

SN55140, SN55141, SN55142A, SN55143A SN75140, SN75141, SN75142A, SN75143A

Dual Line Receivers

Each of these devices consists of a dual single-ended line receiver with TTL-compatible strobes and outputs. The reference voltage (switching threshold) is applied externally and can be adjusted from 1.5 volts to 3.5 volts, making it possible to optimize noise immunity for a given system design. A 2.5-volt internal reference is available for use on the '142A and '143A. Due to their low input current (less than 100 microamperes), they are ideally suited for party-line (bus-organized) systems.

The '140 has a common reference voltage pin and a common strobe. The '141 is the same as the '140 except that the input stage is diode protected. Each receiver of the '142A has an individual reference voltage pin and an individual strobe. The '143A is the same as the '142A except that the input stage is diode protected. The internal reference voltage of the '142A and '143A can be externally adjusted with a single resistor from 1.5 volts to 3.5 volts.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

INTERFACE CIRCUITS

TYPES SN55140, SN55141, SN55142A, SN55143A, SN75140, SN75141, SN75142A, SN75143A DUAL LINE RECEIVERS

BULLETIN NO. DL-S 12456, JANUARY 1977—REVISED JULY 1979

features common to all eight types

- Single 5-V Supply
- ± 100 mV Sensitivity
- For Application As:
Single-Ended Line Receiver
Gated Oscillator
Level Comparator
- Adjustable Reference Voltage
- TTL Outputs
- TTL-Compatible Strobe
- Designed for Party-Line
(Data-Bus) Applications

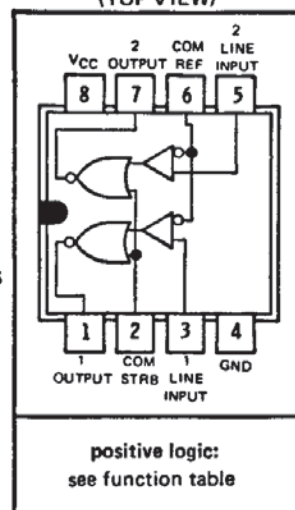
features of '140 and '141

- Common Reference Pin
- Common Strobe
- '141 Has Diode-Protected
Input Stage for Power-Off
Condition

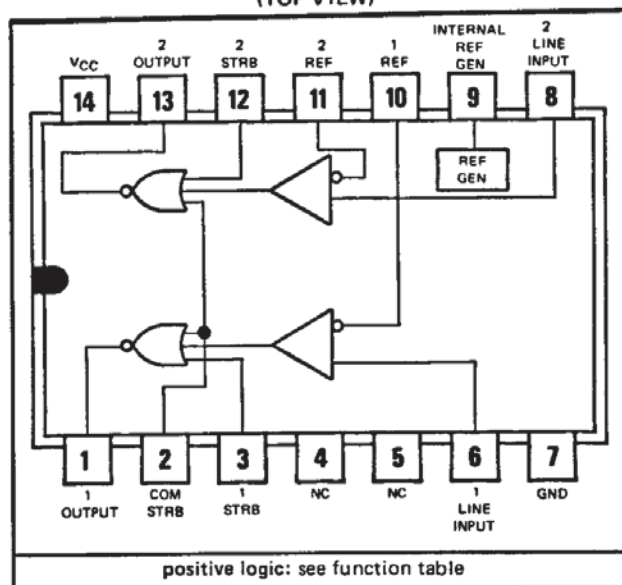
features of '142A and '143A

- Individual Reference Pins
- Common and Individual Strobes
- Internal 2.5-Volt Reference
Available
- '143A Has Diode-Protected
Input Stage for Power-Off
Condition

SN55140, SN55141 ...
JG DUAL-IN-LINE PACKAGE
SN75140, SN75141 ...
JG OR P DUAL-IN-LINE PACKAGE
(TOP VIEW)



