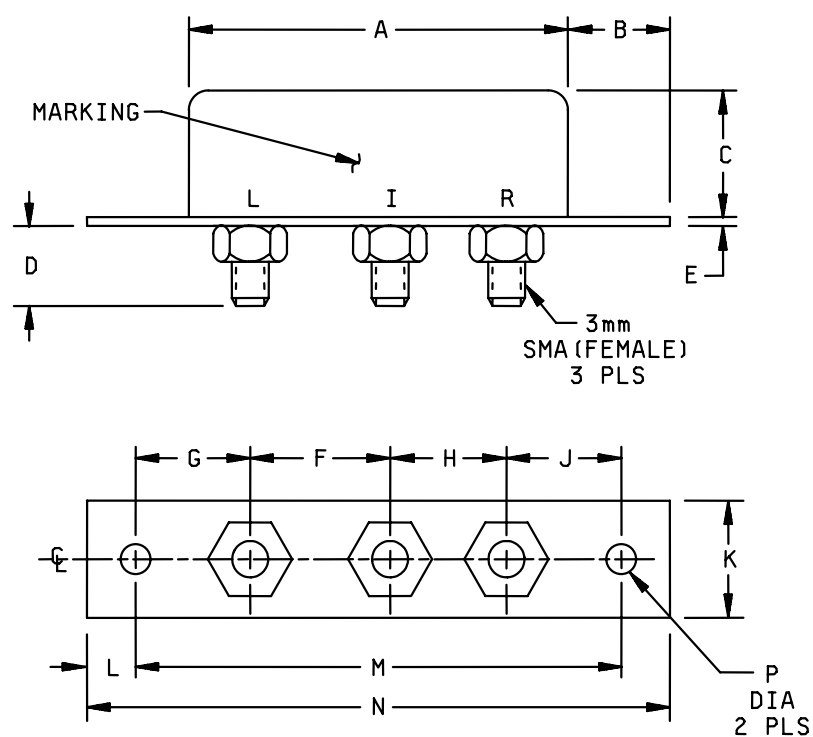


FIGURE 1. Outline drawing for mixers PIN M28837/5-01 through M28837/5-04.

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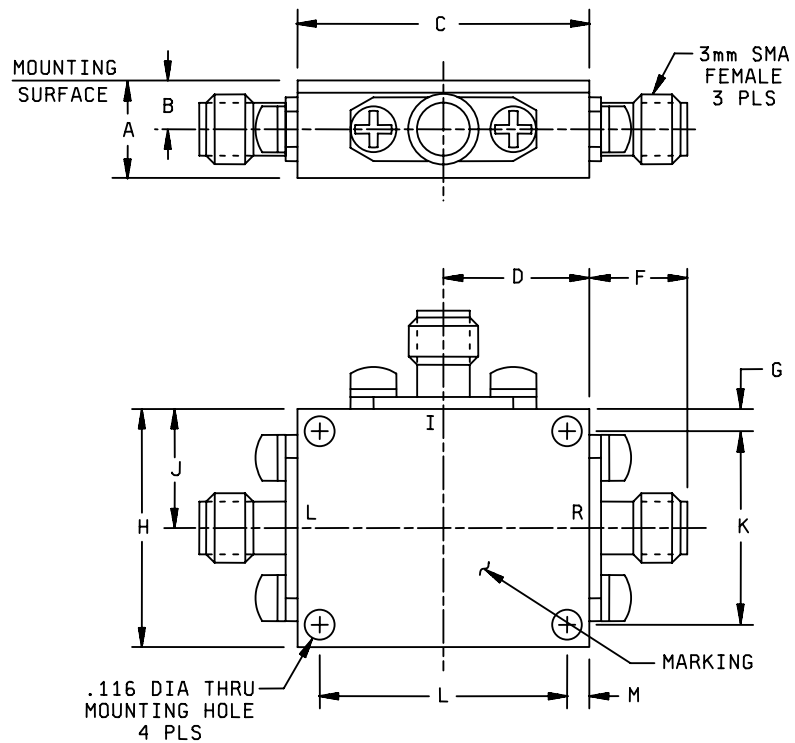
Ltr	Inches		mm	
	Max	Min	Max	Min
A	1.97	1.93	50.0	49.0
B	.54	.50	13.7	12.7
C	.67	.63	17.0	16.0
D	.41	---	10.4	---
E	.060	.030	1.52	0.76
F	.73	.71	18.5	18.0
G	.60	.58	15.2	14.7
H	.61	.59	15.5	15.0
J	.60	.58	15.2	14.7
K	.62	.58	15.7	14.7
L	.26	.24	6.6	6.1
M	2.510	2.490	63.75	63.25
N	3.01	2.99	76.5	75.9
P	1.60	1.50	40.6	38.1

