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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:

5962-86054	01	X	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	55551	Electroluminescent row driver (see figures 1 and 5)
02	55552	Electroluminescent row driver (see figures 1 and 5)

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

Outline letter	Case outline
X	C-5 (44-terminal, .662" x .662" x .120"), square chip carrier package
Y	C-J4 (44-terminal, .662" x .662" x .135"), square J-leaded chip carrier package

1.3 Absolute maximum ratings. 1/

Supply voltage (V_{CC})	18 V dc
Input voltage	-0.3 V dc to $V_{CC} + 0.3$ V dc
Q off state output voltage	225 V
Common terminal current (pulsed mode)	1.5 mA
Storage temperature	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Power dissipation (P_D)	1475 mW 2/
Junction temperature (T_J)	150°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	10.8 V dc to 13.2 V dc
High level input voltage:	
$V_{CC} = 10.8$ V	8.1 V dc minimum
$V_{CC} = 13.2$ V	9.9 V dc minimum
Low level input voltage:	
$V_{CC} = 10.8$ V	2.7 V dc maximum
$V_{CC} = 13.2$ V	3.3 V dc maximum
Clock frequency (f_{CLK}) ($T_A = +25^\circ\text{C}$)	6.25 MHz
Ambient operating temperature range (T_A)	-55°C to +125°C

1/ All voltages are referenced to GND terminal.

2/ 1475 mW for operation between -55°C to +25°C. For operating above +25°C free-air temperature, derate linearly at 14.6 mW/°C.

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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.

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.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.3 Logic diagram. The logic diagram shall be as specified on figure 2.

3.2.4 Truth table. The truth table shall be as specified on figure 3.

3.2.5 Switching diagrams. The switching diagrams shall be specified on figure 4.

3.2.6 Typical operating sequence. Typical operating sequence shall be as specified on figure 5.

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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ $V_{CC} = 12\text{ V}$ unless otherwise specified	Group A sub- groups	Device type	Limits		Unit
					Min	Max	
Low level output voltage, serial output	V_{OLS}	$I_{OUT} = 100\text{ }\mu\text{A}$	1,2,3	ALL		1.5	V
Low level Q output current	I_{OL}	$V_{CC} = 10.8\text{ V}, T_A = +25^{\circ}\text{C}$ 2/	1	ALL	50		mA
		$V_{CC} = 15\text{ V}, T_A = +25^{\circ}\text{C}$ 2/			80		
High level input current	I_{IH}	$V_{IN} = 12\text{ V}$	1,2,3	ALL		5	μA
Low level input current	I_{IL}	$V_{IN} = 0\text{ V}$	1,2,3	ALL	-5		μA
Off state output current	I_{OFF}	$V_O = 200\text{ V}$	1,2,3	ALL		50	μA
High level output voltage serial outputs	V_{OHQ}	$I_{OUT} = -100\text{ }\mu\text{A}$	1,2,3	ALL	10		V
Supply current from V_{CC}	I_{CC}	Outputs open	1,2,3	ALL		0.5	mA
Low level output voltage, Q outputs	V_{OLQ}	$I_{OUT} = 50\text{ mA}$	1,2,3	ALL		50	V
Functional tests		See 4.3.1c	7,8	ALL			
Clock frequency	f_{CLK}	$T_A = +25^{\circ}\text{C}$	9	ALL	6.25		MHz

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C ≤ T _A ≤ +125°C V _{CC} = 12 V unless otherwise specified	Group A sub- groups	Device type	Limits		Unit
					Min	Max	
Turn on time, Q outputs from enable	t _{ON}	R _L = 2 kΩ, 100 V supply T _A = +25°C	9	All		700	ns
Pulse duration clock high or low	t _W	See figure 4 T _A = +25°C	9	All	200		ns
Data setup time before falling clock	t _{SU}	See figure 4 T _A = +25°C	9	All	180		ns
Falling clock	t _H	See figure 4 T _A = +25°C	9	All	180		ns
Delay time, high to low level serial output from clock	t _{DHL}	C _L = 25 pF to ground, See figure 4 T _A = +25°C	9	All		200	ns
Delay time, low to high level serial output from clock	t _{DLH}	C _L = 25 pF to ground, See figure 4 T _A = +25°C	9	All		200	ns

1/ Voltage measured with respect to GND unless otherwise noted.

