

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Changes made in accordance with NOR 5962-R121-92. -sld	92-02-10	Alan Barone
B	Update drawing to the latest requirements -sld	05-11-03	Raymond Monnin

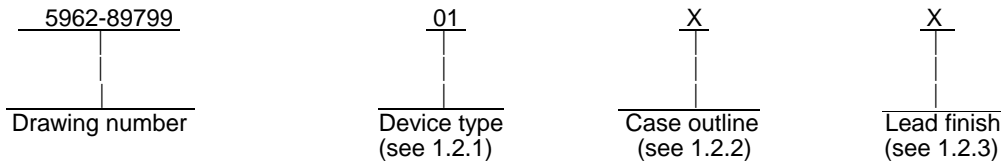
**The original first page of this drawing has been replaced**

REV																					
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REV STATUS	REV	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13							
PMIC N/A	PREPARED BY Steve Duncan				<b>DEFENSE SUPPLY CENTER COLUMBUS</b> <b>COLUMBUS, OHIO 43218-3990</b> <a href="http://www.dsccl.dla.mil/">http://www.dsccl.dla.mil/</a>																
<b>STANDARD MICROCIRCUIT DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A	CHECKED BY Gary Zahn																				
	APPROVED BY William K. Heckman																				
	DRAWING APPROVAL DATE 91-06-26																				
	REVISION LEVEL <b>B</b>																				
				SIZE A	CAGE CODE <b>67268</b>	<b>5962-89799</b>															
				SHEET 1 OF 13																	

1. SCOPE

1.1 Scope. This drawing describes device requirements for class H hybrid microcircuits to processed in accordance with MIL-PRF-38534.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Device type(s). The device type(s) identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>	<u>Coupling transformer</u> <u>Transformer</u>	<u>Turns ratio</u> <u>Direct</u>
01 <u>1/</u>	FC 155391	Low power, driver-receiver	0.67:1	0.47:1
02 <u>2/</u>	FC 155392	Low power, driver-receiver	0.67:1	0.47:1

1.2.2 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
X	See figure 1	24	Dual-in-line

1.2.3 Lead finish. The lead finish shall be as specified in MIL-PRF-38534.

1.3 Absolute maximum ratings. 3/

Supply voltage range ( $V_{CC}$ ) .....	-0.3 V dc to +7 V dc
Logic input voltage range .....	-0.3 V dc to $V_{CC}$
Receiver differential voltage .....	40 V <sub>p-p</sub>
Receiver common mode voltage range .....	-10 V dc to +10 V dc
Driver peak output current .....	200 mA
Power dissipation ( $P_D$ ) at $T_C = +125^\circ\text{C}$ .....	1.4 W
Storage temperature range .....	-65°C to +150°C
Lead temperature (soldering, 10 seconds) .....	+300°C
Junction temperature ( $T_J$ ) .....	+160°C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ) .....	18°C/W
Thermal resistance, junction-to-ambient ( $\theta_{JA}$ ) .....	35°C/W

1/ Interfaces with the Harris Manchester encoder/decoder.

2/ Interfaces with Smith's Manchester encoder/decoder.

3/ Stresses above the absolute maximum ratings may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

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1.4 Recommended operating conditions.

Supply voltage range (V <sub>CC</sub> ) .....	+4.5 V dc to +5.5 V dc
Logic input voltage range.....	0 V dc to +5 V dc
Receiver differential voltage.....	30 V <sub>p-p</sub>
Receiver common mode voltage range .....	-10 V dc to +10 V dc
Driver peak output current .....	220 mA
Serial data rate .....	1.0 MHz maximum
Junction temperature (T <sub>J</sub> ) .....	+150°C
Case operating temperature range (T <sub>C</sub> ).....	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.  
 MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.  
 MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item performance requirements shall be in accordance with MIL-PRF-38534 and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Timing waveforms. The timing waveforms shall be as specified on figure 3.

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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 specified 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 defined in table I.

