# HRF-ROC09325S

Honeywell

*Advance Information*

# Radio On A Chip Transceiver 900 MHz Frequency Agile With 8051 Micro Controller

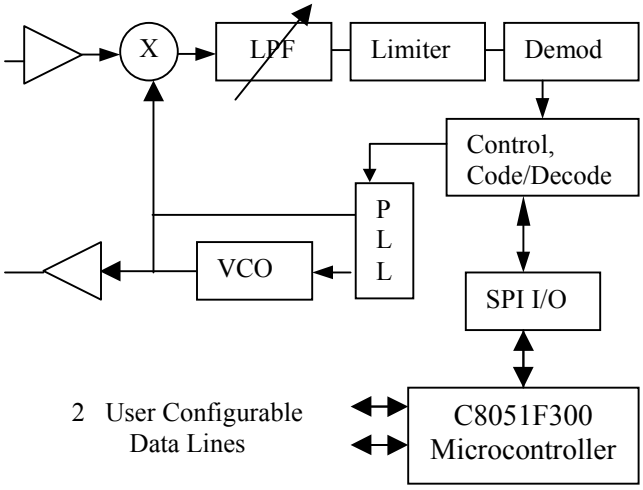
## Description

The Honeywell HRF-ROC09325S is a half-duplex transceiver plus an 8051 based Cygnal C8051F300 microcontroller in a single 52 pin leadless TAPP package for use in digital data applications. Built-in microcontroller connection for control and data transfer, eliminate the need for additional ICs, while integrated data code/decode reduces the instruction set requirements on the microcontroller. The HRF-ROC09325S is ideally suited for use in battery powered wireless applications for data communication. Adjustable data rates, filter bandwidths and detection levels allow the IC to be used in a wide variety of high sensitivity / high EMI environments. Operational characteristics of the microcontroller are detailed at the following site:
http://www.cygnal.com/products/C8051F300.htm

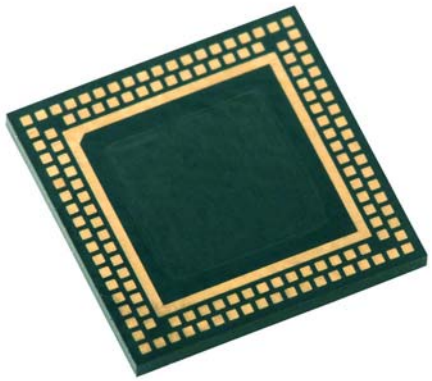
## Features

- Transceiver and Micro Controller in Single Package
- Data Rates to 28.8kbps – Single Package Design
- Adjustable detection bandwidths, data rates
- Programmable Output Power Levels
- Space Saving 7 X 9 mm LPCC Package
- Adjustable gain, detection level/ hysterisis
- Low and high beta FSK detection modes
- Integrated Manchester coding/decoding
- Programmable Frequency And Tx/Rx/Standby
- Operates From Single 2.4-3.3V Power Supply
- Surface Mount Leadless Plastic Packaging
- Low Standby Current Consumption
- 8051 microcontroller with built-in direct sensor interface

## Functional Schematic




## Product Photo

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## RF Electrical Specifications @ + 25°C

| Parameter | Test Condition | Frequency | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|---|---|
| Rx Sensitivity | | 300-900 MHz | | -75 | | dBm |
| 1db Compression | Vdd = 3V | 300-900 MHz | | -30 | | dBm |
| Input IP3 | Vdd = 3V | 300-900 MHz | | -15 | | dBm |
| Tx Output Power | Vdd = 3V | 300-900 MHz | | +3 | | dBm |
| Data Rate, Tx / Rx | Continuous Packetized Data | | | 28.8 | | Kbps |
| Channel Rejection | Adjacent Channels | Fc +/- 250 KHz | | 60 | | dB |
| Max Detection BW | IQ Baseband FilterPassband | | | 250 | | KHz |
| Control/Data I/O | Serial Peripheral Interface (SPI). Direct Connection To Microcontroller/Microprocessor | | | 10 | | MHz |

## DC Electrical Specifications @ + 25°C

| Parameter | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|
| $V_{DD}$ Power Supply Voltage | 2.4 | 3.0 | 3.5 | V |
| Power Supply Current During Tx, Output Power Dependant (915 MHz) * includes 8051 micro ctrlr. | 16 | 31 | | mA |
| Power Supply Current ($I_{DD}$) During Rx (915 MHz) | 22 | 28 | | mA |
| Standby Current Consumption | | <1 | | uA |
| CMOS Logic Level (0) | 0 | | 0.7 | V |
| CMOS Logic Level (1) | 1.7 | | $V_{DD}$ | V |
| Input Leakage Current | | | 2 | nA |

