# SONY

Multi Bit-Rate Routing Switcher
HDS-X5800

The rapid worldwide adoption of Standard and High Definition Digital Television (SD/HD DTV) has brought a marked increase in the complexity and volume of video traffic due to the explosion in the use of digital devices. Sony offers a practical signal-management solution to systems having to handle this traffic growth – the HDS-X5800 Multi Bit-Rate Routing Switcher.

The HDS-X5800 is a serial digital routing switcher for both SDTV and HDTV video signals. Part of the Sony S-BUS family of routing components, it is one of the latest generation of digital routers and uses a highly efficient large-scale matrix with the ultimate in control capability. For larger routing needs, cascading multiple HDS-X5800 frames can expand the matrix size.

Designed to integrate closely with the Sony MVS-8000 Series of multi-format production switchers, it provides user-defined source identification, intelligent tally processing and remote control directly from an MVS Series switcher control panel. A variety of S-BUS control devices can be connected to the external matrix and controlled from MVS Series switchers, as well as from routing switcher control panels. This unique combination provides the optimum routing environment for your system expansion. The HDS-X5800 is ideal for integrating production systems into your live and post-production environments, as well as fulfilling your entire facility routing needs.
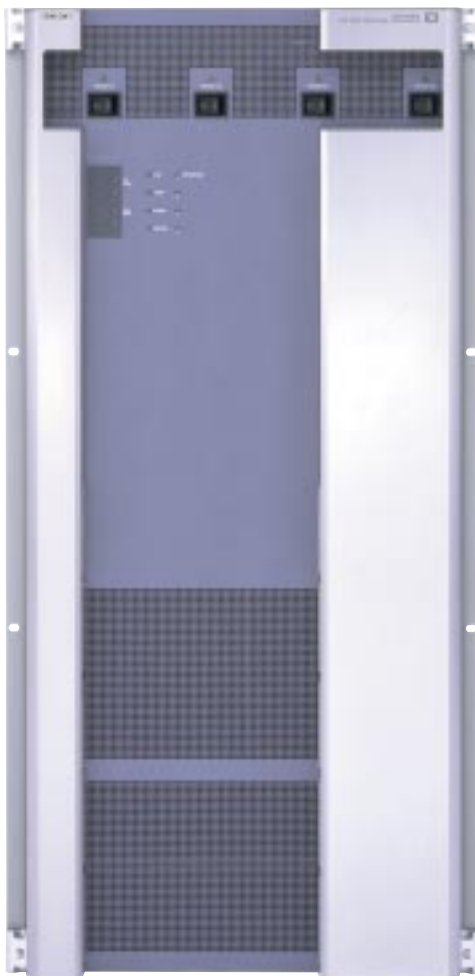
- **Highly flexible, multi bit-rate routing switcher for use in S-BUS systems**
- **Compact size and high packing density**
  - -264 x 272 in 22RU*
- **Flexible input and output configurations**
  - -Increments of 33 inputs and/or 34 outputs
  - -HD/SD input and output options
  - -SD input and output options
- **Non-blocking expansion up to 1056 x 1088**
- **143 Mb/s to 1.5 Gb/s in the same frame**
- **Auto cable equalization**
- **Auto re-clocking at 143, 177, 270, 360, 540 Mb/s and 1.485 Gb/s**
- **Robust and powerful Sony S-BUS control system**
- **Quad-standard operation in a single frame**
  - -Four vertical-interval switching reference inputs
  - -Four S-BUS control ports
- **Ethernet-based remote control and set up**
- **Fully redundant internal controllers and power supplies included as standard**
- **Front loading and hot swap modules**
- **Economical power consumption of approximately 900 W**

*Smaller frame sizes are available in the HDS-X3000 product range: 16 x 16 in 1RU, 64 x 64 in 4 RU, 128 x 128 in 8 RU
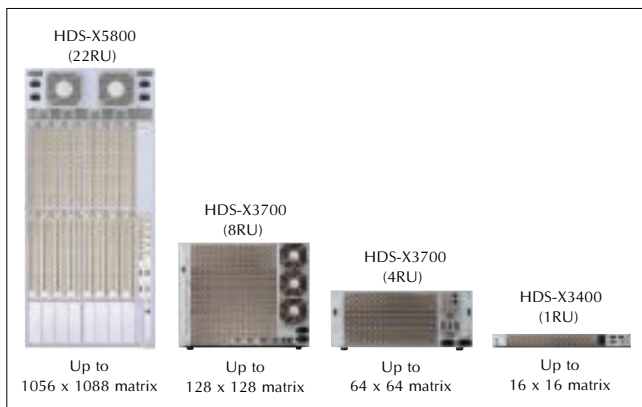
Flexible and scalable

