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	11	12	13											

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: Marcia B. Kelleher

CHECKED BY: Ray Monnin

APPROVED BY: DA DiCenzo

DRAWING APPROVAL DATE: 25 JULY 1988

REVISION LEVEL:

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, LINEAR, 8-BIT, ANALOG-TO-DIGITAL CONVERTER, WITH TRACK/HOLD, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	5962-87762

SHEET 1 OF 13

DESC FORM 193
SEP 87

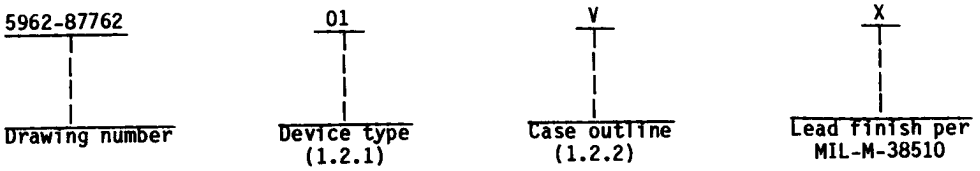
* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E694

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
01	7575S	Monolithic CMOS 8-bit A/D converter with track/hold amplifier, 5 µs conversion time and 7-bit linearity
02	7575T	Monolithic CMOS 8-bit A/D converter with track/hold amplifier, 5 µs conversion time and 8-bit linearity

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

Outline letter	Case outline
V	D-6 (18-lead, .960" x .310" x .200"), dual in-line package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

V_{DD} to AGND	-0.3 V dc to +7.0 V dc
V_{DD} to DGND	-0.3 V dc to +7.0 V dc
AGND to DGND	-0.3 V dc to V_{DD}
Digital input voltage to DGND (Pins $\overline{CS}$, $\overline{RD}$)	-0.3 V dc to V_{DD}
Digital output voltage to DGND: (Pins $\overline{BUSY}$, DB0 to DB7)	-0.3 V dc to V_{DD}
CLK input voltage to DGND	-0.3 V dc to V_{DD}
V_{REF} to AGND	-0.3 V dc to V_{DD}
AIN to AGND	-0.3 V dc to V_{DD}
Power dissipation (P_D) Cases V and 2: Up to +75°C	450 mW
Derate above +75°C	6 mW/°C
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance (θ_{JC}) (Cases V and 2)	See MIL-M-38510, appendix C
Thermal resistance (θ_{JA}) (Cases V and 2)	120°C/W

1.4 Recommended operating conditions.

Ambient operating temperature range (T_A)	-55°C to +125°C
Power supply voltage (V_{DD})	5 V dc ±5%
Reference voltage (V_{REF})	1.23 V dc
AGND = DGND	0 V dc
External clock frequency (f_{CLK})	4 MHz
Analog input voltage range	0 V to 2 V_{REF} (1 LSB = 2 V_{REF}/256)

2. APPLICABLE DOCUMENTS

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 Functional diagram. The functional diagram shall be as specified on figure 2.

