SIEMENS

Reseller Learning Zone

Application No: 2301

- HG 1500 Card

  General Overview

June 2003

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The purpose of this Sales and Applications Note is to provide background information, technical and configuration details and general guidance to reseller sales staff when providing VOIP solutions. It complements the information provided on the HG 1500 sales training course.

History

The HG (HiPath Gateway) 1500 card was first introduced in the autumn of 2000 for use with version 2.2 Hicom Office and was originally known as the Xpress@LAN card. There were two hardware versions of the card, one for the Hicom Office Point / Com and one for the Hicom Office Pro. In technical circles the former card is also known as the HXGS and the latter as the HXGM.

The primary application provided by the card at that time was support for the optiPoint 300 Advanced IP handset and optiClient 130 soft client. Later in that year the Xpress@LAN card changed its name to the HG 1500 card and with the introduction of HiPath 150 H in the August of 2001, became able to support IP networking. Version 2 of the card providing a second Ethernet connection was released in late 2001.

Technical details

Hardware - the current HG 1500 card continues to be provided in 2 basic hardware versions one for the HiPath 33/35XX (small format card - HXGS2) and one for the 37XX (large format card - HXGM2). Each card utilises a card slot in the HiPath 3000 chassis. Each HG 1500 card has a unique MAC address.

Connection from the card to the customers LAN infrastructure is via a standard RJ 45 patch lead. Each card is has 2 connectors, the first being a 10 Mbit Ethernet connector and the second a 10/100 Mbit auto sensing Ethernet connector (the first connector is not generally used in the UK). Each card also has a SLIP connector for initial configuration.

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B channels

The HG 1500 Card uses B Channels to communicate between itself and other devices on the HiPath 3000. Cards are pre configured with either 2, 8 or 16 B channels. Additional B channels can be configured (in steps of 2) using licensing codes which are issued against the MAC address of the card. The maximum B channels per card is 16. It should be noted that on HiPath 37XX all 16 B channels can be used for VOIP related calls but on the 33XX and 35XX only 8 can be used (the rest are used for non VOIP data connection).

Therefore in VOIP only configurations the provision of more than 8 channels on 33XX and 35XX would be pointless.

DSP Chipsets

DSP stands for Digital Signalling Processor and are used to convert standard TDM voice information into IP packets. The small format HG 1500 card used on the HiPath 33XX/35XX has 4 of these Chipsets and the large format HG 1500 card as used on the HiPath 37XX has 8. Each DSP can handle up to 2 simultaneous VOIP calls. DSP chipsets are not used on non VOIP calls.

Analogue Modems

Each HG 1500 card has a number of in built analogue modem chipsets which are used to support analogue RAS (Remote Access Server) and Group 3 analogue FAX access. The small config card used by the HiPath 33XX / 35XX has 2 analogue modems and the large format card used on the HiPath 37XX has 3. Where more than one HG 1500 card is used the modem chipsets will be pooled.

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It should be noted that the maximum combined analogue RAS/FAX calls to or from the HiPath 3000 can not exceed the maximum number of modem chipsets available.

Voice Encoding

The HG 1500 card has 2 encoding codecs available. These are G711 and G723.1. G711 requires 64K Bit of bandwidth in each direction of transmission. With IP packet overhead this is increased to approx 80K Bit (i.e. a total of approx 160K Bits over the LAN). G723.1 compresses voice to 6.3 KBit in each direction of transmission which increases to approx 24KBit when IP packet overheads are added (i.e. a total of approx 48KBits over the LAN).

QOS (Quality Of Service)

The HG 1500 card supports IEEE 802.1 P/Q, Diff Serv (Differentiated Services) and ToS (Type of Service) QOS protocols. It should be noted that, for QOS to be effective, all equipment in the IP network used in switching / routing of voice packets will need to conform to the relevant QOS protocol (QOS aware).

ISDN Router protocols

The HG 1500 card uses PAP (Password authentication Protocol) and CHAP (Challenge Handshake authentication Protocol). Access Control Facilities (Firewall Filtering) include CLI verification, automatic call-back to authorised numbers, IP or IPX verification and verification of the MAC address and IP combination.

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Payload Switching

Payload Switching (also known as Peer to Peer working) was implemented from Version 3 HiPath 3000.

