

Digital Satellite Broadcast Front End IC Supports both Japanese Digital Systems (BS and CS) in a Single Package

CXM3001R

The Japanese BS (broadcast satellite) digital TV broadcasting system started service last year, meaning that Japan has entered an era of full-fledged digital TV broadcasting.

In the near future, CS (communication satellite) digital TV broadcasting will begin from the new 110 degree east longitude satellite, providing further impetus towards the popularization of digital satellite broadcasting.

Thus we expect a wide range of new developments in the near future, such as viewing on data storage type set-top boxes and PCs.

The CXM3001R integrates almost all the required functions of a digital satellite broadcast receiver front end in a single package and can contribute to miniaturization and increased functionality in end products.

- Conforms to the BS digital standard (ISDB-S)
- Conforms to the digital CS standard (DVB-S) and supports the 110 degree east longitude satellite
- No external inductors or varactors required
- No 30 V tuning system power supply required
- Built-in waveform equalizer

Front End Functions Integrated on a Single IC

The CXM3001R integrates, on a single chip, all the functions required for digital satellite broadcast receiver, including a direct conversion circuit, a PLL for tuning, an 8PSK/QPSK demodulator, and an FEC. As a result, it can greatly reduce the number of external components used and contribute to miniaturization in end products. The CXM3001R supports not only Japan's BS digital broadcasts, but also the DVB-S standard and the 110 degree east longitude satellite that will soon start service.

No External Inductors or Varactors Required

Since all the inductors and varactors required by the high-frequency oscillator circuit in the direct conversion block are built in, no adjustment of the high-frequency circuit is required. As a result, the front end block, which is currently realized as a tuner pack or module, can now be implemented onboard.

No 30 V Tuning System Power Supply Required

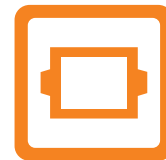
Until now, TV tuner ICs have required a 30 V power supply for tuning. However, this means that a special-purpose power supply is required when used in applications such as set-top boxes or PCs, resulting in higher parts counts and costs. However the CXM3001R includes a built-in oscillator circuit and does not require the 30 V power supply. Furthermore, since the direct conversion block includes a dedicated voltage regulator circuit, these circuits are not influenced by ripple and noise on the power supply lines, and the CXM3001R can easily be included in digital equipment such as PCs.

Built-in Waveform Equalizer

As opposed to conventional analog BS broadcast receivers, BS digital broadcast receivers are more easily influenced by the delayed wave reflections that occur in the antenna lines. As a result, reception can be difficult in larger apartment buildings that use a shared antenna system. To resolve this problem, the CXM3001R includes a built-in waveform equalizer in the demodulator block, and can provide stable reception in any environment. Furthermore, it has a ± 5 MHz automatic carrier recovery function and can automatically compensate for frequency offset in the antenna block.

V O I C E

TV tuner ICs up to now have had the problem that once the IC is complete, an extremely long time is required to adjust the external circuits. (This involves what is commonly known as "trial and error.") Since joining Sony, I had been solely involved with this type of high-frequency related work prior to this project, and I really enjoyed that type of work. However, since completing this IC, this role is no longer required. (The IC simply works as soon as it is installed on the PWB!) Although I'm proud of this IC I created, I'm going to miss the challenge of the adjustment process.