SN55142A, SN55143A ... J DUAL-IN-LINE PACKAGE
SN75142A, SN75143A ... J OR N DUAL-IN-LINE PACKAGE
(TOP VIEW)



NC—No internal connection

Pin 2, if unused, must be grounded when replacing '142 or '143 with '142A or '143A devices.

description

Each of these devices consists of a dual single-ended line receiver with TTL-compatible strobes and outputs. The reference voltage (switching threshold) is applied externally and can be adjusted from 1.5 volts to 3.5 volts, making it possible to optimize noise immunity for a given system design. A 2.5-volt internal reference is available for use on the '142A and '143A. Due to their low input current (less than 100 microamperes), they are ideally suited for party-line (bus-organized) systems.

The '140 has a common reference voltage pin and a common strobe. The '141 is the same as the '140 except that the input stage is diode protected. Each receiver of the '142A has an individual reference voltage pin and an individual strobe. The '143A is the same as the '142A except that the input stage is diode protected. The internal reference voltage of the '142A and '143A can be externally adjusted with a single resistor from 1.5 volts to 3.5 volts.

'140, '141 FUNCTION TABLE
(EACH RECEIVER)

LINE INPUT	STROBE	OUTPUT
$< V_{ref} - 100$ mV	L	H
$> V_{ref} + 100$ mV	X	L
X	H	L

H = high level, L = low level, X = irrelevant

'142A, '143A FUNCTION TABLE
(EACH RECEIVER)

LINE INPUT	INDIVIDUAL STROBE	COMMON STROBE	OUTPUT
$< V_{REF} - 100$ mV	L	L	H
$> V_{REF} + 100$ mV	X	X	L
X	H	X	L
X	X	H	L

H = high level, L = low level, X = irrelevant

TYPES SN55140, SN55141, SN55142A, SN55143A, SN75140, SN75141, SN75142A, SN75143A DUAL LINE RECEIVERS

electrical characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5\text{ V} \pm 10\%$, $V_{ref} = 1.5\text{ V}$ to 3.5 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$V_{IH}(L)$	High-level line input voltage		$V_{ref} + 100$			mV
$V_{IL}(L)$	Low-level line input voltage			$V_{ref} - 100$		mV
$V_{IH}(S)$	High-level strobe input voltage		2			V
$V_{IL}(S)$	Low-level strobe input voltage			0.8		V
V_{OH}	High-level output voltage	$V_{IL}(L) = V_{ref} - 100\text{ mV}$, $V_{IL}(S) = 0.8\text{ V}$, $I_{OH} = -400\text{ }\mu\text{A}$	2.4			V
V_{OL}	Low-level output voltage	$V_{IH}(L) = V_{ref} + 100\text{ mV}$, $V_{IL}(S) = 0.8\text{ V}$, $I_{OL} = 16\text{ mA}$			0.4	V
		$V_{IL}(L) = V_{ref} - 100\text{ mV}$, $V_{IH}(S) = 2\text{ V}$, $I_{OL} = 16\text{ mA}$			0.4	
$V_{IK}(S)$	Strobe input clamp voltage	$I_I(S) = -12\text{ mA}$			-1.5	V
$I_I(S)$	Strobe input current at maximum input voltage	Strobe	$V_I(S) = 5.5\text{ V}$		1	mA
		Com strb			2	
I_{IH}	High-level input current	Strobe	$V_I(S) = 2.4\text{ V}$		40	μA
		Com strb			80	
		Line input	$V_{IL}(L) = 3.5\text{ V}$, $V_{ref} = 1.5\text{ V}$		35	
		Reference	$V_{IL}(L) = 0\text{ V}$, $V_{ref} = 3.5\text{ V}$		35	
		Com ref			70	
I_{IL}	Low-level input current	Strobe	$V_I(S) = 0.4\text{ V}$		-1.6	mA
		Com strb			-3.2	
		Line input	$V_{IL}(L) = 0\text{ V}$, $V_{ref} = 1.5\text{ V}$		-10	μA
		Reference	$V_{IL}(L) = 1.5\text{ V}$, $V_{ref} = 0\text{ V}$		-10	
		Com ref			-20	
V_{gen}	Internal reference generator voltage	'142A, '143A	$V_{CC} = 5\text{ V}$, $I_{gen} = 0$	2.3	2.5	V
			$V_{CC} = 5\text{ V}$, $I_{gen} = -70\text{ }\mu\text{A}$		2.4	
I_{OS}	Short-circuit output current‡	$V_{CC} = 5.5\text{ V}$	-15		-55	mA
I_{CCH}	Supply current, output high	$V_I(S) = 0\text{ V}$, $V_{IL}(L) = V_{ref} - 100\text{ mV}$		18	30	mA
I_{CCL}	Supply current, output low	$V_I(S) = 0\text{ V}$, $V_{IL}(L) = V_{ref} + 100\text{ mV}$		20	35	mA

