NOTICE OF REVISION (NOR)

This revision described below has been authorized for the document listed.

1. DATE (YYMMDD)	Form Approved OMB No. 0704-0188
94-01-03	

2. PROCURING ACTIVITY NO.	
3. DODAAC	

4. ORIGINATOR	b. ADDRESS (Street, City, State, Zip Code)	5. CAGE CODE	6. NOR NO.
a. TYPED NAME (First, Middle Initial, Last)	Defense Electronics Supply Center 1507 Wilmington Pike Dayton, OH 45444-5270	67268 7. CAGE CODE 67268	5962-R003-94 8. DOCUMENT NO. 5962-89642

9. TITLE OF DOCUMENT	10. REVISION LETTER		11. ECP NO.
MICROCIRCUIT, LINEAR, WIDEBAND, HIGH OUTPUT CURRENT, FAST SETTLING, OPERATIONAL AMPLIFIER, MONOLITHIC SILICON	a. CURRENT A	b. NEW B	No users listed

12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES

All

13. DESCRIPTION OF REVISION

Sheet 1: Revisions ltr column; add "B".
Revisions description column; add "Changes in accordance with NOR 5962-R003-94".
Revisions date column; add "94-01-03".
Revision level block; add "B".
Rev status of sheets; For sheets 1 and 4, add "B".

Sheet 4: TABLE I.
Output current test. For $+I_{OUT}$, under the conditions column, delete "V_{OUT} = -10 V" and substitute "V_{OUT} = 0 V". For $-I_{OUT}$, under the conditions column, delete "V_{OUT} = +10 V" and substitute "V_{OUT} = 0 V".

Revision level block; add "B".

14. THIS SECTION FOR GOVERNMENT USE ONLY

a. (X one)		
	X	(1) Existing document supplemented by the NOR may be used in manufacture.
		(2) Revised document must be received before manufacturer may incorporate this change.
		(3) Custodian of master document shall make above revision and furnish revised document.

b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT	c. TYPED NAME (First, Middle Initial, Last)
DESC	MICHAEL A. FRYE

d. TITLE	e. SIGNATURE	f. DATE SIGNED (YYMMDD)
CHIEF, MICROELECTRONICS BRANCH	MICHAEL A. FRYE	94-01-03

15a. ACTIVITY ACCOMPLISHING REVISION	b. REVISION COMPLETED (Signature)	c. DATE SIGNED (YYMMDD)
DESC	RICK C. OFFICER	94-01-03

NOTICE OF REVISION (NOR)

(See MIL-STD-480 for instructions)

This revision described below has been authorized for the document listed.

DATE (YYMMDD): 93-04-06

Form Approved OMB No. 0704-0188

1. ORIGINATOR NAME AND ADDRESS
Defense Electronics Supply Center
Dayton, Ohio 45444-5277

2. CAGE CODE: 67268

3. NOR NO.: 5962-R074-93

4. CAGE CODE: 67268

5. DOCUMENT NO.: 5962-89642

6. TITLE OF DOCUMENT

Mckts, Linear, Wideband, High Output Current, Fast settling, Operational Amplifier, Monolithic Silicon

7. REVISION LETTER
(Current) New: (New) A

8. ECP NO.
No registered users

9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES
All

10. DESCRIPTION OF REVISION

Sheet 1: Revisions ltr column; add "A".
Revisions description column; add "Changes in accordance with NOR 5962-R074-93".
Revisions date column; add "93-04-06".
Revision level block; add "A".
Rev status above sheet number 1, 4, 5, and 6, add "A".

Sheet 4: Table I, Input bias current test, $-I_B$, subgroup 1, delete "-8" min and substitute "+8" max, subgroups 2 and 3, delete "-12" min and substitute "+12" max.
Revision level block; add "A".

Sheet 5: Table I, Common mode rejection ratio test, +CMRR and -CMRR, delete subgroup "4" (two places) and substitute subgroup "1" (two places), delete subgroups "5 and 6" (two places) and substitute subgroups "2 and 3" (two places).
Revision level block; add "A".

Sheet 6: Table I, Slew rate, +SR and -SR, delete subgroup "4" (two places) and substitute subgroup "9" (two places), delete subgroups "5 and 6" (two places) and substitute subgroups "10 and 11" (two places).
Revision level block; add "A".