2/ Output current measurement duty cycle ≤ 1 percent.

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.

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).

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Device types	01	02
Case outlines	X and Y	X and Y
Terminal number	Terminal symbol	
1	Q16	Q17
2	Q17	Q16
3	Q18	Q15
4	Q19	Q14
5	Q20	Q13
6	Q21	Q12
7	Q22	Q11
8	Q23	Q10
9	Q24	Q9
10	Q25	Q8
11	Q26	Q7
12	Q27	Q6
13	Q28	Q5
14	Q29	Q4
15	Q30	Q3
16	Q31	Q2
17	Q32	Q1
18	DATA OUT	DATA OUT
19	NC	NC
20	NC	NC
21	NC	NC
22	NC	NC
23	ENABLE	ENABLE
24	CLOCK	CLOCK
25	GND	GND
26	V _{CC}	V _{CC}
27	STROBE	STROBE
28	DATA IN	DATA IN
29	NC	NC
30	Q1	Q32
31	Q2	Q31
32	Q3	Q30
33	Q4	Q29
34	Q5	Q28
35	Q6	Q27
36	Q7	Q26
37	Q8	Q25
38	Q9	Q24
39	Q10	Q23
40	Q11	Q22
41	Q12	Q21
42	Q13	Q20
43	Q14	Q19
44	Q15	Q18

NC = No connection

FIGURE 1. Terminal connections.

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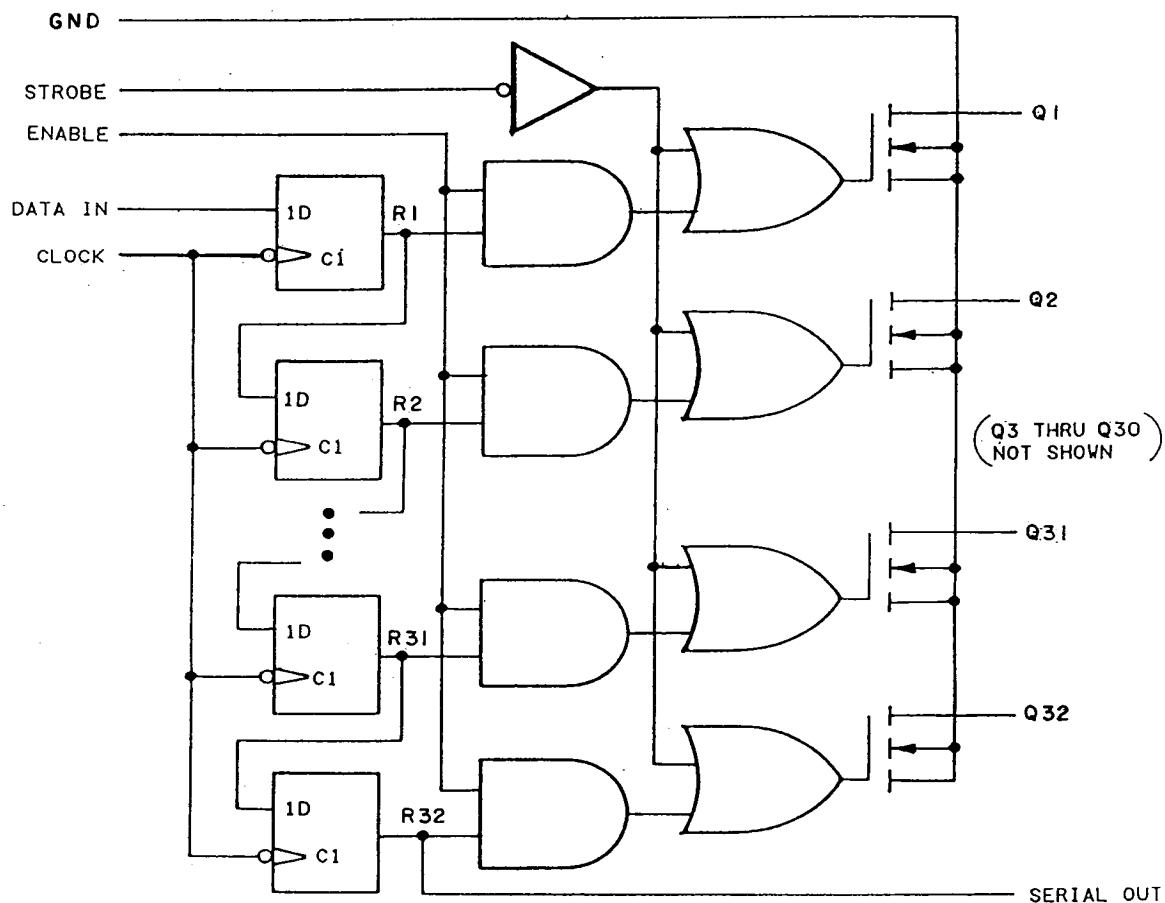


FIGURE 2. Logic diagram.