†All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

‡Only one output should be shorted at a time.

switching characteristics, $V_{CC} = 5\text{ V}$, $V_{ref} = 2.5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}(L)$	Propagation delay time, low-to-high-level output from line input	$C_L = 15\text{ pF}$, $R_L = 400\text{ }\Omega$, See Figure 1		22	35	ns
$t_{PHL}(L)$	Propagation delay time, high-to-low-level output from line input			22	30	
$t_{PLH}(S)$	Propagation delay time, low-to-high-level output from strobe input			12	22	ns
$t_{PHL}(S)$	Propagation delay time, high-to-low-level output from strobe input			8	15	

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PARAMETER MEASUREMENT INFORMATION

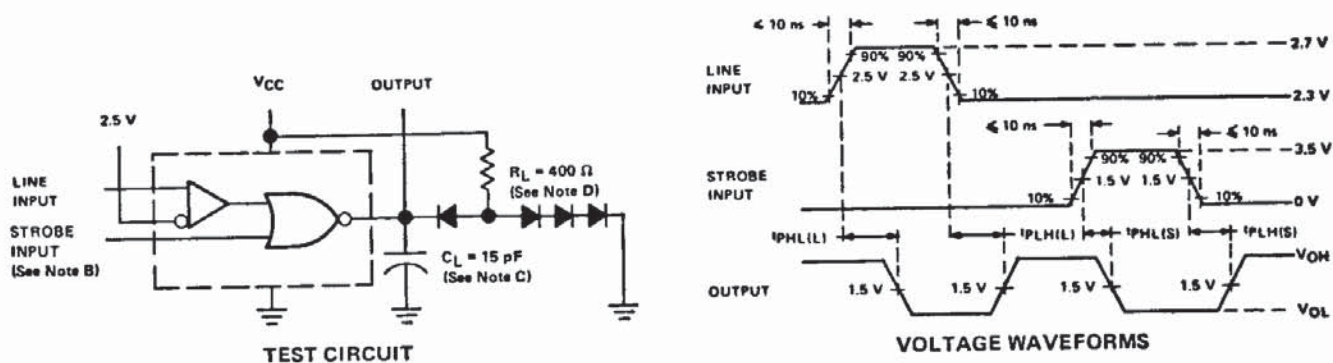


FIGURE 1

- NOTES: A. Input pulses are supplied by generators having the following characteristics: PRR = 1 MHz, duty cycle $\leq 50\%$, $Z_{out} \approx 50 \Omega$.
B. Unused strobe(s) is (are) to be grounded.
C. C_L includes probe and jig capacitance.
D. All diodes are 1N3064.

