MC68181

Product Preview

MC68181 ROAMING FLEX™ chip IC

Roaming FLEX™ protocol is a multi-channel, multi-speed, high-performance protocol adopted by leading service providers worldwide as a de facto roaming paging standard. Roaming FLEX protocol gives service providers the increased capacity, added reliability, and enhanced pager battery performance needed today, coupled with the ability to control a PLL synthesized receiver to receive paging messages from a list of paging channels. It also provides an upward migration path to the service provider that is completely transparent to the end user.

The MC68181 Roaming FLEX chip IC is part of a total solution available from Motorola for providing Roaming FLEX capabilities in a low-power, low-cost system. The Roaming FLEX chip simplifies implementation of a Roaming FLEX paging device by interfacing with many standard paging receivers, and host microcontroller / microprocessors. The primary function of the Roaming FLEX chip 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 Roaming FLEX chip 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.

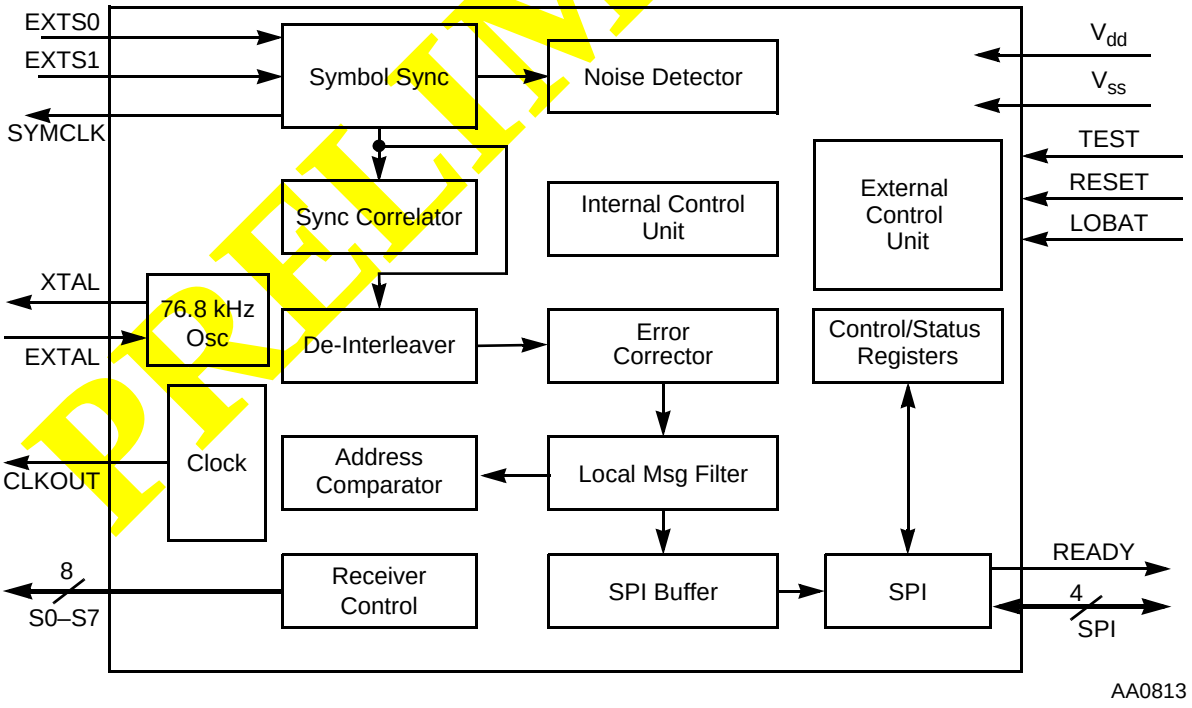

Figure 1 Roaming FLEX chip IC Functional Block Diagram

FLEX chip FEATURES

- Roaming FLEX paging protocol signal processor
- Sixteen programmable user address words
- Sixteen fixed temporary addresses
- Sixteen operator messaging addresses
- 1600, 3200, and 6400 bits per second (bps) decoding
- Any-phase or single-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
- SSID and NID Roaming support
- Low battery indication (external detector)
- 32-pin Thin Quad Flat Pack (TQFP) package
- Backward compatible with standard FLEX chip Signal Processor MC68175
- Operating temperature range 0º to +70ºC (32º to 158ºF)

FLEX chip SYSTEM DESIGN

The Roaming FLEX™ chip IC connects to a receiver capable of converting a 4-level audio signal into a 2-bit digital signal (see **Figure 2**). The FLEX chip IC has eight receiver control lines used for tuning, warming up, and shutting down a receiver in stages. Dual bandwidth control signals for two post-detection filter bandwidths are used for receiving the two FLEX symbol rates. The FLEX chip interfaces to a back-end host MCU through a standard SPI, and provides 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, and the ability to detect a low battery signal during the receiver control sequences.