11. THIS SECTION FOR GOVERNMENT USE ONLY

a. CHECK ONE

[X] EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE.

[ ] REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE.

[ ] CUSTODIAN OF MASTER DOCUMENT SHALL MAKE ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:

b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT	SIGNATURE AND TITLE	DATE (YYMMDD)
DESC-ECS	Michael A Frye, Branch Chief	93-04-06
12. ACTIVITY ACCOMPLISHING REVISION	REVISION COMPLETED (Signature)	DATE (YYMMDD)
DESC-ECS	Marcia B Kelleher	93-04-06

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED

REV																				
SHEET																				
REV																				
SHEET																				

REV STATUS OF SHEETS																
REV																
SHEET	1	2	3	4	5	6	7	8	9	10						

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
Rick Officer

CHECKED BY
Charlie Besore

APPROVED BY
Michael A. Frye

DRAWING APPROVAL DATE
92-07-16

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, WIDEBAND, HIGH OUTPUT CURRENT, FAST SETTLING, OPERATIONAL AMPLIFIER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**67268**	**5962-89642**

SHEET 1 OF 10

DESC FORM 193
JUL 91

5962-E421

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

5962-89642	01	C	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	AD842	Wideband, high output current, fast settling, operational amplifier

1.2.2 Case outline(s). The case outline(s) shall be as designated in NIL-STD-1835, and as follows:

Outline letter	Descriptive designator	Terminals	Package style
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
X	See figure 1	12	Can
2	CQCC1-N20	20	Square leadless chip carrier

1.3 Absolute maximum ratings. 1/ 2/

Voltage between V+ and V- terminals	36 V dc
Differential input voltage	±6.0 V dc
Voltage at either input terminal	V+ to V-
Peak output current (< 10% duty cycle)	200 mA
Storage temperature range	-65°C to +150°C
Power dissipation (P_D):	
Case C	1.3 W 3/
Case X	1.5 W 3/
Case 2	1.0 W 3/
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (Θ_{JC}):	
Cases C and X	30°C/W
Case 2	35°C/W
Thermal resistance, junction-to-ambient (Θ_{JA}):	
Case C	110°C/W
Case X	100°C/W
Case 2	150°C/W
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Positive supply voltage range (V+)	+5 V dc to +15 V dc
Negative supply voltage range (V-)	-5 V dc to -15 V dc
Common mode input voltage (V_{CM})	±10 V
Load resistance (R_L)	500Ω
Ambient operating temperature range (T_A)	-55°C to +125°C

1/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.
2/ Unless otherwise specified, T_A = +25°C .
3/ Derate linearly above T_A = +25°C for case C at 8.7 mW/°C, case X at 10 mW/°C, and case 2 at 6.7 mW/°C.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ $V\pm = \pm 15$ V unless otherwise specified	Group A subgroups	Limits 2/ Min	Limits 2/ Max	Unit
Input offset voltage	V_{IO}	V_{CM} = 0 V	1	-1.5	+1.5	mV
			2,3	-3.5	+3.5	
Input bias current	$+I_B$	V_{CM} = 0 V	1		+8	µA
			2,3		+12	
	$-I_B$	V_{CM} = 0 V	1	-8		
			2,3	-12		
Input offset current	I_{IO}	V_{CM} = 0 V	1	-0.4	+0.4	µA
			2,3	-0.6	+0.6	
Common mode voltage range	$+V_{CM}$	V+ = 5.0 V, V- = -25 V, V_{OUT} = -10 V	1,2,3	10		V
	$-V_{CM}$	V+ = 25 V, V- = -5.0 V, V_{OUT} = 10 V	1,2,3		-10	
Large signal voltage gain	$+A_{VOL}$	V_{OUT} = 0 V and 10 V, R_L = 500Ω	1	40		V/mV
			2,3	20		
	$-A_{VOL}$	V_{OUT} = 0 V and -10 V, R_L = 500Ω	1	40		
			2,3	20		
Output current	$+I_{OUT}$	V_{OUT} = -10 V, T_A = +25°C	1	100		mA
	$-I_{OUT}$	V_{OUT} = +10 V, T_A = +25°C	1		-100	
Output voltage swing	$+V_{OUT}$	R_L = 500Ω	1,2,3	10		V
	$-V_{OUT}$	R_L = 500Ω	1,2,3		-10	
Quiescent power supply current	$+I_{CC}$	V_{OUT} = 0 V, I_{OUT} = 0 mA	1		+14	mA
			2,3		+19	
	$-I_{CC}$	V_{OUT} = 0 V, I_{OUT} = 0 mA	1	-14		
			2,3	-19		