3.2.3 Case outlines. The case outlines 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C < T_A < +125°C$ unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Resolution	RES		01,02		8		Bits
Total unadjusted error	TUE		01,02	1	-2	+2	LSB
			01	2, 3	-2	+2	
			02	2, 3	-1	+1	
			02	12	-1	+1	
Relative accuracy	RA		01,02	1	-1	+1	
			01	2, 3	-1	+1	
			02	2, 3	-0.5	+0.5	
			02	12	-0.5	+0.5	
Full scale error	AE		01,02	1, 2, 3	-1	+1	
Offset error 2/	EOS		01,02	1, 2, 3	-0.5	+0.5	
DC input impedance	Z_{IH}		01,02	1, 2, 3	10		MΩ
Reference input current	I_{REF}		01,02	1, 2, 3		500	µA
Digital input low voltage	V_{IL}	$\overline{CS}$, $\overline{RD}$, CLK	01,02	1, 2, 3		0.8	V
Digital input high voltage	V_{IH}	$\overline{CS}$, $\overline{RD}$, CLK	01,02	1, 2, 3	2.4		
Digital input current	I_{IN}	$\overline{CS}$, $\overline{RD}$ V_{IN} = 0 V or V_{DD} V_{DD} = 5.25 V	01,02	1	-1	+1	µA
				2, 3	-10	+10	
Digital input low current	I_{IL}	CLK; V_{IL} = 0 V	01,02	1, 2, 3	-800	+800	
Digital input high current	I_{IH}	CLK; $V_{IH} = V_{DD}$	01,02	1, 2, 3	-800	+800	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Digital output low voltage	V_{OL}	$\overline{BUSY}$, DB0 to DB7, I_{SINK} = 1.6 mA, V_{DD} = 4.75 V	01,02	1, 2, 3		0.4	V
Digital output high voltage	V_{OH}	$\overline{BUSY}$, DB0 to DB7, I_{SOURCE} = -40 µA, V_{DD} = 4.75 V	01,02	1, 2, 3	4.0		
Floating state leakage current	I_{OUT}	DB0 to DB7 V_{OUT} = 0 V to V_{DD} V_{DD} = 5.25 V	01,02	1, 2, 3	-10	+10	µA
Power supply current 3/	I_{DD}		01,02	1, 2, 3		7	mA
Power supply rejection ratio	PSRR	4.75 V $\le V_{DD} \le$ 5.25 V	01,02	1, 2, 3	-0.25	+0.25	LSB
Digital input capacitance	C_{IN}	$\overline{CS}$, $\overline{RD}$, T_A = +25°C See 4.3.1c	01,02	4		10	pF
Floating state output capacitance	C_{OUT}	DB0 to DB7, T_A = +25°C See 4.3.1c	01,02	4		10	
Conversion time with external clock	t_{CONV}	f_{CLK} = 4 MHz, T_A = +25°C	01,02	4		5	µs
Slew rate, tracking	SR	T_A = +25°C	01,02	4		0.386	V/µs
Signal to noise ratio	SNR	V_{IN} = 2.46 V_{p-p} at 10 kHz T_A = +25°C	01,02	4	45		dB
Conversion time with internal clock	t_{CONV}	R = 100 kΩ, C_L = 100 pF	01,02	9, 10, 11	5	15	µs
$\overline{CS}$ to $\overline{RD}$ setup time, t_1	t_{WSCS}	See figure 4	01,02	9, 10, 11	0		ns
$\overline{RD}$ to $\overline{BUSY}$ propagation delay, t_2	t_{WPBD}		01,02	9		100	
				10, 11		120	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Data access time after $\overline{RD}$, t_3 4/	t_{DAR}	See figure 4	01,02	9		100	ns
				10, 11		120	
$\overline{RD}$ pulse width, t_4	t_{RD}		01,02	9	100		
				10, 11	120		
$\overline{CS}$ to $\overline{RD}$ hold time, t_5	t_{RHS}		01,02	9, 10, 11	0		
Data access time after $\overline{BUSY}$, t_6 4/	t_{DAB}		01,02	9		80	
				10, 11		100	
Data hold time, t_7 5/	t_{DH}		01,02	9	10	80	
				10,11	10	100	
$\overline{BUSY}$ to $\overline{CS}$ delay, t_8	t_{BCD}		01,02	9, 10, 11	0		

1/ The minimum resolution for which no missing code is guaranteed is 8-bits. All input control signals are specified with $t_r = t_f = 20$ ns (10 percent to 90 percent of +5 V) and timed from a voltage level of 1.6 V (see 1.4). $V_{DD} = +5$ V, $V_{REF} = +1.23$ V, unless otherwise specified.

2/ Offset error is measured with respect to an ideal first code transition which occurs at 0.5 LSB.

3/ Power supply current is measured when the device is inactive, i.e., when $\overline{CS} = \overline{RD} = \overline{BUSY}$ = logic HIGH.

4/ t_3 and t_6, are measured with the load circuit of figure 3 and defined as the time required for an output to cross 0.8 V or 2.4 V.

5/ t_7 is defined as the time required for the data lines to change 0.5 V when loaded with the circuits of figure 3 and is measured only for the initial test and after process or design changes which may affect t_7.

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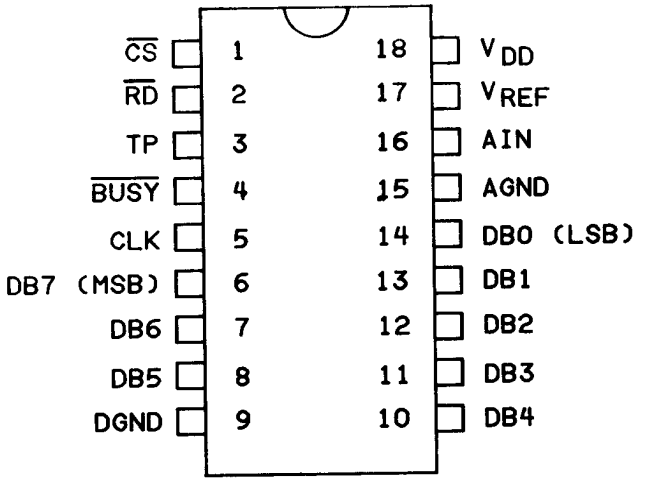
CASE V



