Cermetek microelectronics

Reference Note #105:

Comparative Features and Benefits Review:
Internet Modems versus Standard Analog Modems

INTRODUCTION

Reference Note # 105 contains a series of brief comments which describe the features and benefits associated with internet modems (iModems) and compares them to standard analog modems. The comments contained herein are not exhaustive and are intended primarily to serve as a comparative guide to assist those customers considering establishing a network of field deployed devices.

COMPARATIVE REVIEW

Comment 1: Internet Modems Use The Existing Internet Infrastructure And Do Not Require An On-Site Central Host. Internet enabled modems (iModem) eliminate the need for on-site central hosts and the attendant racks of modems required by analog modems. This, in turn, eliminates the need for costly network hardware and the associated maintenance costs. Additionally, standard analog modem networks require trained personnel to monitor and maintain the on-site central host and often require specialized or custom software. In contrast, internet modems use the existing internet email infrastructure and well established internet protocols to SEND and RETRIEVE email, and do not require specialized or custom networking software.

Comment 2: Information Sent As Email Packets Using The iModem Are Cached Whereas Standard Analog Modems Require Real Time Communication. All iModem messages are routed via the internet and cached at the local ISP server. This eliminates the need for real time communication and the problems associated with BUSY signals and NO answer conditions. Further, every Cermetek iModem product contains an auto re-dial feature and an alternate email transmission channel feature (**FailSafe™ Back Channel** feature currently available for US and Canadian installed locations only). These features ensure that virtually every email message sent will reach its intended destination without intervention by the resident application.

Comment 3: Long Distance Calling Expenses Are Significantly Reduced With iModems. With standard analog modems, all non-local communications incur long distance telephone charges. With the iModem, most communications are local because the iModem uses a local access ISP gateway. Cermetek's **iModem.net** ISP has about 3000 local access numbers in the US and over 1000 additional local access numbers worldwide. The alternate email transmission channel feature (**FailSafe™ Back Channel** feature currently available for US and Canadian iModem installed locations only) routes calls via a toll free number directly to Cermetek's **iModem.net** ISP.

Comment 4: Standard Analog Modems Require A Point To Point Message Transmission Environment. Using the iModem and Cermetek's **iModem.net** ISP, each email message can be sent to multiple destinations, and to multiple recipients, in email form, and also via FAX and voice messaging simultaneously. This eliminates the need for an on-site central host to distribute messages. Email messages are easily retrieved using standard PC hardware and software.

Comment 5: Standard Analog Modem Networks Require Substantial Amounts Of Message Storage Resident At The Central Host. With standard analog modems, all messages must be sent to the on-site central host in real time and must be stored locally on the central host. This requires the central host to have adequate storage, to have hardware redundancy to protect against hardware failures and to have UPS battery or emergency power back up systems. With email, the internet caches all messages at the local ISP server site until retrieved by the user. The **iModem.net** ISP, as with all ISP's, contains hardware redundancy for email storage. Additionally, local ISP servers are typically installed in secure sites that provide emergency power back up and real time maintenance and support.

Comment 6: iModems Allow Unattended Operation And Send Pre-Stored Messages That Do Not Depend On The Resident Application's Intelligence And Control Capabilities. Each iModem is self contained, and imbued with the ability to both SEND and RETRIEVE (depending on the model) emails using the appropriate internet protocols while requiring little or no external control. The native intelligence of the iModem allows for non-volatile storage of: pre-composed messages, local access dial-up telephone numbers, resident/destination email addresses, account ID/password and other parameters. With the iModem, a pre-stored message can be sent on a contact closure event or by executing a single software command. Additionally, the pre-stored message may be dynamically

modified to include new information, if desired. Cermetek iModem operation occurs independent of the resident application. By contrast, standard analog modems require the resident application to exercise continuous software control of the analog modem via AT commands executed by the resident application. Consequently, standard analog modems place additional performance demands on the resident processor and may unnecessarily increase the cost of implementation at the product level.