3.5 Marking of device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked.

3.6 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DSCC-VA) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DSCC-VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C 4.5 V dc ≤ V <sub>CC</sub> ≤ 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Receiver							
Input level <u>1</u> /	V <sub>I</sub>	Differential input, pin 15 to pin 16	4,5,6	All	40		V <sub>p-p</sub>
Input common mode voltage range <u>1</u> /	V <sub>ICM</sub>	Independent of xmfr or in accordance with MIL-HDBK-1553 section 5.1.2.2	4,5,6	All	-10	+10	V(pk)
Output low voltage	V <sub>OL</sub>	I <sub>OL</sub> = 16 mA	1,2,3	All		0.5	V
Output high voltage	V <sub>OH</sub>	I <sub>OH</sub> = -0.4 mA	1,2,3	All	2.4		V
Transmitter							
Input low voltage	V <sub>IL</sub>		1,2,3	All		0.7	V
Input high voltage	V <sub>IH</sub>		1,2,3	All	2.0		V
Input low current	I <sub>IL</sub>	V <sub>IL</sub> = 0.4 V	1,2,3	All		-1.6	mA
Input high current	I <sub>IH</sub>	V <sub>IH</sub> = 2.7 V	1,2,3	All		0.04	mA
Output voltage	V <sub>O</sub>	Across 35Ω load	1,2,3	All	6.0	9.0	V(pk)
Output noise voltage	V <sub>ON</sub>	Across 35Ω load	4,5,6	All		10	mV <sub>p-p</sub>
Receiver strobe							
Input low voltage	V <sub>SIL</sub>		1,2,3	All		0.7	V
Input high voltage	V <sub>SIH</sub>		1,2,3	All	2.0		V
Input low current	I <sub>SIL</sub>	V <sub>SIL</sub> = 0.4 V	1,2,3	All		-1.6	mA
Input high current	I <sub>SIH</sub>	V <sub>SIH</sub> = 2.7 V	1,2,3	All		0.04	mA
See footnotes at end of table.							
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					REVISION LEVEL <b>B</b>		SHEET <b>5</b>

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C 4.5 V dc ≤ V <sub>CC</sub> ≤ 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Transmitter inhibit							
Input low voltage	V <sub>IIL</sub>		1,2,3	All	0.7		V
Input high voltage	V <sub>IIH</sub>		1,2,3	All		2.0	V
Input low current	I <sub>IIL</sub>	V <sub>SIL</sub> = 0.4 V	1,2,3	All		-1.6	mA
Input high current	I <sub>IIH</sub>	V <sub>SIH</sub> = 2.7 V	1,2,3	All	0.04		mA
Power supply							
Total current	I <sub>CC-SB</sub>	Standby mode, V <sub>CC</sub> = 5.5 V dc	1,2,3	All		45	mA
	I <sub>CC-25</sub>	25% duty cycle into 70Ω load, V <sub>CC</sub> = 5.5 V dc <u>1/</u>	4,5,6	All		170	mA
	I <sub>CC-50</sub>	50% duty cycle into 70Ω load, V <sub>CC</sub> = 5.5 V dc	4,5,6	All		350	mA
	I <sub>CC-100</sub>	100% duty cycle into 70Ω load, V <sub>CC</sub> = 5.5 V dc <u>1/</u>	1,2,3	All		700	mA
Receiver							
Input resistance	R <sub>IN</sub>	1 MHz sine wave <u>1/</u>	4,5,6	All	1.6		kΩ
Input capacitance	C <sub>IN</sub>	1 MHz sine wave, <u>1/</u> T <sub>C</sub> = +25°C	4	All		2.0	pF
Threshold voltage <u>2/</u>	V <sub>TH</sub>		1,2,3	All	0.6	1.2	V <sub>p-p</sub>
		Group C, end-point electricals			0.6	1.2	

See footnotes at end of table.