CASE 2

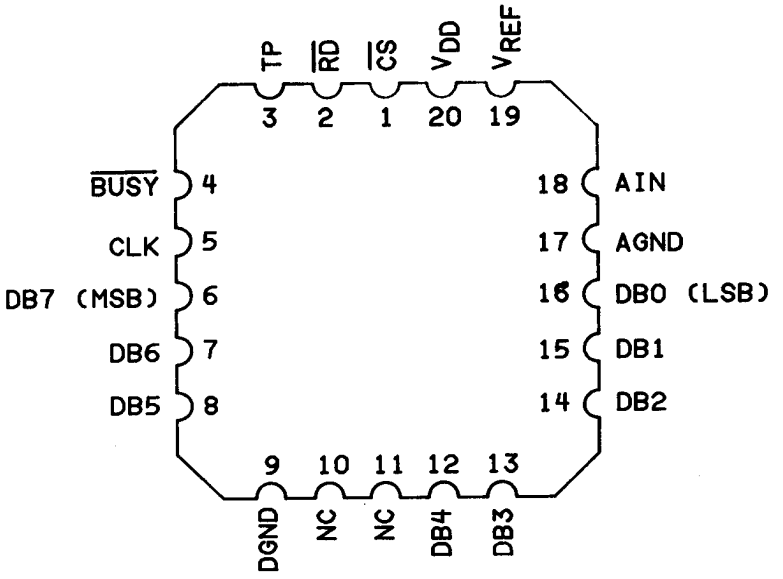


FIGURE 1. Terminal connections.

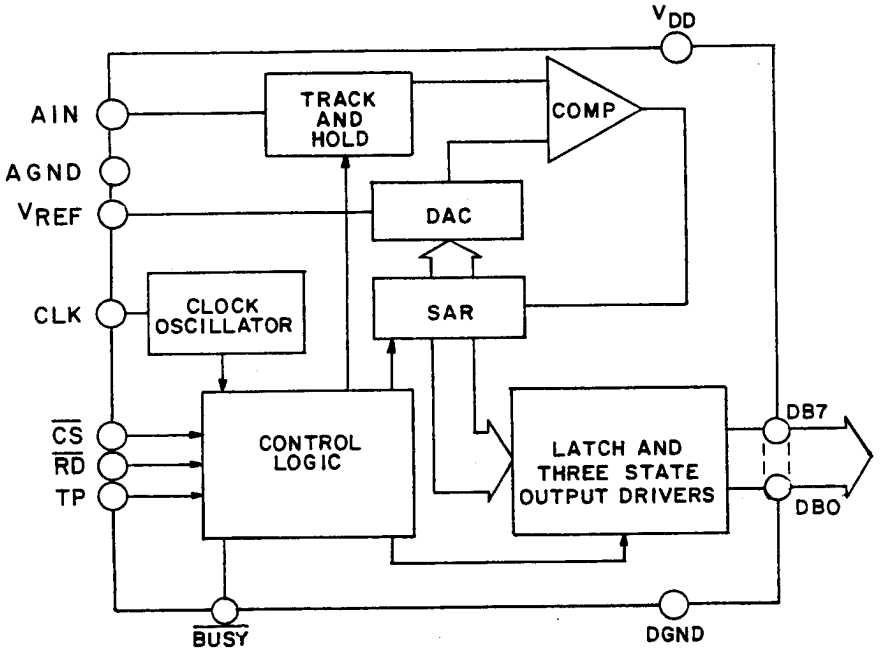
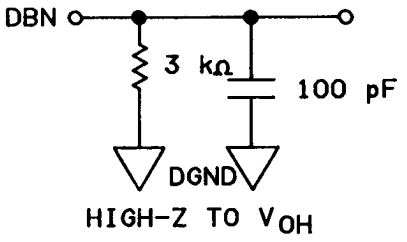
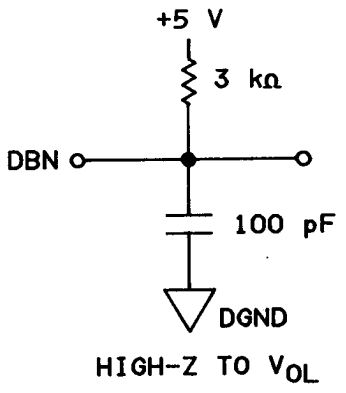


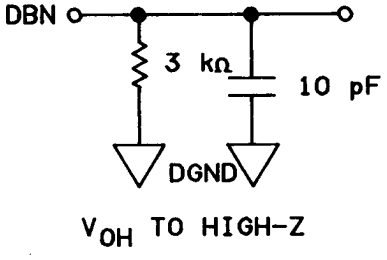
FIGURE 2. Functional diagram.