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

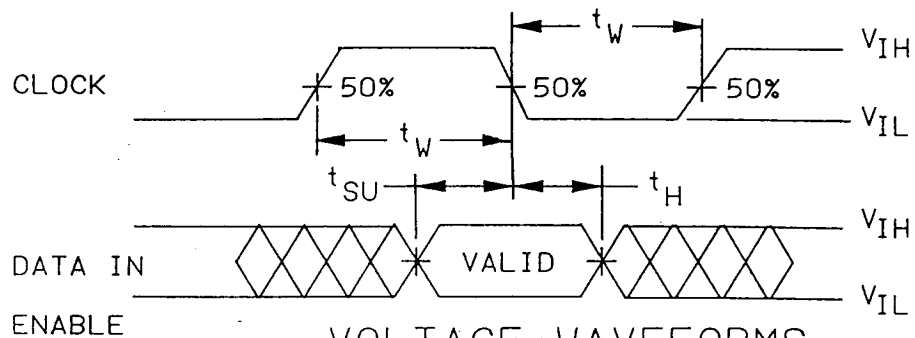
Function	Control inputs			Internal shift register	Q (serial output is always enabled)
	Clock	Enable	Strobe		
Load		X	X	Load and shift data	Determined by enable and strobe
	no 	X	X	No change	
Enable	X	L	H	Determined by clock	All Q outputs off
	X	H	H		Determined by R1 through R32
Strobe	X	X	L		All Q outputs on

FIGURE 3. Truth table.

