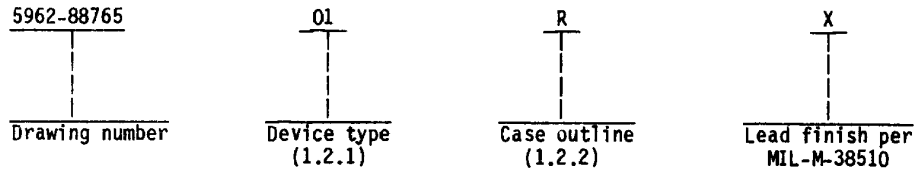




1. SCOPE

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 number. The complete part number shall be as shown in the following example:



1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit function	Relative accuracy
01	7549S	Dual, CMOS, 12-bit DAC	±1.0 LSB
02	7549T	Dual, CMOS, 12-bit DAC	±0.5 LSB

1.2.2 Case outline. The case outline shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
R	D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package

1.3 Absolute maximum ratings.

V <sub>DD</sub> to DGND - - - - -	-0.3 V dc to +17 V dc
V <sub>REFA</sub> , V <sub>REFB</sub> to AGND - - - - -	±25 V dc
V <sub>RFBA</sub> , V <sub>RFBB</sub> to AGND - - - - -	±25 V dc
Digital input voltage to DGND - - - - -	-0.3 V dc to V <sub>DD</sub>
V <sub>PIN15</sub> , V <sub>PIN17</sub> to DGND - - - - -	-0.3 V dc to V <sub>DD</sub>
AGND to DGND - - - - -	-0.3 V dc to V <sub>DD</sub>
Storage temperature range - - - - -	-65°C to +150°C
Lead temperature (soldering, 10 seconds) - - - - -	+300°C
Power dissipation (P <sub>D</sub> ) - - - - -	+450 mW 1/
Thermal resistance, junction-to-case (θ <sub>JC</sub> ) - - - - -	See MIL-M-38510, appendix C
Thermal resistance, junction-to-ambient (θ <sub>JA</sub> ) - - - - -	+120°C/W
Junction temperature (T <sub>J</sub> ) - - - - -	+175°C

1.4 Recommended operating conditions.

Supply voltage (V <sub>DD</sub> ) - - - - -	+14.25 V dc to +15.75 V dc
A-reference voltage (V <sub>REFA</sub> ) - - - - -	+10 V dc
B-reference voltage (V <sub>REFB</sub> ) - - - - -	+10 V dc
Ambient operating temperature range (T <sub>A</sub> ) - - - - -	-55°C to +125°C

1/ Derate above T<sub>A</sub> = +75°C at +6.0 mW/°C.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	5962-88765
	REVISION LEVEL	SHEET 2

DESC FORM 193A  
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1989-549-904

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, 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.

(Copies of the specification and standard 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 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Case outline. The case outline shall be in accordance with 1.2.2 herein.

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

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein

3.5 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 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	5962-88765
	REVISION LEVEL	SHEET 3

DESC FORM 193A  
SEP 87

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TABLE I. Electrical performance characteristics.							
Test	Symbol	Conditions -55°C < T <sub>A</sub> < +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Resolution	RES	Guaranteed minimum resolution	1,2,3	A11	12		Bits
Relative accuracy	RA		1,2,3	01		±1.0	LSB
			1	02		±1.0	
			2,3,12			±0.5	
Differential nonlinearity	DNL	Guaranteed monotonic to 12-bits	1,2,3	A11		±1.0	LSB
Gain error <sup>3/</sup>	A <sub>E</sub>		1,2,3	01		±6.0	LSB
			1	02		±6.0	
			2,3,12			±3.0	
Supply rejection (ΔGain/ΔV <sub>DD</sub> )	PSRR	ΔV <sub>DD</sub> = ±5.0%, full scale outputs	1	A11		±0.01	%/%
			2,3			±0.02	
Output leakage current	I <sub>OUTA</sub>	DAC A loaded with all 0's	1	A11		20	nA
			2,3			250	
	I <sub>OUTB</sub>	DAC B loaded with all 0's	1	A11		20	nA
			2,3			250	
See footnotes at end of table.							
<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444			SIZE		5962-88765		
			A				
			REVISION LEVEL		SHEET		
					4		