A large-scale matrix system with expansion capability

The HDS-X5800 is configurable in size from 33 x 34 to 264 x 272, in steps of 33 inputs and/or 34 outputs. With an input expansion facility unique to Sony, it can be expanded to a 1056 x 272 matrix without an external expansion facility. By combining multiple 1056 x 272 matrices in combination with external distribution amplifiers, it can be expanded to 1056 x 1088.

Cascade connection example of HDS-X5800
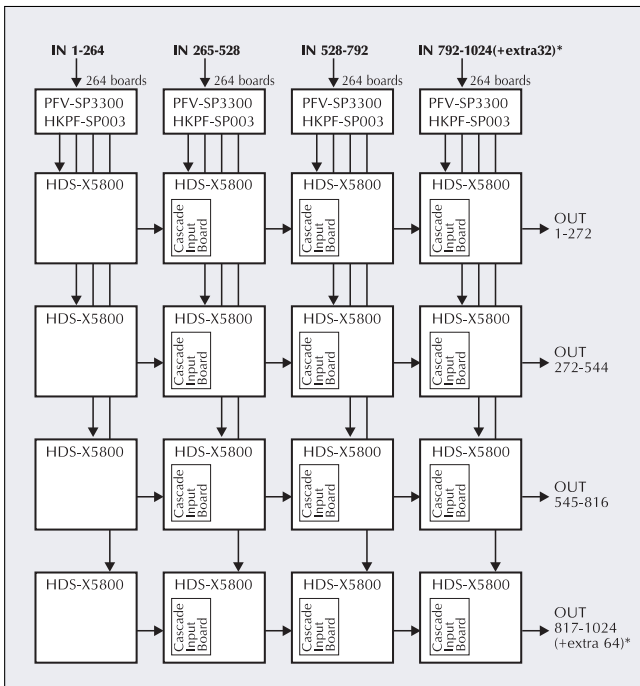
*Remarks:Maximum size is theoretically (physically) 1056 x 1088 but 1024 x 1024 effactually due to current S-BUS mapping space.

HDS-X5800
(22RU)
Up to
1056 x 1088 matrix

HDS-X3700
(8RU)
Up to
128 x 128 matrix

HDS-X3700
(4RU)
Up to
64 x 64 matrix

HDS-X3400
(1RU)
Up to
16 x 16 matrix

Multi-format, multi bit-rate routing

The HDS-X5800 handles serial digital signals over wide range of bit rates – SD SDI signals at 143, 177, 270, 360 and 540 Mb/s and HD SDI signals at 1.485 Gb/s. It supports embedded AES/EBU audio data. SDI I/O options are available for HD/SD and SD only. Both these types can be installed simultaneously in the same frame.

Signal formats supported by the HDS-X5800

Signal Format	Bit Rate	Standard
Composite Digital Video (NTSC)	143 Mb/s	SMPTE259M-A
Composite Digital Video (PAL)	177 Mb/s	SMPTE259M-B
Component Digital Video (13.5/18 MHz Sampling)	270 Mb/s, 360 Mb/s (NRZI coded)	SMPTE259-C/D
Component HDTV (1035i/1080i/720p)	1.485 Gb/s	SMPTE292MA-M
SDTI (Compressed Video Transport)	270 Mb/s (NRZI coded)	SMPTE305M, SMPTE259M
Mezzanine HDTV (Proposed)	540 Mb/s	SMPTE(Draft)

* Rise and fall times of SD SDI output signals may be faster than defined by SMPTE259M.

Sophisticated signal management capability

Affinity with, and expandability in, current system environments

The HDS-X5800 is easily installed into today's system environments. Two RS-422A control ports, an RS-232C control port, four S-BUS terminals, and an Ethernet port are provided for interfacing with automation systems or other manufacturers' routing equipment and control systems. All of these control formats can coexist and be used simultaneously.

