Universal Switching Corporation

Specification Sheet S5120F-001
Modular 512x512 40Mbps Digital Switching Array
System S5120F & S5120FX
Building Block to 1024x1024

March 2024

Designed for routing and distributing digital data in either synchronous or asynchronous modes, the System S5120F helps eliminate the use of manual patch bays and patch cords. It is an ultra-dense all digital switch array specifically designed for routing single-ended and differential (422) digital signals such as RS-422, PCM, TTL, clock & data, RS-530, or other similar signals up to 40Mbps.

Fully populated, this 5RU unit delivers 512 inputs and 512 outputs where a given input can be connected to one, many, or all 512 outputs (full fan-out non-blocking). The S5120F**X** is the same but has a large 10.1″ display (**Option X**) and enhanced front panel capabilities. The I/O of the unit is native "422" (differential) while other signal types are achieved with external active adaptive panels (TTL/PCM). Passive adapter panels are available to port signals to D-Sub and/or RJ type connectors.

The system is field configurable from a 64x64, and expandable to a full 512x512 within the same 5RU chassis while in the field. To further expand, multiple units can be connected together for 1024x1024 with the appropriate adaptive panel.

The unit comes standard with redundant hot-swap power supplies. Several system management options are included such as command line, TCP/IP, SNMP, REST and graphical web GUI interface for remote administration. All control and status is available at the built-in web browser, 10/100/1G Ethernet port or multi-serial port (RS-232C/422A/485), plus it can be configured with single or dual CPU's.

The S5120F is also compatible with our RouteWarePRO control software package that will get you up and running right away. Within minutes, you can install the software and start controlling your automated patch.

Applications

- Telemetry data TTL or PCM streams
- Clock and Data routing
- Differential 422 native I/O
- Data recorder data management
- Imaging and animation production facilities
- Production studios

Features

- High reliability differential ('422) digital design
- Optional 1RU adapter panels for '422, TTL / PCM
- Redundant digital signal paths (Tri-Stage)
- Designed specifically for digital switching
- Flexible configuration: 64x64 up to 512x512 (or larger)
- Multiple units can be grouped to configure 1024x1024
- Ultra-dense with more than 260,000 crosspoints in 5RU
- DC to 40Mbps throughput
- Input signal activity monitoring built-in
- Hot-swap module technology
- Menu driven color touchscreen display (4.3″ or 10.1″)
- Configure with either single or dual CPUs
- 10/100/1G Ethernet and multi-serial control ports
- TCP/IP, SNMP (v1/v2C/v3), IPv4 & IPv6, browser & SNTP
- Removable microSD card for secure environments
- Rugged 5RU high aluminum chassis (8.75″)
- International AC power range
- Self-monitoring hot-swap plug-in supplies with PFC
- Integrated rack mount design (19 inch)
- Chassis slide mounting hardware (slides not included)
- Certified CE EN61010 (LVD)
- Compatible with RouteWarePRO control software
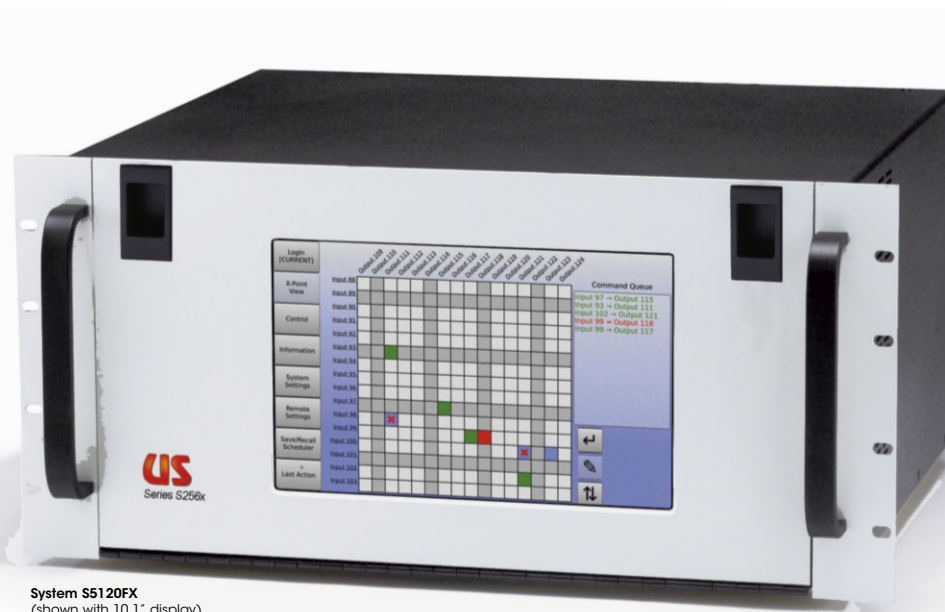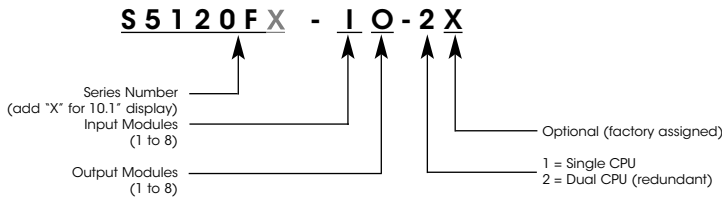
System S5120FX
(shown with 10.1″ display)