## Absolute Maximum Ratings[1]

| Parameter | Absolute Maximum | Units |
|---|---|---|
| Maximum Input Power | - | - |
| $V_{DD}$ | + 3.5 | V |
| ESD Voltage (Human Body Model) | 200 | V |
| Operating Temperature | - 40 to + 85 | Degrees C |
| Storage Temperature | - 40 to + 150 | Degrees C |

(Note 1) Operation Of The HRF-ROC09325S Beyond Any Of These Parameters May Cause Permanent Damage.

**ESD Protection:** The HRF-ROC09325S Contains reduced ESD Protection Circuitry for sensitive RF I/O. Precautions Should Be Taken During Handling/Assembly Until Protected By External Circuitry or Housings



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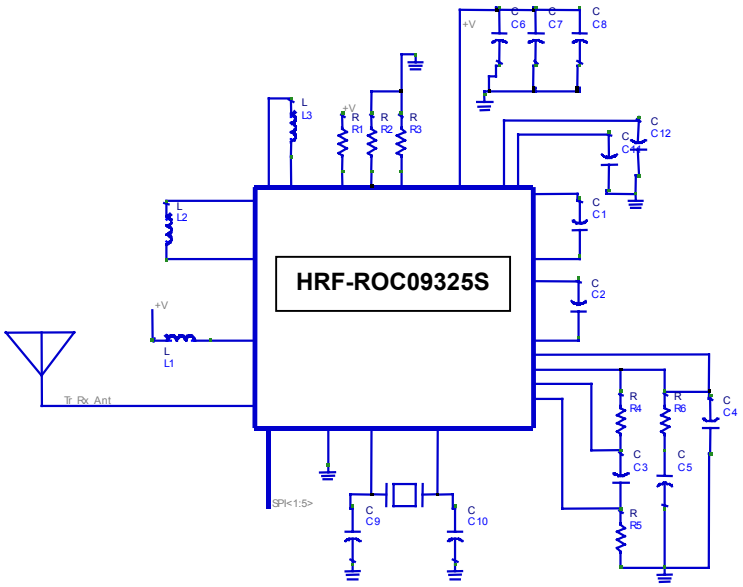
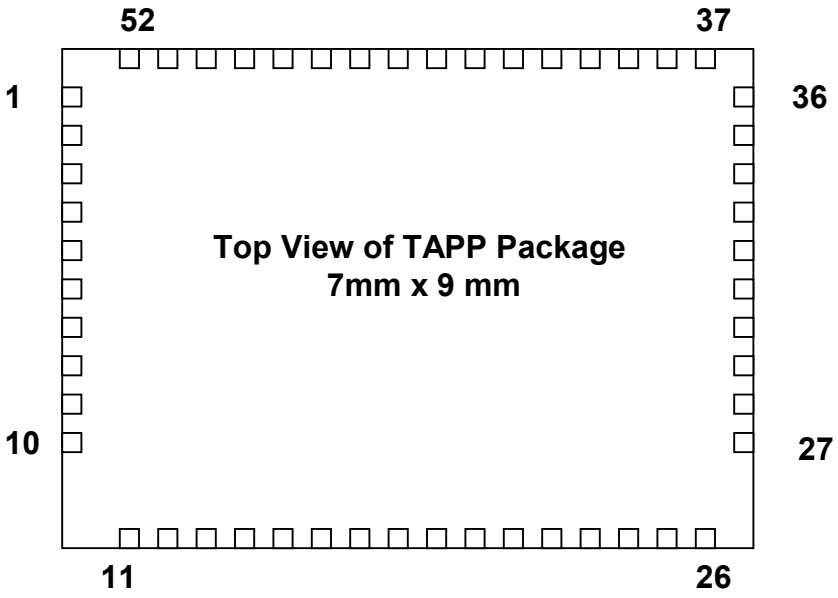
## Typical Application




## Package Outline







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## Pin Configuration

**HRF-ROC09325S Pin TAPP™ (9 mm X 7 mm) Package Pin List**

* RF/Digital ground is provided through backside slug pad.

