

TL851 SONAR RANGING CONTROL

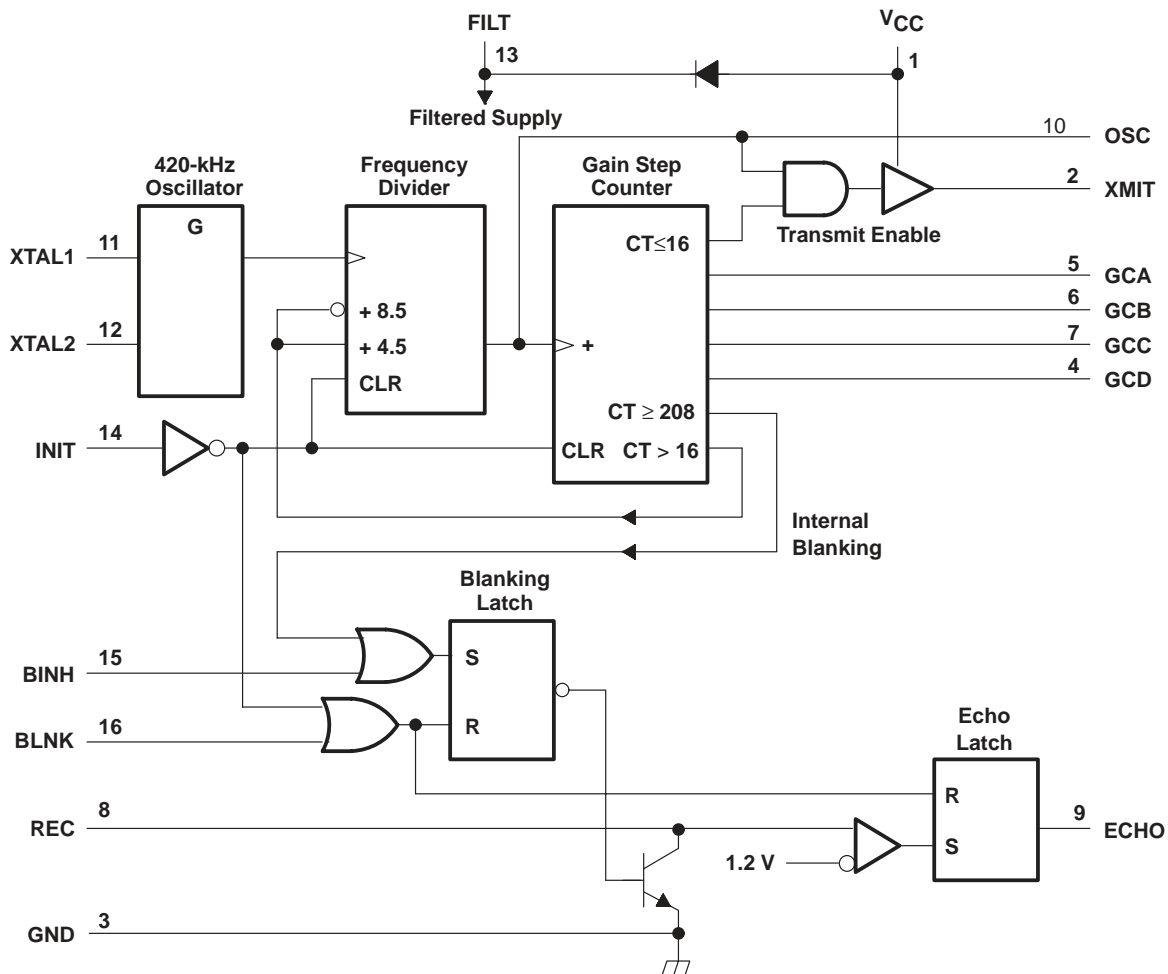
SLSS004 – SEPTEMBER 1983 – REVISED MARCH 1988

