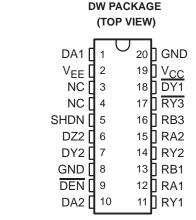
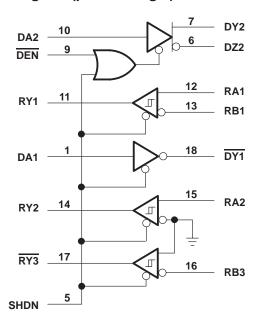
- Supports a 9-Pin GeoPort™ Host Interface Standard for the Intelligent Network Port
- Designed to Operate up to 4-Mbit/s Full **Duplex**
- ±5 V Supply Operation
- **Provides 6 kV ESD Protection**
- **Has Driver Short-Circuit Protection**
- Includes Failsafe Mechanism for Open Inputs
- Is Backward Compatible with AppleTalk™ and LocalTalk™
- **Combines Multiple Components into a** Single Chip Solution
- Complements the SN75LBC772 9-Pin **GeoPort Peripheral (DCE) Interface Device**
- Uses LinBiCMOS™ Process Technology

description

The SN75LBC771 is a low-power LinBiCMOS™ device that incorporates the drivers and receivers for a 9-pin GeoPort host interface. GeoPort combines hybrid EIA/TIA-422-B and EIA/ TIA-423-B drivers and receivers to transmit data up to four-Mbit/s full duplex. GeoPort is a serial communications standard that is intended to replace the RS-232, AppleTalk, and printer ports all in one connector in addition to providing real-time data transfer capability. SN75LBC771 provides point-to-point connections between GeoPort-compatible devices with data transmission rates up to 4-Mbit/s full duplex featuring a hot-plug capability. Applications include connection to telephone, ISDN, digital sound and imaging, fax-data modems, and other traditional serial and parallel connections. The GeoPort is backwardly compatible to both LocalTalk and AppleTalk.



logic diagram (positive logic)



While the SN75LBC771 is powered off (V_{CC} and $V_{EE} = 0$), the outputs are in a high-impedance state. Also, when the shutdown (SHDN) terminal is high, all outputs go into a high-impedance state. A logic high on the driver enable (DEN) terminal places the outputs of the differential driver into a high-impedance state. All drivers and receivers have fail-safe mechanisms that ensure a high output state when the inputs are left open.

The SN75LBC771 is characterized for operation over the 0°C to 70°C temperature range.



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FUNCTION TABLES†

	SINGLE-ENDED DRIVER									
INPUT (DA1)	ENABLE (SHDN)	OUTPUT (DY1)								
H L OPEN X X	L L H OPEN	L H L Z Z								

	DIFFERENTIAL DRIVER										
INPUT (DA2)	ENA (SHDN)	BLE	OUT	PUT (DZ2)							
(=1:=/	(SHDN)	(DEN)	(012)	(DZZ)							
H	L	L	Н	L							
L	L	L	L	Н							
OPEN	L	L	Н	L							
Х	Н	Χ	Z	Z							
Х	OPEN	Χ	Z	Z							
Х	Х	Н	Z	Z							
Х	Х	OPEN	Z	Z							

SINGLED-ENDED RECEIVER									
INPUT (RA2, RA3)	ENABLE (SHDN)	OUTPUT (RY2) (RY3)							
Н	L	Н	L						
L	L	L	Н						
OPEN	L	Н	Н						
SHORT‡	L	?	?						
X	Н	Z	Z						
Х	OPEN	Z	Z						

	DIFFERENTIAL RECEIVER								
	INPUT ENABLE RA1) (RB1) (SHDN)		OUTPUT (RY1)						
Н	L	L	Н						
L	Н	L	L						
OP	PEN	L	Н						
SHC	PRT‡	L	?						
Х	Χ	Н	Z						
Х	Χ	OPEN	Z						

[†] H = high level, L = low level, X = irrelevant, ? = indeterminate, Z = high impedance (off)

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)§

Positive supply voltage range, V _{CC} (see Note 1)	
Negative supply voltage range, VEE (see Note 1)	–7 to 0.5 V
Receiver input voltage range (RA, RB)	
· · · · · · · · · · · · · · · · · · ·	
Receiver differential input voltage range, V _{ID}	
Receiver output voltage range (RY)	
Driver output voltage range (Power Off) (DY1, DY2, DZ2)	–15 V to 15 V
Driver output voltage range (Power On) (DY1, DY2, DZ2)	
Driver input voltage range (DA, SHDN, DEN)	
Electrostatic Discharge (see Note 2)	00
(All pins) Class 3, A	6 kV
(All pins) Class 3, B	
Continuous total power dissipation	
Operating free-air temperature range, T _A	0°C to 70°C
Storage temperature range, T _{stg}	
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C
Load temperature 1,0 mm (1/10 mem edge for 10 edgemes 1.1.1.1.1.	