DESC FORM 193A  
SEP 87

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查询"5962-8876501RX"供应商 TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T <sub>A</sub> < +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Output current settling time to 0.01% of FSR <u>4/</u>	t <sub>SL</sub>	I <sub>OUT</sub> load = 100Ω, C <sub>EXT</sub> = 13 pF, DAC output measured from falling edge of WR	4	A11		1.5	μs
Feedthrough error, V <sub>REFA</sub> to I <sub>OUTA</sub> or V <sub>REFB</sub> to I <sub>OUTB</sub> <u>4/ 5/</u>	FT	V <sub>REFA</sub> = V <sub>REFB</sub> = +20 V <sub>pp</sub> , 10 kHz sine wave, DAC register loaded with all 0's	4	A11		-65	dB
Reference input resistance	R <sub>IN</sub>		1,2,3	A11	7.0	18	kΩ
Reference input resistance match (V <sub>REFA</sub> /V <sub>REFB</sub> )	R <sub>MIN</sub>		1,2,3	01		+3.0	%
			1	02		+3.0	
			2,3,12			+2.0	
Digital input high voltage	V <sub>IH</sub>		1,2,3	A11	2.4		V
Digital input low voltage	V <sub>IL</sub>		1,2,3	A11		0.8	V
Input leakage current	I <sub>IN</sub>	V <sub>IN</sub> = V <sub>DD</sub>	1	A11		+1.0	μA
			2,3			+10	
Input capacitance <u>4/</u>	C <sub>IN</sub>		4	A11		7.0	pF
Analog output capacitance <u>4/</u>	C <sub>OUTA</sub>	DAC A = all 0's	4	A11		80	pF
		DAC A = all 1's				160	
See footnotes at end of table.							
<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444			SIZE <b>A</b>			5962-88765	
			REVISION LEVEL			SHEET 5	

DESC FORM 193A  
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1986-549-804

TABLE I. Electrical performance characteristics - Continued.							
Test	Symbol	Conditions -55°C < T <sub>A</sub> < +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Analog output capacitance 4/	C <sub>OUTB</sub>	DAC B = all 0's	4	A11		80	pF
		DAC B = all 1's				160	
Functional test		See 4.3.1c	7,8	A11			
Address valid to write setup time	t <sub>AWS</sub>	See figure 3	9	A11	50		ns
			10,11		110		
Address valid to write hold time	t <sub>AWH</sub>	See figure 3	9,10,11	A11	0		ns
Data setup time	t <sub>DS</sub>	See figure 3	9	A11	150		ns
			10,11		240		
Data hold time	t <sub>DH</sub>	See figure 3	9,10,11	A11	0		ns
Chip select or update to write setup time	t <sub>CWS</sub>	See figure 3	9,10,11	A11	20		ns
Chip select or update to write hold time	t <sub>CWH</sub>	See figure 3	9,10,11	A11	0		ns
Write pulse width	t <sub>WR</sub>	See figure 3	9	A11	170		ns
			10,11		250		
See footnotes at end of table.							
<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444			SIZE <b>A</b>		5962-88765		
			REVISION LEVEL		SHEET 6		

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T <sub>A</sub> < +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Clear pulse width	t <sub>CLR</sub>	See figure 3	9	A11	170		ns
			10, 11		250		
Supply current	I <sub>DD</sub>		1,2,3	A11		5.0	mA

- 1/ V<sub>REFA</sub> = V<sub>REFB</sub> = +10 V, V<sub>PIN15</sub> = V<sub>PIN16</sub> = V<sub>PIN17</sub> = 0 V unless otherwise specified.  
All tests are guaranteed over a supply voltage range of V<sub>DD</sub> = +15 V ±5.0%, however, all measurements are made at V<sub>DD</sub> = +15 V unless otherwise specified.
- 2/ Subgroups 10 and 11, if not tested, shall be guaranteed to the limits specified in table I.
- 3/ Measured using internal feedback resistor and includes effects of leakage current and gain temperature coefficient.
- 4/ Subgroup 4 (t<sub>SL</sub>, FT, C<sub>IN</sub>, C<sub>OUTA</sub> and C<sub>OUTB</sub> measurements) shall be measured only for the initial test and after process or design changes which may affect these tests.
- 5/ Feedthrough can be further reduced by connecting the metal lid to ground.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		5962-88765
		REVISION LEVEL	SHEET 7

DESC FORM 193A  
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904

Device types	A11
Case outline	R
Terminal number	Terminal symbol
1	DB3
2	DB2
3	DB1
4	DB0
5	UPD
6	A2
7	A1
8	A0
9	CS
10	WR
11	CLR
12	DGND
13	VREFB
14	RFBB
15	IOUTB
16	AGND
17	IOUTA
18	RFBA
19	VREFA
20	VDD










FIGURE 1. Terminal connections.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		5962-88765
		REVISION LEVEL	SHEET 8