New
Products

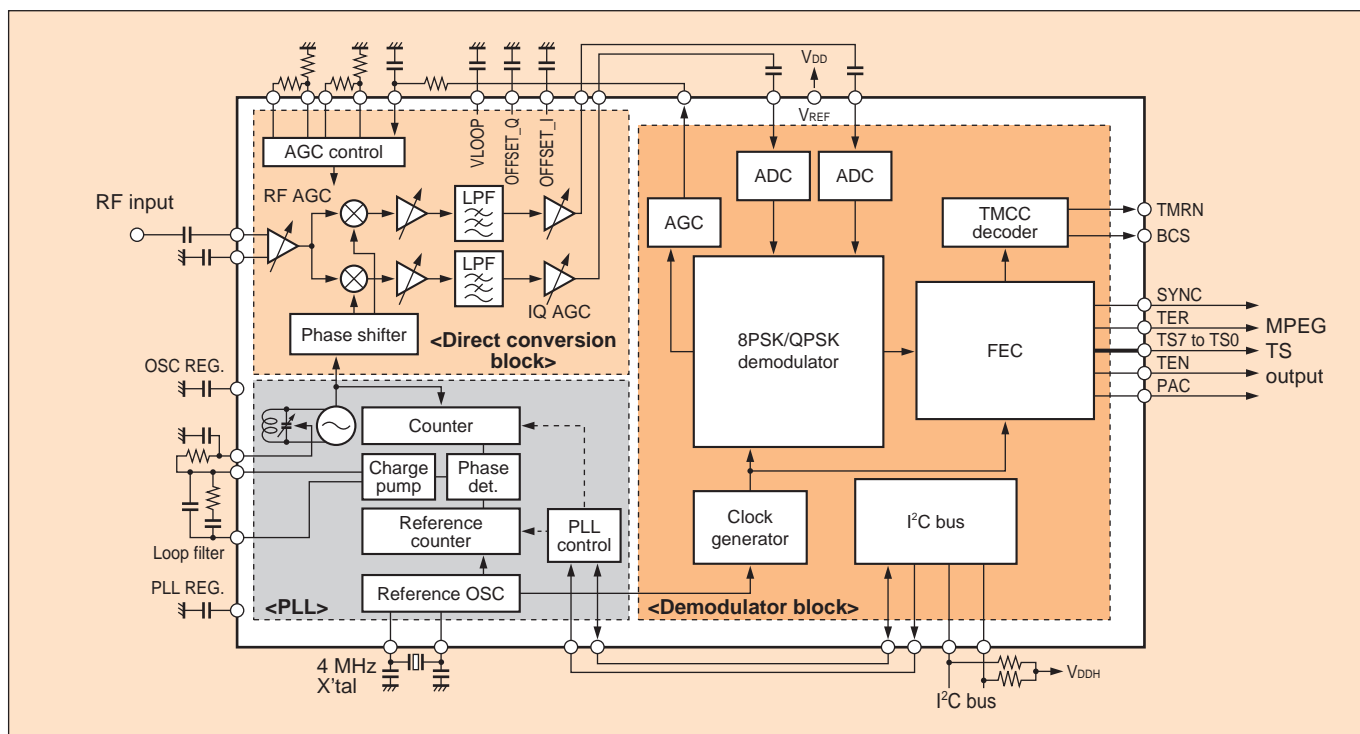


Figure 1 CXM3001R Block Diagram

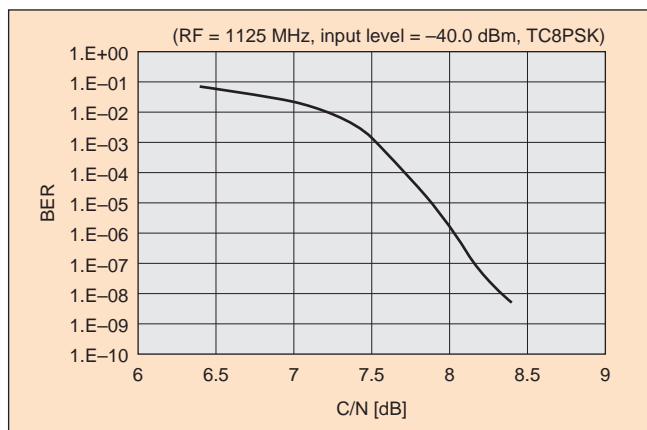


Figure 2 C/N vs. BER Characteristics

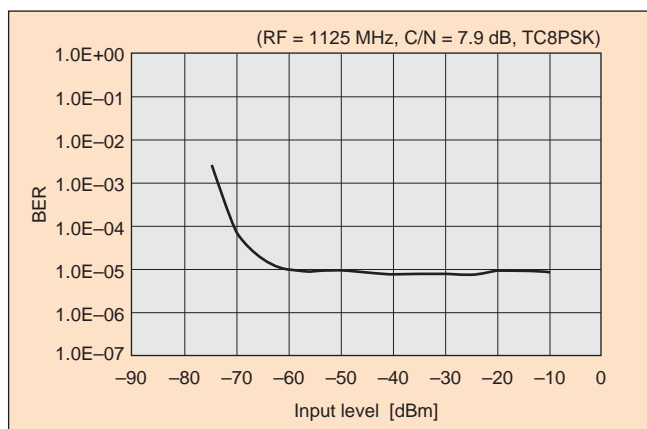
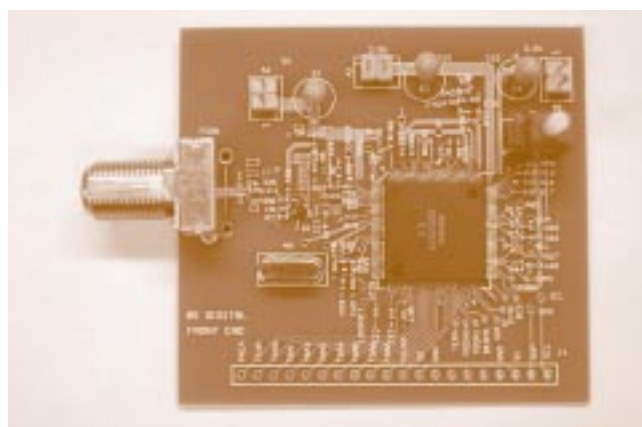


Figure 3 Input Level vs. BER Characteristics

Table 1 Main Specifications

Supply voltage	2.5 V, 3.3 V, 5 V
Package	120-pin LQFP
Reception frequency range	950 MHz to 2.15 GHz



Photograph 1 Mounted in an Actual Circuit