GAIN CONTROL OUTPUT TABLE

STEP NUMBER	GCD	GCC	GCB	GCA	TIME (ms) FROM INITIATE ^{††}
0	L	L	L	L	2.38 ms
1	L	L	L	H	5.12 ms
2	L	L	L	L	7.87 ms
3	L	L	H	H	10.61 ms
4	L	H	L	L	13.35 ms
5	L	H	L	H	16.09 ms
6	L	H	H	L	18.84 ms
7	L	H	H	H	21.58 ms
8	H	L	L	L	27.07 ms
9	H	L	L	H	32.55 ms
10	H	L	H	L	38.04 ms
11	H	L	H	H	INIT ↓

^{††}This is the time to the end of the indicated step and assumes a nominal 420-kHz ceramic resonator.

functional block diagram



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

Voltage range at any pin with respect to GND	– 0.5 V to 7 V
Voltage range at any pin with respect to V_{CC}	– 7 V to 0.5 V
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 1)	1150 mW
Operating free-air temperature range	0°C to 40°C
Storage temperature range	– 65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

† Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at these or any other conditions beyond those indicated in the recommended operating conditions section of this specification is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: For operation above 25°C, derate linearly at the rate of 9.2 mW/°C.

recommended operating conditions

		MIN	MAX	UNIT
Supply voltage, V_{CC}		4.5	6.8	V
High-level input voltage, V_{IH}	BLNK, BINH, INIT	2.1		V
Low-level input voltage, V_{IL}	BLNK, BINH, INIT		0.6	V
Delay time, power up to INIT high		5		ms
Operating free-air temperature, T_A		0	40	°C

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature

PARAMETER		TEST CONDITIONS	MIN	TYP‡	MAX	UNIT
Input current	BLNK, BINH, INIT	$V_I = 2.1$ V			1	mA
High-level output current, I_{OH}	ECHO, OSC, GCA, GCB, GCC, GCD	$V_{OH} = 5.5$ V			100	µA
Low-level output current, I_{OL}	ECHO, OSC, GCA, GCB, GCC, GCD	$I_{OL} = 1.6$ mA			0.4	V
On-state output current	SMIT output	$V_O = 1$ V			–140	mA
Internal blanking interval	REC input				2.38§	ms
Frequency during 16-pulse transmit period	OSC output				49.4§	kHz
	XMIT output				49.4§	
Frequency after 16-pulse transmit period	OSC output				93.3§	kHz
	XMIT output				0	
Supply current, I_{CC}	During transmit period				260	mA
	After transmit period				55	

‡ Typical values are at $V_{CC} = 5$ V and $T_A = 25$ °C.

§ These typical values apply for a 420-kHz ceramic resonator.

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schematics of inputs and outputs