NOTES:

1. Dimensions are in inches.
2. Metric equivalents (in mm) are given for general information only.

FIGURE 1. Outline drawing for mixers PIN M28837/5-01 through M28837/5-04 – Continued.

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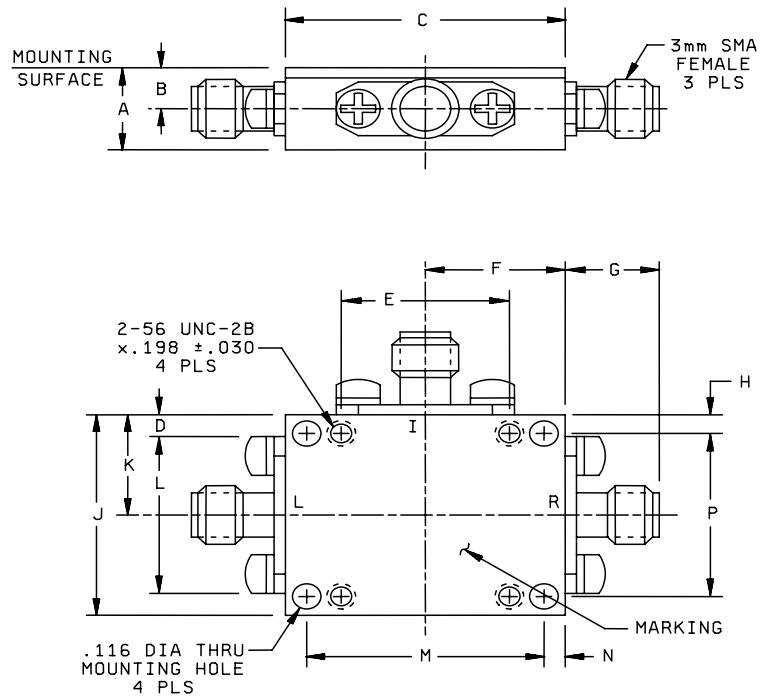
Ltr	Inches		mm	
	Max	Min	Max	Min
A	.390	.360	9.91	9.14
B	.200	.170	5.08	4.32
C	1.443	1.413	36.65	35.89
D	.729	.699	18.52	17.75
F	.41 TYP	---	10.4 TYP	---
G	.101	.071	2.57	1.80
H	1.083	1.073	27.51	27.25
J	.549	.519	13.94	13.18
K	.906	.886	23.01	22.50
L	1.266	1.246	32.16	31.65
M	.101	.071	2.57	1.80

NOTES:

1. Dimensions are in inches.
2. Metric equivalents (in mm) are given for general information only.

FIGURE 2. Outline drawing for mixers PIN M28837/5-05.