[§] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. All voltage values are with respect to network ground terminal unless otherwise noted.
 - 2. This rating is per MIL-STD-883C, Method 3015.7.



 $^{^{\}ddagger}$ -0.2 V < V_{ID} < 0.2 V

DISSIPATION RATING TABLE

PACKAGE	$T_{\mbox{\scriptsize A}} \le 25^{\circ}\mbox{\scriptsize C}$ POWER RATING	DERATING FACTOR ABOVE T _A = 25°C	T _A = 70°C POWER RATING
DW	1125 mW	9.0 mW/°C	720 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Positive supply voltage, V _{CC}	4.75	5	5.25	V
Negative supply voltage, VEE	-5.25	-5	-4.75	V
High-level input voltage, VIH (DA, SHDN, DEN)	2			V
Low-level input voltage, V _{IL} (DA, SHDN, DEN)			0.8	V
Receiver common-mode input voltage, V _{IC}	-7		7	V
Receiver differential input voltage, V _{ID}	-12		12	V
Operating free-air temperature, T _A	0		70	°C

driver electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

	PARAMETER		TEST CON	DITIONS	MIN	TYP	MAX	UNIT
V	High lovel output voltage		R _L = 12 kΩ		3.6	4.5		V
Vон	High-level output voltage	Single-ended,	R _L = 120 Ω		2	3.6		V
\/a.	Low lovel output voltage	See Figure 1	R _L = 12 kΩ			-4.5	-3.6	V
VOL	Low-level output voltage		R _L = 120 Ω			-3.6	-2	V
IVODI	Magnitude of differential output	t voltage	R _L = 120 Ω,	See Figure 2	4			V
$\Delta V_{OD} $	Change in differential voltage	magnitude					250	mV
Voc	Common-mode output voltage	;			-2		2	V
l∆Voc(ss)l	Magnitude of change, common steady-state output voltage	agnitude of change, common-mode eady-state output voltage		See Figure 3			200	mV
ΔVOC(PP)	Magnitude of change, common peak-to-peak output voltage	n-mode		Ĭ		700		mV
Icc	Positive supply current			Noteed		4	10	mA
I _{EE}	Negative supply current		$SHDN = \overline{DEN} = 0 \text{ V},$	No Load		-2	-5	mA
Icc	Positive supply current		OURN BEN SV	Noload			100	μΑ
IEE	Negative supply current		SHDN = DEN = 5 V,	No Load			-100	μΑ
loz	High-impedance output curren	t	$V_{CC} = 0 \text{ or } 5 \text{ V},$	-10 ≤ V _O ≤ 10 V			±100	μΑ
los	Short-circuit output current		V _{CC} = 5.25 V, See Note 3	$-5 \text{ V} \le \text{V}_{\text{O}} \le 5 \text{ V},$		±170	±450	mA

NOTE 3: Not more than one output should be shorted at one time.

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driver switching characteristics over operating free-air temperature range

	PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
tPHL	Propagation delay time, high-to-low level output				42	75	ns
^t PLH	Propagation delay time, low-to-high level output				41	75	ns
tPZL	Driver output enable time to low-level output				25	100	μs
^t PZH	Driver output enable time to high-level output	SHDN	Single ended,		25	100	μs
tPLZ	Driver output disable time from low-level output	SUDIN	See Figure 4		28	100	ns
tPHZ	Driver output disable time from high-level output	7			37	100	ns
t _r	Rise time		1	10	25	75	ns
t _f	Fall time		1	10	23	75	ns
tPHL	Propagation delay time, high-to-low level output				40	75	ns
tPLH	Propagation delay time, low-to-high level output		1		42	75	ns
4	Driver cutout enable time to level evel cutout	SHDN			25	100	μs
tPZL	Driver output enable time to low-level output	DEN]		29	150	ns
4	Driver cutout enable time to high level cutout	SHDN			25	100	μs
^t PZH	Driver output enable time to high-level output	DEN	Differential,		35	150	ns
4	Driver cutout disable time from level cutout	SHDN	See Figure 5		28	100	ns
^t PLZ	Driver output disable time from low-level output	DEN]		34	100	ns
4	Driver cuteut dischie time from high level cuteut	SHDN	1		37	100	ns
tPHZ	Driver output disable time from high-level output	DEN			34	100	ns
t _r	Rise time]	10	27	75	ns
t _f	Fall time		<u> </u>	10	26	75	ns
tSK(p)	Pulse skew, tpLH - tpHL					22	ns

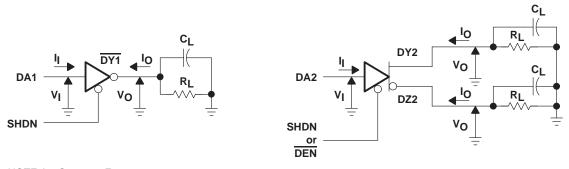
receiver electrical characteristics over recommended operating conditions (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT	
V _{IT+}	Positive-going input threshold voltage					200	mV
V _{IT} _	Negative-going input threshold voltage	See Figure 6		-200			mV
V _{hys}	Differential input voltage hysteresis (V _{IT+} – V _{IT-})				50		mV
VOH	High-level output voltage (see Note 4)	$V_{IC} = 0$, $I_{OH} = -2 \text{ r}$ See Figure 6	mA,	2	4.5		V
VOL	Low-level output voltage	$V_{IC} = 0$, $I_{OL} = 2 \text{ m}$. See Figure 6	Α,		0.4	0.8	V
la a	Chart aire it autout aurent	VO = 0			-45	-85	mA
los	Short-circuit output current	V _O = 5.25 V			45	85	mA
R _{IN}	Input resistance	$V_{CC} = 0 \text{ or } 5.25 \text{ V}, -12 \text{ V} \le \text{V}_{I}$	≤12 V	6	30		kΩ

NOTE 4: If the inputs are left unconnected, receivers one and two interpret this as a high-level input and receiver three interprets this as a low-level input so that all outputs are at the high level.

receiver switching characteristics over recommended conditions (unless otherwise noted)

	PARAMETER		TEST CO	NDITIONS	MIN	TYP	MAX	UNIT
tPHL	Propagation delay time, high-to-low level output					30	75	ns
tPLH	Propagation delay time, low-to-high level output]			30	75	ns
t _r	Rise time		$R_L = 2 kΩ$, See Figure 6	$C_L = 15 pF$,		15	30	ns
t _f	Fall time		Occ riguic o			15	30	ns
tSK(P)	Pulse skew tpLH-tpHL						20	ns
tPZL	Receiver output enable time to low-level output					35	100	ns
tPZH	Receiver output enable time to high-level output					35	100	ns
tPLZ	Receiver output disable time from low-level output	Differential				20	100	ns
^t PHZ	Receiver output disable time from high-level output]		Caa Firuma 7		20	100	ns
tPZL	Receiver output enable time to low-level output		$C_L = 50 \text{ pF},$	See Figure 7		12	25	ns
^t PZH	Receiver output enable time to high-level output]				12	25	μs
t _{PLZ}	Receiver output disable time from low-level output	Single-ended				25	100	μs
^t PHZ	Receiver output disable time from high-level output					125	400	ns



NOTE A: C_L = 50 pF

Figure 1. Single-Ended Driver DC Parameter Test Circuits

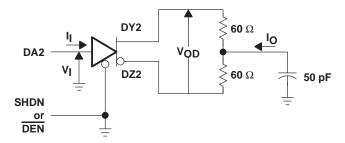
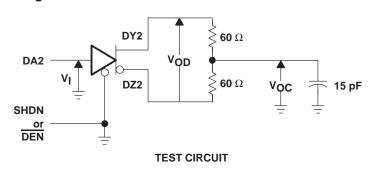
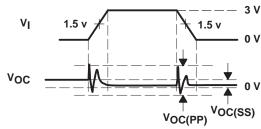


