

MN88413

Channel Decoder LSI for Digital Satellite Broadcast Reception

■ Overview

The MN88413 is a channel decoder LSI that integrates functions for digital satellite communications and broadcast reception on a single chip.

The MN88413 supports both the Digital Video Broadcast (DVB) and the Digital Satellite System (DSS®) specifications. It also supports a variable transport rate that can be set under program control using a fixed system clock frequency and can implement a channel decoder with a minimal number of external components.

■ Features

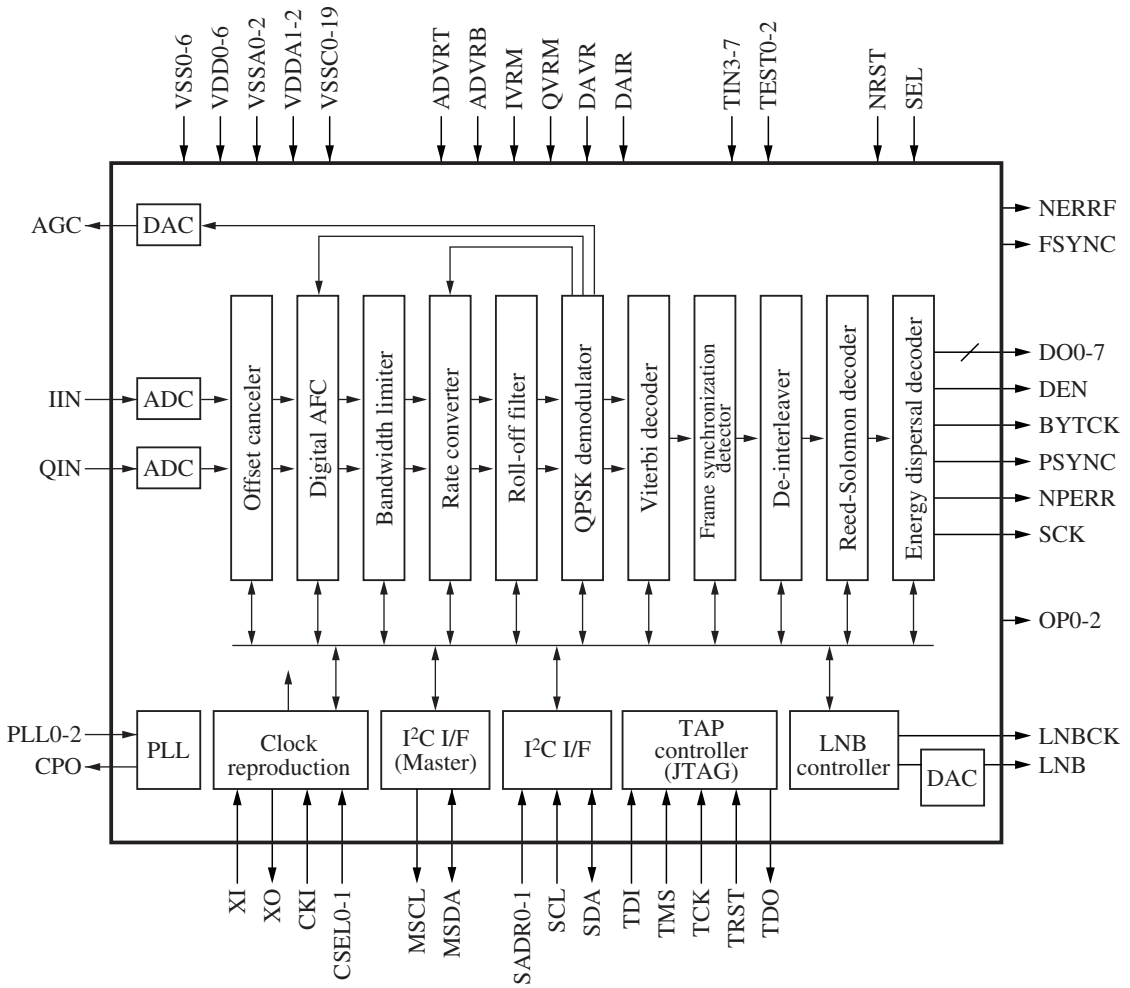
- Can be used in systems conforming to DVB, in US DIRECTV® systems, and in single carrier per channel (SCPC) communication systems.
- Integrates a 2-channel A/D converter, a variable rate QPSK demodulator, and forward error correction (FEC) on a single chip.
- Supports transfer rates from 1 Mbps to 90 Mbps.
- On-chip I/Q baseband signal offset voltage circuit and on-chip reference voltage circuit for the A/D and D/A converters.
- On-chip PLL circuit
- BER monitor function
- I²C bus master circuit for tuner control
- Supports LNB control clock and DiSEqC 1.0/1.1 and can output DiSEqC messages.
- General-purpose input and output ports
- On-chip boundary scan test circuit conforming to IEEE 1149.1

