Low-Power Mobile TV Tuner IC
Allows Analog TV Reception on Cellular Phones

CXA3681ER

Although Sony has provided a wide range of TV tuner ICs for TV, VCR, set-top box and other products, Sony is now adding to their lineup for the first time a TV broadcast silicon tuner IC for mobile devices, the CXA3681ER. The CXA3681ER obviates the need for the external components (coils (inductors) and varactor diodes (capacitors)) previously required for the oscillator and tunable filter circuits in conventional TV tuner modules. This not only allows the creation of ultraminiature TV tuner modules, but also obviates the adjustment steps that were labor and time consuming in the manufacture of such TV tuner modules.
In addition, this device achieves low distortion and low power consumption with single 3.3 V power supply operation.

- **No external coils or varactors required for oscillator and tunable filter circuits**
- **Automatic band selector circuit covers the wide oscillator bandwidth**
- **Wide dynamic range RF gain control amplifier**
- **Low power: 300 mW**

No External Coils or Varactors Required for Oscillator and Tunable Filter Circuits

Until now, TV tuner ICs have adopted single conversion. This technique requires that oscillator and tunable filter tank circuits (including large air-core coils and varactor diodes that require a 30 V power supply) be mounted in the TV tuner module. The CXA3681ER, however, adopts double conversion, which does not require these external components. This allows extreme miniaturization of the TV tuner module and operation on a single 3.3 V power supply.
This also completely obviates the need for the labor and time intensive adjustment stage in the TV tuner module manufacturing line and can contribute to a significant reduction in production costs.

V O I C E

Although I enjoy watching soccer matches on TV, I've often wondered if it would be possible to watch the Japanese national team's matches while commuting by train. Now, having been part of the development team for the CXA3681ER, with the release of this device as a product, I have the pleasure of having realized this dream.
Although the many hurdles we faced, from improving the characteristics through mass production, were high, and we ran into many difficulties along the way, we succeeded in developing a superb product by combining the technological abilities of all the team members with our willingness to accept challenges without tiring. I strongly recommend that you look into this product.

Automatic Band Selector Circuit Covers the Wide Oscillator Bandwidth

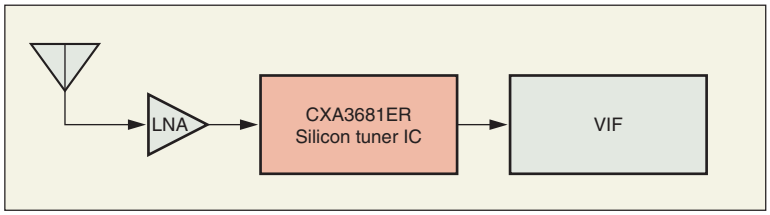
The CXA3681ER integrates both the upconverter and the downconverter oscillator circuits on the same chip and adopts an automatic band selection system in each.
By developing these automatic band selection circuits, Sony was able to implement oscillator circuits that support reception of wideband TV signals.

Wide Dynamic Range RF Gain Control Amplifier

By applying Sony's superlative BiCMOS process and RF circuit technologies, Sony was able to develop a low-power/high-performance RF gain control amplifier that can process, with low distortion, TV signals that require a wide dynamic range. This allows stable TV reception even in locations with extremely strong signal fields, such as the vicinity of a TV broadcasting tower.