IP Adapters / Clients / Telephones

IP Adapter

The IP adapter enabled a conventional optiset / optiPoint telephone to be converted to an IP handset that could be connected directly into an IP infrastructure. Supported on HiPath 150H and HiPath 3000 Version 1.2. Not supported on HiPath 3000 version 3 onwards. Supports G711 codec only. Not supported on HiPath 3000 V3 onwards.

IP Client – optiClient 130

Supported on Hicom 150H and HiPath 3000. First version (V1) used Java and was resource hungry. V2 launched in late 2001 uses less resources and quicker to load. Two modes of operation available. The first, known as optiClient phone interface provides a virtual handset identical in looks and operation to an optiPoint handset (including up to 4 16 button add on modules). In addition has its own directory and multiple missed call list. The second is known as optiClient office interface and provides a more open and flexible interface. optiClient 130 is TAPI compliant. Dialling from MS Outlook database is possible but for incoming calls to automatically pop MS Outlook then ARC screenpop is required.

One copy of optiClient 130 is provided FOC with each HG1500 card.

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IP Telephones – optiPoint 300 advanced

Limited features and functionality – withdrawn end 2001

IP Telephones - optiPoint 400 HFA (standard and economy) and optiPoint 600 HFA

Based on H 323 compliant optiPoint 400 handset but enhanced using HFA (Hipath Feature Access) internal software. Features similar to optiPoint 500 (TDM) handset. OptiPoint 400 standard supports full handsfree working and Incorporates a 10/100 base T switched hub. optiPoint 400 economy has a loudspeaker but no microphone and does not incorporate the switched hub. optiPoint 600 has similar functionality to the 400 standard but has dual TDM / IP capability with a large touch sensitive display. All handsets support G711 / G723.1 and QOS.

Configurations

The following are the maximum configurations for HG1500 cards and IP workpoint clients (optipoint 400 / 600 and optiClient 130).

HiPath 150H and HiPath 3000 version 1.2

Office Point / HiPath 33XX 1 card
            16 IP devices per card (overall system maximum 16)
Office Com / HiPath 35XX 2 cards
            16 IP devices per card (overall system maximum 32)
Office Pro / HiPath 37XX   3 cards
            48 IP devices per card (overall system maximum 144)

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HiPath 3000 version 3

HiPath 33XX 2 cards   48 IP devices per card (overall maximum 96)
HiPath 35XX 4 cards   48 IP devices per card (overall maximum 192)
HiPath 37XX 8* cards   96 IP devices per card (overall maximum 500)

*The maximum amount of HG 1500 cards in any one cabinet is limited to 6

IP workpoints – calculation of HG 1500 B-channels (from V3 software)

The following table lists the **minimum** recommended B-channels required for IP workpoints clients.

IP workpoints clients in system	Required number of B-channels
0 - 3	2
4 - 12	4
13 - 16	6
17 - 32	8
39 - 54	10
55 - 70	12
71- 76	14
87- 96	15*

Thereafter 2 B-channels for every 15 IP workpoint clients. Please note that in high traffic environments the number of B channels will need to be increased.

*The last channel is used to connect MOH to IP workpoints.

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Workpoint client licensing (HiPath 3000 V3 onwards)

From version 3.0 HiPath 3000 workpoint clients are licensed. Workpoint client licenses are issued against the MAC address of the HG 1500 card and are available in the following options.

- 1 workpoint client licence
- 10 workpoint client licence
- 25 workpoint client licence
- 50 workpoint client licence
- 100 workpoint client licence

2 singe workpoint client licences are provided FOC with each card.

The following information will prove a useful reference when providing VOIP solutions.

IP Trunking – CorNet N

Regardless of the connect type (i.e. via fixed IP link or dial up ISDN) the signalling used is CorNet N.   This is a Siemens proprietary protocol providing a high level of feature transparency between Siemens PBX's. CorNet N signalling is also used on conventional voice (TDM) links between Siemens telephone systems and the level of functionality is identical.

