

## DX/64x64 SERIES SOLID STATE DIGITAL SWITCHING SYSTEMS



- Switches high speed differential signals up to 2 Gbps.
- Typical signal types: ECL, LVDS, RS422, PECL, LVPECL and CML.
- Single Chassis nonblocking, full fan-out matrices from 16x16 to 64x64.
- Larger Systems and Dual Clock and Data Matrices available.
- Ideal for Serial Digital Data and Telemetry applications.

### FEATURES

- Solid State switch fabric restores signal levels and reduces jitter.
- Buffer Modules allow conversion between input and output signal types.
- Rise and Fall times as low as 400 pico seconds.
- **Non Blocking:** Any input to any output without interfering with a previously set path.
- **Full Fan-out:** Any input to any or all outputs.

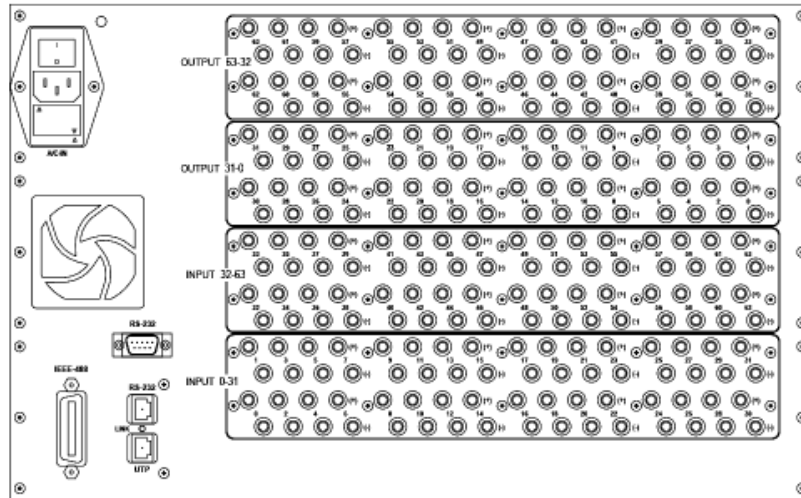
### DX/64X64 MAINFRAME

Standard Mainframes are built with power supplies, a control module and optionally with a LAN interface or keypad manual control. Input and output buffer modules are added as needed according to the signal types being switched. Buffer modules are shown on page 2 of this bulletin. A single Mainframe may be configured from a 16x16 up to a 64x64 matrix. Dual Clock and Data matrices are built as single chassis 16x16 or 32x32 matrices.

### DX/64x64-E EXPANSION CHASSIS

The Expansion Chassis is identical to the Mainframe in size and function. The Expansion Chassis, however, is built without a dedicated control module or manual control. Instead, it is designed to be controlled by the Cytec MESA Control Chassis described in the **MESA Bulletin**. Ribbon expansion cables connect the expansion chassis to the MESA. Expansion Chassis are used to build larger configurations such as 64x64 or 128x128 clock and data matrices which can not be achieved in a single Mainframe.

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FOR TECHNICAL ASSISTANCE**



DX/64x64 Mainframe Rear View with IEEE488, RS232 and LAN Control

## DX/64x64 MATRIX SPECIFICATIONS

**Dimensions:** **Width** 19" rack mount  
**Height** 10.5" Height (6 RU)  
**Depth** 25"

**Weight:** < 40 lbs

**Mounting:** Handled Flanges standard  
 Flush Mount Flanges available at no charge  
 Drilled for slides (CHS-1 slides additional)

**Power:**  
**AC Input**  
**VAC:** Full autoranging 85 - 264 VAC  
**Frequency:** 47 - 500 Hz  
**Connectors:** Universal US Standard, IEC C13  
**Fuse:** 2 amp  
**Power Used:** < 60 watts max, all outputs on

**Environmental:**  
**Operating Temp:** 0 to 50 °C  
**Storage Temp:** -25 to 85 °C  
**Humidity:** 95% RH noncondensing to 30° C

**Switch Fabric:**  
**Switching Speed:** 50 ns + control interface delay  
**Unbuffered In:** CML  
**Unbuffered Out:** CML  
**Max Data Rate:** 3.2 Gbps NRZ

**Connections:**  
**Signals:** SMA Female + and -  
 BNC, Triax or other via patch panels.  
**RS232:** D9 Male  
**GPIB:** IEEE488  
**10BaseT LAN:** RJ45  
**LAN to RS232:** RJ45 to D9 Cable

