



## ST12 CODEC – IR/RF Remote Control Encoder/Decoder IC

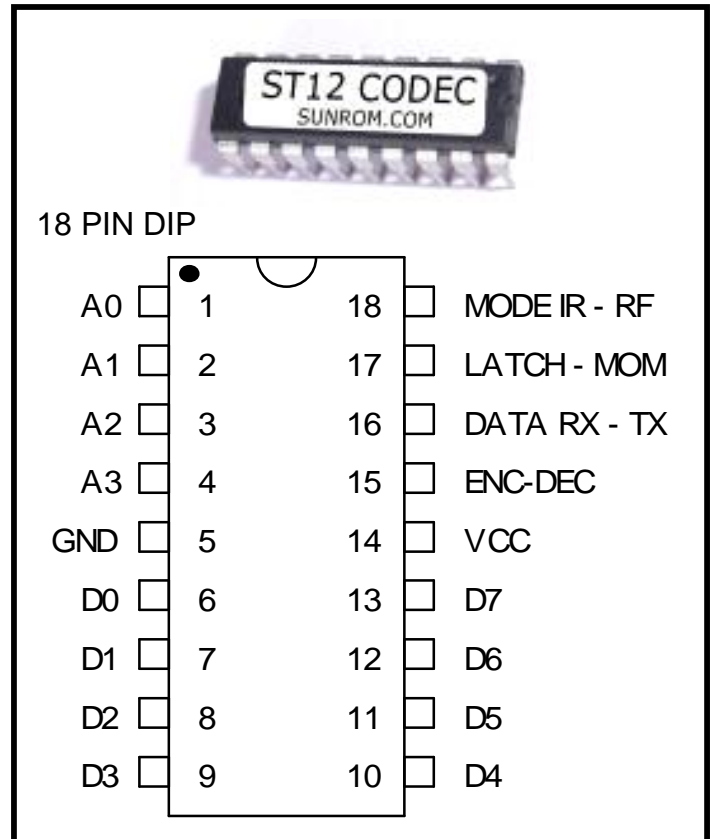
### 1. Overview

**ST12 CODEC** is Radio Frequency and Infrared encoder/decoder IC for remote control applications having unique features and flexibility not available with other remote control encoder decoder ICs. ST12 is truly a single-chip remote control solution.

Transmitter and Receiver can operate over Radio Frequency or Infrared having four address and eight data bits. Transmission and Reception over Infrared is achieved by commonly available Infrared LED-Detector and for RF any general purpose RF Transmitter-Receiver pair would suffice.

The ST12 combines the functionality of both encoder and decoder in a single package with several unique features for enhanced operation and a reduced component count for transmitter and receiver circuits.

The ENC-DEC pin configures the ST12 IC for encode or decode operation automatically at power-up.



### 2. Features

- Encode / Decode on single chip
- Built in Oscillator
- Minimum External Components
- Wide operating voltage range. (2.0 - 5.5V)
- Single chip Encoding Decoding Mode
- 40kHz carrier for infrared transmission medium
- 18 pin DIP package

### 3. Applications

- Burglar alarm system
- Smoke and fire alarm system
- Garage door controllers
- Car door controllers
- Car alarm system
- Security system
- Cordless telephones
- Other remote control systems

## 4. Pin Definitions

Pin Number	Description
1-4	A0-A3 - 4 bit Address Input
5	GND – Ground
6-13	D0-D7 – 8 bit Data input if configured as Encoder D0-D7 – 8 bit Data output if configured as Decoder
14	VCC - +5V DC
15	ENC-DEC – Configure chip as Encoder or Decoder Encoder if pin is tied to VCC Decoder if pin is tied to GND
16	DATA RX-TX – Transmit data or Receive Data from this pin through IR/RF Interface
17	LATCH-MOM – Applicable in Decoder Mode Latching output (Toggle Output) if pin is tied to VCC Momentary output if pin is tied to GND  In encoder mode tie this pin to GND or VCC and do not leave it floating
18	Mode IR/RF – Selects Transmit / Receive by Infrared or Radio Frequency IR Mode if pin is tied to VCC RF Mode if pin is tied to GND Encoder sends 40khz Modulation signal in IR Mode for driving IR LED Decoder inverts received data in IR Mode

## 5. Encoder

When configured as Encoder the chip will transmit signal containing 4 bit Address A0-A4 and 8 bit of Data D0-D7 from its DATA RX-TX pin. Removing ground from a data input will end the transmission. Infrared transmission will include data modulated for 40 kHz frequency for driving Infrared LED. Radio Frequency Transmission mode will transmit data in bi-phase Manchester encoding.

