**DMF-4800****Digital Media Forum**

## **A multimedia processor for service providers to enable real-time, collaborative visual services**

The DMF-4800, a member of Starvision's family of Multi-Service Intelligent Networking products, is a revolutionary new intelligent peripheral that redefines the role and functionality of the multipoint conferencing unit (MCU). Equally adept at handling broadband and narrowband conferencing, the DMF-4800 is the first MCU to leverage the capacity, switching, and quality-of-service capabilities of ATM network technology. Bridging, interworking, and gateway capability for MPEG-2, H.320, H.321, and H.323 as well as NTSC/PAL baseband video are requirements for offering leading-edge, collaborative multimedia services supported by the DMF-4800. The DMF-4800 enables a smooth migration path from narrowband to broadband — towards the true visual interaction users have been asking for from day one: broadcast-quality video.

Designed to the highest standards of reliability and maintainability, the DMF-4800 is configurable for either public telecommunications service-provider deployment or for use in enterprise networks. The DMF-4800 is designed to easily handle the complexity of user-controlled, on-demand, and scheduled multipoint conferencing in a mixed codec environment. A highly scalable architecture combined with centralized network-wide management and support of codecs attached to differing transport networks make the DMF-4800 the MCU of choice for providing the industry's most comprehensive range of interactive visual services.

- **The first MCU that offers seamless interworking of broadband and narrowband visual conferencing services**
- **Offers unprecedented reliability, performance, and scalability**
- **Establishes a new benchmark for video, audio, and graphics processing capabilities**
- **Offers Investment protection and reduces the costs of delivering visual services**
- **Web-based conference scheduling and centralized management via Starvision's MCS-ATM and MCS-IP products**

## Seamless interworking of broadband and narrowband terminals

Finally, the necessary glue is here to piece together disparate network and codec technologies to allow visual communications and interactive collaboration on a broad scale. In addition to providing the basic functions of an MCU, such as bridging, the DMF 4800 supports multimedia conferences involving any mix of MPEG-2, H.321, and H.320 terminals. Also, video and audio baseband interfaces support CATV, satellite, and other analog video systems including media storage and media content devices. As the DMF 4800 evolves, more service interworking capabilities will be developed including MPEG-2 over IP and H.323.

## Reliability

The DMF 4800 is designed specifically for the demanding environment of the telecommunications service provider where maintaining service-level agreements with customers is paramount. Routine maintenance does not require downtime because hardware components can be swapped on a live system and firmware can be upgraded on the fly. The DMF 4800 has been designed to meet the strenuous Bellcore standards for reliability and survivability (Bellcore SR-3580 Network Equipment Building System Level 3 certification).

The DMF 4800 can be configured for full redundancy whereby cards can be replaced or upgraded without disruption of conferencing service. The DMF 4800 is Year 2000 compliant.

## Performance

The DMF 4800's powerful DSP hardware technology is built to handle the extreme demands of broadband real-time processing. Advanced DSPs and Starvision proprietary ASICs coupled to a high-capacity 10 Gb/s backplane put the DMF's ability to process video, audio, and graphics in a class all of its own. The DMF's backplane has almost 40 times the capacity of its nearest competitor.

## Scalability

The DMF 4800's scalable architecture provides the flexibility to expand from a minimal single shelf system supporting two conference participants to a three-

shelf system supporting up to 48 conference participants in as many 18 multipoint simultaneous sessions. In all cases, a participant could be either a broadband MPEG-2 or narrowband H.261/263 codec site — the hardware is the same. A single DMF 4800 shelf fits in a standard 19-inch rack and houses 14 card slots: two slots are dedicated to shelf controller cards and the remaining twelve are configurable. Unlike other MCUs where the port capacity is specified by the number of 64-Kb/s channels, the definition of a user port on the DMF 4800 is simple: a user port is equivalent to a conference participant, no matter what the connection speed.