Download our Monitor & Control software **RouteWarePRO** for a FREE 30-day trial today!

Made in the USA

S5120F-001 2024-03

Model Number Assignment

S5120F X - I O - 2 X

Series Number
(add "X" for 10.1″ display)

Input Modules
(1 to 8)

Output Modules
(1 to 8)

Optional (factory assigned)

1 = Single CPU
2 = Dual CPU (redundant)

System S5120F
(shown with 4.3″ display)

Defining a System

How to choose your features

The S5120F is a modular digital switching array comprised of plug-in modules installed into a 5RU mainframe. Plug-in modules provide a flexible architecture for configurations as small as 64 inputs, 64 outputs and can be expanded to a fully populated system providing 512 inputs and 512 outputs. Larger systems up to 1024x1024 can be realized by interconnecting multiple units.

The system model number and basic features can be specified by observing the definition above. First, choose how many input modules you will need, then the number of output remembering that each module provides 64 differential channels.

Each input or output module provides 64 ports (32 differential ports per connector). The high density design of the system incorporates 100 position SCSI connectors. Each connector provides 32 differential ports. It can be specified as a symmetrical or asymmetrical configuration to meet your needs. Factory supplied filler plates cover unpopulated slots for proper system cooling.

Due to the compact size of the S5120F and unique Tri-Stage™ design, path-to-path skew is very small allowing the possibility to route both clock and data within the same unit, up to 256x256. If larger clock/data configurations are needed, then two units can be used to configure a dual 512x512 where clock signals would be routed by one unit and data signals routed by the second. Control of the systems can be ganged so that both signals switch together under one command. This is called peer-to-peer control.

Adapter Panels

Optional adapter panels provide other connection schemes (grouping two pairs for clock/data), various connector types, and even signal conversion (PCM / TTL).

The use of the optional I/O connector adapter panel assemblies provides a host of additional unique features such as individual connectors for each channel, grouping of signals for clock/data, or the simple ability to locate the system I/O connectors on the front of the equipment rack (or mixed, some on the front and some on the rear). The connector panel assemblies also allow the I/O to be located in a different rack from the actual switching system.

Signals can be grouped together as clock and data on DSub connectors, or as Triax type (BJ-77), or on BNC for PCM type signals. This allows a new higher level of flexibility for the system integrator. Contact your local sales representative or the factory for assistance.