TYPICAL CHARACTERISTICS

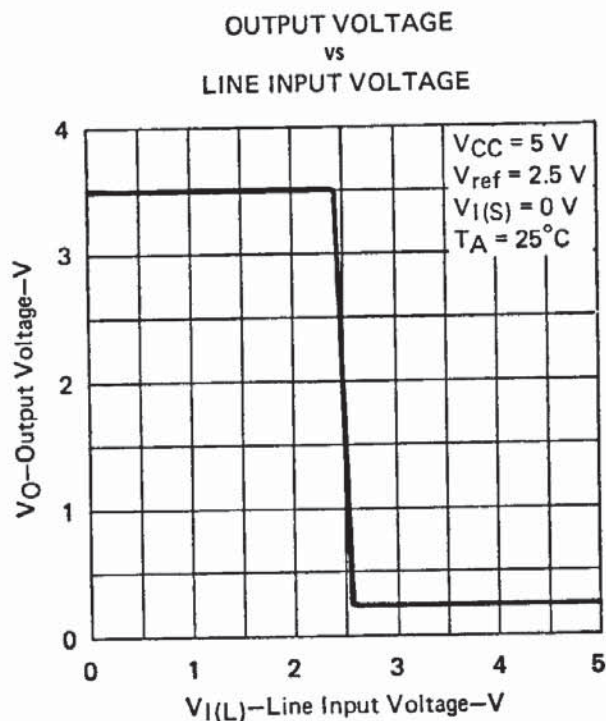
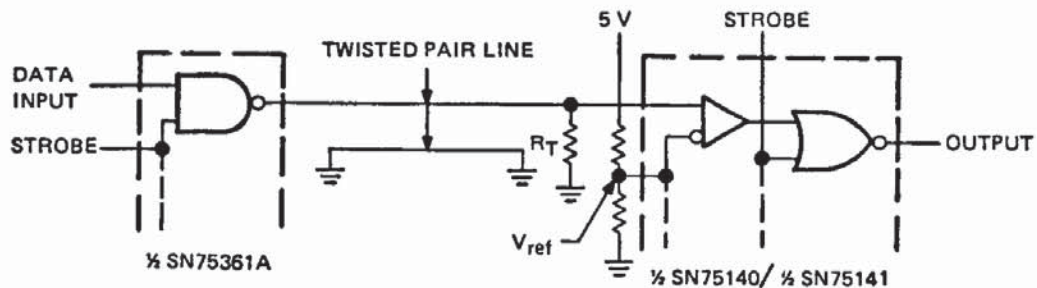


FIGURE 2

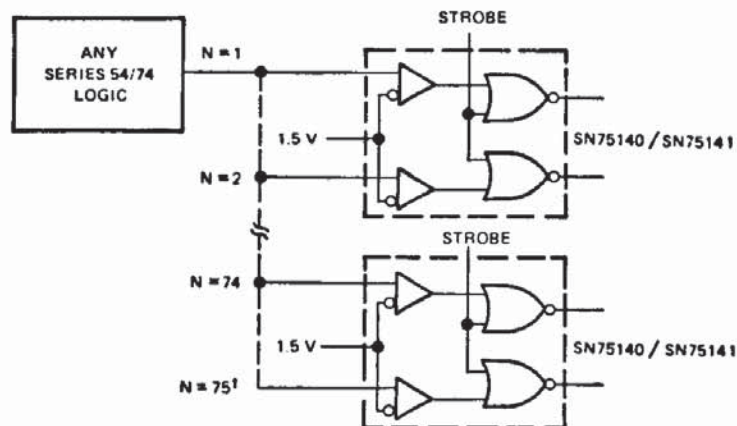
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TYPICAL APPLICATION DATA