The DMF 4800's physical network connectivity is achieved with simple OC-3 ATM UNI fiber interfaces, each capable of supporting 128 virtual circuits of varying bandwidths. Bandwidth connection speeds range from up to 15 MB/s for MPEG-2 codec connections down to 128 Kb/s for H.261/H.263 codecs.

## Video, audio, and graphics processing features

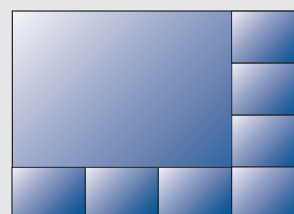
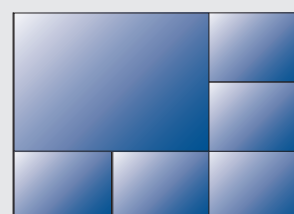
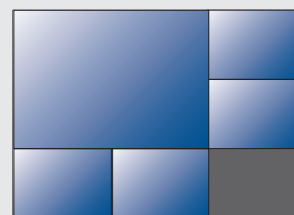
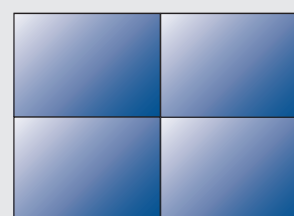
In addition to voice-activated switching, the DMF 4800 has been architected to support a multitude of Continuous Presence collages — well beyond the traditional quad-split. Continuous presence layouts can easily be modified during a conference session and users can be added or dropped from a session.

The DMF 4800 processes video at the digital pixel level; the need for transcoding is eliminated, latency is optimized, and imaginative graphics capabilities are easily incorporated. Graphics overlay features for customized logo placement, window titling, backgrounds, and window borders are some of the features which will be delivered by the DMF.

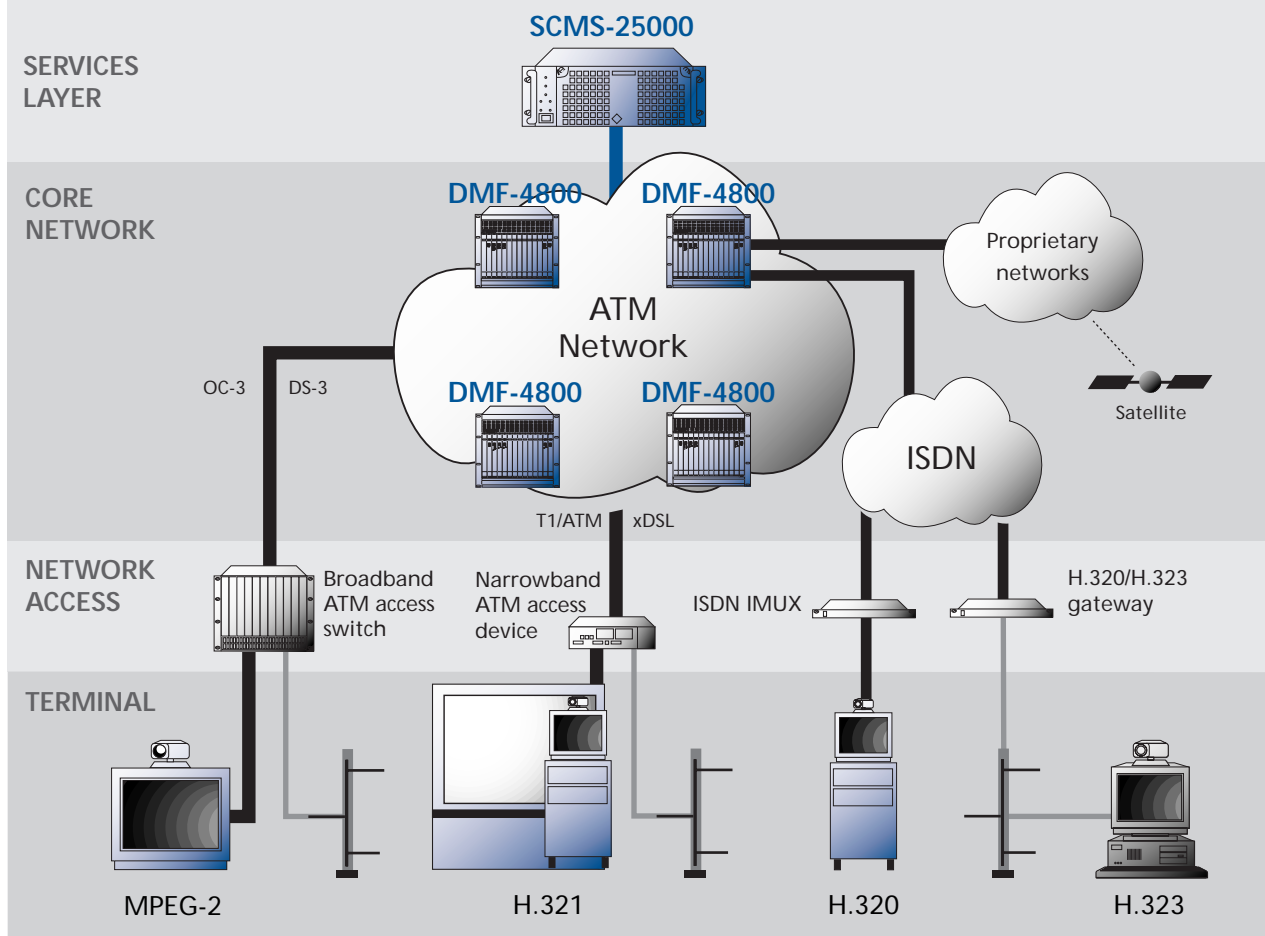
## Investment protection & visual services cost reduction

