REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Technical change to 1.4. Added footnote 5 to table I. Editorial changes throughout.	1990 DEC 4	

REV																									
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REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A														
	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

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APPROVED BY:

DRAWING APPROVAL DATE: 24 FEBRUARY 1989

REVISION LEVEL:

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCED SCHOTTKY, TTL, SYNCHRONOUS 8-BIT UP/DOWN COUNTER, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-89526
A	67268	

SHEET 1

DESC FORM 193
SEP 87

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

5962-E1735

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:

5962-89526	01	K	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	54AS869	Synchronous 8-bit up/down counter

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
K	F-6 (24-lead, .640" x .420" x .090"), flat package
L	D-9 (24-lead, 1.280" x .310" x .200"), dual-in-line package
3	C-4 (28-terminal, .460" x .460" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc minimum to +7.0 V dc maximum
Input voltage range	-1.2 V dc at -18 mA to +7.0 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) 1/	990 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	+4.5 V dc minimum to +5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Case operating temperature range (T_C)	-55°C to +125°C
High level output current (I_{OH})	-2.0 mA maximum
Low level output current (I_{OL})	20 mA maximum

1/ Maximum power dissipation is defined as V_{CC} x I_{CC}, and the device must withstand the added P_D due to output current test; e.g., I_O.

Clock frequency (f_{CLK})	0 MHz - 40 MHz
Minimum clock pulse duration (t_{wCLK}) 2/	12.5 ns
Setup time (t_{su}): 2/	
Data inputs A - H	6.0 ns minimum
Enable P ($\overline{ENP}$) when changing from load 0's to countdown for output (Q_H)	23 ns minimum
Enable P ($\overline{ENP}$) when changing from load 0's to countdown for output ($\overline{RCO}$)	21 ns minimum
Enable P ($\overline{ENP}$) (all other conditions) or Enable T ($\overline{ENT}$)	10 ns minimum
S0 or S1 (load)	13 ns minimum
S0 or S1 (clear)	13 ns minimum
S0 or S1 (count down)	52 ns minimum
S0 or S1 (count up)	52 ns minimum
Hold time at any input with respect to CLK (t_h)	0.0 ns minimum
Operating temperature (T_A)	-55°C to +125°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.

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.

2/ This setup time is required to ensure stable data.

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

3.2.4 Switching waveforms and test circuit. The switching waveforms and test circuit shall be as specified on figure 3.

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 case 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-ECC 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.

3.7 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-ECC 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.

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 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 I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ 1/ unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, I_{OH} = -2.0 mA V_{IL} = 0.8 V V_{IH} = 2.0 V 2/		1, 2, 3	2.5		V
Low level output voltage	V_{OL1}	V_{CC} = 4.5 V V_{IH} = 2.0 V I_{OL} = 20 mA 2/	Qn V_{IL} = 0.8 V	1, 2, 3		0.5	V
	V_{OL2}		$\overline{RCO}$ V_{IL} = 0.7			0.5	
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V I_{IN} = -18 mA		1, 2, 3		-1.2	V
Low level input current	I_{IL}	V_{CC} = 5.5 V V_{IN} = 0.4 V	$\overline{ENT}$	1, 2, 3		-4.0	mA
			other inputs			-2.0	
High level input current	I_{IH1}	V_{CC} = 5.5 V V_{IN} = 2.7 V	$\overline{ENT}$			40	µA
			other inputs			20	
Input current	I_{IH2}	V_{CC} = 5.5 V V_{IN} = 7.0 V		1, 2, 3		0.1	mA
Output current	I_O	V_{CC} = 5.5 V V_{OUT} = 2.25 V 3/		1, 2, 3	-30	-112	mA
Supply current	I_{CC}	V_{CC} = 5.5 V		1, 2, 3		180	mA
Functional tests		See 4.3.1c		7, 8			
Maximum clock frequency	f_{MAX}	V_{CC} = 5.5 V; R_L = 500Ω C_L = 50 pF 4/		9, 10, 11	40		MHz

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ 1/ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Propagation delay time, CLK to $\overline{RCO}$	t_{PLH1}	V_{CC} = 4.5 V to 5.5 V C_L = 50 pF R_L = 500Ω 5/ See figure 3	9, 10, 11	6.0	35	ns
	t_{PHL1}			6.0	20	
Propagation delay time, CLK to any Q	t_{PLH2}			3.0	12	
	t_{PHL2}			4.0	16	
Propagation delay time, $\overline{ENT}$ to $\overline{RCO}$	t_{PLH3}			3.0	25	
	t_{PHL3}			6.0	21	
Propagation delay time, $\overline{ENP}$ to $\overline{RCO}$	t_{PLH4}			5.0	27	
	t_{PHL4}			6.0	21	

1/ Unused inputs that do not directly control the pin under test must be $\ge$ 2.5 V or $\le$ 0.4 V. No unused inputs shall exceed 5.5 V or go less than 0.0 V. No inputs shall be floated.