It should be noted that IP trunking is only supported between HiPath 3000 / HiPath 150H systems with up to a maximum of 16 nodes. **A CMS (Clock Module Small) is required at all connected nodes.**

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CorNet N feature set between HiPath 3000 systems include:

Hold / Enquiry
Transfer
Conference
Call back
Camp on
Message Send (not absence messaging)
Internal name
External CLI Break Out
Centralised VM

Dial up IP Trunking – B-channel usage

When using IP trunking over dial up ISDN up to 5 calls can be funnelled down a single 64K ISDN B channel. However for each call in progress a B-channel is required on the HG 1500 card. In addition a single channel is required to provide a signalling link. E.g. if 5 calls are funnelled down a single 64K ISDN B-channel than a total of 6 HG1500 B channels will be needed, 1 for signalling and 5 for the actual calls. If 2 calls were funnelled down the single ISDN B-channel a total of 3 HG1500 b-channels would be needed, 1 for signalling and the other 2 for the calls. This consideration applies to both the HG 1500 cards (1 at each end of the link).

Note: Voice compression will tend to degrade the overall quality of a call. The more calls compressed down a single link the greater the reduction in the voice quality.

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Dynamic Host Configuration Protocol

Both the optiPoint 130 and optiPoint 400 HFA can be used in a DHCP environment.

Customer Programming Via LAN

The HG 1500 card can also provide an interface to facilitate customer programming (using Manager C) via any PC on the WAN / LAN (provides the same functionality as the LIM).

IP Speech Quality

One of the side effects of VOIP technology is the delay caused by the conversion of digital voice into IP packets and back to digital voice. Network topology and compression algorithms can also effect the quality of the end to end connection. Customers must be made aware of these limitations to prevent any unnecessary dissatisfaction.

Network Health Checks

To ensure that a customer's existing data infrastructure is capable of supporting the deployment of voice traffic, it is recommended that an assessment is made of their network, particularly where high levels of voice traffic are anticipated.

This assessment, commonly known as a network health check, will determine any technical limitations of their data network that may significantly effect the successful implementation of a voice over IP solution. Network health checks are available as a chargeable service from Siemens Communications if required.

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Terminology

The following list represents the common terminology associated with the HG 1500 card and VOIP in general.

ADSL	Asynchronous Digital Subscriber Line
APS	Applications Program System
CAPI	Common Applications Interface
CHAP	Challenge Handshake Authentication Protocol
CMS	Clock Module Small
CSTA	Computer Supported Telephony Application
CTI	Computer Telephony Integration
DDE	Dynamic Data Exchange
Diff Serv	Differentiated services
DSSS	Direct Sequence Spread Spectrum
DTMF	Dual Tone Multifrequency
DHCP	Dynamic Host Configuration Protocol
DSL	Digital Subscriber Line
EMC	Electromagnetic Compatibility
FHSS	Frequency Hop Spread Spectrum
GSM	Global System Mobile
HXGM	HiPath HG1500 Card Medium
HXGS	HiPath HG 1500 Card Small
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
IPX	Internet Package Exchange (Novell Protocol)
ISDN	Integrated Services Digital Network
ISP	Internet Services Provider
LAN	Local Area Network
LCR	Least Cost Routing
LIM	LAN Interface Module
MAC	Media Access Control
PAP	Password Authentication Protocol
PBX	Private Branch Exchange
PING	Packet Internet Groper

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PPP	Point to Point Protocol
PPPoE	Point to Point Protocol over Ethernet
PPTP	Point to Point Tunnelling Protocol
QOS	Quality of Service
RAS	Remote Access Server
RIP	Routing Information Protocol
RTPC	RTP Control Protocol
RTP	Real-Time Transport Protocol
SIC	Serial Interface Cable
SLA	Subscriber Line Analogue (HiPath 3000 analogue extension card)
SLIP	Serial Line Interface Protocol
SNMP	Simple Network Management Protocol
SPRX	Sequence Packet Exchange Protocol
STLS	Subscriber Trunk Line SO (HiPath 3000 ISDN 2 Card)
TAPI	Telephone Applications Programming Interface
TCP	Transmission Control Protocol
TLA	Trunk Line Analogue (HiPath 3000 analogue trunk card)
ToS	Type of Service
TMS	Trunk 2 Meg (HiPath 3000 ISDN 30 card)
VCAPI	Virtual CAPI
WAN	Wide Area Network