REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Pg 11 - Delete one vendor.	12/19/77	MCA
B	Pg 1: Document Inactive	9-25-81	MCA Hauck

INACTIVE FOR NEW DESIGN AS OF 25 SEPTEMBER 1981. USE M38510/17504B--

Prepared in accordance with MIL-STD-100

Selected item drawing

REV	B	-	-	-	-	-	-	-	-	-	A
PAGE	1	2	3	4	5	6	7	8	9	10	11
REV STATUS OF PAGES	REV										
	PAGES										

Original Date of Drawing
16 November 1977

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DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO

TITLE
Microcircuits, Digital, CMOS Dual, Retriggerable/Resettable Monostable Multivibrator, Monolithic Silicon

SIZE	CODE IDENT. NO.	DWG NO.
A	14933	77055

REV B

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1. SCOPE

1.1 Scope. This drawing describes the requirements for monolithic silicon, retriggerable/resettable microcircuits. This drawing provides for a level of microcircuit quality and reliability assurance for procurement of microcircuits in accordance with MIL-M-38510.

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

77055	01	E	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish (3.3)

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

Device type	Generic number	Circuit
01	(See 6.6)	Dual retriggerable/resettable monostable multivibrator

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

Outline letter	Case outline
E	D-2 (16-pin, 1/4" X 7/8" dual-in-line)
F	F-5 (16-pin, 1/4" X 3/8" flat pack)

1.3 Absolute maximum ratings.

Supply voltage range- - - - - - - - - - - - - - - - - - - -0.5 Vdc to +18 Vdc
Input voltage range - - - - - - - - - - - - - - - - - - - -0.5 to V_{DD} +0.5 Vdc
Storage temperature range - - - - - - - - - - - - - - - -65°C to +150°C
Maximum power dissipation, P_D 1/- - - - - - - - - - - 500 mWdc 2/
Lead temperature (soldering 10 seconds) - - - - - - - - +300°C
Thermal resistance, junction to case - - - - - - - - - θ_{JC} = {0.09°C/mW for flat pack; 0.08°C/mW for dual-in-line}
Junction temperature- - - - - - - - - - - - - - - - - - T_J = +175°C

1.4 Recommended operating conditions.

Supply voltage- +3 Vdc to +18 Vdc
Ambient operating temperature range - - - - - - - - - -55°C to +125°C

1/ Must withstand the added P_D due to short circuit conditions (e.g. I_{OS}) test.
2/ For T_A= +100 to +125°C, derate linearly at 12 mW/°C to 200 mW.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, 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 specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Detail specification. The individual item requirements shall be in accordance with MIL-M-38510, 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 Design documentation. The design documentation shall be in accordance with MIL-M-38510 and, unless otherwise specified in the contract or purchase order, shall be retained by the manufacturer but be available for review by the procuring activity or contractor upon request.

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

3.2.3 Case outlines. The case outlines shall be in accordance with 1.2.2.

3.3 Lead material and finish. Lead material and finish shall be in accordance with MIL-M-38510.

3.4 Electrical performance characteristics. The electrical performance characteristics are as specified in table I and apply over the full recommended ambient operating temperature range, unless otherwise specified.

3.5 Marking. Marking shall be in accordance with MIL-M-38510 except the part number shall be in accordance with 1.2 herein. The M38510/XXX part number, and the "JAN" or "J" mark shall not be used.

3.6 Product assurance requirements. Microcircuits furnished under this drawing shall have been subjected to, and passed all the requirements, tests, and inspections detailed herein including screening, and quality conformance inspection requirements.

TABLE I. Electrical characteristics.

Test	Symbol	Conditions	Device type	Limits Min	Limits Max	Units
High-level output voltage 1/	V_{OH}	V_{DD}= 5 V; V_{IN}= 0 or V_{DD}	01	4.95	---	V
		10 V		9.95	---	
		15 V		14.95	---	
Low-level output voltage 1/	V_{OL}	V_{DD}= 5 V; V_{IN}= V_{DD} or 0	01	---	.05	V
		10 V		---	.05	
		15 V		---	.05	
High-level input voltage 1/	V_{IH}	V_{DD}= 5 V; V_O= 0.5 or 4.5V	01	3.5	---	V
		10 V 1.0 or 9.0 V		7.0	---	
		15 V 1.5 or 13.5 V		11.0	---	
Low-level input voltage 1/	V_{IL}	V_{DD}= 5 V V_O= 4.5 or 0.5 V	01	---	1.5	V
		10 V 9.0 or 1.0 V		---	3.0	
		15 V 13.5 or 1.5 V		---	4.0	
Output drive current (source) 1/	I_{OH}	V_{DD}= 5 V; V_{OH}= 2.5 V	01	-1.15	---	mA
		5 V 4.6 V		-0.36	---	
		10 V 9.5 V		-0.9	---	
		15 V 13.5 V		-2.4	---	
		V_{IN} = 0,5V				
		0,5V				
		0,10 V				
		0,15 V				
Output drive current	I_{OL}	V_{DD} = 5 V: V_{OL} = 0.4 V	01	0.36	---	mA
		10 V 0.5 V		0.9	---	
		15 V 1.5 V		2.4	---	
		V_{IN} = 0,5 V				
		0,10 V				
		0,15 V				
Input current 1/	I_{IN}	V_{DD} = 18V V_{IN} = 0,18 V	01	---	±0.1	µA
Input capacitance 2/	C_{in}	V_{in} = 0 T_A = 25°C	01	---	7.5	pF