2/ All outputs must be tested. In the case where only one input at V_{IL} maximum or V_{IH} minimum produces the proper output state, the test must be performed with each input being selected as the V_{IL} maximum or V_{IH} minimum input.

3/ The output conditions have been chosen to produce a current that closely approximates one-half of the true short circuit output current, I_{OS}. Not more than one output will be tested at one time and the duration of the test condition shall not exceed 1 second.

4/ This parameter may be guaranteed if not tested.

5/ Propagation delay limits are based on single output switching. Unused inputs = 3.5 V or $\le$ 0.3 V.

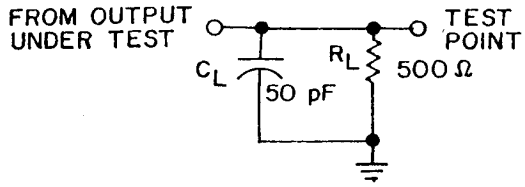
Case outlines	K and L	3
Terminal number	Terminal symbol	
1	SO	NC
2	S1	SO
3	A	S1
4	B	A
5	C	B
6	D	C
7	E	D
8	F	NC
9	G	E
10	H	F
11	$\overline{ENT}$	G
12	GND	H
13	$\overline{RCO}$	$\overline{ENT}$
14	CLK	GND
15	QH	NC
16	QG	$\overline{RCO}$
17	QF	CLK
18	QE	QH
19	QD	QG
20	QC	QF
21	QB	QE
22	QA	NC
23	$\overline{ENP}$	QD
24	V_{CC}	QC
25	---	QB
26	---	QA
27	---	$\overline{ENP}$
28	---	V_{CC}

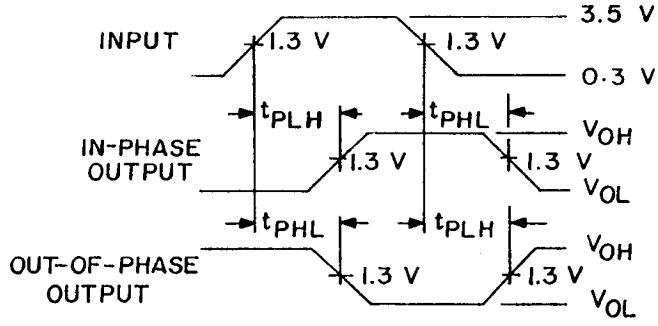
FIGURE 1. Terminal connections.

Inputs				Function
$\overline{ENP}$	$\overline{ENT}$	S1	SO	
X	X	L	L	Clear
L	L	L	H	Count down
X	X	H	L	Load
L	L	H	H	Count up

H = High voltage level
L = Low voltage level
X = Irrelevant

FIGURE 2. Truth table.





NOTES:
1. C_L includes probe and jig capacitance.
2. All input pulses have the following characteristics: PRR $\leq$ 10 MHz, duty cycle = 50%, $t_r = t_f = 3$ ns ±1 ns.
3. The outputs are measured one at a time with one input transition per measurement.

FIGURE 3. Switching waveforms and test circuit.

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 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.

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, 8, 9, 10, 11
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10, 11
Group C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

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-ECC, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECC, 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-ECC.

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 1990 DEC 4

Approved sources of supply for SMD 5962-89526 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.

Military drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
5962-8952601KX	01295	SNJ54AS869W
5962-8952601LX	01295	SNJ54AS869JT
5962-89526013X	01295	SNJ54AS869FK

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
01295	Texas Instruments, Incorporated 13500 N. Central Expressway P.O. Box 655303 Dallas, TX 75265 Point of contact: I-20 at FM 1788 Midland, TX 79711-0448

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in this information bulletin.

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