The hardware investment is well-protected by the DMF 4800's state-of-the-art DSP architecture. Advances in codec and conferencing standards such as MPEG-4 and wavelet compression are easily incorporated through simple firmware upgrading.

Since codec requirements will vary from conference to conference, the DMF 4800



Flexible video collages for multipoint conferences  
Powerful graphics and text overlays



also makes efficient use of its of codec resources using Starvision's proprietary Adaptiport technology. Codec resources don't sit idle but adapt to changing conference requirements. Digital Signal Processing (DSP) technology enables the DMF 4800 to support a different codec functionality and transmission speed per connected user for each conference session. For example, a DMF 4800 hardware resource can decode H.321 video and audio in one conference and in the next conference it can decode an MPEG-2 audio & video stream. The DMF 4800 also supports multiple decode/single encode resources per conference or multiple decode/multiple encode resources used per conference.

Starvision recognizes that not all users who wish to collaborate use the same technology or require or have access to a particular level of video quality. The DMF 4800's ability to directly interwork MPEG-2 and H.321/H.320 terminals is supplemented by its unique ability to gateway directly to other codecs and video systems via baseband video and audio interfaces. The need to build back-to-back codec farms is eliminated.

Baseband interfaces also allow media storage and media content devices to be cost-effectively incorporated which in turn will create more demand for service usage.

Compared to other MCUs, the DMF enjoys a higher availability for processing interactive calls. By harnessing the underlying ATM transport network's multicast capability, a Starvision service network does not require valuable DMF 4800 resources for one-way broadcast calls.

### Web-based conference scheduling

Using Starvision SessionBuilder™, a web-based graphical user interface, the end-user can place or schedule multipoint calls. When the user clicks on the sites to participate in the call, the system automatically assigns DMF 4800 resources from the common network pool to handle the call request. This is unlike traditional video conferencing where it is often necessary to reserve an MCU from a third-party bridging service or coordinate usage on a particular

A four-tier architecture for managed visual services

enterprise MCU. Starvision makes creating multiparty, visual, collaborative sessions a hassle-free, single-step process.

### Centralized management

The activities of all DMF 4800s in the network are controlled by the Starvision SCMS 25000 (Service Creation and Management System), which provides central management of all multimedia conference activity, including call control, scheduling, maintenance, configuration, performance and billing. The SCMS communicates with the DMF 4800 via SNMP. Service operations personnel communicate to the DMF 4800 via a web browser interface.