Figure 2. Differential Driver DC Parameter Test Circuit



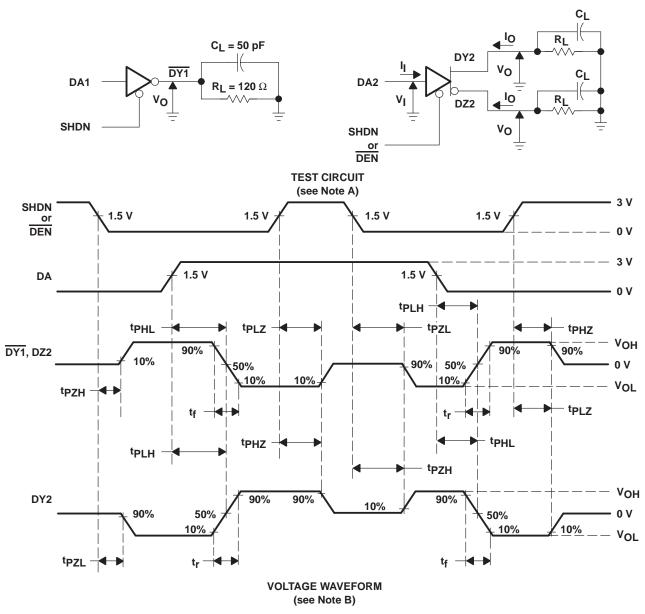


VOLTAGE WAVEFORM

NOTE A: Measured 3dB Bandwidth = 300 MHz

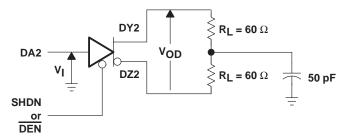
Figure 3. Differential Driver Common-Mode Output Voltage Test Circuit



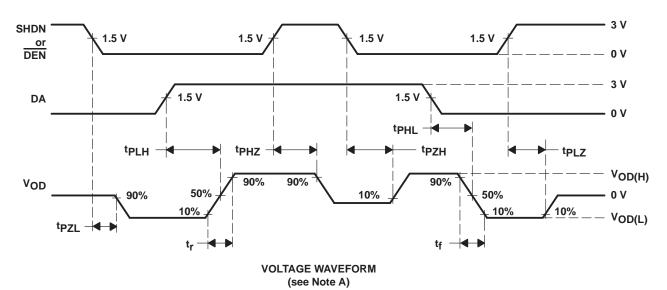


NOTES: A. C_L = 50 pF, R_L = 120 Ω B. The input waveform t_r , $t_f \le$ 10 ns.

Figure 4. Single-Ended Driver Propagation and Transition Times Test Circuits and Waveform

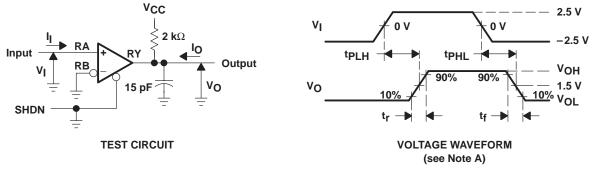


TEST CIRCUIT



NOTE A: For the input waveform t_f , $t_f < = 10$ ns

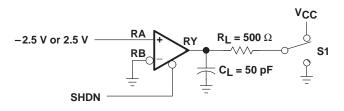
Figure 5. Differential Driver Propagation and Transition Times Test Circuit and Waveforms



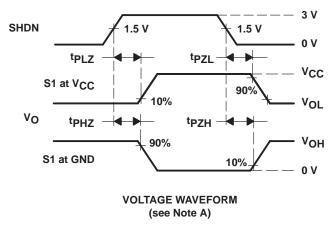
NOTE A: For the input waveform t_r , $t_f < = 10$ ns