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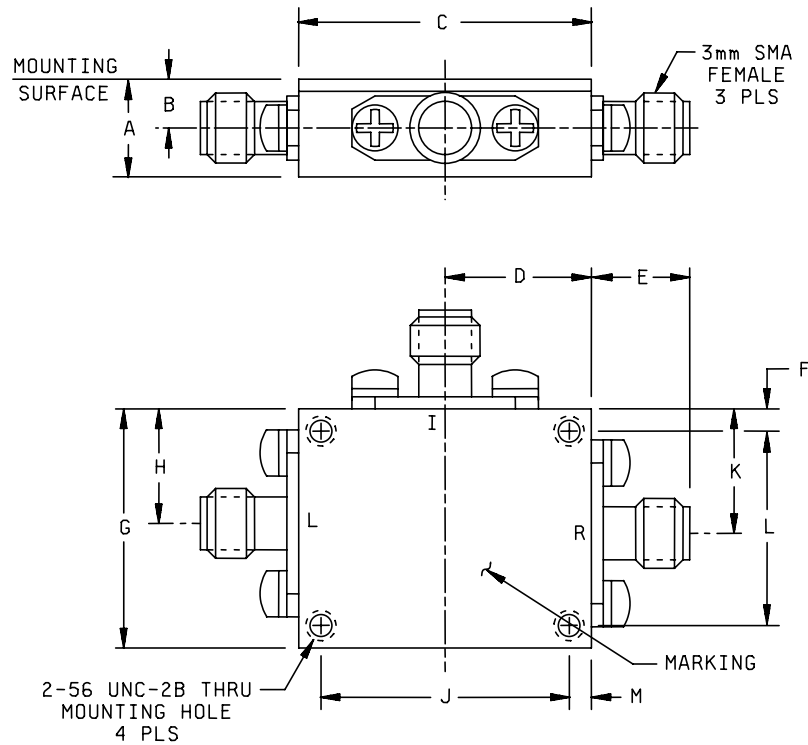
Ltr	Inches		mm	
	Max	Min	Max	Min
A	.390	.360	9.91	9.14
B	.200	.170	5.08	4.32
C	1.143	1.113	29.03	28.27
D	.110	.090	2.79	2.29
E	.688	.668	17.48	16.97
F	.579	.549	14.71	13.94
G	.41 TYP	---	10.4 TYP	---
H	.101	.071	2.57	1.80
J	.933	.903	23.70	22.94
K	.474	.444	12.04	11.28
L	.728	.708	18.49	17.98
M	.966	.946	24.54	24.03
N	.101	.071	2.57	1.80
P	.756	.736	19.20	18.69

NOTES:

1. Dimensions are in inches.
2. Metric equivalents (in mm) are given for general information only.

FIGURE 3. Outline drawing for mixers PIN M28837/5-06.

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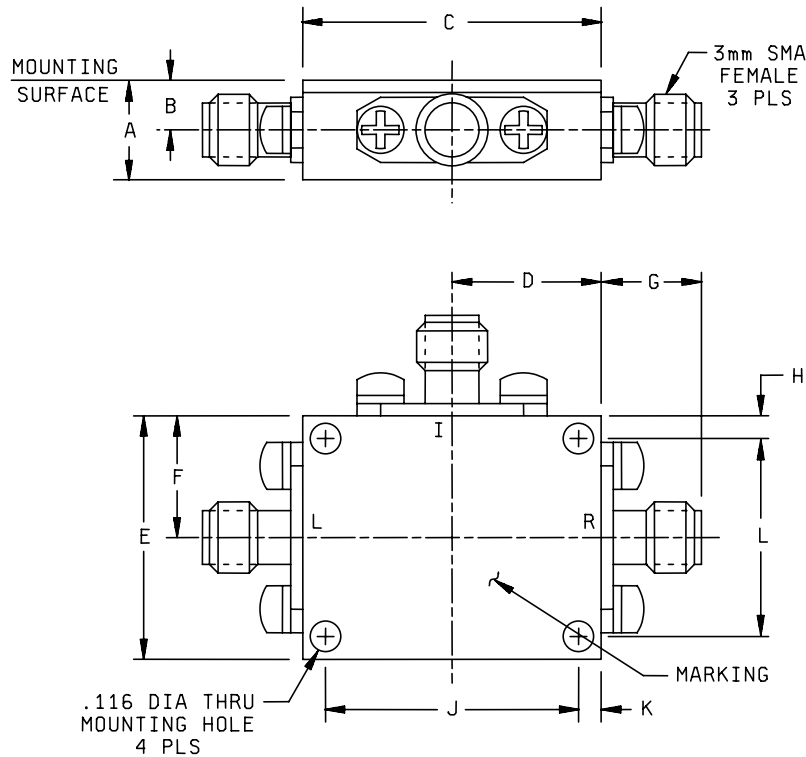
Ltr	Inches		mm	
	Max	Min	Max	Min
A	.390	.360	9.91	9.14
B	.200	.170	5.08	4.32
C	.903	.873	22.94	22.17
D	.459	.429	11.66	10.90
E	.41 TYP	---	10.4 TYP	---
F	.079	.049	2.01	1.24
G	.913	.873	23.19	22.17
H	.439	.409	11.15	10.39
J	.770	.750	19.56	19.05
K	.505	.485	12.83	12.32
L	.780	.760	19.81	19.30
M	.079	.049	2.01	1.24

NOTES:

1. Dimensions are in inches.
2. Metric equivalents (in mm) are given for general information only.

FIGURE 4. Outline drawing for mixers PIN M28837/5-07.