DESC FORM 193A  
SEP 87

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CLR	UPD	CS	WR	A2	A1	A0	Function
0	X	X	1	X	X	X	No data transfer
0	1	1	X	X	X	X	No data transfer
1	X	X	X	X	X	X	All register cleared
0	1	0		0	0	0	DAC A low nibble register loaded from data bus
0	1	0		0	0	1	DAC A mid nibble register loaded from data bus
0	1	0		0	1	0	DAC A high nibble register loaded from data bus
0	1	0		0	1	1	DAC A register loaded from input registers
0	1	0		1	0	0	DAC B low nibble register loaded from data bus
0	1	0		1	0	1	DAC B mid nibble register loaded from data bus
0	1	0		1	1	0	DAC B high nibble register loaded from data bus
0	1	0		1	1	1	DAC B register loaded from input registers
0	0	1		X	X	X	DAC A, DAC B registers updated simultaneously from input registers

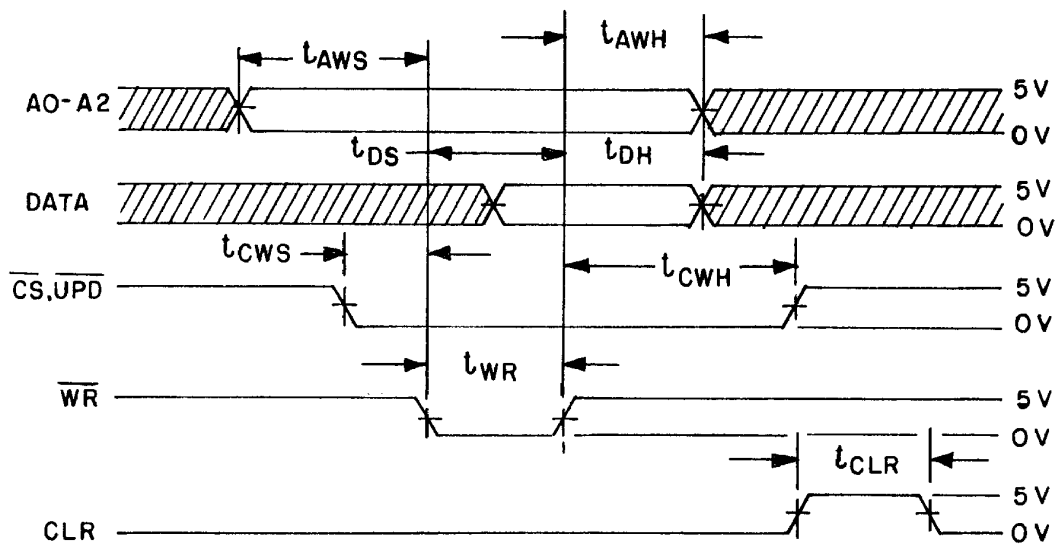
0 = Logic low level  
 1 = Logic high level  
 X = Don't care

FIGURE 2. Truth table.

<b>STANDARDIZED                  MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	5962-88765
	REVISION LEVEL	SHEET 9

DESC FORM 193A  
 SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-6093



NOTES:

1. All input signal rise and fall times are measured from 10% to 90% of +5.0 V,  $t_r = t_f = 20$  ns.
2. Timing measurement reference level is  $\frac{V_{IH} + V_{IL}}{2}$ .

FIGURE 3. Timing diagram.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	5962-88765
	REVISION LEVEL	SHEET 10

DESC FORM 193A  
SEP 87

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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.

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

3.8 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.

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 3.5 herein).
- (2)  $T_A = +125^\circ\text{C}$ , 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.

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 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroups 7 and 8 tests shall verify the truth table as specified in figure 2.
- d. Subgroup 12 test is used for grading and part selection at  $T_A = +25^\circ\text{C}$  and is not included in PDA calculations.
- e. Subgroup 4 (TSL, FT,  $C_{IN}$ ,  $C_{OUTA}$  and  $C_{OUTB}$  measurements) shall be measured only for the initial test and after process or design changes which may affect these tests.

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 3.5 herein).
  - (2)  $T_A = +125^\circ\text{C}$ , minimum.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	5962-88765
	REVISION LEVEL	SHEET 11

DESC FORM 193A  
SEP 87

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*,2,3,7,12
Group A test requirements (method 5005)	1,2,3,4**,7,8, 9,10***,11***,12
Groups C and D end-point electrical parameters (method 5005)	1

\* PDA applies to subgroup 1.

\*\* See 4.3.1e.

\*\*\* Subgroups 10 and 11, if not tested, shall be guaranteed to the limits specified in table I.

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 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	5962-88765	
		REVISION LEVEL	SHEET 12

DESC FORM 193A  
SEP 87

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查询"5962-8876501RX"供应商

Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <sup>1/</sup>
5962-8876501RX	24355	AD7549SQ/883B
5962-8876502RX	24355	AD7549TQ/883B

<sup>1/</sup> 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

24355

Vendor name and address

Analog Devices  
Technology Way  
Norwood, MA 02062-9106

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		5962-88765
		REVISION LEVEL	SHEET 13

DESC FORM 193A  
SEP 87

\* U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904