LOAD CIRCUITS FOR DATA ACCESS TIME TEST





LOAD CIRCUITS FOR DATA HOLD TIME TEST



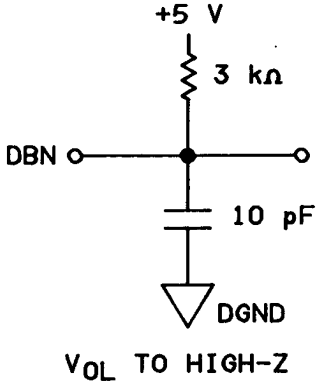
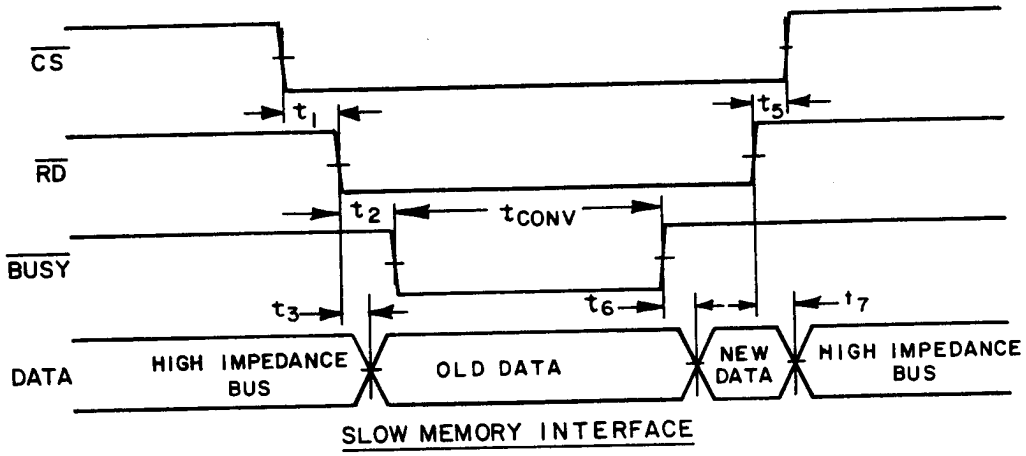
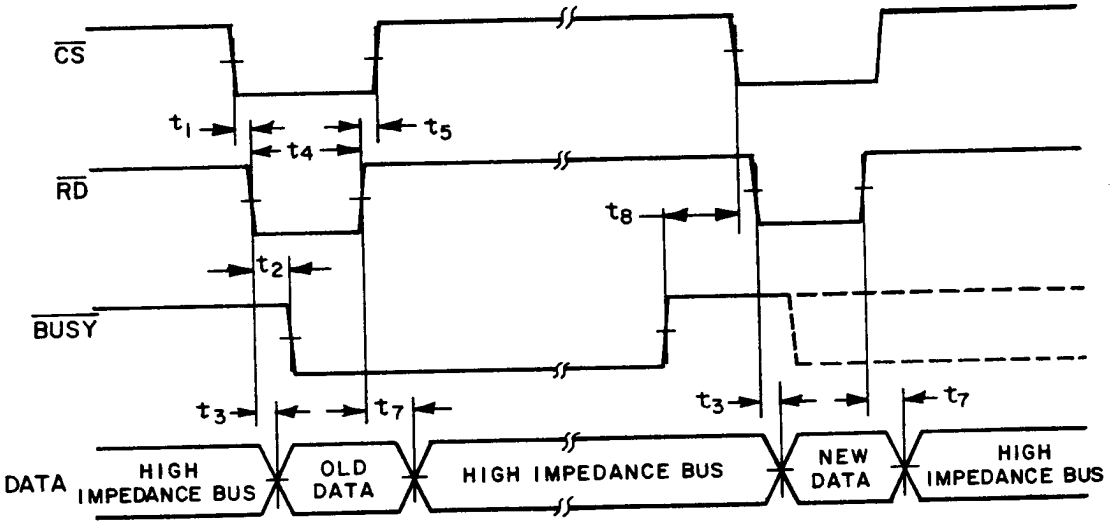


FIGURE 3. Timing test circuits.



SLOW MEMORY INTERFACE



ROM INTERFACE

FIGURE 4. Timing diagrams.

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.

3.6 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.

3.7 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°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.

c. Optional subgroup 12 is used for grading and part selection at +25°C, not included in PDA.

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.

c. Subgroup 4 (C_{IN} and C_{OUT} measurement) shall be measured only for the initial test and after process or design changes which may affect capacitance.

d. Optional subgroup 12 is used for grading and part selection at +25°C.

TABLE II. Electrical test requirements.

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

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

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

6.4 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 1/
5962-8776201VX	24355	AD7575SQ/883B
5962-87762012X	24355	AD7575SE/883B
5962-8776202VX	24355	AD7575TQ/883B
5962-87762022X	24355	AD7575TE/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 1 Technology Way Norwood, MA 02062