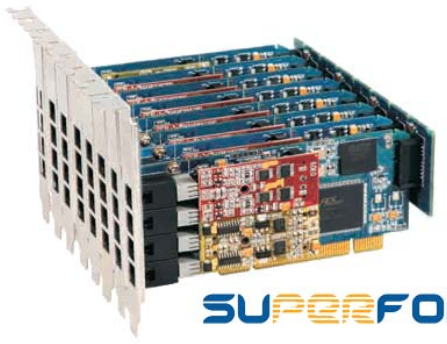
Value Maximum Beyond Tomorrow

# Introduction about SuPerForm™

Synway, an innovative player of providing superior media processing & signaling technologies as well as high-performance CTI components in use for convergence (voice/data/video) communications for CTI software developers and system integrators worldwide, has leveraged its own patent-owned DSP algorithm SuPerForm™, to realize the superior auto-adaptive echo cancellation in any complex networks. All Synway's products support echo cancellation capabilities, up to 128ms, and are suitable for most traditional PSTN applications and new-generation IP applications.




*SuPerForm™ assures superior voice quality and echo cancellation*

*High-adjustability, original and complimentary SuPerFormTM, built on Synway-owned, certified DSP algorithm and carrier-grade applications, can be "automatic adaptability" optimized by site environments for the unmatched voice enhancements(over 128ms echo tail), accurate DTMF/tone detection, conferencing efficiency.*

For that, Synway's engineers have resolved the echo's negative impact on signal tone detection, DTMF detection, energy detection and audio recognition. Specifically, many existing enterprise/Telco solution developers have approved the performance of the SuPerForm™ while they struggle to eliminate echo in field applications for superior audio quality and voice enhancements. SuPerForm™ is the most rugged, Synway patent-owned echo cancellation technology (adapted to the most complex networks and over half a million channels installed worldwide);

Regarding to customer experience, field feedback and large-scale installations worldwide, SuPerForm™ characteristics can be summarized as follows:

- High adjustability: can be "adaptability" optimized by site environments for the unmatched voice enhancements, and automatically adapt to any complex situation;
- Originality and customizability: SuPerForm™ is Synway-owned and solidly rooted in certified DSP algorithm and carrier-grade applications. For its high flexibility, it can be customized;
- Complimentary: DSP algorithm at SuPerForm™ is Synway's robust, high-performance aid to improve your differentiation advantages.

# Key features of SuPerForm™

With more and more solution providers expanding business to IP media server, IP cal center, IP gateway and other IP value-added service, Synway has further powered the capability of echo cancellation by taking advantage of its unique expertise. Today, more CTI applications and services have been used in hybrid IP and PSTN situations. Coordinated with customer needs, Synway traditional PSTN product lines, its new generation IP series, and Asterisk open source components/appliances, have first been optimized for unmatched capabilities of echo elimination in complex network.

The following graph illustrates the general calling environment between traditional phone side and VoIP soft terminal one, and the data flowing in a gateway system based on Synway SHN board and SHT board. The echo is produced in the voice transference across Internet and Gateway between two terminals, with the signaling transferred over Internet, the echo in VoIP network is up to 2-times as delay as that in PSTN scenario, generally it will reach hundreds milliseconds or above one second, the callers can easily detect the existence of echo, and seriously influence call quality.

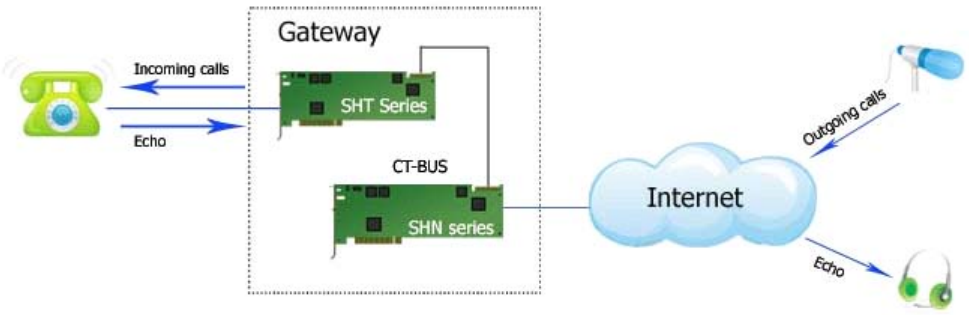



*Figure 1*

Here is a typical application case: with enhanced echo cancellation capability on Synway's SHT series board, Synway's hardware architecture can cancel the echo from (traditional) phone calling side to the VoIP soft terminal, and so further eliminate the root cause for negative echo impact. If a speaker is installed on VoIP soft terminal, echo cancellation must be achieved on VoIP soft terminal to ensure the audio signal through the speaker does not return to the listener. Regarding to the "Phone to Phone" VoIP system (which is defined as "Internet network connects PSTN phones on both callingout and receiving terminals"), the Echo cancellation capability is required at the both gateway terminals to ensure the quality of call conversation.

Synway has intensively allocated technical resources to improve products' performance in echo cancellation (EC), and its enhanced EC resources have the following special advantages:

- Empower the echo cancellation capability to 128ms, and can cancel echo effect in any extreme environment, including long distance and hybrid network;

- Due to SuPerForm™ , any systems based on Synway's hardware platform can perform high-quality echo cancellation and voice processing capability.
- The new released Asterisk hardware architectures from Synway are matchless in cost-efficiency and performance with the new EC enhancement complimentary.

To better understand SuPerForm™ 's technical performance, its built-in functional modules are introduced briefly here:

- Auto-adaptive Filter: the core component of echo cancellation, and can simulate characteristics of echo-relative channel automatically, and generate echo-canceling signaling to eliminate echo by synchronizing with the original signaling. The auto-adaptive filter on Synway hardware platform has 512-1,024 delay units, and time delay on the longest corresponding echo-relative channel is between 32ms and 128ms.
- Controller of auto-adaptive filter: The algorithm of controller, as the core technology of echo cancellation, relates to quality and stability of echo cancellation. The controller dynamically monitors source of echo generation and cancel echos, once parameters from the auto adaptive filter are updated (the parameters are dynamically adjusted while echo occurs in a channel. Note that paired telephony lines and telephone sets have corresponding echo channels). When parameters are updated by source other than echo (noise or signaling and etc.), the controller will detect and assure that parameters are not adjusted, in which would avoid intensifying echo. The accuracy rate of controller developed by Synway has been up to 5SIGMA (99.98%, only 23ms defect rate in every 100 second conversation).
- Non-linear Processor (NLP): NLP module can eliminate the echo residual to improve the conversation quality at maximum.
- Comfort Noise Generator (CNG): quick fading of normal background noise causes very undesirable noise to reduce the voice clearness. The purpose of the Synway CNG module is to generate noise to synchronize with the background noise, which improves voice quality.

According to the field test by worldwide users, Synway's SuPerForm™ have been confirmed with high quality performance and reliability in a variety of application environments, such as VoIP gateway, IP PBX and any other IP-based applications.