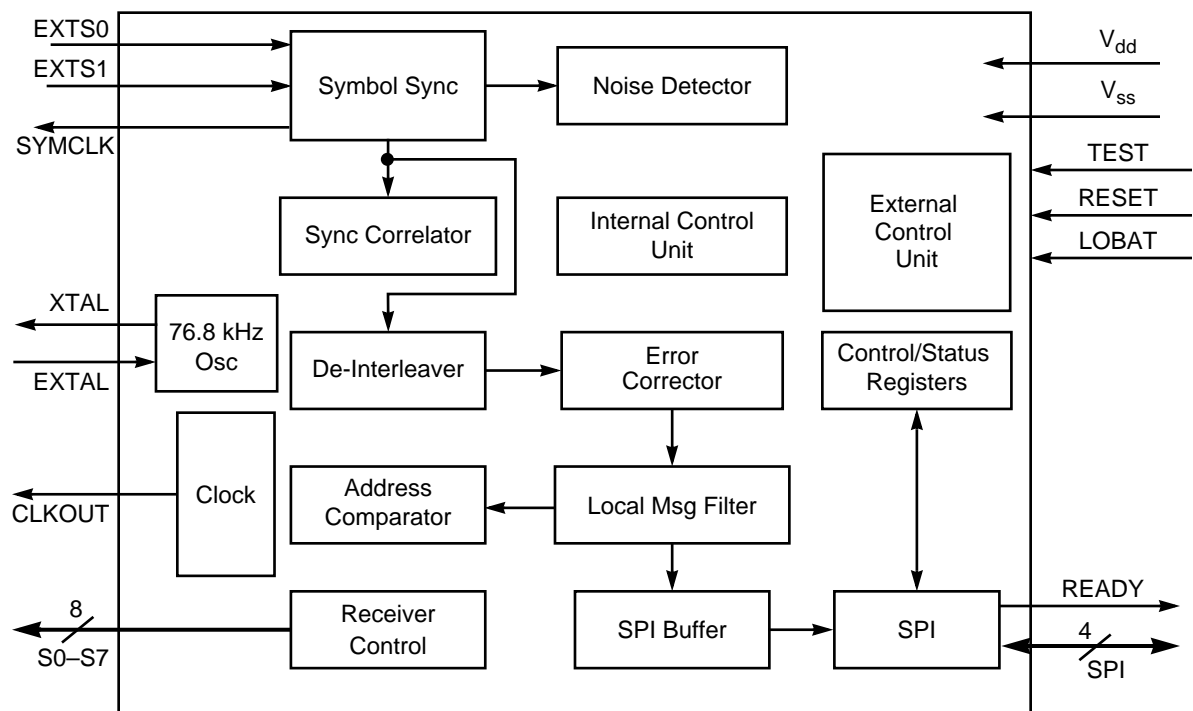


# MC68175

## Product Preview MC68175 FLEXchip™ IC

FLEX™ protocol is a multi-speed, high-performance protocol adopted by leading service providers worldwide as a de facto paging standard. FLEX protocol gives service providers the increased capacity, added reliability, and enhanced pager battery performance they need today. It also provides an upward migration path to the service provider that is completely transparent to the end user.

The MC68175 FLEXchip IC is part of a total solution available from Motorola for providing FLEX capabilities in a low-power, low-cost system. The FLEXchip simplifies implementation of a FLEX paging device by interfacing with any of several off-the-shelf paging receivers, such as the MC13150 or MC3374, and any of several off-the-shelf host microcontroller / microprocessors. The primary function of the FLEXchip is to process information received and demodulated from a radio paging channel, select messages addressed to the paging device, and communicate the message information to the host. The host interprets the message information in an appropriate manner (numeric, alphanumeric, binary, etc.) and handles all the I/O activity. The FLEXchip IC also operates the paging receiver in an efficient power consumption mode and enables the host to operate in a low power mode when message information for the paging device is not being received.



AA0813

**Figure 1** FLEXchip IC Functional Block Diagram

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.

## FLEXchip FEATURES

- FLEX paging protocol signal processor
- Sixteen programmable user address words
- Sixteen fixed temporary addresses
- 1600, 3200, and 6400 bits per second (bps) decoding
- Any-phase decoding
- Uses standard Serial Peripheral Interface (SPI) in Slave mode
- Wide operating voltage range from 3.3 V down to 1.8 V
- Allows low current Stop mode operation of host processor
- Highly programmable receiver control
- Real time clock time base
- FLEX fragmentation, and group messaging support
- Real time clock over-the-air update support
- Compatible with synthesized receivers
- Low battery indication (external detector)
- 32-pin Thin Quad Flat Pack (TQFP) package
- Operating temperature range 0° to +70°C (32° to 158°F)

## FLEXchip SYSTEM DESIGN

The FLEXchip IC connects to a receiver capable of converting a 4-level audio signal into a 2-bit digital signal (see **Figure 2**). The FLEXchip IC has eight receiver control lines used for warming up and shutting down a receiver in stages. The FLEXchip IC has dual bandwidth control signals for two post-detection filter bandwidths for receiving the two symbol rates of the FLEX signal. The FLEXchip IC has the ability to detect a low battery signal during the receiver control sequences. It interfaces to a back-end host MCU through a standard SPI. It has a 38.4 kHz clock output capable of driving other devices. It has a 1 minute timer that offers low power support for time of day function on the host.