All data communicated between the FLEX chip 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 FLEX chip IC uses the SPI bus in Full Duplex mode, so whenever a packet communication occurs, the data in both directions is valid packet data.

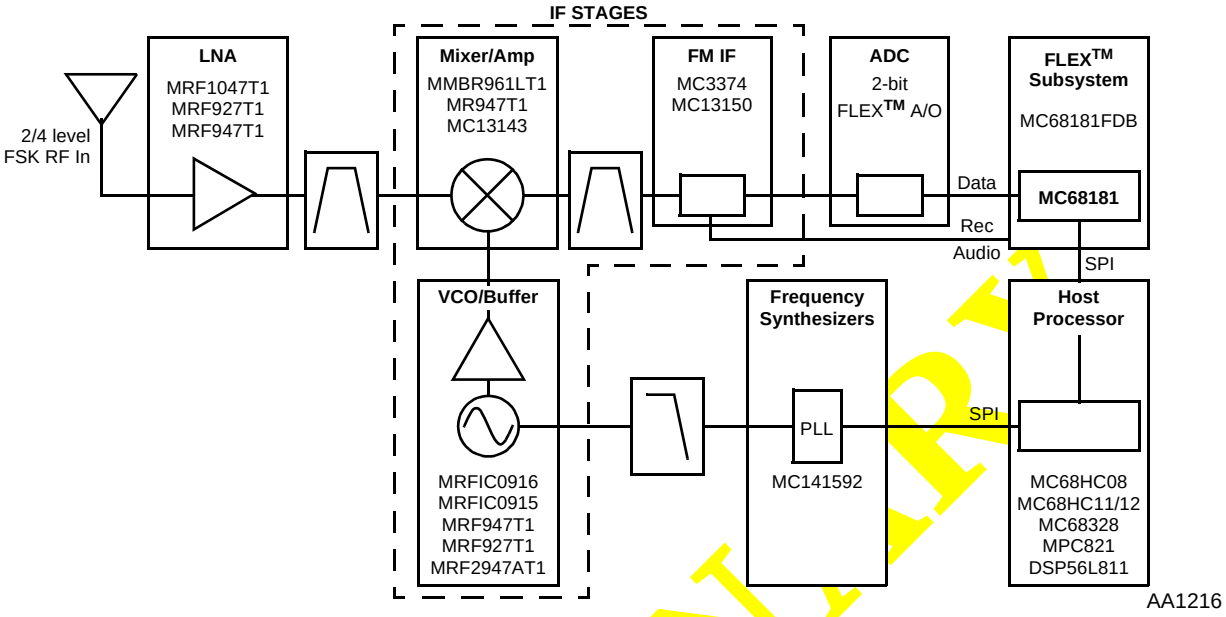

Figure 2 Roaming FLEX Receiver Block Diagram

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 FLEX chip IC. It runs on a product's host processor and communicates with the FLEX chip IC, fully controlling the receiver subsystem and interpreting the code words that are passed to the host from the FLEX chip IC.

FLEX protocol offers more than 10 times the data capacity of a POCSAG 512 bps system, and at least 12 times the fading protection. FLEX protocol operates at 1600, 3200, and 6400 bps, allowing a system to increase capacity as demands increase, without replacing or reconfiguring the pager units. FLEX protocol is synchronous—all data intended for a particular pager is scheduled in pre-defined time slots, so the receiver and host processor are only active when messages are scheduled for delivery.

ROAMING FLEX PROTOCOL

Roaming FLEX provides the ability to tune the receiver circuits into the required paging channel. This allows roaming in areas serviced by transmitters using different frequencies, or load balancing and reallocating where multiple frequencies are used to serve a single area.

When first acquiring a FLEX signal, the receiver is stepped through frequencies in the scan list, and the signal checked for FLEX information. The Roaming software checks the Network Identifier (NID) and Simulcast System Identifier (SSID), to determine the correct channel(s) to lock onto. During idle frames, other channels may be scanned for the presence of FLEX signals and alternate channels. FLEXstack software also captures Traffic Management Flags, assisting load management by shifting groups of subscribers between channels.

PRODUCT DOCUMENTATION

The manual listed in **Table 1** is required for a complete description of the MC68181 and is necessary to design properly 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.

Table 1 Additional Documentation

Document Name	Description	Order Number
MC68181 Technical Data	MC68181 features list and physical, electrical, timing, and package specifications	MC68181/D

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