System S5120FX
Rear view showing hot-swap power supplies and a card being extracted

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Adapter Panel Assemblies

See individual data sheets for details. Ordered separately.

| Model	Description	Figure
AP512-32BIN-xxx	1RU active TTL/PCM input adapter panel with thirty-two BNC connectors (used for 512x512 arrays maximum)	1
AP512-32BI-xxx	1RU active distributive TTL/PCM input adapter panel with thirty-two BNC connectors (w/expanders for 1024x1024 arrays)	1
AP512-32BON-xxx	1RU active TTL/PCM output adapter panel with thirty-two BNC connectors (used for 512x512 arrays maximum)	1
AP512-32BO-xxx	1RU active "muxing" TTL/PCM output adapter panel with thirty-two BNC connectors (w/expanders for 1024x1024 arrays)	1
AP512-16D9P-xxx	1RU passive "422" adapter panel with sixteen DE9P connectors (male), two pairs per connector (clock & data)	2
AP512-16D9S-xxx	1RU passive "422" adapter panel with sixteen DE9S connectors (female), two pairs per connector (clock & data)	2
AP512-32R-xxx	1RU passive "422" adapter panel with thirty-two RJ45 connectors, two pair per connector,	5
AP512-32TR-xxx	1RU passive "422" adapter panel with thirty-two BJ77 Triax connectors	4
AP512-32TRI-xxx	1RU active "422" distributive input adapter panel with thirty-two BJ77 Triax conn (w/expanders for 1024x1024 arrays)	3
AP512-32TRO-xxx	1RU active "422" muxing output adapter panel with thirty-two BJ77 Triax conn (w/expanders for 1024x1024 arrays)	3

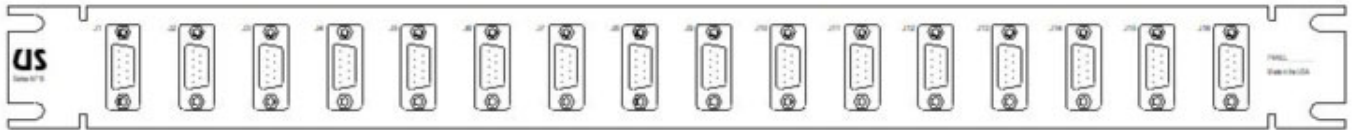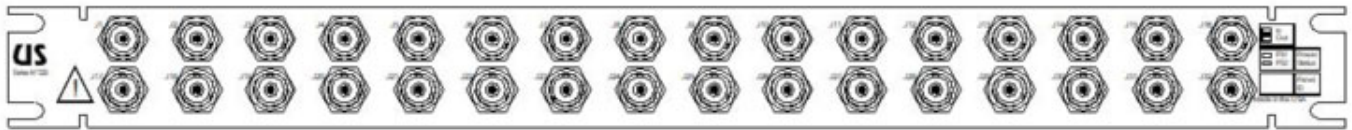## Figure 1
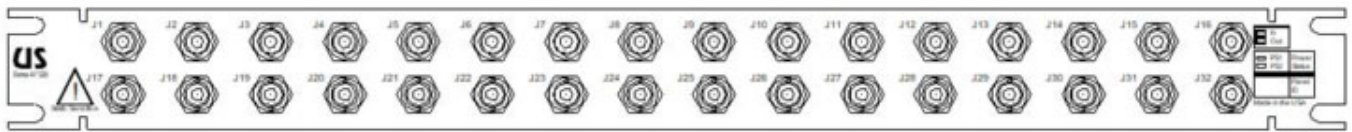
Figure 2

Figure 3

Figure 4

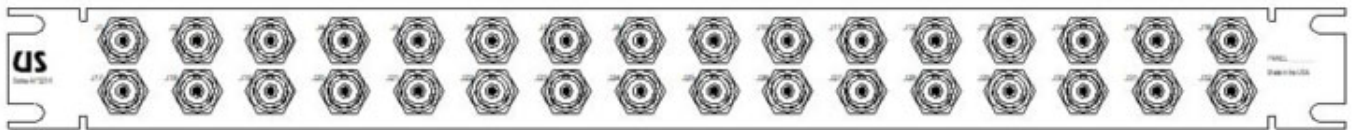## Figure 5

Active Panels (TTL/PCM)

The S5120F(X) provides both high-speed digital signal routing and distribution in a huge full fan-out matrix configuration. The system I/O provides native highspeed differential '422 digital data at both the inputs and the outputs. These signals are provided at the rear panel via 100-position SCSI-II high-density connectors to reduce the front panel rackmount footprint, which is only 5RU.