line receiver

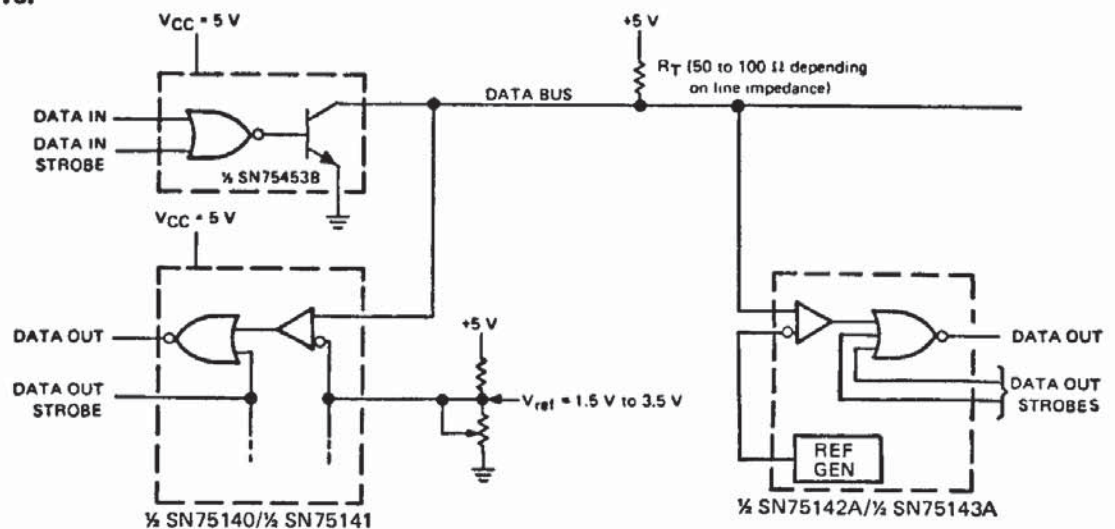


high fan-out from standard TTL gate



† Although most Series 54/74 circuits have a guaranteed 2.4-V output at 400 μ A, they are typically capable of maintaining a 2.4-V output level under a load of 7.5 mA.

dual bus transceiver

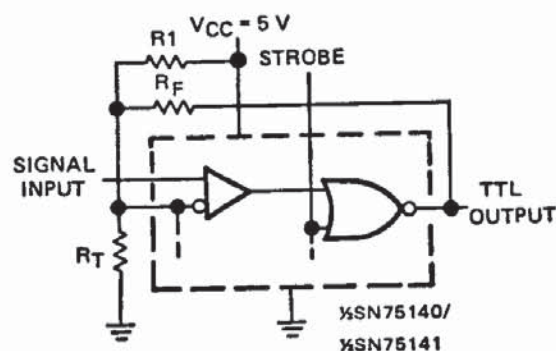


Using this arrangement, as many as 100 transceivers can be connected to a single data bus. The adjustable reference voltage feature allows the noise margin to be optimized for a given system. The complete dual bus transceiver (SN75453B driver and SN75140 receiver) can be assembled in approximately the same space required by a single 16-pin package, and only one power supply is required (+5 V). Data In and Data Out terminals are TTL compatible.

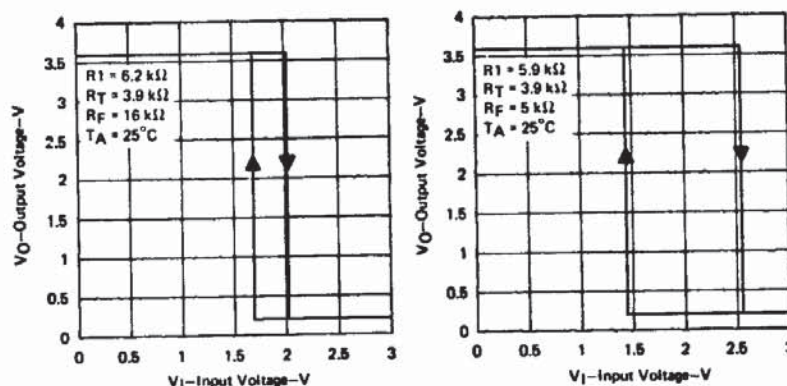
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TYPICAL APPLICATION DATA