■ Applications

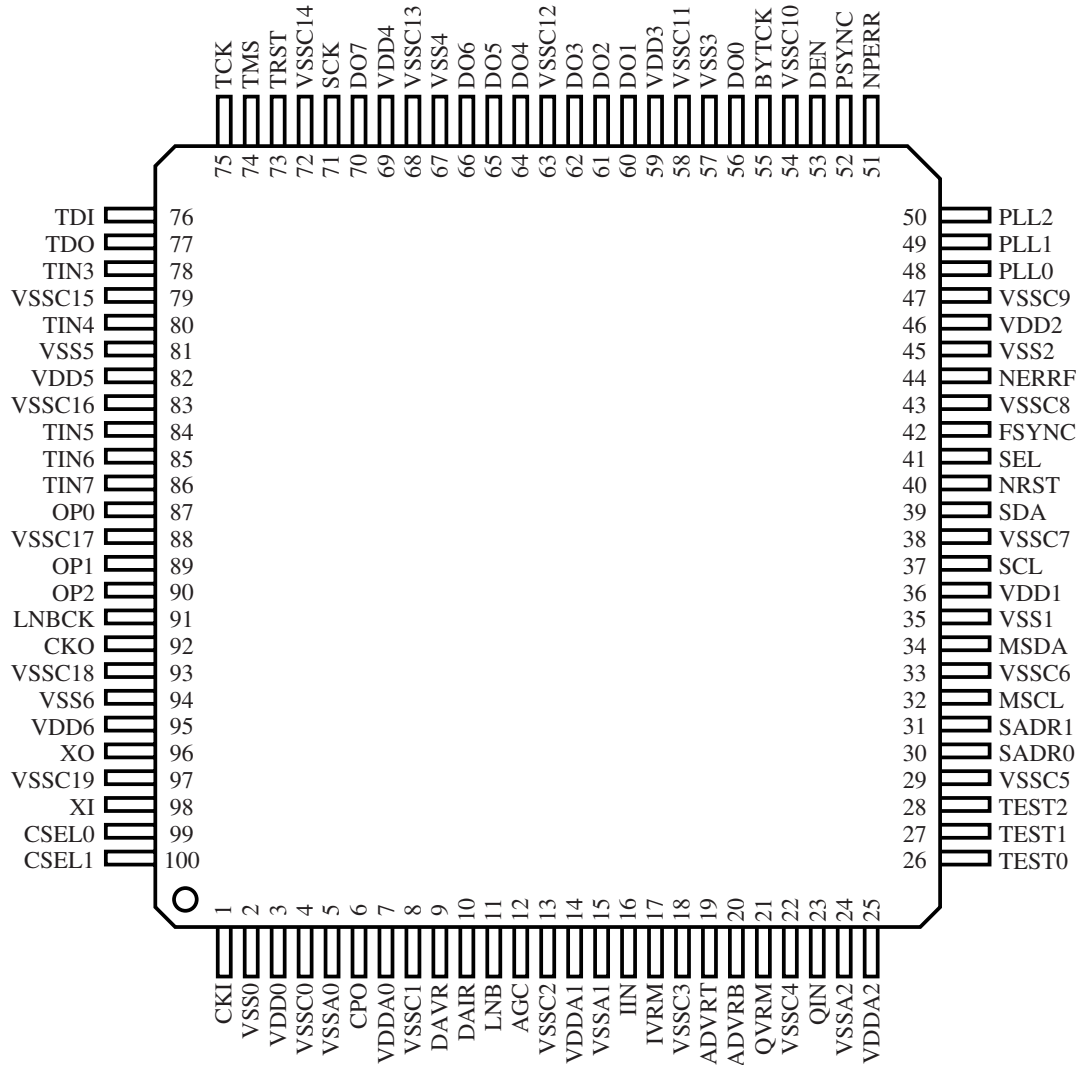
- Digital satellite broadcast receivers

Note: DSS® and DIRECTV® are registered trademarks of DIRECTV, Inc.

■ Block Diagram



■ Pin Assignment



■ Specifications Overview

- QPSK demodulator

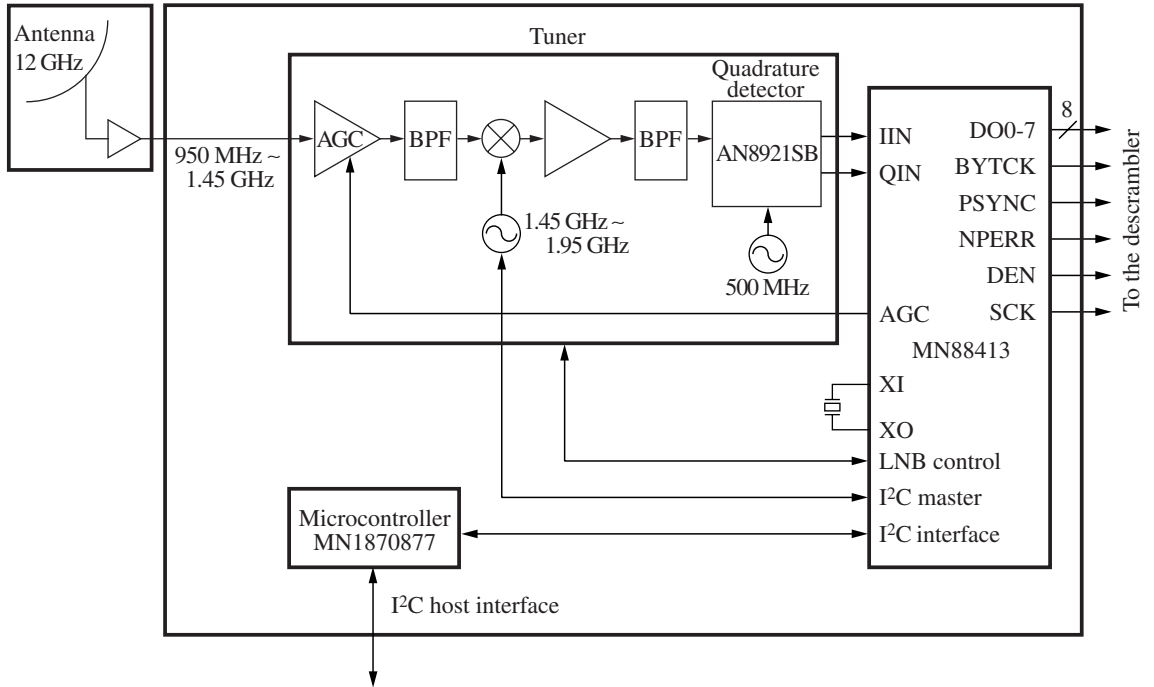
Data rate	: 1 Mbps to 90 Mbps
A/D converter resolution	: 6 bits
Linearity error	: ± 0.5 LSB (typical)
Differential linearity error	: ± 0.5 LSB (typical)
Input voltage level	: 1.5 V [p-p] (typical) [On-chip self-bias circuit]
Roll-off rate	: Switchable between the DVB and the DSS [®] specifications.
AFC range	: \pm (<symbol rate>/8)
Synchronization establishment time	: 100 ms or less.