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ $V\pm = \pm 15$ V unless otherwise specified	Group A subgroups	Limits 2/ Min	Limits 2/ Max	Unit
Power supply rejection ratio	+PSRR	V+ = 5.0 V to 18 V, V- = -15 V	1	86		dB
			2,3	80		
	-PSRR	V- = -5.0 V to -18 V, V+ = +15 V	1	86		
			2,3	80		
Quiescent power consumption 3/	P_C	V_{OUT} = 0 V, I_{OUT} = 0 mA	1		420	mW
			2,3		570	
Differential input resistance 4/	R_{IN}	V_{CM} = 0 V, $T_A = +25°C$	4	50		kΩ
Gain bandwidth product 4/	GBWP	V_{OUT} = ±100 mV, R_L = 500Ω, f_1 = 100 kHz, f_2 = 10 MHz, $T_A = +25°C$	4	50		MHz
Full power bandwidth 4/ 5/	FPBW	V_{PK} = 10 V, R_L = 500Ω, $T_A = +25°C$	4	4.7		MHz
Closed loop stable gain 4/	CLSG	R_L = 500Ω, $C_L \le 10$ pF, $T_A = +25°C$	4	2		V/V
Common mode rejection ratio	+CMRR	Delta V_{CM} = 10 V, V+ = 5.0 V, V- = -25 V, V_{OUT} = -10 V	4	86		dB
			5,6	80		
	-CMRR	Delta V_{CM} = -10 V, V+ = 25 V, V- = -5.0 V, V_{OUT} = 10 V	4	86		
			5,6	80		
Settling time 4/	t_S	A_V = -2 V/V, 10 V step at 0.1% of the final value, R_L = 500Ω, $T_A = +25°C$	9		150	ns
		A_V = -2 V/V, 10 V step to 0.01% of the final value, R_L = 500Ω, $T_A = +25°C$	9		200	

See footnotes at end of table.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ $V\pm = \pm 15$ V unless otherwise specified	Group A subgroups	Limits 2/ Min	Limits 2/ Max	Unit
Overshoot 4/	+OS	V_{OUT} = 0 V to +200 mV, A_V +2, $R_L = 500\Omega$, $T_A = +25°C$	9		50	%
	-OS	V_{OUT} = 0 V to -200 mV, A_V = +2, $R_L = 500\Omega$, $T_A = +25°C$	9		50	
Slew rate 4/	+SR	V_{OUT} = -5.0 V to 5.0 V, rising edge, $R_L = 500\Omega$, A_V = -2 V/V, measured from 10 percent to 90 percent point	4	300		V/µs
			5,6	200		
	-SR	V_{OUT} = 5.0 V to -5.0 V, falling edge, $R_L = 500\Omega$, A_V = -2 V/V, measured from 90 percent to 10 percent point	4	300		
			5,6	200		
Rise time 4/ 6/	t_R	V_{OUT} = 0 V to +200 mV, A_V = +2, $R_L = 500\Omega$	9,10,11		10	ns
Fall time 4/ 6/	t_F	V_{OUT} = 0 V to -200 mV, A_V = +2, $R_L = 500\Omega$	9,10,11		10	ns

1/ Unless otherwise specified, for dc tests, $R_L = 100\Omega$ and $V_{OUT} = 0$ V.

2/ The algebraic convention, whereby the most negative value is a minimum and the most positive is a maximum, is used in this table. Negative current shall be defined as conventional current flow out of a device terminal.

3/ Quiescent power consumption is based on quiescent supply current test maximum with no load on outputs.

4/ If not tested, shall be guaranteed to the limits specified in table I herein.