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Ltr	Inches		mm	
	Max	Min	Max	Min
A	.465	.425	11.81	10.79
B	.202	.172	5.13	4.37
C	1.148	1.108	29.16	28.14
D	.579	.549	14.71	13.94
E	.938	.898	23.83	22.81
F	.474	.444	12.04	11.28
G	.41 TYP	---	10.41 TYP	---
H	.101	.071	2.57	1.80
J	.966	.946	24.54	24.03
K	.101	.071	2.57	1.80
L	.756	.736	19.20	18.69

NOTES:

1. Dimensions are in inches.
2. Metric equivalents (in mm) are given for general information only.

FIGURE 5. Outline drawing for mixers PIN M28837/5-08 through M28837/5-10.

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Part or Identifying Number (PIN): M28837/5- (dash number from tables I and II).

REQUIREMENTS:

Design and construction:

Dimensions and construction: See figures 1 through 5.

Electrical characteristics:

Frequency range: See table I.

Input drive power: See table I.

Conversion loss (max): See table I.

Noise figure (SSB) (max): See table I.

Isolation: See table I.

Maximum power input (rms): See table I.

DC relative polarity: See table I.

VSWR: See table I.

Third order, two tone inter-modulation: See table I.

Impedance: 50 ohms.

Physical and environmental characteristics:

Weight: See table II.

Temperature: See table II.

Shock: See table II.

Seal: Non-hermetic: 4.8.8.2 of MIL-DTL-28837 applies.

Qualification: Not applicable (see note below).

NOTE: When there are no products listed or approved for listing on the qualified products list (QPL) for this specification sheet, acquiring activities shall invoke first article inspection, consisting of meeting all qualification test requirements of MIL-DTL-28837. Acquiring activities may require contractors to furnish first article samples of those mixers that they propose to supply for Government inspection and contractual approval. First article approval is valid only on the contract under which it is granted, unless extended by the Government to another contract. First article inspection is performed by the contractor after award of contract and prior to production.

TABLE I. Electrical characteristics.

Dash no.	Operating frequency range	LO input drive power in dBm <u>1/</u>	Maximum conversion loss (SSB)	Noise figure (SSB)	Isolation			
					Minimum			
			dB	dB	LO-RF dB	LO-IF dB	RF-IF dB	Frequency
01N 01S	<u>MHz</u> RF 300-1000 LO 300-1000 IF DC-1000	minimum +4 TV +7 maximum +13	at: f_L and f_R 1.0-1.7 GHz 7.5 f_i .01-.5 GHz 8 f_i .5-1.0 GHz	at: f_L and f_R 1.0-1.7 GHz 7.5 f_i .01-.5 GHz 8 f_i .5-1.0 GHz	45	35	20	.3 -1 GHz
			at: f_L and f_R .3-2.0 GHz 9 f_i .01-.45 GHz 10 f_i .45-1.0 GHz	at: f_L and f_R .3-2.0 GHz 9 f_i .01-.45 GHz 10 f_i .45-1 GHz	40	30	N/A	1.0-2.0 GHz
02N 02S	<u>GHz</u> RF 1-4.2 LO 1-4.2 IF DC-1.0	Minimum +4 TV +7 maximum +13	at: f_L and f_R 8.5 1-1.5 GHz f_i .01-.5 GHz	at: f_L and f_R 8.5 1-1.5 GHz f_i .01-.5 GHz	25	15	N/A	1.0-4.2 GHz
			7.5 at: f_L and f_R 1.5-4.2 GHz f_i .01-1.0 GHz	7.5 at: f_L and f_R 1.5-4.2 GHz f_i .01-1 GHz				
03N 03S	<u>MHz</u> RF .2-500 LO .2-500 IF DC-500	minimum +4 TV +7 maximum +13	6.5 at: f_L , f_R and f_i 1-50 MHz	6.5 at: f_L , f_R and f_i 1-50 MHz	45	40	35	2-50 MHz
			8.5 at: f_L , f_R and f_i 2-500 MHz	8.5 at: f_L , f_R and f_i 1-500 MHz	35	25	20	50-500 MHz

See footnotes at end of table.