Resource sharing

Four reference inputs and four simultaneous S-BUS controls allow quad-standard operations in a single HDS-X5800. Four reference inputs support the co-existence of four different vertical interval switching timings. Black burst or tri-level sync is available for each reference signal.

Networking

In addition to the well-proven S-BUS control, HDS-X5800 has a 100Base-TX Ethernet port, which supports the setup file upload/download and remote control. Now setup and matrix switching can be performed from a remote location via LAN, WAN or Internet.

New tie-line functions

Tie-line management function is enhanced for efficient use of source/destination routing paths, which can be fed across two or three routing switchers.

1. 'Cross-level' tie-line function provides source/destination routing paths between routing switchers over different levels.

2. 'Camp-on' tie-line allows parts of a single source/destination routing path to be shared between different destinations.

3. 'Multi-paths' tie-line sets a 'trunk' of multiple source/destination routing paths which can be shared between different destinations.

Tie-line function concept diagram
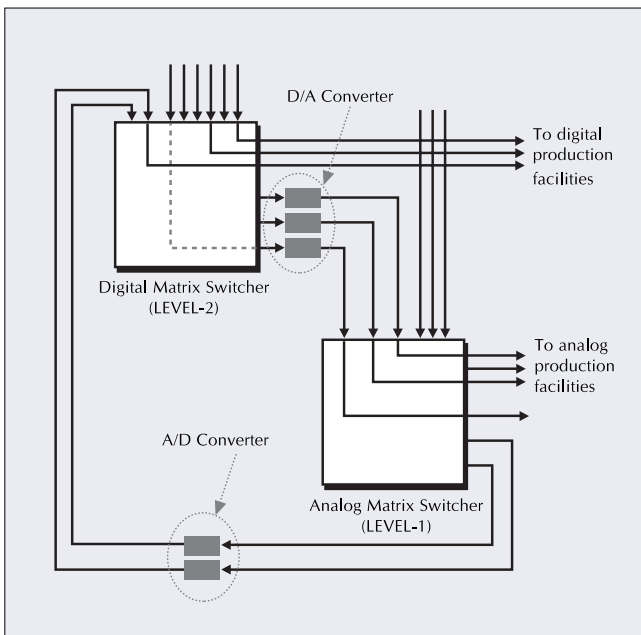
Compact and space saving

Compact size and high packing density
The HDS-X5800 can be expanded up to 264 x 272 in just 22RU of rack height. This figure includes a unique input expansion facility, a redundant power supply unit and control board as well as all other functionality required in routing switchers. The weight of a fully loaded unit is approximately 90 kg.

Economical power consumption
With a 264 x 272 matrix loaded, the power consumption of an HDS-X5800 is approximately 900 W. This figure includes a redundant power supply unit and control board.

High level of reliability and easy maintenance

Redundant power supply and control board
The HDS-X5800 incorporates a redundant power supply unit and redundant control board as standard. These units, along with the fan assemblies and all other modules such as distribution, matrix, and control boards can be easily exchanged from the front of the unit without affecting its overall operation.

Self-diagnostic functions
Internal diagnostics monitor the condition of critical items such as the status of the modules, power supply units and cooling fans, cross-point circuit faults, internal temperature rise, reference signal presence, and communication with S-BUS control units.
If a fault is detected, the situation is easily confirmed by reference to the status indicators on the front panel. The details can be checked on the S-BUS control terminal, and the fault status is also output from the parallel control port.

System Profile

Routing Switcher Processor (Main Frame) HDS-X5800

The matrix size is configurable from 33 x 34 up to 264 x 272 inputs/outputs. Main and backup power supply units and CPU boards are provided as standard.

HD/SD Input Board HKS-5810M*

Provides 33 inputs for serial digital signal with the data rates of up to 1.5 Gb/s.

SD Input Board HKS-5810SD

Provides 33 inputs for serial digital signal with the data rates of up to 360 Mb/s.

HD/SD Input Distribution Board HKS-5820M

One HKS-5820M Distribution Board supports the distribution of up to 33 inputs in an HDS-X5800 frame.