Low Power: 300 mW

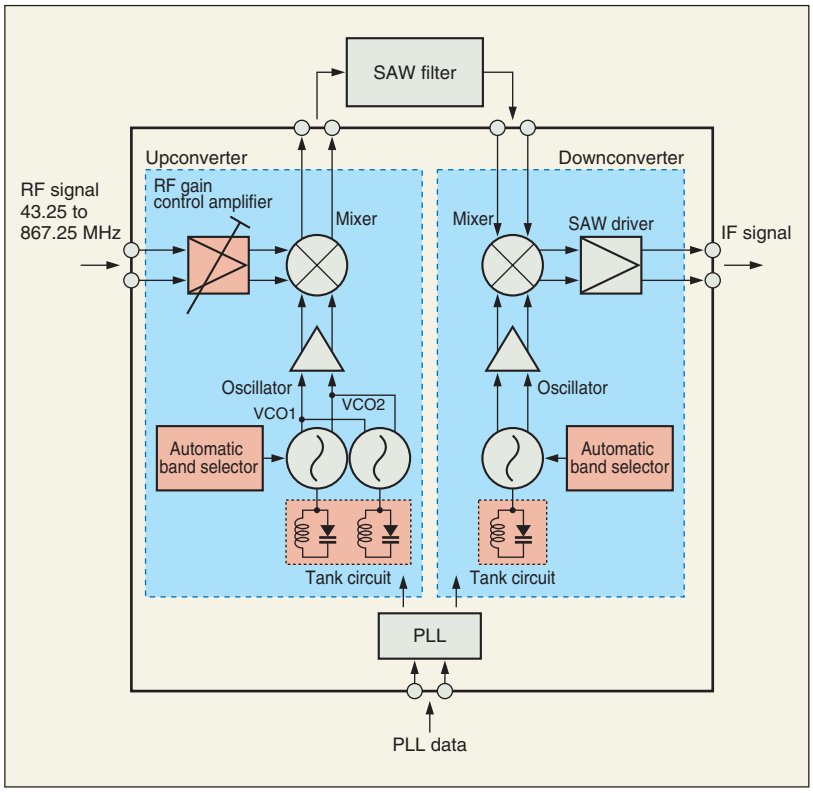
Sony's unique circuit technologies make it possible for the CXA3681ER to achieve the lowest power consumption of any analog TV silicon tuner IC. This can contribute to reduced battery drain in mobile equipment that provides this functionality.



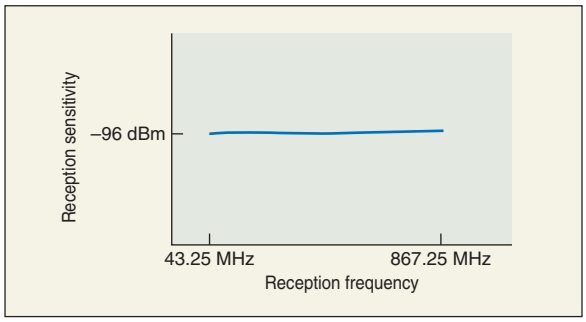
■ Figure 1 TV Reception System Structure Example

■ Table 1 Main Specifications

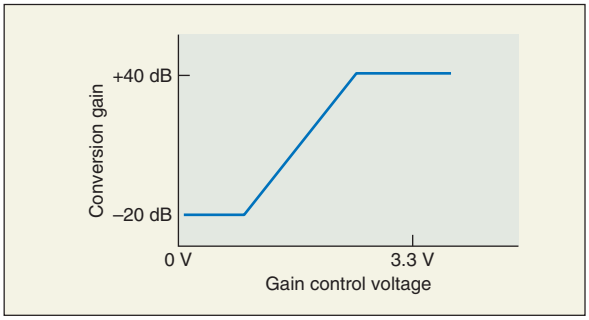
Supply voltage	Single 3.3 V power supply
Power consumption	Approx. 300 mW
RF frequency	43.25 to 867.25 MHz
Conversion gain	Approx. 40 dB



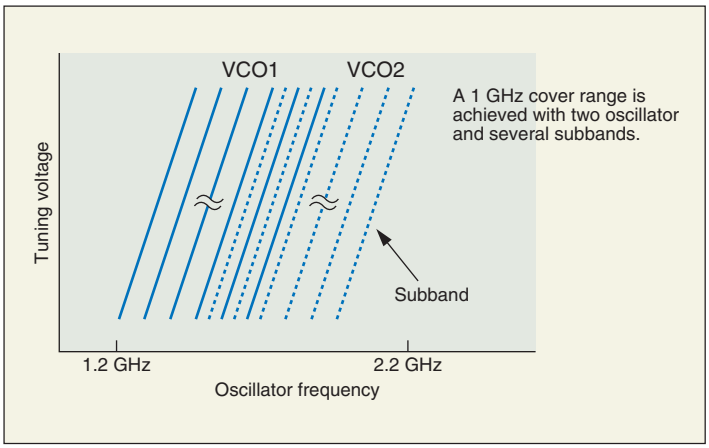
■ Figure 2 Main Block Diagram



■ Figure 3 Reception Sensitivity Characteristics



■ Figure 4 RF Gain Control Amplifier Characteristics



■ Figure 5 Upconverter Oscillator Tuning Characteristics

■ Photograph 1 Size Comparison between a CXA3681ER Based Tuner Module and a Conventional Miniature Tuner Module