TABLE I. Electrical characteristics - Continued.

Test	Symbol	Conditions	Device type	Limits Min	Limits Max	Units
Quiescent current 1/	I_{DD}	V_{DD} = 5 V V_{IN} = 0,5 V 10 V 0,10 V 15 V 0,15 V	01 -	--- --- ---	30 60 120	µA
Trigger propagation delay time +TR, -TR, to Q,$\overline{Q}$ 3/	t_{PLH} t_{PHL}	V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = 25°C	01	2 2 2	500 250 200	ns
		V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = -55°C, 125°C	01	2 2 2	750 375 300	ns
Transition time 3/	t_{TLH} t_{THL}	V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = 25°C	01	2 2 2	200 100 80	ns
		V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = -55°C, 125°C	01	2 2 2	300 150 120	ns
Reset propagation delay time 3/	t_{PLH} t_{PHL}	V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = 25°C	01	2 2 2	450 250 150	ns

TABLE I. Electrical characteristics - Continued.

Test	Symbol	Conditions	Device type	Limits Min	Limits Max	Units
Reset propagation delay time 3/	t_{PLH} t_{PHL}	V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = -55°C, 125°C	01	2 2 2	675 375 225	ns
Minimum trigger pulse width 3/	t_{WH} t_{WL}	V_{DD} = 5 V = 10 V = 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = 25°C	01	2 2 2	140 60 40	ns
Minimum reset pulse width 3/	t_WR	V_{DD} = 5 V 10 V 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = 25°C	01	2 2 2	200 80 60	ns
Trigger rise or fall time 3/	t_r(TR) t_f(TF)	V_{DD} = 5 to 15 V C_L = 50 pF ±10%; R_L = 200 kΩ T_A = 25°C	01	2	100	µs

1/ Test is part of subgroups A-1, A-2, and A-3.
2/ Test is subgroup A-4.
3/ Test is part of subgroups A-9, A-10, and A-11.
4/ Test is subgroup A-7.

Device type 01

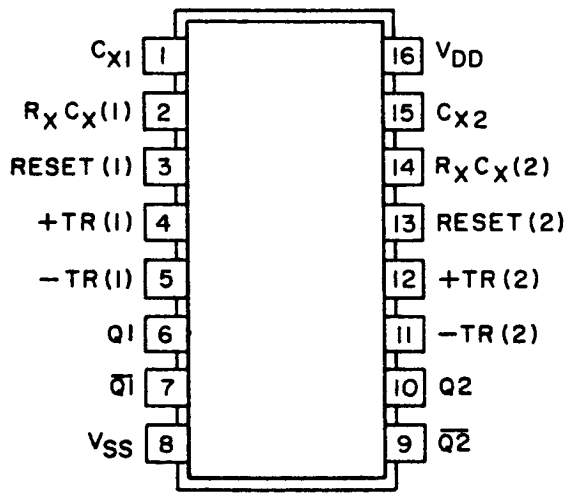

FIGURE 1. Terminal connections (top view).

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3.6.1 Screening. Screening shall be in accordance with method 5004, class B, of MIL-STD-883 and 4.3 herein. The 100 percent final electrical screening for off the shelf devices shall consist of the normal 100 percent DC tests at 25°C with 10 percent PDA, high and low temperature DC tests, and 25°C AC tests followed by normal sampling and LTPD's at group A lot acceptance.

3.6.2 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-M-38510 and 4.4 herein.

3.7 Manufacturer eligibility. To be eligible to supply microcircuits to this drawing, a manufacturer must have manufacturer certification in accordance with MIL-M-38510 for at least one line and have PART I listing on Qualified Products List QPL-38510 for at least one device type (not necessarily the one for which the procurement to this drawing is to apply).

4. PRODUCT ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-M-38510 and method 5005 of MIL-STD-883, except as modified herein.

4.2 Qualification inspection. Qualification inspection to this device type shall not be required.

4.3 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 D or E, each circuit must be driven with an appropriate signal to simulate circuit applications and each circuit shall have maximum load applied.
   (2) T_A = 125°C minimum.