TABLE I. Electrical characteristics - Continued.

Dash no.	RF and LO <u>2</u> / maximum power input (rms)	Conversion compression (maximum)	Desensitization (maximum)	Relative dc polarity <u>3</u> /	VSWR (maximum)			Third order, two tone inter-modulation	
					LO	IF	RF	dBm	Frequencies
01N 01S	400 mW	1.0 dB @ P _R 0 dBm	1.0 dB @ P _{R2} -3 dBm	Positive	2.5:1	2.3:1	16.0:1	+10	f _{LO} : 1.2 GHz f _{R1} : 2 GHz @ -10 dBm f _{R2} : 1.99 GHz @ -10 dBm
02N 02S	50 mW	1.0 dB @ P _R +0 dBm	1.0 dB @ P _{R2} -3 dBm	Negative	3.5:1	2.4:1	8.5:1	+8	f _{LO} : 2 GHz f _{R1} : 1.5 GHz @ -10 dBm f _{R2} : 1.51 GHz @ -10 dBm
03N 03S	50 mW	0.3 dB @ P _R +1 dBm	1.0 dB @ P _{R2} +1 dBm	Negative					

See footnotes at end of table.

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TABLE I. Electrical characteristics - Continued.

Dash no.	Operating frequency range	LO input drive power in dBm <u>1/</u>	Maximum conversion loss (SSB)	Noise figure (SSB)	Isolation			
					Minimum			
			dB	dB	LO-RF dB	LO-IF dB	RF-IF dB	Frequency
04N 04S	<u>GHz</u> RF 1-4 LO 1-4 IF DC 1.0	minimum +16 TV +20 maximum +23	8.0 at: f_L 1.2-4 GHz f_R 1.2-3.5 GHz f_I DC-.5 GHz	8.0 at: f_L 1.2-4 GHz f_R 1.2-3.5 GHz f_I DC-.5 GHz	20	10 15	N/A	1-4 GHz 1-2 GHz 2-4 GHz
			9.5 at: f_L and f_R 1-4 GHz f_I DC-1 GHz	9.5 at: f_L and f_R 1-4 GHz f_I DC-1 GHz				
05N 05S	<u>GHz</u> RF 2.5-5.5 LO 2.5-7.0 IF DC-1.5	minimum +7 TV +9 maximum +13	6.5 at: f_L 3-5.5 GHz f_R 3-5.0 GHz f_I .03-0.5 GHz	6.5 at: f_L 3-5.5 GHz f_R 3-5.0 GHz f_I .03-0.5 GHz	30	17	20	2.5-7 GHz 2.5-3.5 GHz 3.5-7.0 GHz
			7.0 at: f_L 2.5-7.0 GHz f_R 2.5-5.5 GHz f_I .03-1.5 GHz	7.0 at: f_L 2.5-7.0 f_R 2.5-5.5 GHz f_I .03-1.5 GHz				

See footnotes at end of table.

TABLE I. Electrical characteristics - Continued.

Dash no.	RF and LO <u>2</u> / maximum power input (rms)	Conversion compression (maximum)	Desensitization (maximum)	Relative dc polarity <u>3</u> / 	VSWR (maximum)			Third order, two tone Inter-modulation	
					LO	IF	RF	dBm	Frequencies
04N 04S	400 mW	1.0 dB @ $P_R + 13$ dBm	1.0 dB @ $P_{R2} + 8$ dBm	Negative	3.4:1	4.0:1	3.5:1	<u>4</u> / 	f_{LO} : 2.0 GHz f_{R1} : 1.5 GHz @ -5 dBm f_{R2} : 1.51 GHz @ -5 dBm
05N 05S	200 mW	1.0 dB @ $P_R + 3$ dBm	1.0 dB @ $P_{R2} - 2$ dBm	Positive	2.5:1	2.5:1	3.3:1	11 <u>4</u> / 	f_{LO} : 5.0 GHz f_{R1} : 4.0 GHz @ -10 dBm f_{R2} : 4.01 GHz @ -10 dBm

See footnotes at end of table.