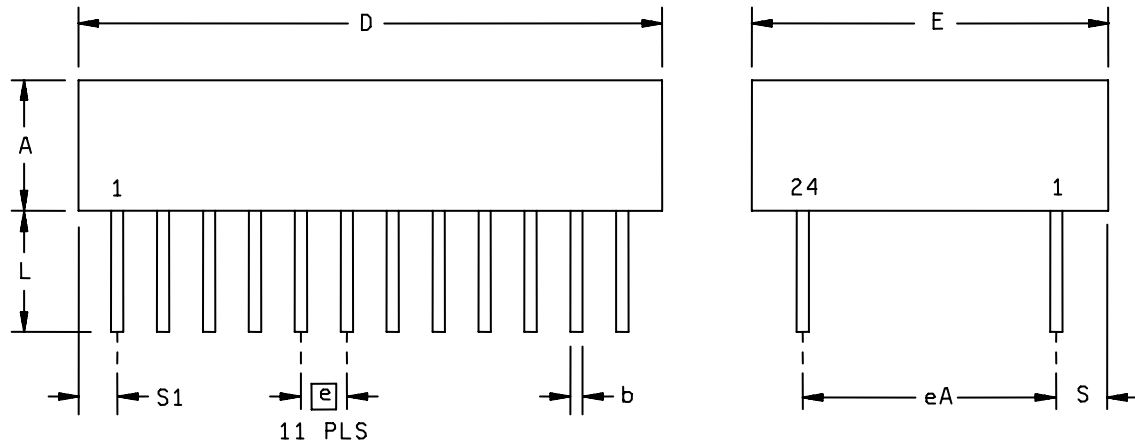
<b>STANDARD MICROCIRCUIT DRAWING</b>  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-89799</b>
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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C 4.5 V dc ≤ V <sub>CC</sub> ≤ 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Transmitter							
Output resistance, transmitter off	R <sub>OUT</sub>	1 MHz sine wave <u>1/</u>	4,5,6	All	10		kΩ
Output capacitance, transmitter off	C <sub>OUT</sub>	1 MHz sine wave, <u>1/</u> T <sub>C</sub> = +25°C	4	All		18	pF
Output offset voltage	V <sub>OS</sub>	V <sub>CC</sub> = 5.5 V dc <u>1/</u> <u>3/</u>	4,5,6	All	-90	+90	mV(pk)
Peak amplitude variation	A <sub>V</sub>	V <sub>CC</sub> = 4.5 V dc <u>1/</u> <u>4/</u>	4,5,6	All	-15	+15	%
Receiver							
Delay time, input to output <u>1/</u>	t <sub>DR</sub>	Delay time from differential input zero crossing to DATA or $\overline{\text{DATA}}$ , see figure 3	9,10,11	All		300	ns
Strobe delay <u>1/</u>	t <sub>DS</sub>	Delay time from strobe rising or falling edge to DATA or $\overline{\text{DATA}}$ , see figure 3	9,10,11	All		200	ns
Transmitter							
Rise time	t <sub>R</sub>	Output load = 70Ω, see figure 3	9,10,11	All	100	300	ns
Fall time	t <sub>F</sub>				100	300	ns
Delay time	t <sub>DT</sub>	See figure 3 <u>1/</u>	9,10,11	All		250	ns
Inhibit delay inhibiting	t <sub>DI-H</sub>	See figure 3 <u>1/</u>	9,10,11	All		500	ns
Inhibit delay active	t <sub>DI-L</sub>	See figure 3 <u>1/</u>	9,10,11	All		450	ns

- 1/ Parameter shall be tested as part of device initial characterization and after design and process changes. Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.
- 2/ Threshold is measured in direct coupled mode including the transformer. Threshold is the maximum level on the BUS at which there are no pulses on either receiver output. Divide by 1.4 to obtain threshold in transformer coupled mode. Add 0.14 V in direct coupled mode or 0.10 V in transformer coupled mode to obtain threshold at which no errors are observed when receiver is used with 15530 CMOS Manchester encoder-decoder.
- 3/ Measured across 70Ω load, 2.5 μs after parity bit mid-bit zero crossing of a 660 μs message.
- 4/ Measured across 70Ω load, variation of average peak amplitude.

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Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		4.82		.190
b		.51		.020
D		33.02		1.300
e	2.54 BSC		.100 BSC	
eA	12.70	17.78	.500	.700
E		20.06		.790
L		6.60		.260
S		2.23		.088
S1		2.20		.087

NOTES:

1. The U.S. government preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Lead identification for reference only.

FIGURE 1. Case outline.