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

c. Percent defective allowable (PDA) - The PDA is specified as 10 percent based on failures from group A, subgroup 1, test after cooldown as final electrical test in accordance with method 5004 of MIL-STD-883, and with no intervening electrical measurements. If interim electrical parameter tests are performed prior to burn-in, failures resulting from pre burn-in screening may be excluded from the PDA. If interim electrical parameter tests prior to burn-in are omitted, then all screening failures shall be included in the PDA. The verified failures of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent defective for the lot.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-M-38510. Groups A and B inspections shall be performed on each lot. Quality assurance shall keep lot records for 3 years (minimum), monitor for compliance to the prescribed procedures, and observe that satisfactory manufacturing conditions and records on lots are maintained for these devices. The records, including as a minimum an attributes summary of all screening and quality conformance inspections conducted on each lot, shall be available for review by the customer at all times.

4.4.1 Group A inspection. Group A inspection shall consist of the test subgroups and LTPD values shown in table I of method 5005 of MIL-STD-883 (class B) and as follows:

a. Tests shall be as specified in table II.
b. Subgroups 5, 6, and 8 of table I of method 5005 of MIL-STD-883 shall be omitted.

4.4.2 Group B inspection. In group B inspection, each inspection lot shall be subjected to the test subgroups and LTPD values shown in table IIb of method 5005 of MIL-STD-883, class B.

4.4.3 Group C and group D inspection. Group C and group D inspections shall be as specified in method 5005 of MIL-STD-883, class B. The frequency of testing and the sample size shall be in accordance with MIL-M-38510. Generic test data (6.5) may be used to satisfy the requirements for group C and group D inspection.

a. End point electrical parameters shall be as specified in table II.
b. Operating life test (method 1005 of MIL-STD-883) conditions:
   (1) Test condition D or E, each circuit must be driven with an appropriate signal to simulate circuit applications and each circuit shall have maximum load applied.
   (2) T_A = 125°C, minimum.
   (3) Test duration: 1,000 hours.
c. Subgroups 3 and 4 shall be added to the group C inspection requirements and shall consist of the tests, conditions, and limits specified for subgroups 10 and 11 of group A.

4.5 Inspection of preparation for delivery. Inspection of preparation for delivery shall be in accordance with MIL-M-38510, except that the rough handling test shall not apply.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups 1/
Interim electrical parameters (pre burn-in) (method 5004, 3.1.8)	---
Final electrical test parameters (method 5004, 3.1.14)	1*, 2, 3, 9
Group A test requirements (method 5005)	1, 2, 3, 4, 7, 9
Groups C and D end point electrical parameters (method 5005)	1, 2, 3
Additional electrical subgroups for group C periodic inspections	10, 11

* PDA applies to subgroup 1 (see 4.3c).

1/ Subgroups per method 5005, Table I.

5. PACKAGING

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

6. NOTES

6.1 Notes. Only 6.4 of the notes specified in MIL-M-38510 shall apply to this drawing.

6.2 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. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, this drawing becomes obsolete and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.3 Ordering data. The contract or order should specify the following:

a. Complete part number (see 1.2).
b. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
c. Requirement for certificate of compliance, if applicable.
d. Requirements for notification of change of product or process to procuring activity, if applicable.
e. Requirements for packaging and packing.
f. Requirements for carrier, special lead lengths or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements will not apply to direct shipment to the Government.

6.4 Replaceability. Replaceability is determined as follows:

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

6.5 Generic test data. Generic test data may be used to satisfy the requirements of 4.4.3. Generic test data is defined as test data from devices manufactured during the same time period, by means of the same production technique, materials, controls and design, and in the same microcircuit group (see 3.1.3(h) of MIL-M-38510) as the deliverable devices. The same time period shall be interpreted as covering a maximum span of 180 days between the generic test sample fabrication and the fabrication of deliverable devices. The vendor is required to retain generic data for a period of not less than 36 months from the date of shipment.

6.6 Suggested source(s) of supply. 2/

DESC DRAWING PART NUMBER	VENDOR FSCM NUMBER	SIMILAR 1/ VENDOR TYPE
7705501EX	18714	CD4098BD/3
7705501FX	18714	CD4098BK/3

VENDOR FSCM NUMBER	VENDOR NAME AND ADDRESS
18714	RCA Corporation Solid State Division Route 202 Somerville, NJ 08876

1/ CAUTION. DO NOT USE THIS NUMBER FOR ITEM PROCUREMENT. ITEMS PROCURED TO THE SIMILAR VENDOR TYPE ONLY MAY NOT SATISFY THE PERFORMANCE REQUIREMENTS OF THIS DRAWING.

2/ For additional suggested sources of supply or assistance in the use of this drawing contact DESC-EC, 1507 Wilmington Pike, Dayton, Ohio 45444 or telephone 513-296-5375.