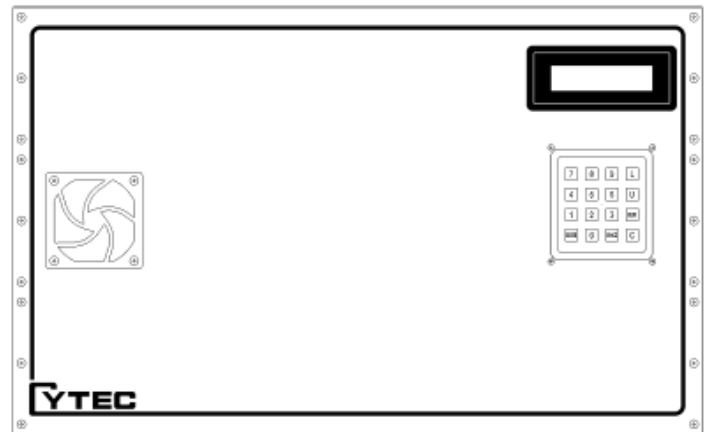
### MTBF (Full System)

**Telcordia** 124,244 Hours  
**MIL 217F** 68,760 Hours

Optional input and/or output buffer modules convert the system to ECL, LVDS or RS-422 levels. Each buffer module has sixteen differential channels, so a fully buffered 64x64 system has four input buffers and four output buffers. When these modules are used, the specifications of the system are determined by the input and/or output buffers present.

## DX SPECIFICATIONS (signal w/o buffers)

<b>Input Voltage High (VIH) :</b>	2.1V Min	2.5V Max
<b>Input Voltage Low (VIL)</b>	1.5V Min	1.9V Max
<b>Output Voltage High (VOH)</b>	2.25V Min	2.5V Max
<b>Output Voltage Low (VOL)</b>	1.6V Min	1.8V Max
<b>Data Rate</b>	-----	2000Mb/s Max
<b>Output Current</b>	-----	50mA Max



DX/64x64 Mainframe Front View with Manual Control

## Need a smaller matrix?

Cytec can build matrices in physically smaller sizes for applications where space is at a premium or expansion is not needed. 16x16 or 32x32 matrices are only 7 inches in height. All Cytec products are engineered with flexibility in mind.

## Clock and Data Matrices

Systems can be built as 16x16 or 32x32 clock and data matrices in a single chassis. Two chassis can be driven in parallel to form up to 64x64 clock and data systems.

# INPUT and OUTPUT MODULES

## ECL MODULES

The ECL Input Buffer Module accepts ECL signals, converts them to CML and then sends them to the 64x64 switch fabric. The module uses two SMA connectors for each differential input.

The ECL Output Module accepts CML outputs from the 64x64 switch fabric and converts them into ECL for output. The module uses two SMA connectors for each differential output.

Both ECL modules are intended to work with typical ECL signal levels of -1.8 to -0.8 volts. Differential signals are terminated into 50 ohms tied to -2 volts. Typically, V<sub>ee</sub> is -5.0 volts, while V<sub>cc</sub> is GND.

DC Characteristics					
Symbol	Parameter	Min	Typ	Max	Units
V <sub>ih</sub>	ECL Input Voltage High	-1.165		-0.880	V
V <sub>il</sub>	ECL Input Voltage Low	-1.810		-1.475	V
V <sub>icm</sub>	Input Common Mode Voltage	-1.38		-1.26	V
V <sub>idif</sub>	Input Differential Voltage	150			mV
V <sub>oh</sub>	ECL Output Voltage High	-.980		-.810	V
V <sub>ol</sub>	ECL Output Voltage Low	-1.950		-1.630	V
V <sub>ocm</sub>	Output Common Mode Voltage	-1.350		-1.25	V
V <sub>odiff</sub>	Output Differential Voltage		250		mV
I <sub>o</sub>	ECL Output Current Continuous			50	mA
I <sub>o Max</sub>	ECL Output Current Surge			100	mA

AC Characteristics				
Function		Min	Max	Units
Data Rate	<b>RZ (Return to Zero)</b>	NA	1600	Mbps
	<b>NRZ (Non Return to Zero)</b>	NA	2000	Mbps
Channel Propagation Delay (input to Output)			2000	psec
Ch-to-Ch Propagation Skew			600	psec

## RS422 MODULES

The RS422 Input Module accepts RS422 signals, converts them to CML and then sends them to the 64x64 solid state switch fabric, at the heart of the matrix. The module uses two SMA connectors for each differential input. The RS422 Input Module is identical to the LVDS input module, has been tested to all RS422 levels and actually allows RS422 inputs up to 60 Mbps.