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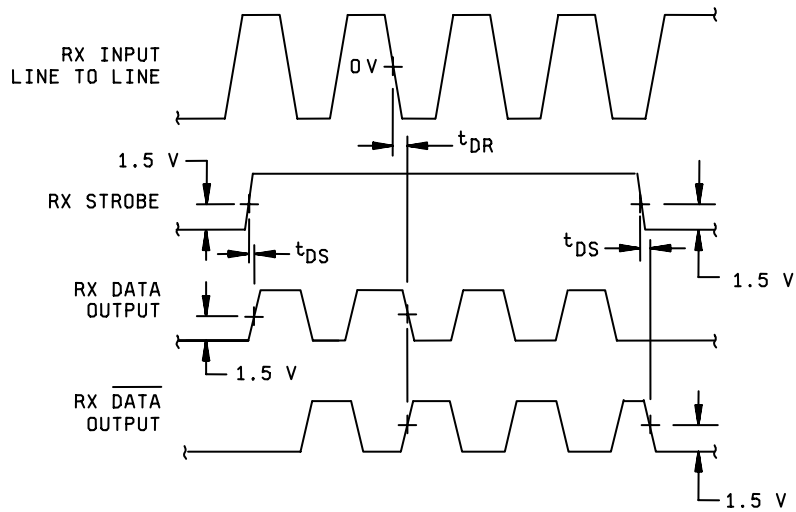
Device types	01 and 02
Case outline	X
Terminal number	Terminal symbol
1	TXDATAOUT
2	$\overline{\text{TXDATAOUT}}$
3	CASE
4	NO CONNECTION
5	NO CONNECTION
6	NO CONNECTION
7	RXLOGICOUT
8	$\overline{\text{RXDISABLE}}$
9	GND
10	$\overline{\text{RXLOGICOUT}}$
11	NO CONNECTION
12	NO CONNECTION
13	NO CONNECTION
14	NO CONNECTION
15	RXDATAIN
16	$\overline{\text{RXDATAIN}}$
17	NO CONNECTION
18	GND
19	NO CONNECTION
20	V <sub>CC</sub>
21	TXINHIBIT
22	TXDATAIN
23	$\overline{\text{TXDATAIN}}$
24	THERMAL OVERRIDE

NOTE: Pin 24 is a no connection if thermal override is not employed.

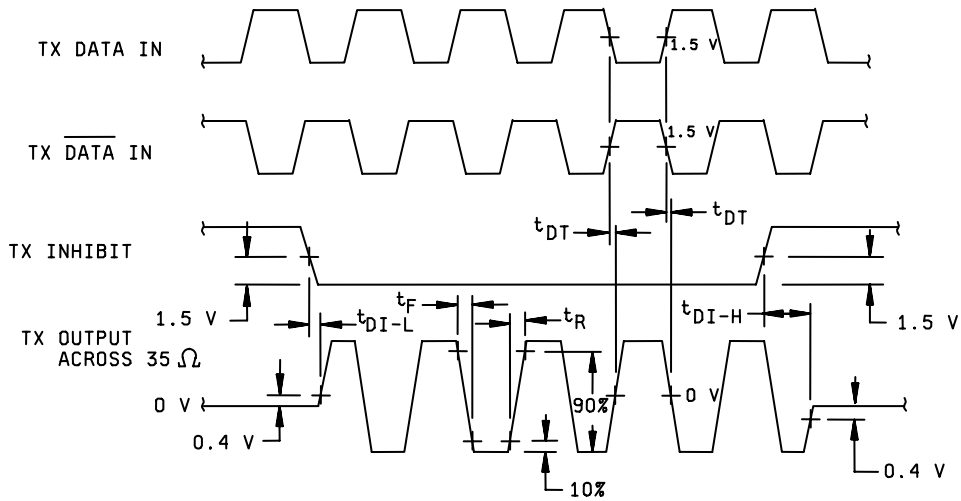
FIGURE 2. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b>  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-89799</b>
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RECEIVER TIMING