D/A converter used for LNB/AFC and AGC

Resolution	: 8 bits
Linearity error	: ± 0.5 LSB (typical)
Differential linearity error	: ± 0.5 LSB (typical)
Output voltage level	: 1.0 V [p-p] (typical) [0.0 V to 1.0 V]

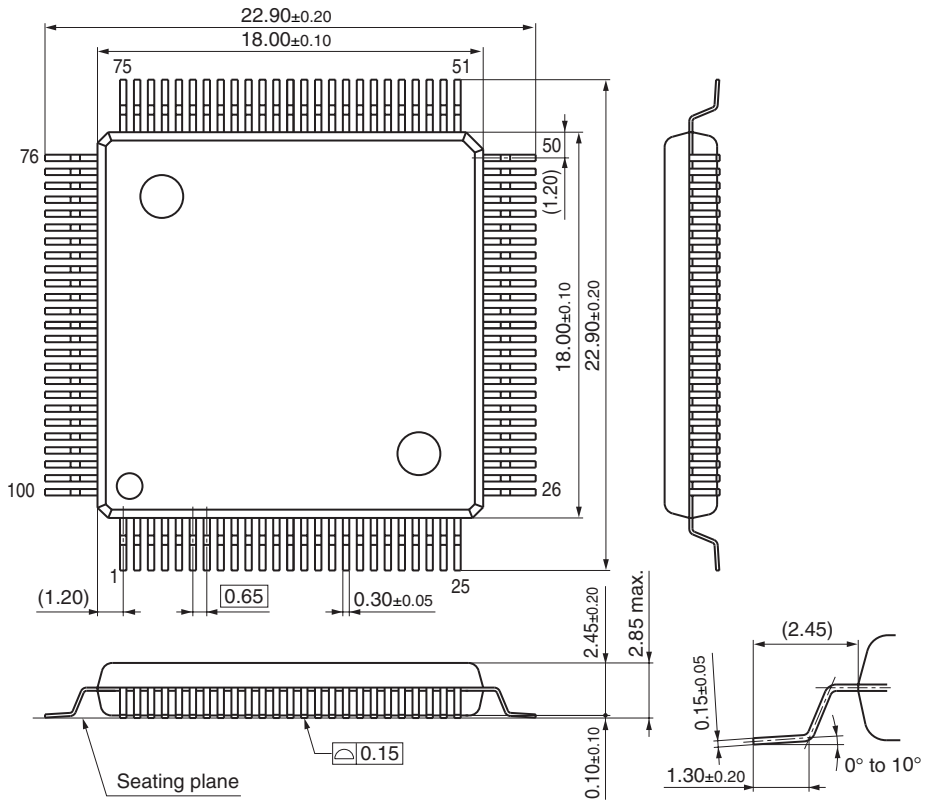
- Viterbi decoder : Switchable between the DVB and the DSS[®] specifications.
: Automatic detection of encoding ratios in the range 1/2 to 7/8.
: Auto-synchronous operation
- Frame synchronization detection, De-interleaver, Reed-Solomon decoding, and Energy dispersal : Switchable between the DVB and the DSS[®] specifications.
- PLL circuit : Reference clock input frequency: 4 MHz to 30 MHz
- CPU interface : I²C bus interface
- Supply voltage : 3.3 V ± 0.165 V
- Power dissipation : 990 mW (typical) [at VDD = 3.3 V, 60 Mbps, R = 7/8]
- Package : QFP100-P-1818B (18 \times 18 mm)

■ System Application Example



■ Package Dimensions (Unit: mm)

- QFP100-P-1818B (Lead-free package)



Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.
- (3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
 - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
 - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.
- (6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.
- (7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

- A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.
- B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.
- C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.