All data communicated between the FLEXchip IC and the host MCU is transmitted on the SPI in 32-bit packets. Each packet consists of an 8-bit ID followed by 24 bits of information. The FLEXchip IC uses the SPI bus in Full Duplex mode. In other words, whenever a packet communication occurs, the data in both directions is valid packet data.

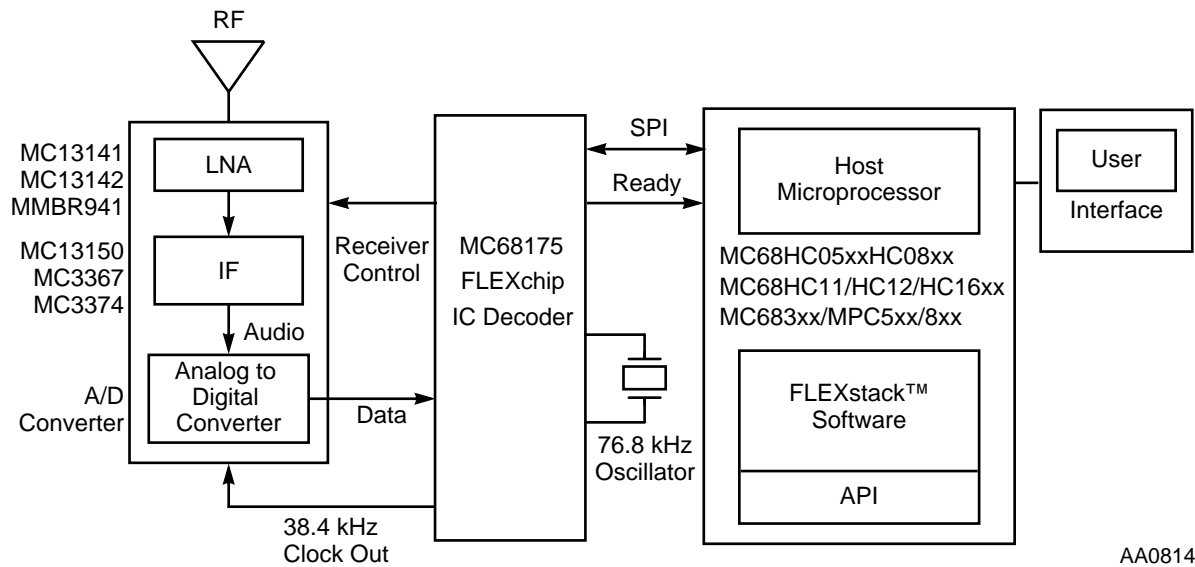


Figure 2 FLEXchip System Block Diagram

## FLEX PROTOCOL

FLEX System Software from Motorola is a family of software components for building world-class products incorporating messaging capabilities. FLEXstack™ Software is specifically designed to support the FLEXchip IC. FLEXstack Software runs on a product's host processor and takes care of communicating with the FLEXchip IC and fully interpreting the code words that are passed to the host from the FLEXchip IC.

FLEX protocol can give the service provider a capacity increase of greater than 10 times over a POCSAG 512 bps system. FLEX protocol can operate at three different speeds, allowing a system to initially run more slowly, and then increase speed as system demands increase, while still using the same pager units. FLEX protocol provides accurate message delivery by offering protection from fading conditions, such as bridges or overpasses. It provides 12 times the fading protection of POCSAG 1200, and 24 times the fading protection of POCSAG 2400. FLEX protocol is a synchronous time slot scheme, designed to increase the battery life of pagers. Instead of sending out messages at random, all paging data intended for a particular pager is scheduled into a pre-defined time slot. This allows a FLEX pager to selectively decode one or more frames over each four minute FLEX cycle, so that the pager does not waste its battery life decoding data intended for other pagers.

# PRODUCT DOCUMENTATION


The manual listed in **Table 1** is required for a complete description of the MC68175 and is necessary to properly design with the part. Documentation is available from a local Motorola distributor, a Motorola semiconductor sales office, a Motorola Literature Distribution Center, or through the Motorola DSP home page on the Internet (the source for the latest information).

**Table 1** Additional Documentation

Document Name	Description	Order Number
MC68175 Technical Data	MC68175 features list and physical, electrical, timing, and package specifications	MC68175/D

FLEX, FLEXchip, FLEXstack, and Mfax are trademarks of Motorola, Inc.



Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

**USA/Europe/Locations Not Listed:**

Motorola Literature Distribution  
P.O. Box 20912  
Phoenix, Arizona 85036  
1 (800) 441-2447 or  
1 (602) 303-5454

**Mfax™:**

RMFAX0@email.sps.mot.com  
TOUCHTONE (602) 244-6609

**Asia/Pacific:**

Motorola Semiconductors H.K. Ltd.  
8B Tai Ping Industrial Park  
51 Ting Kok Road  
Tai Po, N.T., Hong Kong  
852-2662928

**Technical Resource Center:**

1 (800) 521-6274

**DSP Helpline**

dsphelp@dsp.sps.mot.com

**Japan:**

Nippon Motorola Ltd.  
Tatsumi-SPD-JLDC  
6F Seibu-Butsuryu-Center  
3-14-2 Tatsumi Koto-Ku  
Tokyo 135, Japan  
03-3521-8315

**Internet:**

<http://www.motorola-dsp.com>