The DMF 4800 also features alarm logging, usage/performance statistics generation and is easily adaptable into an existing SNMP environment for monitoring purposes. A local RS-232C craft interface is also provided.

## Capabilities

	Single shelf	Multi-shelf
	Up to...	Up to...
<b>Simultaneous users</b> .....	<b>16</b>	<b>48</b>
(any combination of MPEG-2, H.321, H.320 gateway, baseband ports)		
<b>Simultaneous conferences</b> .....	<b>6</b>	<b>18</b>
<b>Number of users per conference</b> .....	<b>16</b>	<b>32</b>
<b>H.320 gateway/baseband ports</b> .....	<b>8</b>	<b>24</b>
<b>Number of shelves</b> .....	<b>1</b>	<b>3</b>

## Technical Summary

### Video conferencing standards supported

#### MPEG-2 video

- ISO/IEC 13818-2
- SP@ML, 4:2:0 format, I & IP frame format
- Line resolutions: 720, 544, or 352 pixels per line decode; 720 or 352 pixels per line encode
- Elementary stream bit rates from 1.5 Mbits/sec to 15 Mbits/sec.

#### ITU-T H. series

- H.221 Frame Structure
- H.230 Frame Sync Control
- H.231 Multipoint Control Units
- H.242 Establishing Point-to-Point Communications
- H.243 Establishing Multipoint Communications
- H.261 Video Coding
- H.262 MPEG-2
- H.263 Video Coding
- H.320 Narrowband Visual Systems via gateway
- H.321/H.320 adaptation to broadband
- Voice-activated switching

### Audio

- ISO/IEC 11172-3 (MPEG-1 audio)
- G.711, G.722, G.728

### Network interfaces

#### Dual OC-3C ATM UNI cards

- ATM Forum UNI 3.1, UNI 4.0
- Multimode & single mode fiber
- SC connectors
- Proxy SVC signaling
- 128 virtual circuits per OC-3 interface

### Baseband

#### Audio

- EIA/TIA 250C section 4
- Inputs: differential or unbalanced floating, 10 K $\Omega$ , RCA connectors
- Outputs: unbalanced, low impedance, RCA connectors
- Frequency response : 20 Hz to 20 kHz +/- 1.5 dB
- SNR  $\geq$  75 dB (input level)

### Video

- NTSC standard SMPTE 170 M
- EIA/TIA 250C
- BNC connectors

### Physical description (single shelf)

- Height: 48 cm (19 in.)
- Width: 58 cm (23 in.)
- Depth: 29 cm (11.5 in.)
- Bellcore GR-63-CORE, section 3 (NEBS 2000) Framework Criteria certified
- Rack mountable

### Maintenance

- SNMP manageable
- Firmware upgradable from remote locations
- Hot swappable cards
- n+1 redundancy
- RS-232C Craft Interface
- Visual CO alarm indicators
- Form C dry contact alarm outputs
- External alarm inputs
- OAM ATM cell flows (F4, F5)

### Power

- -48 VDC voltage @ 9 amps
- Redundant power inputs
- Maximum power consumption: 460W per shelf
- Optional rectifier: 100/120 VAC up to 1100W or 220/240 VAC up to 1680W

### Environmental

- Bellcore GR-63-CORE, (NEBS) section 4 "Environmental Criteria" compliance certified
- Bellcore SR-3580 (NEBS) Level 3
- EMI: FCC Part 15 Class A

### Safety

- Bellcore GR-253-CORE, section 7.4, Laser Safety Requirements
- UL 1950
- CSA C22.2 No. 950

### Future enhancements

- H.323/H.323 Annex-C
- Gigabit Ethernet Interface
- STM-3C and PAL support
- European EMC Directive / CE Mark
- Cascading (H.243)
- H.224 /H.281 far-end camera control
- MPEG-2 over IP

## Starvision Multimedia Corporation

Up to... Up to...

16 48

6 18

16 32

8 24

1 3



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