Schmitt trigger

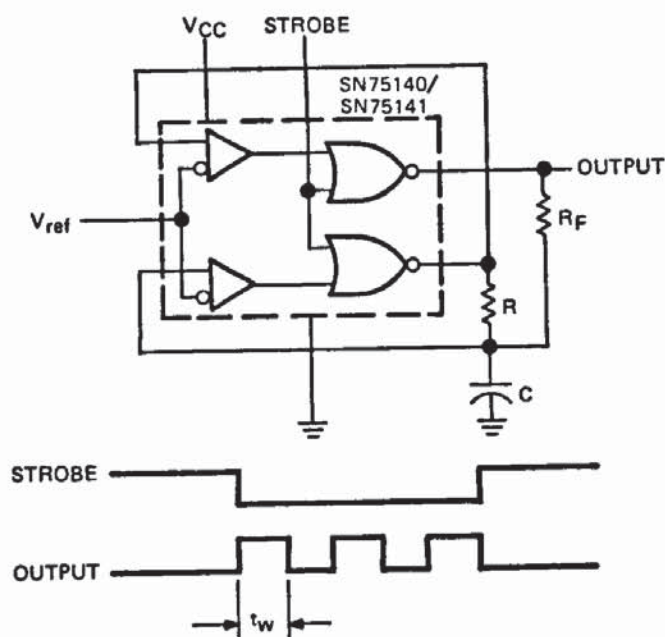


EXAMPLES OF TRANSFER CHARACTERISTICS

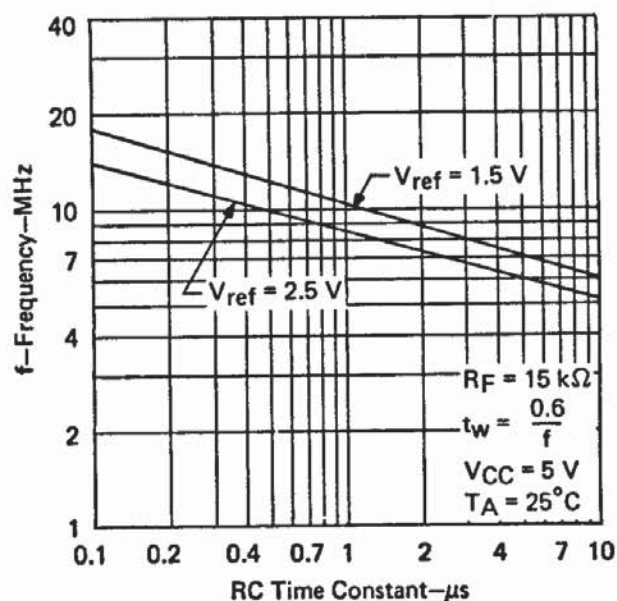


Slowly changing input levels from data lines, optical detectors, and other types of transducers may be converted to standard TTL signals with this Schmitt trigger circuit. R_1 , R_F , and R_T may be adjusted for the desired hysteresis and trigger levels.

gated oscillator



OSCILLATOR FREQUENCY vs RC TIME CONSTANT



TYPICAL APPLICATION DATA

The diagram illustrates a two-level detector circuit. It features two comparators, SN75142A or SN75143A, enclosed in a dashed box. The top comparator's non-inverting input (+) is connected to a voltage divider consisting of resistors R1 and R2, with the midpoint labeled V1. Its inverting input (-) is connected to a common strobe line. The output of this comparator is the LEVEL-1 DETECTOR OUTPUT. The bottom comparator's non-inverting input (+) is connected to a SIGNAL INPUT. Its inverting input (-) is connected to a reference voltage V2, which is provided by a REF GEN block. The output of this comparator is the LEVEL-2 DETECTOR OUTPUT. Both comparators are also connected to a common strobe line, which is labeled COMMON STROBE. The circuit is powered by VCC and ground.

LEVEL-1
DETECTOR
OUTPUT
VOLTAGE

$V_1 = \frac{V_{CC} R_2}{R_1 + R_2}$

SIGNAL INPUT VOLTAGE

