



FEATURES

- RS1™ long-range IR protocol - 10m minimum indoor range
- No crystal or resonator needed - nor timing resistors or capacitors
- Minimal support components – a complete 32-key remote requires a total of 8 components (excluding the key matrix and batteries)
- The addition of one diode allows the enabling/disabling of the repeat bit
- Transmit LED indicator
- Backlight control output - keeps backlight lit for 60 seconds
- Over 65,000 unique manufacturer/product ID codes available
- Very small footprint – industry standard 150mil SOIC
- Advanced signal multiplexing yields a very small device - just 14 pins
- Less than 200nA sleep current
- Electrically quiet – no clock nor keypad scanning during sleep
- Extended industrial temperature range: -40°C to +125°C
- Extended supply range: 2.0V to 5.5V

DESCRIPTION

The IR116 is a state-of-the-art controller IC for handheld remote controls. Utilizing a precision, on-chip oscillator it needs no external crystal, resonator or other clock source. The IR116 includes internal pull-up resistors to eliminate even more components that are needed for typical remote control ICs. In fact, a complete 32-key remote control can be constructed with just 8 components (excluding the keypad matrix and battery contacts).

The IR116 is a very low power, electrically quiet device dissipating just 500nW when waiting for keypresses. In this state, the on-chip oscillator is stopped to reduce noise and further reduce power consumption. When sending it dissipates just 450uW. This means extremely long battery life even when operating with small battery cells; for example: a pair of AAA cells.

The IR116 uses the RS1™ infrared communications protocol to for long distance, accurate transmission of keypress information. A range of 10m indoors is achievable even with inexpensive driver transistors and IR emitters. The RS1™ protocol has been designed to allow for over 65,000 unique manufacturer and/or product IDs.

ORDERING INFORMATION

IR116D Standard Version, 14-pin DIP (300mil)

IR116SO Standard Version, 14-pin SOIC (150mil)

Availability: *NOW*

Standard version ships with manufacturer's ID code of 0x0101. Contact the sales office to obtain a unique ID code.

Infrared Remote Solutions, Inc

229 Lafayette Drive
Syosset, New York 11791
516.364.9803 sales
516.364.9807 fax

www.infraredremote.com

PIN ASSIGNMENT

<i>PIN</i>	<i>Signal</i>	<i>Type</i>	<i>Description</i>
1	VDD	Power	Positive supply
2	SC6/BKL	Output	Scan/backlight driver
3	SE3	Input	Sense input
4	SE2/RDISC	Input	Sense input/repeat disable (cathode)
5	SC5	Output	Scan driver
6	SC4	Output	Scan driver
7	SC3/LEDL	Output	Scan/LED driver
8	SC2	Output	Scan driver
9	SC1	Output	Scan driver
10	SC0/LEDH	Output	Scan/LED driver
11	SC7/IR	3-state	Scan/IR driver
12	SE1/RDISA	Input	Sense input/repeat disable (anode)
13	SE0	Input	Sense input
14	VSS	Power	Negative supply

SIGNAL DESCRIPTION

SE0 and SE3 are keypad sense inputs. They are low-true. Each has an internal pull-up resistor in the range of approximately 20K ohms.

SE1/RDISA and SE2/RDISB are keypad sense inputs and repeat disable pins. They are low-true. Each has an internal pull-up resistor in the range of approximately 20K ohms. If a diode is placed between them, with the anode to SE1/RDISA and the cathode to SE2/RDISC, the repeat bit in the IR output packet will be disabled. This makes learning easier for some learning remote controls.

SC1, SC2, SC4 and SC5 are keyscan outputs. They are driven low while waiting for a keypress. When a keypress is detected, these outputs are cycled to detect which key has been pressed.

SC0 and SC3 are keyscan outputs and LED drivers. They are driven low while waiting for a keypress. They are cycled during keypress detection. During the IR output phase, these outputs drive an LED to indicate IR transmission.

SC6/BKL is a keyscan output and backlight driver. It is low while waiting for a keypress. It is cycled with the other keyscan signals to detect which key has been pressed. When not scanning keys, this output controls the optional backlight.

SC7/IR is a keyscan output and IR emitter driver. It is low while waiting for a keypress. It is cycled with other keyscan signals to detect which key has been pressed. After a keypress has been detected, this signal drives the IR emitter.

KEY MATRIX MAP

Key	Input	Output
KEY1	SE0	SC0
KEY2	SE1	SC0
KEY3	SE2	SC0
KEY4	SE3	SC0
KEY5	SE0	SC1
KEY6	SE1	SC1
KEY7	SE2	SC1
KEY8	SE3	SC1
KEY9	SE0	SC2
KEY10	SE1	SC2
KEY11	SE2	SC2
KEY12	SE3	SC2
KEY13	SE0	SC3
KEY14	SE1	SC3
KEY15	SE2	SC3
KEY16	SE3	SC3

Key	Input	Output
KEY17	SE0	SC4
KEY18	SE1	SC4
KEY19	SE2	SC4
KEY20	SE3	SC4
KEY21	SE0	SC5
KEY22	SE1	SC5
KEY23	SE2	SC5
KEY24	SE3	SC5
KEY25	SE0	SC6
KEY26	SE1	SC6
KEY27	SE2	SC6
KEY28	SE3	SC6
KEY29	SE0	SC7
KEY30	SE1	SC7
KEY31	SE2	SC7
KEY32	SE3	SC7

ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

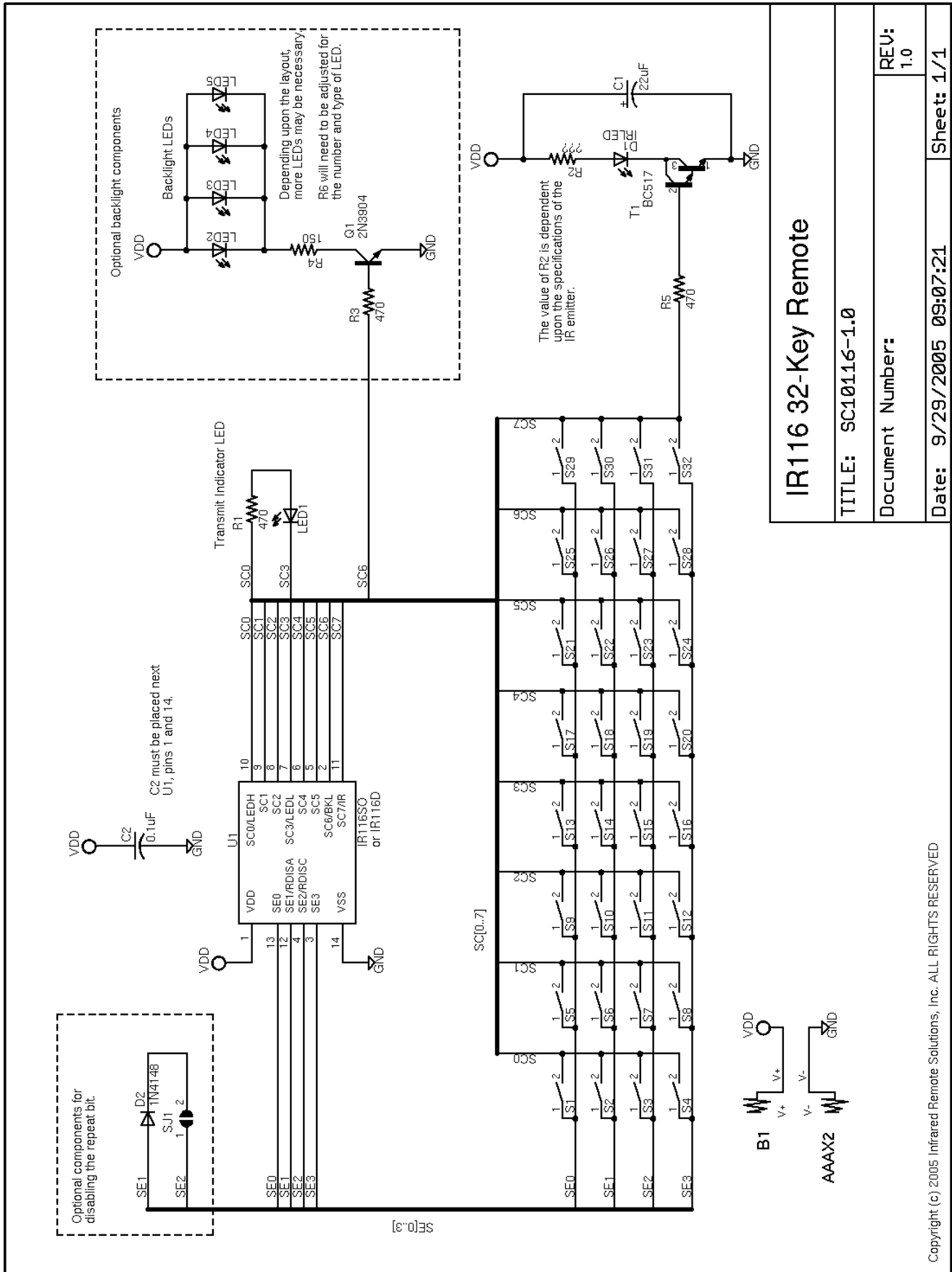
Parameter	Value
Temperature, Ambient	-40°C to +125°C
Temperature, Storage	-65°C to +150°C
VDD (with respect to VSS)	+7.0V
Inputs (with respect to VSS)	-0.3V to (V _{DD} + 0.3V)
Total Power Dissipation	500mW
Maximum Supply Current	150mA
Input Clamp Current	±20mA
Output Clamp Current	±20mA
Maximum Output Current, Sourced	25mA
Maximum Output Current, Sunk	25mA

DC Characteristics

Characteristic	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-40		125	°C
Operating Voltage	VDD	2.0		5.5	V
Supply Current, Sending	IDD		180.0	TBD	uA
Supply Current, Sleeping	IDDS		200.0	TBD	nA
Input Low Voltage	VIL	VSS		0.8	V
Input High Voltage	VIH	2.0		VDD	V
Input Leakage Current	IIL			±1.0	uA
Output Low Voltage	VOL			0.6	V
Output High Voltage	VOH	VDD-0.7			V

AC Characteristics

Characteristic	Symbol	Min	Typ	Max	Unit
Wake From Sleep	TWAKE		50		uS
Keypad Scan and Debounce	TSCAN		10		mS
IR Packet Transmit Time	TSEND	34.3		46.3	mS
IR Packet Repeat Interval	TRPT	98		102	mS
Sleep Timeout (after last keypress)	TSLP		0		S
Backlight Timeout (after last keypress)	TBKL		60		S
IR Carrier Frequency	IRF		38		KHz
IR Carrier Duty Cycle	IRDUTY		50		%



IR116 32-Key Remote	
TITLE: SC10116-1.0	
Document Number:	REV: 1.0
Date: 9/29/2005 09:07:21	Sheet: 1/1

Copyright (c) 2005 Infrared Remote Solutions, Inc. ALL RIGHTS RESERVED