HD/SD Matrix Board HKS-5830M*

One HKS-5830M Matrix Board supports the matrix for up to 264 inputs and 34 outputs in an HDS-X5800 frame.

SD Matrix Board HKS-5830SD

One HKS-5830SD Matrix Board supports the matrix for up to 264 inputs and 34 outputs in an HDS-X5800 frame.

HD/SD Output Board HKS-5860M*

Provides 34 outputs for serial digital signal with the data rates of up to 1.5 Gb/s.

SD Output Board HKS-5860SD

Provides 34 outputs for serial digital signal with the data rates of up to 360 Mb/s.

HD/SD Cascade Input Board HKS-5811M

One HKS-5811M Cascade Board supports 34 channels of cascade connection to another HDS-X5800 unit for input expansion.

SD Cascade Input Board HKS-5811SD

One HKS-5811SD Cascade Board supports 34 channels of cascade connection to another HDS-X5800 unit for input expansion.

∗ Available in the future

Peripherals

Multi-bus Control Unit   BKS-R3216

16-button Multi-display Control Unit   BKS-R1617

16-button Universal Control Unit   BKS-R1618

32-button Universal Control Unit   BKS-R3219

X-Y Control Unit   BKS-R3220

X-Y Control Unit   BKS-R3240A

X-Y Control Unit   BKS-R3242A

X-Y Control Unit   BKS-R3248A

16-button Multi-display Control Unit   BKS-R1621

Single Status Display Unit   BKS-R3280/R3281

Routing Switcher Controller Board   BKPF-R70A
S-BUS Sub-net Controller Software   BZR-IF310
Routing Switcher Control Software   BZR-2000
Extension Board   EX-847(Part No.A-8329-772-A)

What is S-BUS ?

Advantages of S-BUS in installation

• The S-BUS system does not require special central control equipment. All that is necessary is to assign one routing switcher as a primary station.

• LAN-style connections are made with a single coaxial cable daisy-chaining each item of routing hardware, up to a total length of 500 m. For cable lengths over this distance, S-BUS distribution amplifiers can be installed.

• LAN configuration allows the primary station (the system's master routing switcher) to control up to 253 routing switchers and remote control panels. More than 60,000 routing switchers and remote control panels can be connected using the S-BUS sub-net controllers.

• Diagnosis of the entire routing system status can be conducted by connecting a PC-based control terminal to the primary station.

Operational features of S-BUS

• Free I/O assignment across all levels:
Assignment of sources and destinations can be freely made by any crosspoint, regardless of physical connection. Sources (or destinations) on the different levels can be grouped as a single source (or a destination name).