| Name | Pin # | Function | Name | Pin # | Function |
|---|---|---|---|---|---|
| NC | 1 | NC | P0.4 (uC) | 27 | P0.4 (uC) |
| VSSVCO | 2 | VSSVCO | P0.5 (uC) | 28 | P0.5 (uC) |
| TP | 3 | TP | RST (uC) | 29 | RST (uC) |
| TM | 4 | TM | NC | 30 | NC |
| *VSSVCO* | 5 | *VSSVCO* | SPISSN | 31 | SPISSN |
| MOD3 | 6 | MOD3 | NC | 32 | NC |
| MOD1 | 7 | MOD1 | REXT_BE | 33 | REXT_BE |
| VDDVCO | 8 | VDDVCO | ***RSS1_Q*** | 34 | ***RSS1_Q*** |
| TX_DATA_1 | 9 | TX_DATA_1 | ***RSS1 1*** | 35 | ***RSS1 1*** |
| PD OUT | 10 | PD OUT | NC | 36 | NC |
| CLK1 | 11 | CLK1 | NC | 37 | NC |
| CLK2 | 12 | CLK2 | NC | 38 | NC |
| VDDPLL_DIG | 13 | VDDPLL_DIG | TX EN | 39 | TX EN |
| XTALDIV2 | 14 | XTALDIV2 | RX EN | 40 | RX EN |
| VSSPLL_DIG | 15 | VSSPLL_DIG | NC | 41 | NC |
| ***RX_OUT*** | 16 | ***RX_OUT*** | VSS BB | 42 | VSS BB |
| ***TX_DATA_V*** | 17 | ***TX_DATA_V*** | VDD BB | 43 | VDD BB |
| REXT_PLL | 18 | REXT_PLL | VDDMIX | 44 | VDDMIX |
| SPIDATAOUT | 19 | SPIDATAOUT | VSS MIX | 45 | VSS MIX |
| NC | 20 | NC | ***MIX_QP*** | 46 | ***MIX_QP*** |
| ***DIG DATA_IN*** | 21 | ***DIG DATA_IN*** | ***MIX_QN*** | 47 | ***MIX_QN*** |
| NC | 22 | NC | REXT_FE | 48 | REXT_FE |
| NC | 23 | NC | VSS PA | 49 | VSS PA |
| NC | 24 | NC | PA OUT | 50 | PA OUT |
| VDD (uC) | 25 | VDD (uC) | VDD PA | 51 | VDD PA |
| NC | 26 | NC | LNA IN | 52 | LNA IN |



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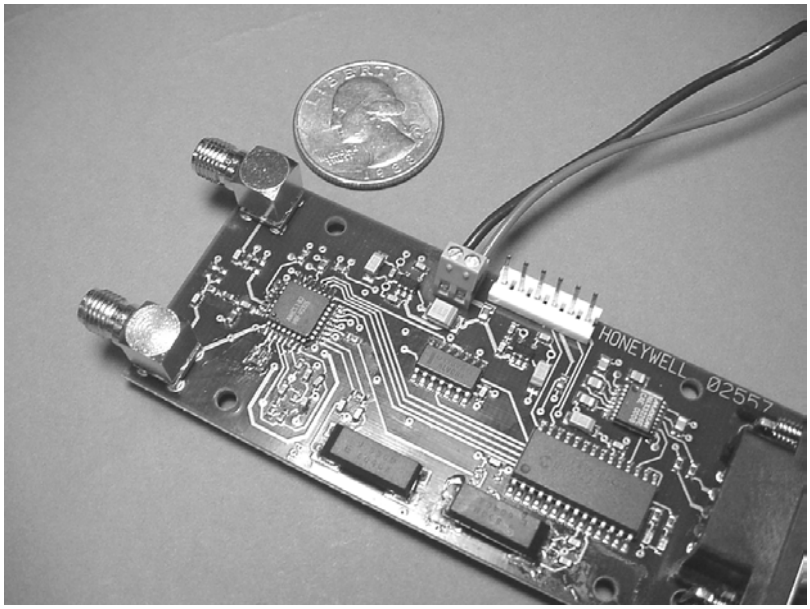
## Engineering Evaluation Board




The engineering evaluation board provides for a RS232 connection using the in package 8051 based micro controller as the interface between the HRF-ROC09325S and the RS232 port. Using the software provided and a PC, control of test data, operating frequency, power levels and all internal registers is available for early product development/prototyping. The board operates from a single +6 to +9 volt supply and provides separate RF Rx/Tx ports.

## Ordering Information

| Ordering Number | Product |
|---|---|
| HRF-ROC09325S -B | Delivered In Chip Tubes |
| HRF-ROC09325S -T | Delivered On Tape And Reel[2] |
| HRF-ROC09325S -E | Engineering Evaluation Board |

Note 2: Contact Honeywell for details

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