Figure 6. Receiver Propagation and Transition Times Test Circuit and Waveform





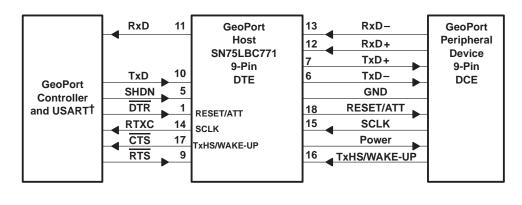
TEST CIRCUIT

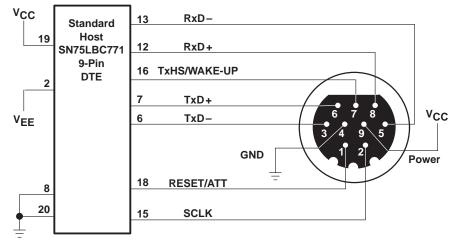


NOTE A: For the input waveform t_r , $t_f < = 10$ ns

Figure 7. Receiver Enable and Disable Test Circuit and Waveforms

APPLICATION INFORMATION





 $[\]dagger$ USART = universal synchronous asynchronous receiver transmitter

Figure 8. GeoPort 9-Pin DTE Connection Application

generator characteristics

PARAMETER		TEST O	TEST CONDITIONS		232/V.28		423/V.10		562	
	FARAMETER		CNDITIONS	MIN	MAX	MIN	MAX	MIN	MAX	UNIT
		Open circuit			25	4	6		13.2	V
IVOI	Output voltage magnitude	$3 \text{ k}\Omega \leq \text{RL} \leq 7$	7 kΩ	5	15	NA		3.7		V
		R _L = 450 Ω		NA		3.6		NA		V
los	Short-circuit output current	V _O = 0			100		150		60	mA
R(OFF)	Power-off source resistance	$V_{CC} = 0$,	VO < 2 V	300		NA		300		Ω
I _{O(OFF)}	Power-off output current	$V_{CC} = 0$,	VO < 6 V	NA			±100	NA		μΑ
SR	Output voltage slew rate				30	NA		4	30	V/μs
		±3.3 V to ±3.3	3 V	NA		NA		0.22	2.1	μs
t _t	Output transition time	±3 V to ±3 V			0.04	NA		NA		ui‡
		10% to 90%	·	NA			0.3	NA		ui‡
VO(RING)	Output voltage ring		·	NA			10%		5%	·

[‡] ui is the unit interval and is the inverse of the signaling rate (bit time).



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APPLICATION INFORMATION

receiver characteristics

PARAMETER		TEST CONDITIONS	232/V.28		423/V.10		562		UNIT
		TEST CONDITIONS	MIN	MAX	MIN	MAX	MIN	MAX	UNII
V _I	Input voltage			25		10		25	V
VIT	Input voltage threshold	V _I < 15 V	-3	3	NA		-3	3	V
		V _I < 10 V	NA		-0.2	0.2	NA		V
R _I	Input resistance	3 V < V _I < 15 V	3	7	NA		3	7	kΩ
		V _I < 10 V	NA		4		NA		kΩ

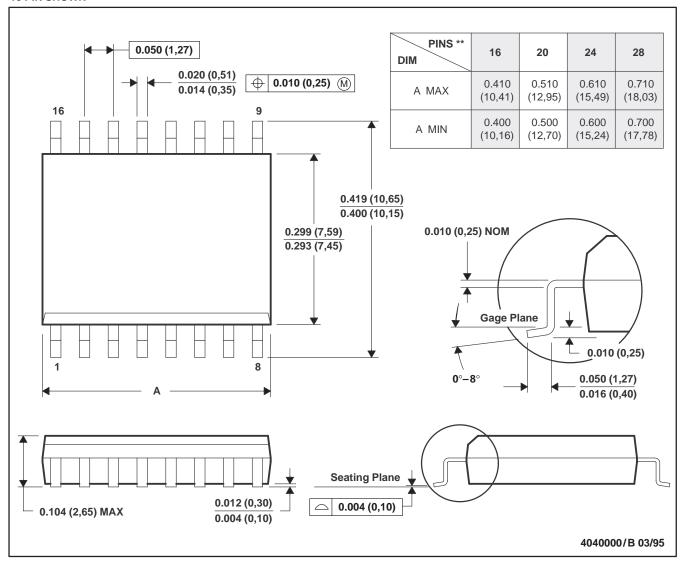
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MECHANICAL INFORMATION

DW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

16 PIN SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - D. Falls within JEDEC MS-013





PACKAGE OPTION ADDENDUM

8-Jan-2007

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins P	ackage Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN75LBC771DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75LBC771DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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