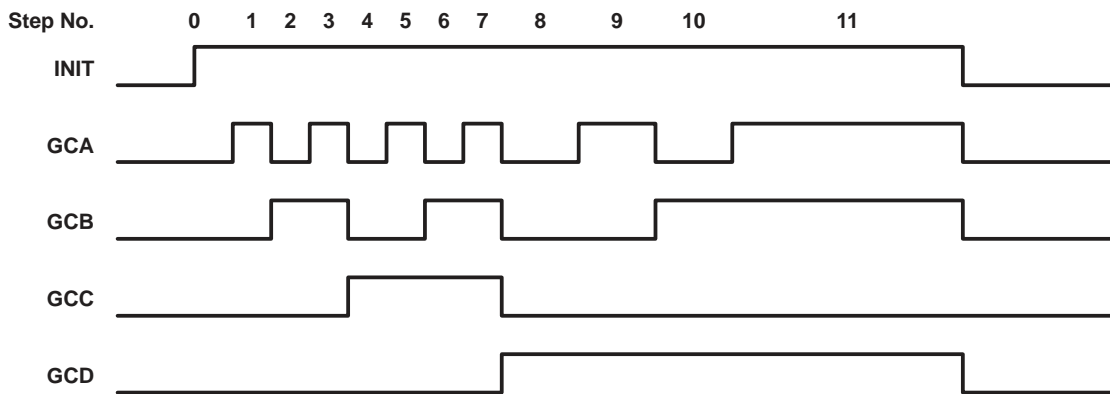
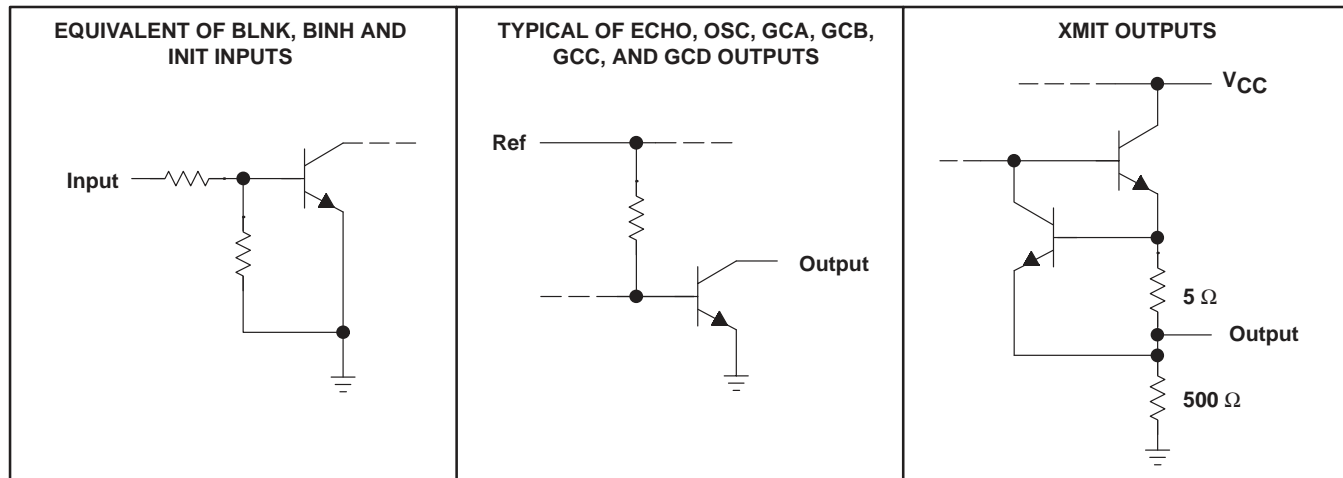


Figure 1. Digital Gain Control Waveforms

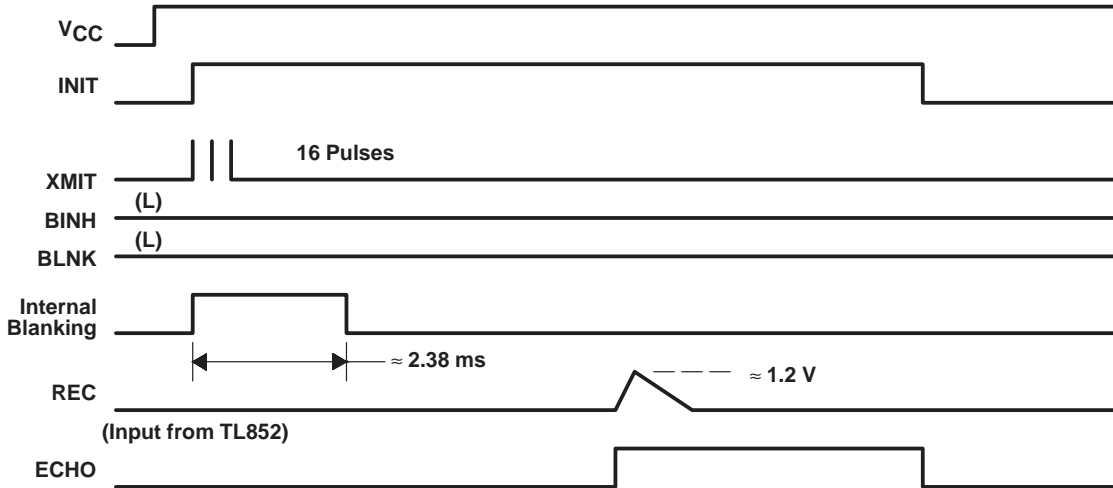


Figure 2. Example of Single-Echo-Mode Cycle When Used With the TL852 Receiver and 420-kHz Ceramic Resonator