### 5.1. Latching Key-Press

With the decoder in latch mode, data inputs D0-D7 of the encoder must be pressed & released one at a time to toggle decoder outputs on or off individually. Multiple key presses are not allowed on the encoder when the decoder is configured for latch mode.

### 5.2. Momentary Key-Press

In momentary mode, any combination of the encoder data inputs D0-D7 may be grounded simultaneously.

## 6. Decoder

Decoder outputs can sink or source up to 25mA per pin with a total combined device package maximum of 200mA allowing direct remote control of LED's, solid-state relays, and other logic devices without the need for secondary driver circuits.

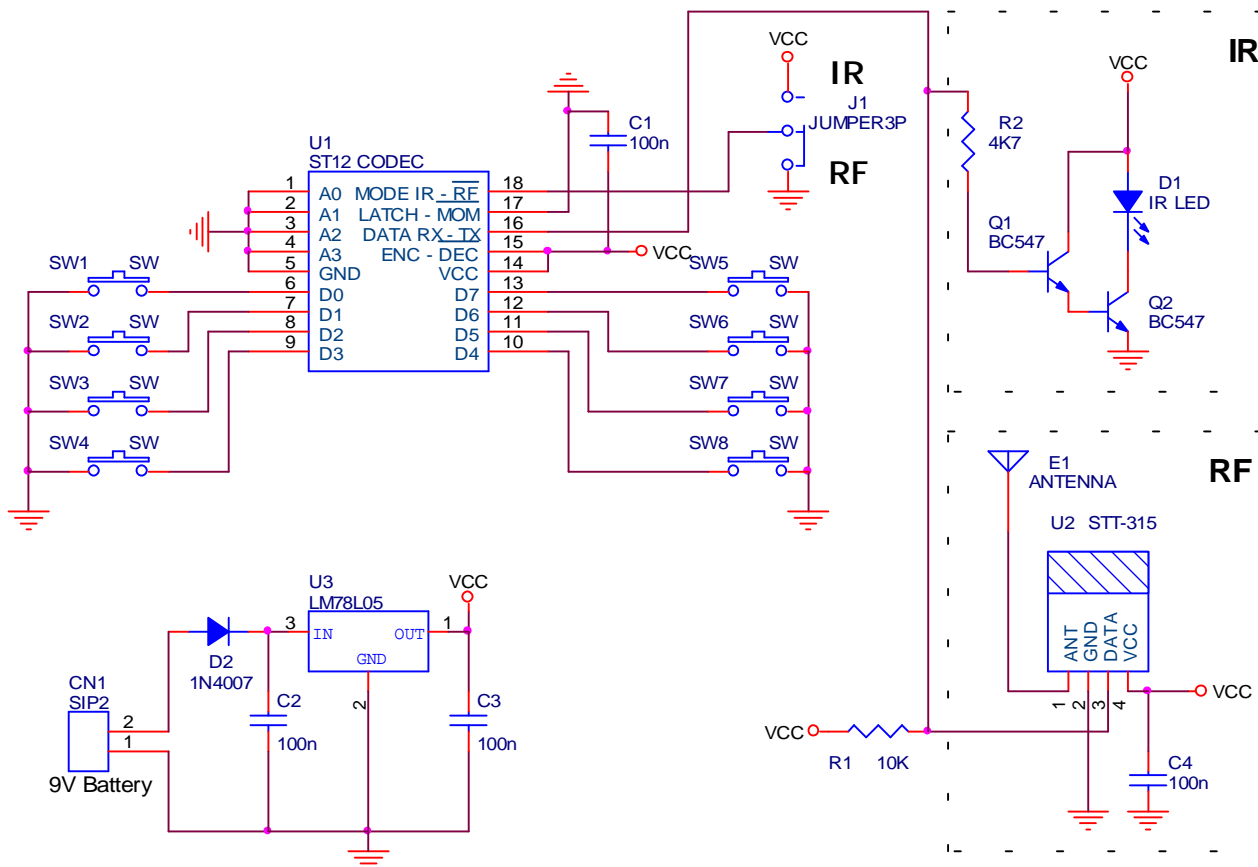