TRANSMITTER TIMING

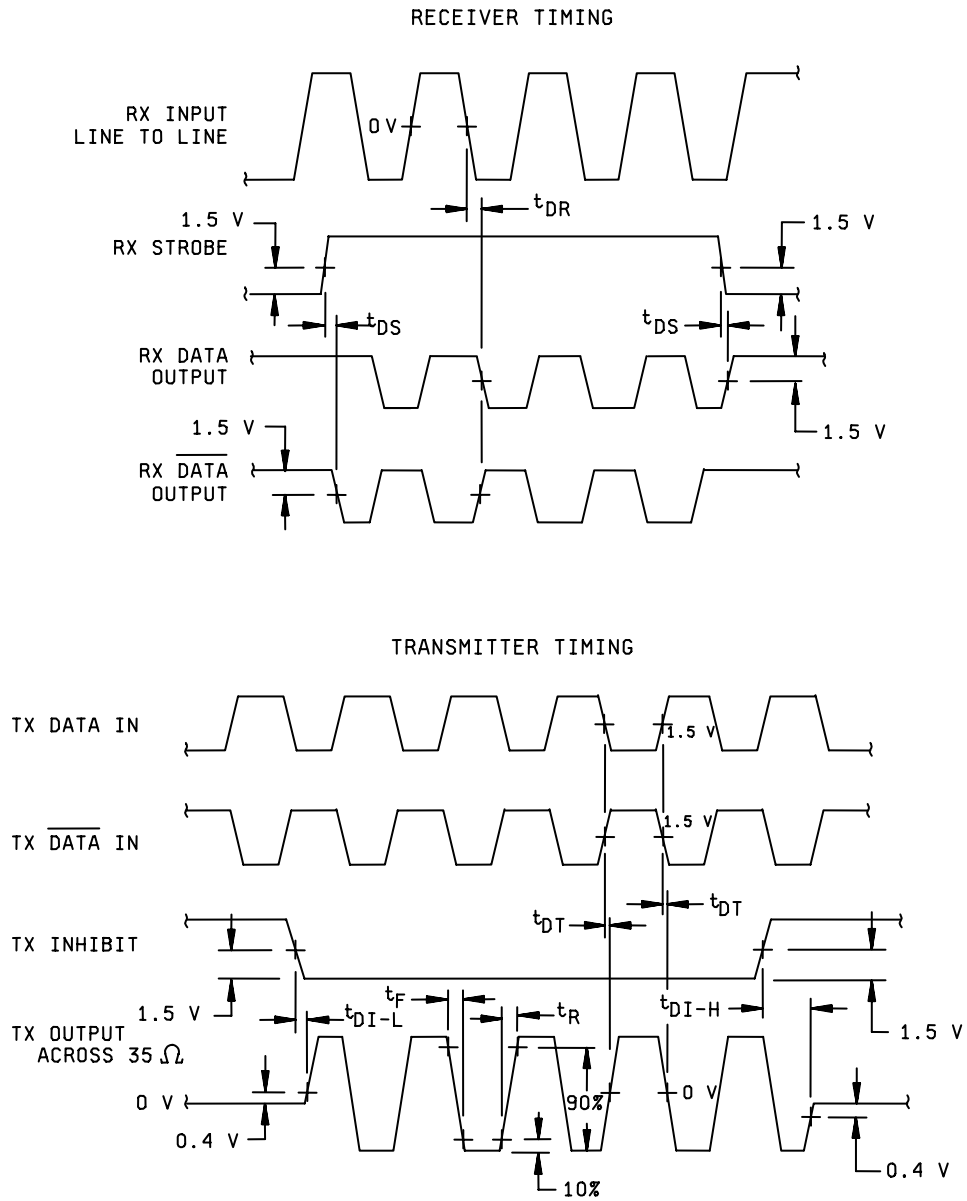


NOTE: Both inputs "TX DATA IN" and "TX DATA IN" must be in the same logic state during off times.

Device type 01

FIGURE 3. Timing waveform(s).

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Device type 02

FIGURE 3. Timing waveform(s) - Continued.

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TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	
Final electrical parameters	1*,2,3,4,5,6,9,10,11
Group A test requirements	1,2,3,4,5,6,9,10,11
Group C end-point electrical parameters	1,2,3
End-point electrical parameters for Radiation Hardness Assurance (RHA) devices	Not applicable

\* PDA applies to subgroup 1.

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
  - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.
  - (2) T<sub>A</sub> as specified in accordance with table I of method 1015 of MIL-STD-883.
- 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 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 7 and 8 shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

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4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test, method 1005 of MIL-STD-883.
  - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.
  - (2)  $T_A$  as specified in accordance with table I of method 1005 of MIL-STD-883.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

4.3.5 Radiation Hardness Assurance (RHA) inspection. RHA inspection is not currently applicable to this drawing.

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

## 6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

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 as specified in MIL-PRF-38534.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) when a system application requires configuration control and the applicable SMD. DSCC 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 microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-1081.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors listed in MIL-HDBK-103 and QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DSCC-VA and have agreed to this drawing.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 05-11-03

Approved sources of supply for SMD 5962-89799 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 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 DSCC-VA. This information bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534. DSCC maintains an online database of all current sources of supply at <http://www.dsccl.dla.mil/Programs/Smcr/>.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-8979901XA 5962-8979901XC	U4388 U4388	FC155391 FC155391
5962-8979902XA 5962-8979902XC	U4388 U4388	FC155392 FC155392

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the Vendor to determine its availability.
- 2/ 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

U4388

Vendor name and address

C-MAC Microcircuits Limited  
South Denes  
Great Yarmouth, Norfolk NR30 3PX  
England

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