• Virtual Matrix Management:
Virtual Matrix Management allows a matrix to be placed virtually within S-BUS space for more efficient operation. A single 128 x 128 routing switcher divided into a 96 x 96 switcher and a 32 x 32 switcher to switch the corresponding crosspoints on two levels simultaneously. Alternatively, multiple routing switchers can be mapped on a larger, virtual routing level. Maximum increments are 1024 x 1024 inputs/outputs (eight levels) or 1024 x 512 inputs/outputs (16 levels).
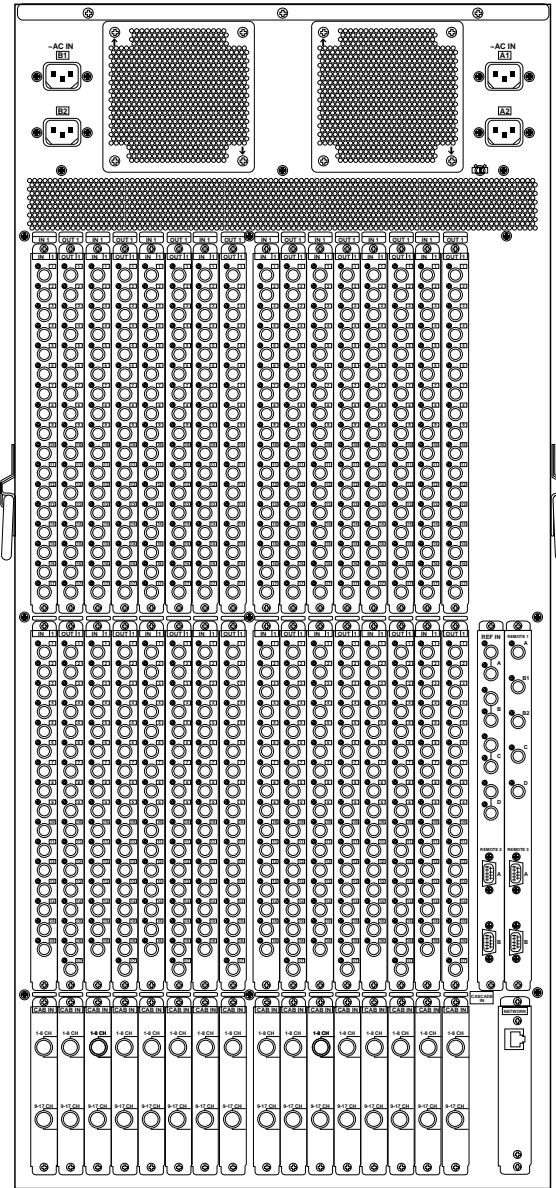
Example of S-BUS data link
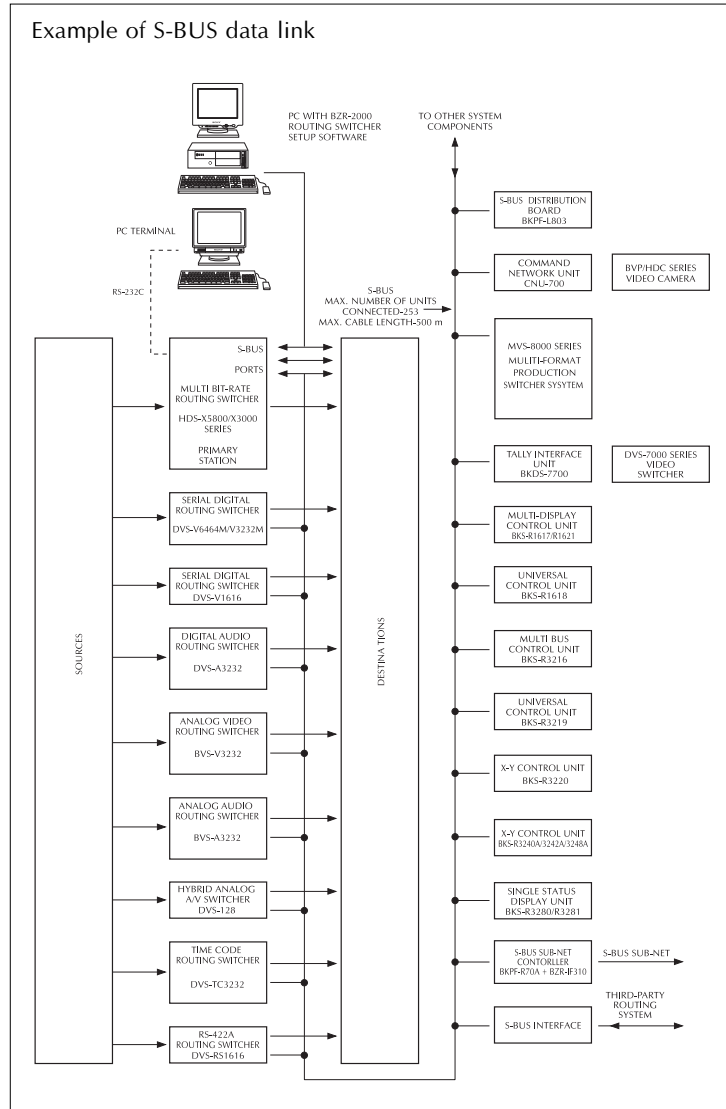
• Signal naming:
Names can be assigned to input/output connectors either as type and number, such as 'VTR005' or as descriptive names like 'REPORT_FROM_LA'.

• Tie-line management:
The tie-line management automatically establishes the routing paths between routers. This can include external devices. Up to 16 tie-line groups can be set up with this tie-line management, also up to 255 paths, 255 sources and 255 destinations can be set within each tie-line group.

