Path 1 enables real time transport of high definition video over IP

【Uncompressed SDI and DVB-ASI IP gateway】

FRONTIERS
FRONTIERS CO., LTD.

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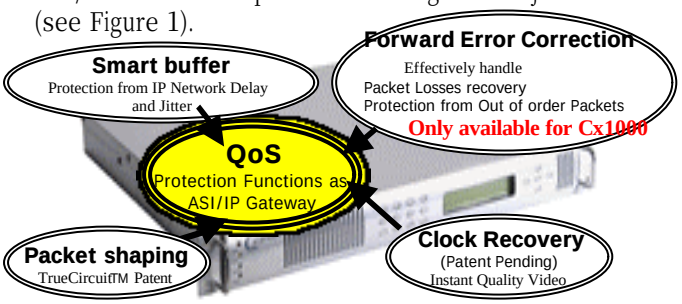
Cx Series is the world's first IP video gateway with QoS guarantee functions from Path1 Network Technologies, Inc., for whom Frontiers Co., Ltd. is the exclusive sales representative in Japan and non-exclusive sales representative for the Asia-Pacific region. The Cx1000 video gateway comes in a compact 1RU chassis, yet is capable of delivering video at high speeds up to 270Mbps for full spec DVB-ASI, and uncompressed SDI/SDTI at 270Mbps. The following four major functions enable Cx1000 to provide QoS guarantee as an IP video gateway (see Figure 1).



(Figure 1: Concept of the four QoS functions of Cx1000)

- **Powerful FEC functions**
- **Complete clock recovery function, which is essential to video transmission**
- **Efficient packet shaping function to prevent packet loss caused by burst traffic**
- **Smart de-jitter function to absorb IP network jitter up to 250msec long**

◆Powerful FEC

FEC (Forward Error Correction) is a technology to recover in real time the packets lost on the receiving end, by adding redundant packets onto the transport stream in anticipation of packet losses through IP networks. FEC technology enables distribution of broadcast-quality video materials and contents over IP networks.
Cx1000 features two types of FEC functions: Double FEC, which transmits twice the number of packets (i.e., original video signal can be recovered even if up to 50% of IP packets are lost) and Partial FEC, which can be adjusted at 2%-intervals between 6-50%. Cx1000 also supports protection against burst packet loss. These functions can be easily configured using soft keys.

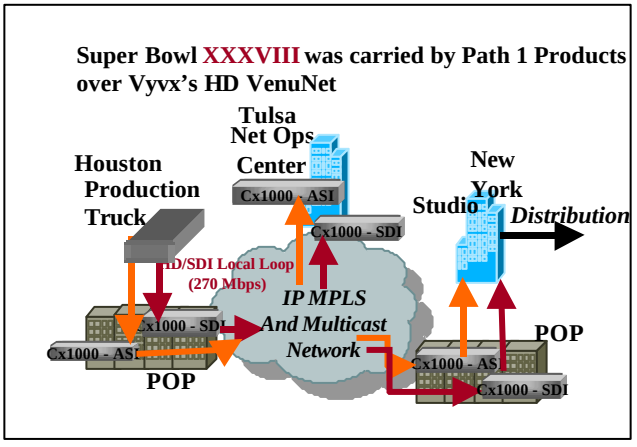
◆Clock recovery function

Cx1000 independently generates a video clock to support both DVB-ASI and uncompressed SDI/SDTI. A transmitting Cx1000 will independently generate a 27MHz clock, place a time stamp on IP-packetized video signal, and simultaneously transmit both signals to the IP network. A receiving Cx1000 will accurately regenerate packets using FEC and accurately transmit video signal, which is synchronized with the transmitting Cx1000, using Path 1's proprietary clock recovery algorithm. Security during video transport is covered by the following functions:

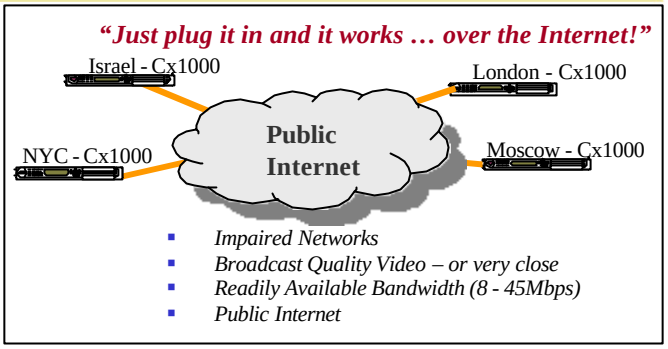
- **Path 1's proprietary protocol, which is non-UDP/RTP, is used as IP transmission protocol.**
- **Path 1's undisclosed, proprietary method is used for Cx1000's FEC technology.**
- **For unicast transmission, MAC address of the destination is confirmed before transmission is commenced.**

