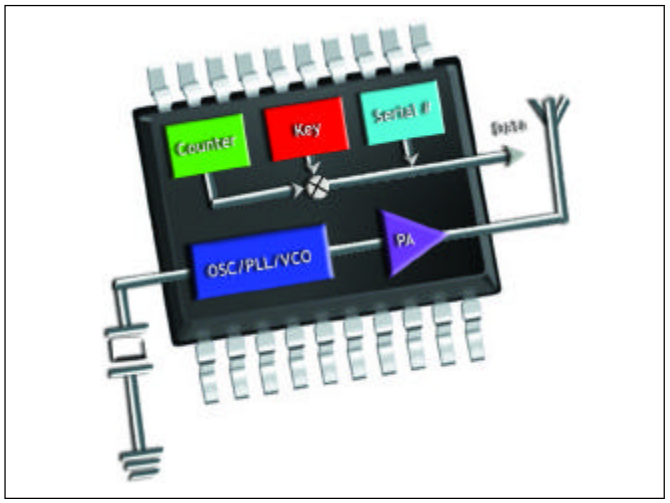
rfHCS362G / 362F KEELOQ® Encoder with RF Transmitter Product Information

The rfHCS devices provide a single chip that combines the KEELOQ technology with the Low Power Radio Frequency circuitry required for remote control and authentication systems. The rfHCS362G and rfHCS362F combine a 32-bit hopping code generated by a non-linear encryption algorithm, with a serial number and status bits to create a 69-bit transmission stream that is unique every time the device is activated. The length of the transmission protects against the threat of code scanning, and the code hopping mechanism protects against code capture and re-send schemes. The devices offer small package outline and low external component count to fit the most space-constrained applications. The rfHCS362G, an 18-pin device, features an integrated 310-440 MHz Amplitude Shift Key (ASK) transmitter. The rfHCS362F, a 20-pin device, features a Frequency Shift Key (FSK) and ASK transmitter covering the same frequency range.



Security:

- Programmable 28/32-bit serial number
- Two programmable 64-bit encryption keys
- Programmable 60-bit seed
- Each 69-bit transmission is unique with 32 bits of hopping code
- Encryption keys are read protected

Code Hopping Encoder:

- Programmable minimum code word completion
- Battery low signal transmitted to receiver with programmable threshold
- Non-volatile EEPROM storage of synchronization data
- PWM or Manchester encoding
- Selectable encoder data rate 417 to 3334 bps
- Easy to use EEPROM programming interface
- On-chip tunable encoder oscillator
- Button inputs have internal pull-down resistors
- Current limiting on $\overline{\text{LED}}$ output
- 2-bit CRC for error detection
- Elapsed time and button queuing options

UHF ASK / FSK Transmitter:

- Conforms to US FCC Part 15.231 regulations and European ERC 70-03E and EN 300 220-1 requirements
- VCO phase locked to quartz crystal reference; allows narrow receiver bandwidth to maximize range and interference immunity
- Crystal frequency divide by 4 output (CLKOUT)
- Frequency range set by crystal: 310–440 MHz
- ASK/FSK Modulation
- Adjustable output power: -12 dBm to +2 dBm
- Differential output configurable for single or double ended loop antenna

Applications:

- Automotive Remote Keyless Entry (RKE) systems
- Automotive alarm systems
- Automotive immobilizers
- Community gate and garage door openers
- Identity tokens with usage counters
- Burglar alarm systems
- Building access

rfHCS362G / 362F Microcontroller Family

Part Number	Code Word Length	Function Codes	Protocols	Modulation	Frequency Range (MHz)	Output Power (dBm)	Operating Voltage (volt)	Package	Other
rfHCS362G	69	4x15	PWM, Manchester	ASK	310–440	2dBm	2.2 – 5.5	18 SOIC	Queue counter, Timer bits CRC
rfHCS362F	69	4x15	PWM, Manchester	ASK/FSK	310–440	2dBm	2.2 – 5.5	20 SSOP	Queue counter, Timer bits CRC

Abbreviation: PWM = Pulse Width Modulation; ASK = Amplitude Shift Key; FSK = Frequency Shift Key; CRC = Cyclic Redundancy Check; VCO = Voltage Controlled Oscillator

MICROCHIP

KEELOQ® Secure Data Products

Development Tool Support:

Microchip is committed to providing useful and innovative development tools that allow designers to meet design and time-to-market requirements. KEELOQ evaluation kits and programming tools support Microchip's KEELOQ code hopping devices. The KEELOQ development tools allow system engineers to quickly evaluate, prototype, make code changes, and get designs to market faster than ever before.

The PRO MATE® II Programmer (DV007003) provides manufacturing with the capability to program KEELOQ devices in production quantities. Microchip supplies various socket adapters as well as In-Circuit Serial Programming™ (ICSP™) for the PRO MATE II Programmer.

Application Notes:

A wide range of application notes offer design engineers detailed technical information to remove roadblocks during the development cycle. The application notes available are:

- Crystal Oscillator Basics (AN826)
- Matching Small Loop Antennas (AN831)
- PIC16C57 Based Code Hopping Security System (AN645)
- KEELOQ Code Hopping Decoder Using Secure Learn (AN662)
- KEELOQ Simple Code Hopping Decoder (AN663)
- Using KEELOQ to Generate Hopping Passwords (AN665)
- KEELOQ Code Hopping Decoder Implemented on Microchip Mid-Range MCUs (PIC16C6X, PIC16C7X, PIC16C62X) (AN672)
- Wireless Home Security Implementing KEELOQ and the PICmicro® Microcontroller (AN714)
- Modular PICmicro Mid-Range MCU Code Hopping Decoder (AN742)
- Modular Mid-Range PICmicro KEELOQ Decoder in C (AN744)
- Secure Learning RKE Systems Using Encoders (TB001)
- An Introduction to KEELOQ Code Hopping Technical Brief (TB003)
- KEELOQ CRC Verification Routines (TB043)
- KEELOQ Manchester Encoding Receive Routines (TB045)

KeeLoq Evaluation Kits:

* Does not include rfHCS362G/362F

The KEELOQ Evaluation Kit II (DM303006) demonstrates the capabilities of KEELOQ code hopping technology. The KEELOQ Evaluation Kit II contains all the necessary hardware to evaluate a code hopping system, including two transmitters and a multi-function receiver board that supports the HCS5XX stand-alone decoders. Additionally, it allows the user to develop his own software to receive, decode and interpret the KEELOQ transmission. The KEELOQ evaluation kit includes PC software to configure, program and evaluate the KEELOQ system without additional hardware.

Additional Information:

- KEELOQ Secure Solution CD, Order No. DS40038
- Microchip's web site: www.microchip.com

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