Married with the S5120F(X), adapter panels are typically used for the client interface with either Dsub or RJ45 type for the native '422 signals. Most common are active panel assemblies that converts signals from '422 differential pair to a single-ended TTL/PCM signal for the output, or receives TTL/PCM signals and converts them to '422 to route to the S5120F(X) system inputs.

The active panels (example shown to the right) include many additional advanced features. Not only is there the signal monitoring, but there is a status LED next to each connector showing signal status, as well ads redundant (monitored) power supplies, an alarm port (hard contact), dual AC input connectors and some versions provide a system expansion port to expand the system to 1024x1024.

Also included on the AP512 panels is a 10/100/1G Ethernet status port that can inquire on the panel health, voltages, temperature, signal activity, and other unique features. The included removable rackmount flanges can be positioned in four different locations to meet a variety of installation needs.

Active Panel AP512-32B
1RU unit shows BNC connectors and status LEDs

Active Panel AP512-32B
1RU unit shows expansion ports (for 1024x1024), dual AC inputs 1Gb Ethernet port, ground stud and hard contact alarm port

PS64530-002 Power Supply
This shows one of the hot-swap power supplies being removed from the system

System S5120F(X) Specifications

Minimum array size . . . . .64 input, 64 output
Maximum array size . . . . . . .512 input, 512 output
Expansion increment . . . . . . .64 ports per module
Design capacity . . . . .1024 inputs, 1024 outputs **
Switching technology . . . . . .Digital
Type of system . . . . .Non-blocking with full fanout
Architecture . . . . .Tri-Stage redundant, uni-directional

** Configurations comprised of multiple units are individually controlled unless you add the MAC4 master array controllers.

Input Characteristics
Signal connector . . . . .100 position SCSI-II
Coupling . . . . .DC
Impedance . . . . .100 ohm (differential 422)
Input type . . . . .High-speed 422 receivers
Common mode . . . .-7V to +12V

Output Characteristics
Signal connector . . . . .100 position SCSI-II
Coupling . . . . .DC
Impedance . . . . .100 ohm (differential 422)
Output type . . . . .High-speed, low skew differential drivers

Signal Characteristics with AP512-32B Type TTL Adaptive Panels
Frequency response DC-40Mbps
onnector . . . . .BNC
Signal . . . . .Single-ended

General Specifications

Module technology . . . . .Hot-Swappable
Power supply section . . . . .Redundant hot-swap standard
Controller CPU . . . . .Single or Dual (redundant)
Remote interface (per CPU) . . . . .10/100/1G Ethernet, Serial (232/422/485)
Protocols . . . . .TCP/IP, SNMP (v1/v2C/v3), IPV4, IPV6, SNTP
Alarm port . . . . .Included (hard contact - one per CPU)
Local control . . . . .Color touchscreen (4.3" or 10.1")
Configuration routing . . . . .AutoRoute or manual
Configuration memory . . . . .Flash
Cooling . . . . .Forced cooling with RPM monitoring
AC power requirements . . . . .90-264VAC, 47-63Hz, <400Watts
Power cords . . . . .Dual inputs (USA 15A)
Weight 55lbs
Size . . . . .8.75H x 22.00D x 19.00W (5RU)
Operating temp . . . . .0 to +50C
Non-operating temp . . . .-20 to +85C
Humidity . . . . .0 to 95% (NC @ +25C)
MTBF . . . .>125,000 hours (per MIL-HDBK-217F N1, ground benign @ +25C) estimated

Factory Spares
In-module (64 input) VSI5120F-D64-1
Mid-module VSM5120F-D64-1
Out-module (64 output) VSO5120F-D64-1
Power supply element PS64530-002

Universal Switching's policy is one of continuous development, and consequently the company reserves the right to vary from the descriptions and specifications shown in this publication.

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