Path 1 conducted joint development and verification tests on Cx1000 with carriers such as Level 3 Inc. (USA) before making the announcement at the NAB2003 in Las Vegas last year. Cx1000 has already won the trust of broadcast stations and carriers worldwide, including Japan, for its high level of performance and stability. Major operational achievements are as follows:

•At the Super Bowl XXXVIII held in February 2004, Cx1000 was used to deliver the world's first live High Definition TV (HDTV) broadcast over IP network, linking the stadium in Houston and CBS Studios in New York City. Delivering the primary feed in SDTI (compressed HD-SDI) at 270Mbps and backup feed in MPEG2-TS at 40Mbps, the video over IP service (HD VenuNet) provided by Vyvx, an emerging communications carrier, received overwhelming response from viewers (Figure 2).



(Figure 2: Configuration diagram of Super Bowl broadcast setup)



(Figure 3: Configuration diagram of public IP network)

•COX Communications, one of the leading MSOs in the United States, has selected an IP transport network which uses Cx1000 for digital distribution of HDTV for subscribers, which began in March, 2004. The HDTV service will be used for live telecast of over 150 events annually, including sporting events such as Major League Baseball games (San Diego Padres), air shows and parades.

•Cx1000 has been selected for a long haul contents distribution service from London to Hong Kong (spanning approximately 13,000miles) via three different carriers, which began operating in January,2004.

•Cx1000 has over two years of solid performance in broadcast program transport from Moscow to New York using the public Internet network (Figure 3).

•In Japan, SOFTBANK BB Corp. and Frontiers Co. have announced that they will use Cx1000 in their 100Mbps best-effort lines to provide HD video transport service for broadcast companies.

Path 1 has also released Ax100, which is a low-cost version of Cx1000 without the uncompressed SDI transmission functions. Ax100 uses the same hardware as Cx1000 and can be upgraded to Cx1000 by software upgrade.

◆Chameleon vidX series

Chameleon vidX series includes the DX1801 video demultiplexer (DVB-ASI to GbE) developed for FTTH and xDSL, which features 8 DVB-ASI input ports in a compact 1 RU chassis, and the MX1810 video multiplexer (GbE to DVB-ASI) for HFC, featuring 8 DVB-ASI output ports. These models are not equipped with FEC but feature PCR correction function and use common UDP/RTP protocol. Chameleon vidX devices are powerful tools in high-efficiency distribution of DVB-ASI (MPEG2-TS) video for regional IP networks and HFC.

DVB-ASI ports are available in 2 to 8 ports, for simple pass-through, demultiplexer or multiplexer. Using common hardware, functions can be upgraded by upgrading the software.

•Features PCR correction function, which is essential to video transmission.

•For demultiplexer operation, an MPEG-2 table is automatically generated for each SPTS.

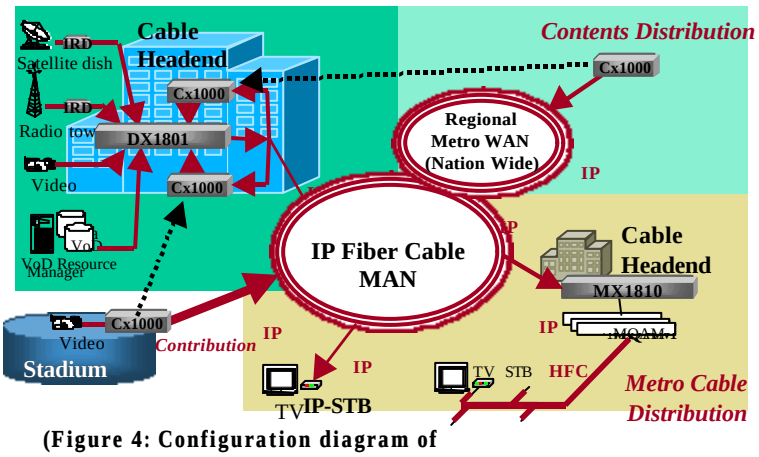
•For multiplexer operation, an MPEG-2 table corresponding to MPEG-2 configuration of output TS is automatically generated.

A Pro-MPEG model equipped with standard FEC is scheduled to be released in the autumn of 2004, which is capable of simultaneous two-way transport of 4-port DVB-ASI to GbE and 4-port GbE to DVB-ASI streams.

Chameleon vidX series also has a proven field record, which includes the following:

•The 4-port DVB-ASI/GbE pass-through model (Cx1400) has many years of excellent operational record with American CATV operators.