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INPUT TIMING



VOLTAGE WAVEFORMS

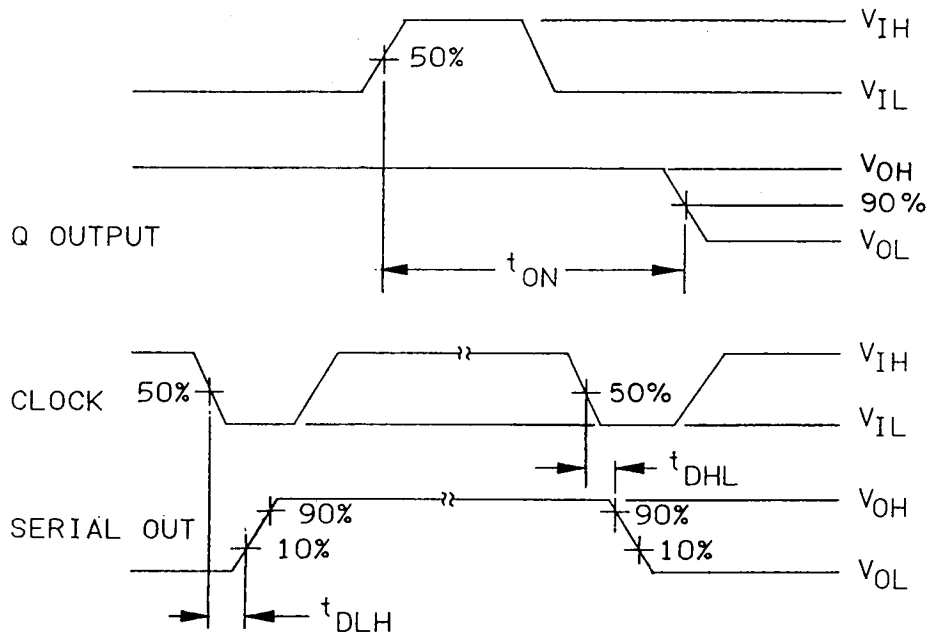
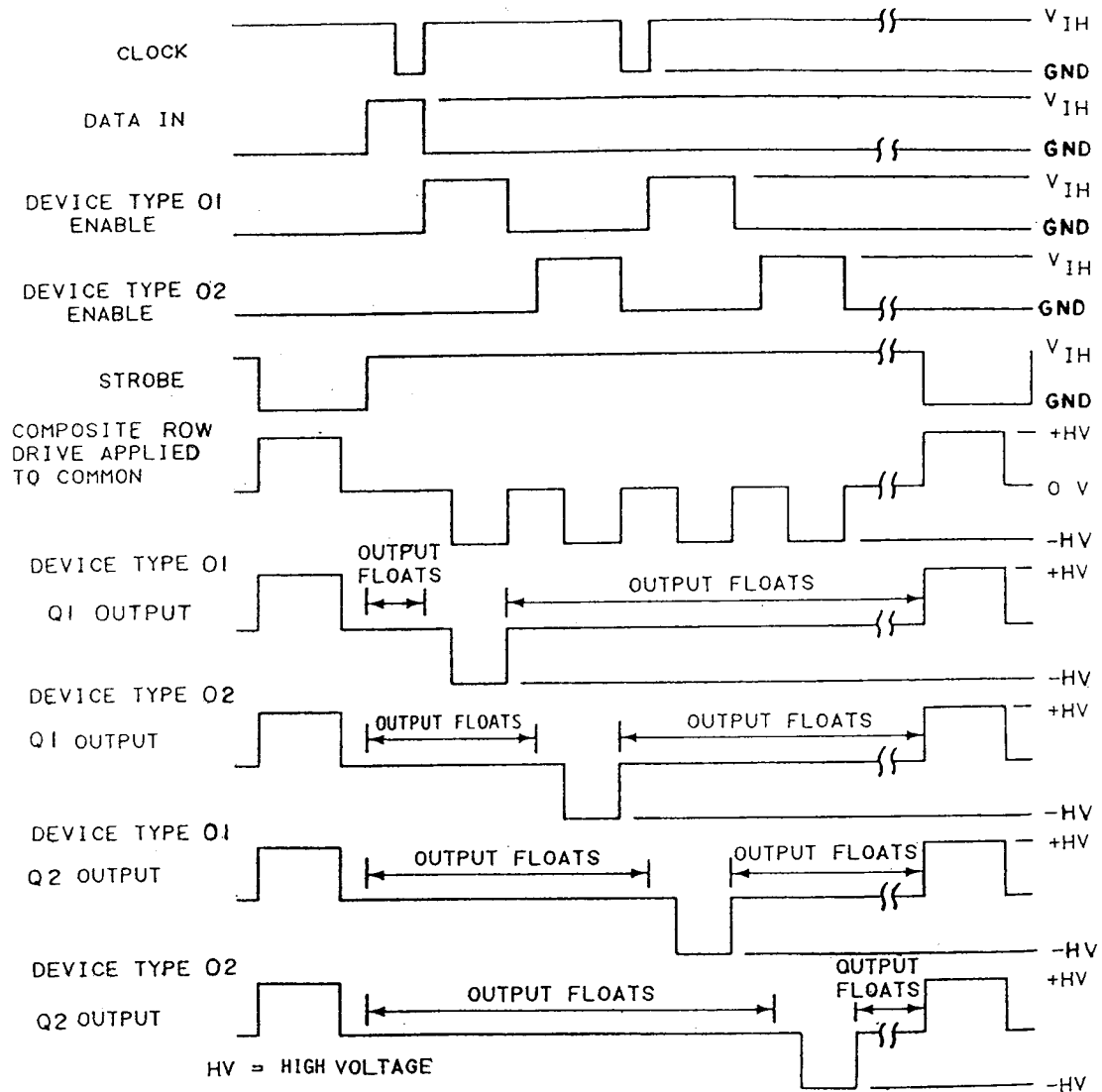


FIGURE 4. Switching diagrams.

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NOTE: During operation clock, data in, enable, and strobe are referenced to the composite row drive signal received at the common pin of the device.

FIGURE 5. Typical operating sequence.

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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.

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) $T_A = +125^{\circ}\text{C}$, 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 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroups 7 and 8 shall include verification of the truth table.

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) $T_A = +125^{\circ}\text{C}$, 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.

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TABLE II. Electrical test requirements. 1/ 2/

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, 8, 9
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

1/ Any or all subgroups may be combined when using a high speed tester.

2/ * PDA applies to subgroup 1.

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) 296-6022.

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

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.

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