## 7. Data & Address Validation

Encoder address pins A0-A3 must be set to the same logic levels as decoder address pins A0-A3. If these do not match, the decoder will ignore data sent from the encoder. The decoder receives two consecutive & matching data/address packets before transferring data to the D0-D7 outputs.

Each 13-bit packet transmit time requires approximately 48mS. Care should be taken not to violate these timing requirements when the ST12 is controlled by high-speed logic circuits or embedded controllers such as the PIC, BASIC Stamp or 8051.

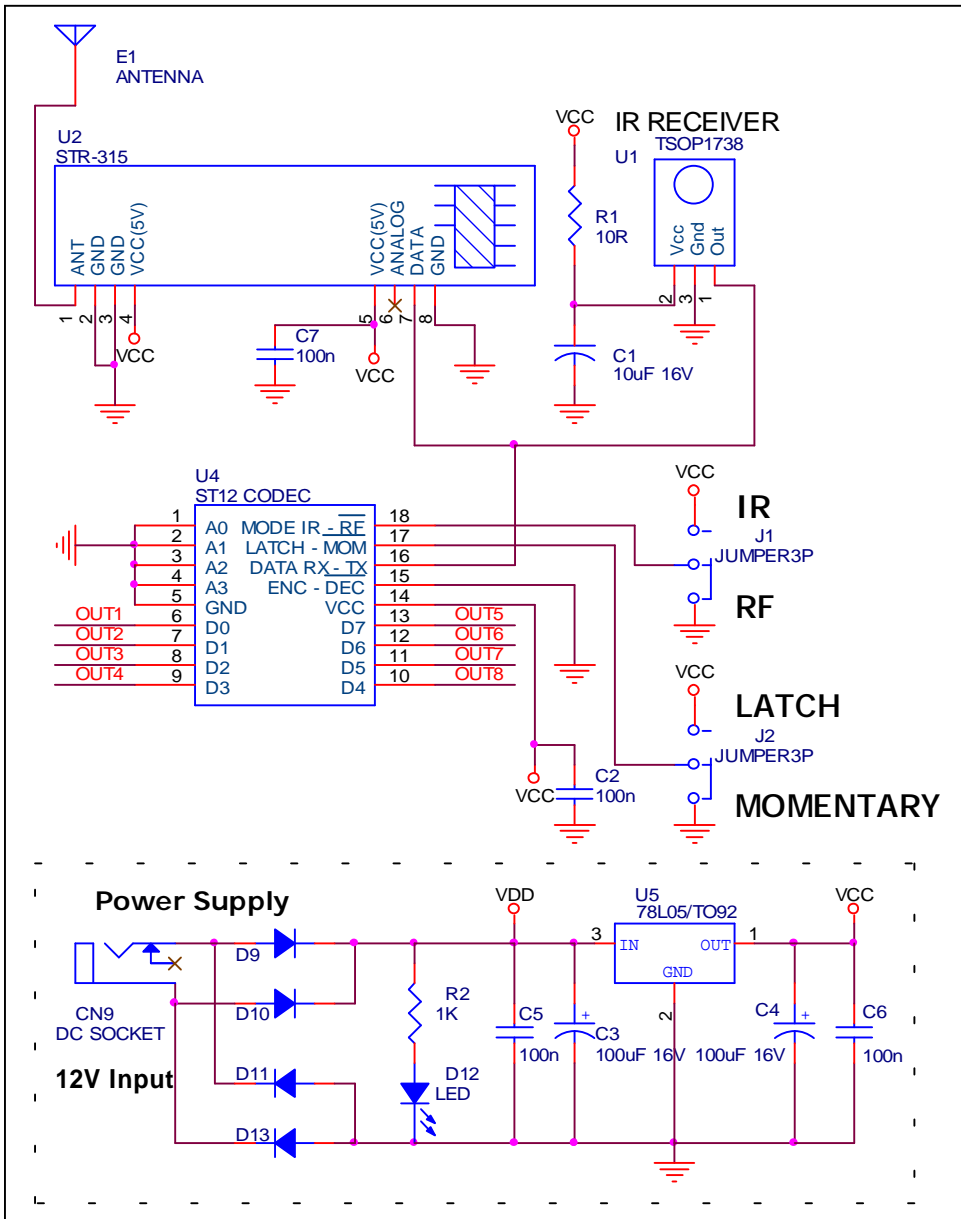
**Important:** Address input pins A0-A3 & configuration selection input must always be connected to Vdd or circuit ground depending on the mode required. Allowing any of these input pins to “float” (leaving them un-connected) will cause erratic results.