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TABLE I. Electrical characteristics - Continued.

Dash no.	Operating frequency range (GHz)	LO input drive power in dBm <u>1/</u>	Maximum conversion loss (SSB)	Noise figure (SSB)	Isolation			
					Minimum			
			dB (GHz)	dB (GHz)	LO-RF dB	LO-IF dB	RF-IF dB	Frequency (GHz)
06N 06S	RF 4.5-9.5 LO 2.5-11.5 IF DC-2.0	minimum +7 TV +10 maximum +13	7.0 at: f_L 4-10 f_R 5-9 f_i 0.03-1	7.0 at: f_L 4-10 f_R 5-9 7.5 f_i 0.03-1	25			2.5-9.0
					20			9-11.5
						15		4-11.5
						10		2.5-4
			8.0 at: f_L 2.5-11 f_R 4.5-9.5 f_i 0.03-2	8.0 at: f_L 2.5-11 f_R 4.5-9.5 f_i 0.03-2			15	4.5-8
							18	8-9.5
07N 07S	RF 7-18 LO 5-18 IF DC-3	minimum +7 TV +10 maximum +13	8.0 at: f_L 5-18 f_R 7-16 f_i 0.03-3 $f_L > f_R$	8.0 at: f_L 5-18 f_R 7-16 f_i 0.03-3	22			5-14
					15			14-18
						12		5-8
						22		8-18
			8.5 at: f_L 5-16 f_R 8-16 f_i 0.03-3 $f_L < f_R$	8.5 at: f_L 5-16 f_R 8-16 f_i 0.03-3			23	.03-8
							15	8-18
			9.0 at: f_L 13-18 f_R 16-18 f_i 0.03-3	9.0 at: f_L 13-18 f_R 16-18 f_i 0.03-3				

See footnotes at end of table.

TABLE I. Electrical characteristics - Continued.

Dash no.	RF and LO <u>2</u> / maximum power input (rms)	Conversion compression (maximum)	Desensitization (maximum)	Relative dc polarity <u>3</u> /	VSWR (maximum)			Third order, two tone intermodulation	
					LO	IF	RF	dBm	Frequencies
06N 06S	200 mW	1.0 dB @ P _R +3 dBm	1.0 dB @ P _{R2} -2 dBm	Positive	2.1:1	3.5:1	2.2:1	+13 <u>4</u> /	f _{LO} : 8 GHz f _{R1} : 7 GHz @ -6 dBm f _{R2} : 7.01 GHz @ -6 dBm
07N 07S	200 mW	1.0 dB @ P _R +4 dBm	1.0 dB @ P _{R2} -2 dBm	Positive	2.3:1	3.3:1	3.0:1	+15 <u>4</u> /	f _{LO} : 14 GHz f _{R1} : 13 GHz @ -6 dBm f _{R2} : 13.01 GHz @ -6 dBm

See footnotes at end of table.

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TABLE I. Electrical characteristics - Continued.