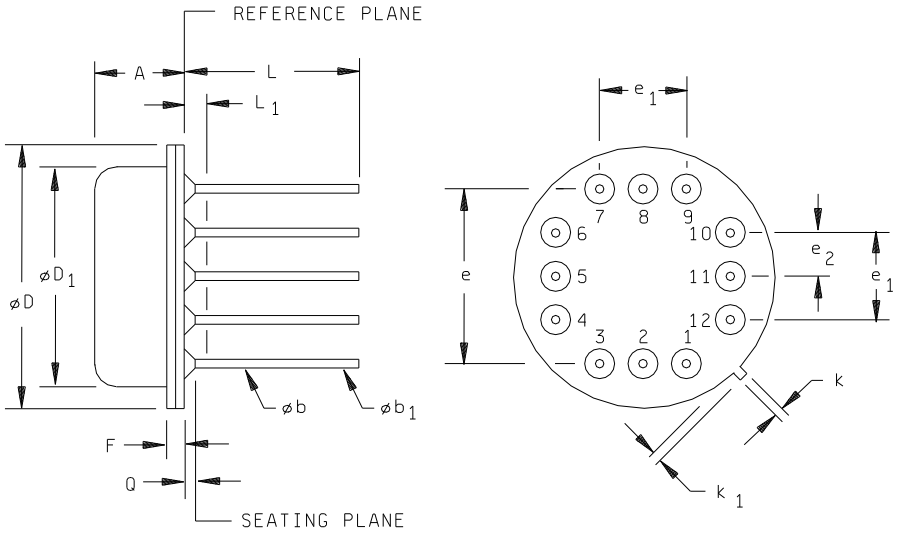
5/ Full power bandwidth = $\frac{SR}{2 \pi V_{PK}}$.

6/ Rise and fall times measured between 10 percent to 90 percent point.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.



Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	0.148	0.181	3.76	4.60	
ϕb	0.016	0.019	0.41	0.48	1
ϕb_1	0.016	0.021	0.41	0.53	1
ϕD	0.592	0.615	15.04	15.62	
ϕD_1	0.545	0.555	13.84	14.10	
e	0.400 BSC		10.16 BSC		3
e_1	0.200 BSC		5.00 BSC		3
e_2	0.100 BSC		2.54 BSC		3
F		0.040		1.02	
k	0.026	0.036	0.66	0.91	
k_1	0.027	0.037	0.68	0.94	2
L	0.375		9.50		
L_1		0.050		1.27	1
Q	0.010	0.045	0.25	1.14	

NOTES:
1. (All leads) ϕb applies between L and L_1, ϕb_1 applies between L_1 and 0.375 inch (9.50 mm) from the reference plane. Diameter is uncontrolled in L_1 and beyond 0.375 inch (9.50 mm) from the reference plane.
2. Measured from the maximum diameter of the product.
3. Leads having a maximum diameter 0.019 inch (0.48 mm) measured in gauging plane 0.054 inch (1.37 mm) + 0.001 inch (0.03 mm) - 0.000 inch (0.000 mm) below the base plane of the product are within 0.007 inch (0.18 mm) of their true position relative to the maximum width tab.

FIGURE 1. Case outline X.

Device type	01		
Case outlines	C	X	2
Terminal number	Terminal symbol		
1	NC	NC	NC
2	NC	NC	Balance
3	Balance	Balance	NC
4	Input-	Balance	NC
5	Input+	Input-	Input-
6	V-	Input+	NC
7	NC	NC	Input+
8	NC	NC	NC
9	NC	NC	NC
10	Output	V-	V-
11	V+	Output	NC
12	NC	V+	NC
13	Balance	---	NC
14	NC	---	NC
15	---	---	Output
16	---	---	NC
17	---	---	V+
18	---	---	NC
19	---	---	NC
20	---	---	Balance

NC = No connection

FIGURE 2. Terminal connections.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1,4
Final electrical test parameters (method 5005)	1*,2,3,4
Group A test requirements (method 5004)	1,2,3,4,5,6, 9**,10**,11**
Groups C and D end-point electrical parameters (method 5005)	1

* PDA applies to subgroup 1.
** Subgroups 9, 10, and 11, if not tested, shall be guaranteed to the limits specified in table I.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6021.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS.

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 92-07-16

Approved sources of supply for SMD 5962-89642 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-ECS. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
5962-8964201CX	24355	AD842SQ/883B
5962-8964201XX	24355	AD842SH/883B
5962-89642012X	24355	AD842SE/883B

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address
24355	Analog Devices Route 1 Industrial Park P.O. Box 9106 Norwood, MA 02062 Point of contact: 804 Woburn Street Wilmington, MA 01887-3642