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TL851CD	ACTIVE	SOIC	D	16	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		TL851C	Samples
TL851CDR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		TL851C	Samples
TL851CDR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		TL851C	Samples
TL851CN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type		TL851CN	Samples
TL851CN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type		TL851CN	Samples
TL851CNE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type		TL851CN	Samples
TL851CNE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type		TL851CN	Samples

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

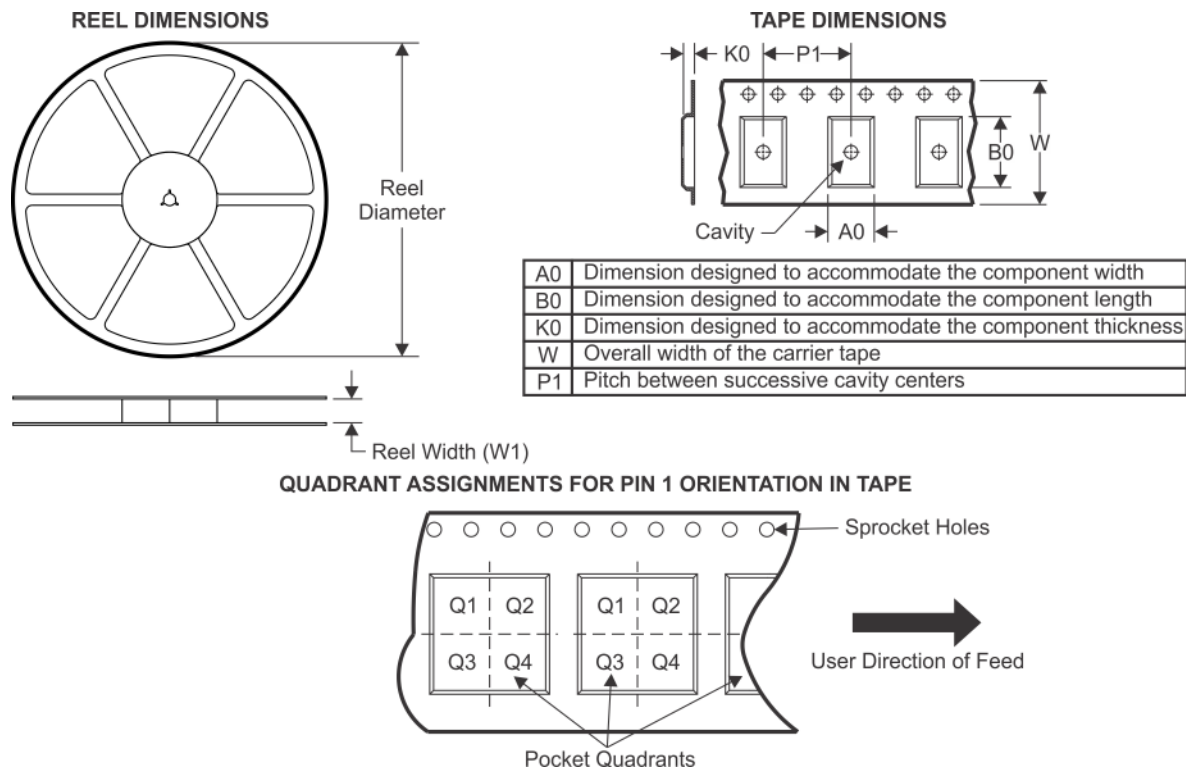
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

⁽⁶⁾ Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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TAPE AND REEL INFORMATION


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TL851CDR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TL851CDR	SOIC	D	16	2500	350.0	350.0	43.0

TUBE


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
TL851CD	D	SOIC	16	40	505.46	6.76	3810	4
TL851CN	N	PDIP	16	25	506	13.97	11230	4.32
TL851CNE4	N	PDIP	16	25	506	13.97	11230	4.32

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

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