Dash no.	Operating frequency range (GHz)	LO input drive power in dBm <u>1/</u>	Maximum conversion loss (SSB)	Noise figure (SSB)	Isolation			
			dB (GHz)	dB (GHz)	Minimum			
					LO-RF dB	LO-IF dB	RF-IF dB	Frequency (GHz)
08N 08S	RF 1-18 LO 2-18 IF DC-5	Minimum +10 TV +13 maximum +16	8.0 at: f_L 5-13 f_R 5-13 f_I 0.03-2	8.0 at: f_L 5-13 f_R 5-13 f_I 0.03-2	18	20		2-18
							25	1-2
							28	2-8
			9.0 at: f_L 2-18 f_R 2-16 f_I 0.03-4	9.0 at: f_L 2-18 f_R 2-16 f_I 0.03-4				
09N 09S	RF 2-18 LO 2-18 IF 1-8	minimum +10 TV +13 maximum +16	10 at: f_L 2-18 f_R 2-10 f_I 1-8	10 at: f_L 2-18 f_R 2-10 f_I 1-8	15	16	20	2-18
			10.5 at: f_L 10-18 f_R 10-18 f_I 2-8	10.5 at: f_L 10-18 f_R 10-18 f_I 2-8				
			11 at: f_L 2-10 f_R 10-18 f_I 2-8	11 at: f_L 2-10 f_R 10-18 f_I 2-8				
10N 10S	RF 2-18 LO 2-18 IF DC-4	minimum +7 TV +10 maximum +13	10 at: f_L 2-14 f_R 2-10 f_I 0.03-4	10 at: f_L 2-14 f_R 2-10 f_I 0.03-4	15	16		2-18
							20	2-8
			11 at: f_L 6-18 f_R 10-18 f_I 0.03-4	11 at: f_L 6-18 f_R 10-18 f_I 0.03-4			15	8-18

See footnotes at end of table.

TABLE I. Electrical characteristics - Continued.

Dash no.	RF and LO <u>2</u> / maximum power input (rms)	Conversion compression (maximum)	Desensitization (maximum)	Relative dc polarity <u>3</u> /	VSWR (maximum)			Third order, two tone inter-modulation	
					LO	IF	RF	dBm	Frequencies
08N 08S	400 mW	1.0 dB @ P _R +6 dBm	1.0 dB @ P _{R2} -2 dBm	Positive	3.0:1	2.0:1	3.5:1	+19 <u>4</u> /	f _{LO} : 18 GHz f _{R1} : 15 GHz @ -3 dBm f _{R2} : 15.01 GHz @ - 3 dBm
09N 09S	400 mW	1.0 dB @ P _R +7 dBm	1.0 dB @ P _{R2} -2 dBm	Positive	3.3:1	1.8:1	3.5:1	+22 <u>4</u> /	f _{LO} : 18 GHz f _{R1} : 15 GHz @ -3 dBm f _{R2} : 15.01 GHz @ -3 dBm
10N 10S	400 mW	1.0 dB @ P _R +4 dBm	1.0 dB @ P _{R2} -2 dBm	Positive	3.0:1	2.0:1	4.0:1	+18 <u>4</u> /	f _{LO} : 18 GHz f _{R1} : 15 GHz @ -6 dBm f _{R2} : 15.01 GHz @ -6 dBm

See footnotes at top of next page.

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TABLE I. Electrical characteristics - Continued.

1/ Unless otherwise specified, TV is the test value of the LO power for the electrical characteristics.

2/ These values are for +25°C and are derated linearly to +125°C.

3/ With two in-phase signals applied to the LO and RF ports.

4/ Input intercept points.

TABLE II. Physical and environmental characteristics. 1/

Dash no.	Weight	Temperature range in Celsius (operating on top non-operating on bottom)	Mechanical shock (method 213) <u>2/</u>
01	1.1 oz. (31 gm)	-54° to +100° -65° to +100°	---
02	1.1 oz. (31 gm)	-54° to +100° -65° to +100°	---
03	1.1 oz. (31 gm)	-54° to +100° -65° to +100°	---
04	1.1 oz. (31 gm)	-54° to +100° -65° to +100°	---
05	1.6 oz. (45 gm)	-54° to +100° -65° to +100°	C
06	1.27 oz. (36 gm)	-54° to +100° -65° to +100°	C
07	1.06 oz. (30 gm)	-54° to +100° -65° to +100°	C
08	1.41 oz. (40 gm)	-54° to +100° -65° to +100°	C
09	1.41 oz. (40 gm)	-54° to +100° -65° to +100°	C
10	1.41 oz. (40 gm)	-54° to +100° -65° to +100°	C

1/ Where --- is indicated, reference requirements as set forth in MIL-DTL-28837.

2/ Reference MIL-STD-202.

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Referenced documents. In addition to MIL-DTL-28837, this document references the following: MIL-STD-202.

Changes from previous issue. 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 - 11
DLA - CC

Preparing activity:

DLA- CC

(Project 5895-2006-002)

Review activities:

Army - AR, MI
Navy - AS, CG, MC, OS
Air Force - 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.