• Powerful phantom facilities:
This function allows multiple crosspoints to be switched simultaneously with a single touch of one control panel button.
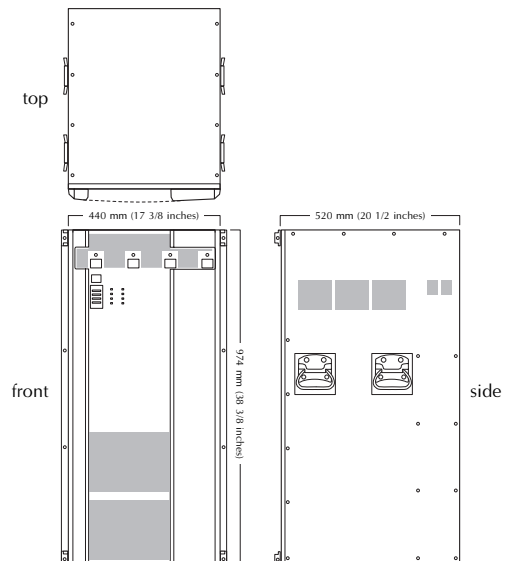
Specifications

General

Power requirement	AC 100 V to 240 V, 50 to 60 Hz
Power consumption	Approx. 900 W (fully loaded)
Operating temperature	+5 °C to +40 °C (+41 °F to +104 °F)
Operational humidity	10% to 90% (no condensation)
Dimensions	974 mm x 520 mm x 440 mm
	(38 3/8 x 20 1/2 x 17 3/8 inches)
	(without projections) (h/d/w)
Mass	Approx. 107 kg (fully loaded) (235 lb)

Inputs/outputs

Serial digital input	SDI IN connector (BNC type)	
	(up to 264 in steps of 33) 0.8 Vp-p ±10%, 75 Ω	
Channel coding	Scrambled NRZI	
Cable length	SD options	
		200 m max. (with Belden 8281, Fujikura 5C2V or equivalent coaxial cable)
	HD/SD options	
		100 m max. (with Belden 1694A, Fujikura 5CFB or equivalent coaxial cable)
Input return loss	SD options	
		15 dB or more (5 MHz to 360 MHz)
	HD/SD options	
		15 dB or more (5 MHz to 1.485 GHz)
Serial digital output	SDI OUT connector (BNC type)	
	(up to 272 in steps of 34)	
Signal standard	SD options	
		4:2:2 component serial digital signal (SDI), conforming to SMPTE259M-A/B/C/D
	HD/SD options	
		HD component serial digital signal (HD SDI), conforming to SMPTE292M
Data transfer rate	SD options	
		143 Mb/s to 360 Mb/s
	HD/SD options	
		143 Mb/s to 1.485 Gb/s
Re-clocking	SD options	
		143, 177, 270, 360 Mb/s
	HD/SD options	
		143, 177, 270, 360, 540 Mb/s; 1.485/1.001, 1.485 Gb/s
Output return loss	SD options	
		15 dB or more (5 MHz to 360 MHz)
	HD/SD options	
		15 dB or more (5 MHz to 1.485 GHz)
REMOTE 1	Connector	
		BNC type (4)
	Protocol	
		Sony S-BUS
	Data transfer rate	
		312 kb/s (1250 kb/s will be supported in the future)
	Data transfer method	
		Bi-phase Space
	Cable length	
		500 m max. (with Belden 8281, Fujikura 5C2V or equivalent coaxial cable)
REMOTE 2	Connector	
		D-sub 9-pin (2), complies with RS-422A signal standard
	Protocol	
		Sony Cart++
	Data transfer rate	
		38.4 kb/s
REMOTE 3	Connector	
		D-sub 9-pin male (1), complies with RS-232C signal standard, 38.4 kb/s DTR control, 8 bits, no parity, no check, 1 stop bit
ALARM OUT	Connector	
		Mini D-sub 15-pin female (1), Parallel (Open collector outputs 6-ch)
REF IN	Connector	
		BNC (4), with loop-through output, tri-level sync or black burst signal
DATA	RJ-45 (1), 100BASE-TX	

Rear Panel

Dimensions

top

440 mm (17 3/8 inches)   520 mm (20 1/2 inches)

974 mm (38 3/8 inches)

front   side

SONY

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