## 8. Transmitter Application Schematic (Encoder)



<b>Sunrom Technologies</b>		<a href="http://www.sunrom.com">http://www.sunrom.com</a>	
Title 8 Channel Remote Transmitter			
Code 1001-3487		Rev 1	
Date: Monday, May 01, 2006		Sheet 1 of 1	

## 8.1. Receiver Application Schematic (Decoder)



## 9. Related Information

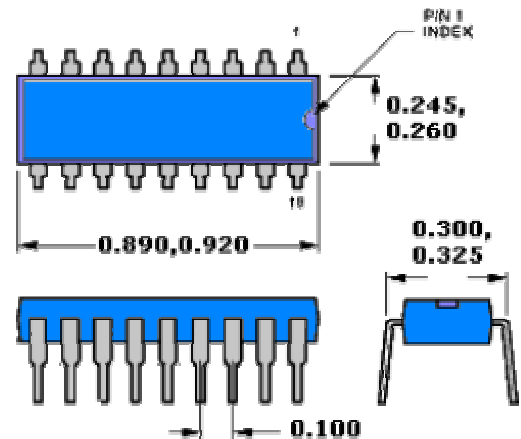
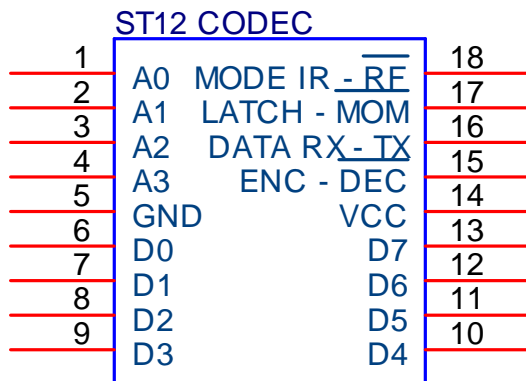
- Infrared version of 8 channel RF Remote Control <http://www.sunrom.com/product.php?id=114>
  - Infrared LED <http://www.sunrom.com/product.php?id=118>
  - Infrared Detector TSOP1738 <http://www.sunrom.com/product.php?id=19>
- RF version of 8 channel RF Remote Control <http://www.sunrom.com/product.php?id=115>
  - 315 MHz RF Transmitter STT-315 <http://www.sunrom.com/product.php?id=116>
  - 315 MHz RF Receiver STR-315 <http://www.sunrom.com/product.php?id=117>

## 10. Electrical Specifications

Parameter	Value
Maximum Input/Output Sink/Source Current On Any Pin	25mA
Maximum Input/Output Sink/Source Current Total	200mA
Operating Voltage	3.0-5.0V DC
Avg. No Load Operating Current	<2mA @5.0VDC
Carrier Frequency / Duty Cycle +/- 2%	40kHz / 50%

### 10.1. Chip Description

The ST12 – CODEC is available in a 18 pin DIP package (0.3" width). It uses a supply voltage of 5v DC. Outputs and inputs are TTL and CMOS compatible.



### 10.2. Ordering Information

Part Number	Description
3000-1012	ST12 CODEC - IR/RF Remote Control Encoder/Decoder I.C.

## 11. Disclaimer

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