•Chameleon vidX series, successor models to Cx1400, received a large order from a major US MSO immediately after release, as component devices of a VOD system.



(Figure 4: Configuration diagram of video material transport and VOD network)

Efficient use of Path 1's product groups will enable distribution service of broadcast-quality video material and contents, as illustrated in Figure 4.

Inquiry

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Fax: : +851-2881-6761
E-mail: benson@big-frontiers.com.hk
URL :www.big-frontiers.co.jp

Company Profile (as of March 31, 2004)

1. Trade Name: FRONTIERS CO., LTD.

2. Description of Business: A prime mover that possesses both info-mediator functions, matching customer needs with type II telecommunications carrier service, export/import of video transmission equipment, optical amplifiers and optical components and on-demand provision of system-integrated broadband video transmission environment and line services, and development functions to create B-to-B communications networks to deliver broadcast-quality video.

3. Founded: July 25, 1996

4. Capital: 150 million yen (as of March 31, 2004)

5. Corporate History

Fiscal Year	Number of Employees	Major events
1996	3	Founded in Sagamihara with capital of \5M.
1997	6	Reorganized to a stock company, capital increased to \10M.
1998	7	Tama Branch Office established.
1999	12	Hong Kong and U.S. subsidiaries established.
2000	19	Capital increased to \33M by investment from Global Venture Capital Inc.
		Capital increased to \63M by investment from Marubeni Corporation.
		Head Office moved to Hachioji.
2001	18	Capital increased to \68M.
2002	16	Suspended operation of U.S. subsidiary.
2003	11	May: Increased capital to \78M.
		December: Capital increased to \123M by investment from Orix Capital Corporation and Mizuho Capital Co.
		Signed an exclusive sales representative agreement for Japan with Path 1 Network Technologies Inc. of U.S.A.
		January 2004: Capital increased to \129M by investment from Tama Chuo Shinkin Bank.
		March 2004: Capital increased to \150M by investment from Shoko Chukin Bank and Seibu Shinkin Capital Corporation.

6. Location: 3F. Fresco Minamiosawa, 2-27 Minamiosawa, Hachioji, Tokyo 192-0364
Phone: 0426-70-8840 Fax: 0426-70-8820
e-mail: info@big-frontiers.co.jp URL: http://www.big-frontiers.co.jp

7. Representative: Hiroshi Tango (President)

8. Number of employees: 11

9. Subsidiary: Frontiers(H.K.)TRADING Limited. 9A Fair View Commercial Building, 27 sugar street, Causeway Bay, Hong Kong
Benson Dunn (Director) Phone: +852-2881-6809 Fax: : +851-2881-6761
E-mail: benson@big-frontiers.com.hk URL :www.big-frontiers.co.jp

10. System integration cooperator: Kandenko Co.

11. Maintenance Subcontractors: Sumitomo Electric Field Systems Co.
Marubeni Network Systems Corporation

12. Auditing Firm: Shin Nihon & Co.

13. Corporate Legal Counsel: Mitsui, Yasuda, Wani & Maeda

14. Correspondent Financial Institutions: Tokyo Mitsubishi Bank, Toranomon Branch; Shinkin Chuo Bank, Hong Kong Branch
Tama Chuo Shinkin Bank, Nakagawara Branch; Mizuho Bank, Hachioji Branch

15. Primary Investors: Global Venture Capital Inc.; Tama Chuo Shinkin Bank
Marubeni Corporation; Shoko Chukin Bank
Orix Capital Corporation; Seibu Shinkin Capital Corporation
Mizuho Capital Co.

16. Certification/ Appraisal:
- Received certification pursuant to the stipulations of the Temporary Law on the Promotion of Creative Business Activities by Small and Medium-sized Enterprises, Section 4, Item 3 (Tokyo Metropolitan Government Law No.1230).
- Ranked 79th in sales growth rate in Diamond Weekly magazine's "1,250 large corporations 10 years from now" (October 30, 1999, special issue).
- March 2000: Listed in the "Tokyo Venture File 100" by Tokyo Metropolitan Industrial Technology Research Institute.
- May 2002: Obtained qualification of Type II telecommunications carrier from the Ministry of Public Management, Home Affairs, Post and Telecommunications.
- November 2002: Received venture business nurturing subsidy fund from Sumitomo Mitsui Banking Corporation.
- October 2003: Received certification under the Law on the Promotion of Creative Business Activities by Small and Medium-sized Enterprises from Tokyo Metropolitan Government (Tokyo Metropolitan Government Certification No.3446).

17. Affiliations: TAMA Industrial Vitalization Association Inc.
Hachioji Council for Promotion of Metropolitan IT Industry Special Zone (Cyber Silkroad Hachioji)

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