

TUNER CHIPS ENABLE VIDEO, VOICE AND DATA SERVICE ON CHINA'S CABLE NETWORKS

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Set-top box manufacturers who select high-performance, low-cost silicon tuners can help cable operators in China satisfy consumer demands for voice, video, and Internet in challenging cable environments.

SUMMARY

The convergence of three networks is a good time to transition to silicon tuners, and Microtune tuners come with detailed reference designs that are field proven in the most demanding cable networks.

New government initiatives in China are creating great interest in offering video, data and voice over cable networks. Several major cities are expected to begin trials of these expanded services soon. Today, most cable set-top boxes in China include a single tuner that only receives cable TV signals. Soon, Chinese cable TV subscribers will also be able to bring high definition video, on-demand options, voice and high-speed Internet services into their homes through the cable TV set-top box.

The Cable Set-top Box will Evolve to a Multi-service Platform for Entertainment and Telecommunications

Set-top box capabilities will be expanded to support new functions:



- Multiple tuners for multiple simultaneous services
- More exacting tuner technical specs for dynamic range, distortion, and adjacent channel rejection
- Support for higher order modulation schemes and MPEG-4
- High definition video
- Digital video recording capability
- Digital telephone
- Embedded cable modem for fast internet access
- IPTV streaming

New set top boxes with integrated data modems are already being fielded in China, and these require multiple tuners in order to support video services, as well as data functions. New tiny silicon tuners can provide a size advantage, competitive price, and better performance than traditional can tuners for the support of these expanded services. Service providers can use set-top boxes that include these silicon tuners to deliver telecommunications, data, and entertainment in a single set-top box. However, it is important to know that not all silicon tuners perform the same. It is important for designers to choose the right silicon tuner to be sure of clear, reliable voice, video, and Internet signals, even in noisy or "dirty" cable environments.

The convergence of these three service offerings over cable networks is a good time to transition to silicon tuners, and Microtune tuners come with detailed reference designs and local design engineering help, even for networks with substantial interference issues. The right silicon tuner can offer a low-cost, high-reliability solution with the performance necessary to deliver services even in challenging environments. The right tuner provider can offer design assistance to make the change from traditional can tuners to silicon tuners much easier.

CONVERGENCE OF THREE SERVICES



The tuner is the key electronics component that enables high-performance signal reception. It has two important functions. First, it takes high frequencies from the cable plant installation and translates them to the lower frequencies that are used by the set top box to deliver video, voice or data. Second, it conditions the desired signal and it filters out unwanted channels and signals.

The quality of the tuner becomes even more important in areas with high levels of interference. High-performance silicon tuners designed to operate in cable environments with high interference or dirty plants must have good dynamic range, selectivity, and linearity. A high-quality tuner has good performance in all of these areas and enables high levels of dedicated bandwidth support for each subscriber.

A wide dynamic range allows the tuner to detect and handle very large and very small signals. The strength of the signal can vary depending on where the set top box is located on the cable plant. Good selectivity allows the tuner to discriminate a signal from nearby undesired channels or in-band interference. Linearity helps the tuner to maintain the quality of the original signal in order to minimize distortion of the signal.

In order to address network interference issues, Microtune tuners integrate ClearTune™ filtering technology, including a switched filter that works to attenuate out-of-band carriers. Large undesired channels transmitting directly adjacent to a desired channel are suppressed by external filters. ClearTune technology works with these filters to ensure reliable reception. This approach can significantly reduce impairments to audio and video signals, which has a direct impact on a customer's perception of signal quality.

Offering video, voice, and data services requires multiple tuners in a single set-top box so tuner reliability becomes even more important to the overall reliability of the set top box. The tuners used in multiple-tuner designs also need to be cost-effective. Silicon tuners provide high-quality performance in a small footprint. They offer the best cost versus performance because they are reliable, available in high-volume pricing, and proven to deliver the signal in the most challenging of cable networks.

In a traditional single-tuner set top box, routing the input signal to the tuner is quite simple. However, when multiple tuners are deployed in a single set top box, it is important to carefully divide the signal to each of the tuners. The right tuner partner with experienced local support can help set top box designers choose the best design to keep noise figure low so the performance of the cascading tuners is ensured.

Proven Technology

Silicon tuners have been deployed in millions of set-top boxes and cable modems worldwide, including China. For example, the low-cost Microtune MT2066 tuner chip was designed for China, and it is already deployed in the Chinese cable market both in major cities and in rural locations. Microtune tuners are also widely deployed by international set-top box manufacturers such as Cisco, Panasonic and Samsung.

Microtune pioneered multi-tuner technology for the set-top box and has worked with set-top box designers and service providers around the world to develop specialized silicon tuners that work in all cable network environments. Microtune tuners have been proven in both

DOCSIS® 2.0 and DOCSIS 3.0 cable modem and set-top box designs that support the convergence of video, voice and data networks.

Summary of Advantages – Silicon Tuners over Can Tuners

Silicon tuners have proven advantages over can tuners in the convergence of three services:

- Low cost due to modern silicon processes
- Better reliability (a can tuner can have a defective rate of 3000ppm, while Microtune's silicon tuner defective rates are closer to 20 to 30ppm. They are also resistant to mechanical and temperature stresses that can cause tracking filter coils to drift out of tune.)
- Easy to design on board using available reference designs and local technical support
- Smaller footprint and board area. For example, the MT2066 silicon tuner designed for the Chinese market is 6.35mm²



Microtune's Differentiating Advantages for Cable Equipment Suppliers

Inventor of the single-chip TV tuner and today's market leader

- 84 patents
- More than 172 million tuners shipped
- Only company to ship high volumes of silicon tuners and demodulator chips in China
- Key customers are worldwide market and brand leaders

World-class quality, operations and support infrastructure

- Local sales and design team
- Local field application engineers and application engineers
- Complete in-house lab equipment to provide local customer service, including product evaluation, design review, testing, measurement, field test support, performance enhancement and production

The Future of Chinese Cable

As Chinese cable operators plan for the upcoming trials and then nationwide deployment of the convergence of three networks, those who deploy set-top boxes that include high-performance, low-cost silicon tuners can improve their services, increase revenue, and provide a better experience for customers. Using silicon tuners such as the MT2066, tomorrow's Chinese cable set top boxes will be able to deliver high-definition cable television channels, high-speed Internet data, voice over Internet protocol, as well as support picture-in-picture, watch and record, on-demand programming, and in-home networking applications.

The transition to a silicon tuner does not have to be costly or risky, if manufacturers select proven tuner technology from a dependable tuner vendor. Set top box manufacturers should evaluate the performance, technical support, and cost of each tuner option to find the best solution for the convergence of three networks.