Comment 7: iModem Networks Provide Low Fixed Cost Network Solutions That Have Very Predictable Variable Costs. The communications cost of maintaining a product in the field is finite whether it is an iModem or a standard analog modem. However, with a standard analog modem network, not only are there the unpredictable and variable long distance telephone charges incurred when field deployed devices communicate with the on-site central host, there are also substantial fixed costs associated with the racks of modems and telephone line trunks. Further, standard analog modem networks have significant maintenance and personnel costs. With an iModem network there is only the monthly ISP charges. In fact, the incremental costs for an iModem network can be near zero if the OEM already operates an ISP; or $2/month per unit if Cermetek's **iModem.net** ISP is used to convey the email traffic. IModem networks allow for a low fixed, predictable monthly cost which can be ascribed to each device and, where appropriate, passed on to the end user.

Comment 8: Non-Real Time Cached Email Message Traffic Is Ideally Suited For Large Installed Bases Of Products When The Installed Products Are Required To Communicate At Regular Intervals. With standard analog modems, a large installed base of modems that report at periodic intervals must have the intervals staggered or the incoming telephone traffic will create a large, temporary demand for local bandwidth at the on-site central host. Servicing this temporary bandwidth requirement forces the installation of excess modem and telephone line capacity at the central host. Even with time-distributed communication, the possibility of traffic congestion and the unreliability of coincidence collisions increases as the installed base increases. With email messages, all field deployed iModems can send periodic emails at the exact same time and the email will be delivered to the specified destination email box without concern for bandwidth limitations. With iModems, a large installed base benefits from the distributed nature of the local access POP gateway numbers and the large bandwidth of the Internet.

Comment 9: Polling Of Large Numbers Of Field Installed Devices Is Easier When The Devices Are iModems. It is often required to poll a large number of field deployed devices for the purpose of updating software or retrieving accumulated data. This can be done by sending an email to each device. The email is cached by the local ISP server and the iModem retrieves the email when needed (or at a predetermined interval). The retrieval process utilizes local access ISP gateways. All iModem devices may call simultaneous, if desired, without concern because the calls are spread over many local ISP gateways, each capable of handling thousands of incoming calls simultaneous. Once retrieved by the iModem, the information contained in the email is passed on to the resident application for further processing. With a standard analog modem, the on-site central host must contact each device individually. If a particular field modem is unavailable because it is not on line, or busy due to a shared telephone line, the central site must retry the communication. This can be burdensome and time consuming especially as the size of the installed base increases.

Comment 10: Remote Download Of Field Upgradeable Parameters. Certain parameters must be programmed into the iModem to create its internet personality. Among these are: account ID/password, local access dial-up phone number and destination email address. Occasionally, these parameters require modification after installation. The Cermetek iModem allows remote access under protected administrative control so that these parameters may be modified while the iModems are still in the field. This capability avoids costly field service calls, reduces the need to return field deployed products to the factory for modification and provides the end user with a faster response time. Standard analog modem set-up parameters are not remotely re-configurable and cannot provide this level of remote field service access.

Comment 11: Transparent migration path to higher speed iModems and more advanced service features. Cermetek's iModem devices are pin compatible. Consequently, a user starting with 2400 bps iModems can upgrade to higher speed iModem devices when required without modifying existing PCB layouts. Further, as new capabilities are added to the **iModem.net** ISP, the field deployed units can use these features simply by remotely changing the iModem parameters.

Comment 12: Competitive advantages of an iModem network. When an iModem is designed into a product as the preferred communications method, the product end user immediately understands the communication methodology. Email is intuitive, flexible and universally pervasive. Further, every PC sends and receives email, which means any PC can be used to communicate with field deployed iModem devices. This is compared to defining, building, maintaining and learning a central site custom network system as is required for the case of standard analog

modems. The Cermetek iModem device and associated **iModem.net** ISP features allow products using iModems to be favorably differentiated from their non-internet capable standard analog modem competitors.