The RS422 Output Module accepts CML outputs from the 64x64 switch fabric and converts them into fast RS422 for output. The modules use two SMA connectors for each differential output.

Both RS422 modules are intended to work with typical RS422 signal levels of 0 to 5 volts. Differential signals are terminated into 100 ohms across the differential pairs. Typically, V<sub>cc</sub> is approximately 3.3 volts for the input module and 5 volts for the output module.

DC Characteristics					
Symbol	Parameter	Min	Typ	Max	Units
V <sub>ih</sub>	RS422 Input Voltage High	2		5	V
V <sub>il</sub>	RS422 Input Voltage Low	0		0.8	V
V <sub>idif</sub>	Input Differential Voltage	0.2	3	5	V
V <sub>oh</sub>	RS422 Output Voltage High	3	3.3	4.5	V
V <sub>ol</sub>	RS422 Output Voltage Low	0	.35	.5	V
V <sub>odiff</sub>	Output Differential Voltage	2	3	4.5	V
I <sub>oh</sub>	RS422 Output Current High	25	50		mA

AC Characteristics				
Function		Min	Max	Units
Data Rate		NA	60	Mbps
Channel Propagation Delay (input to Output)			2000	psec
			800	psec

## LVDS MODULES

The LVDS Input Buffer Module accepts LVDS signals and then sends them to the 64x64 switch fabric. The module uses two SMA connectors for each differential input.

The LVDS Output Module accepts CML outputs from the 64x64 switch fabric and converts them into LVDS for output. The module uses two SMA connectors for each differential output.

Both LVDS modules are intended to work with typical LVDS signal levels of 1 to 1.4 volts. Differential signals are terminated into 100 ohms across differential pairs. Typically, V<sub>cc</sub> is approximately 3.3 volts.

DC Characteristics					
Symbol	Parameter	Min	Typ	Max	Units
V <sub>ih</sub>	LVDS Input Voltage High		1.4	V <sub>cc</sub> +0.3	V
V <sub>il</sub>	LVDS Input Voltage Low	-0.3	1.0		V
V <sub>icm</sub>	Input Common Mode Voltage		1.2		V
V <sub>idif</sub>	Input Differential Voltage	100(V <sub>in</sub> <2.4V)			mV
		200(V <sub>in</sub> <V <sub>cc</sub> )			mV
V <sub>oh</sub>	LVDS Output Voltage High			1.474	V
V <sub>ol</sub>	LVDS Output Voltage Low	.925			V
V <sub>ocm</sub>	Output Common Mode Voltage	1.125		1.375	V
V <sub>odiff</sub>	Output Differential Voltage	250		450	mV
I <sub>oh</sub>	LVDS Output Current High	-4			mA
I <sub>ol</sub>	LVDS Output Current Low			4	mA

AC Characteristics				
Function		Min	Max	Units
Data Rate	<b>RZ (Return to Zero)</b>	NA	1600	Mbps
	<b>NRZ (Non Return to Zero)</b>	NA	2000	Mbps
Channel Propagation Delay (input to Output)			2000	psec
Ch-to-Ch Propagation Skew			800	psec

## OTHER INPUT / OUTPUT MODULES

Cytec can easily produce input / output modules for many other types of differential digital signals including:

**PECL** - Positive Emitter Coupled Logic

**LV PECL** - Low Voltage PECL

**HSSI** - High Speed Serial Interface

**CML** - Current Mode Logic

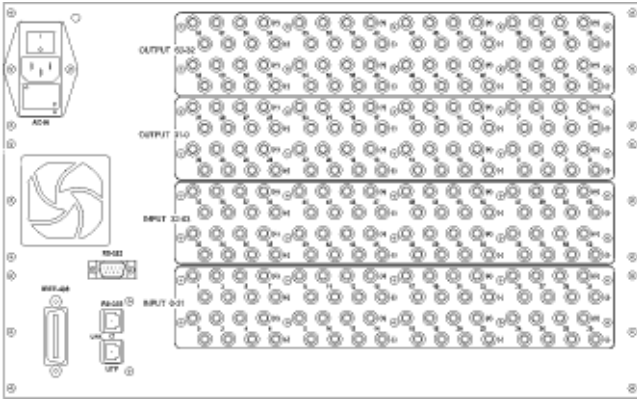
or any other type of high speed differential signal.

Please contact Cytec for questions regarding any type of input / output modules for your particular implementation. Custom configurations are available per request.

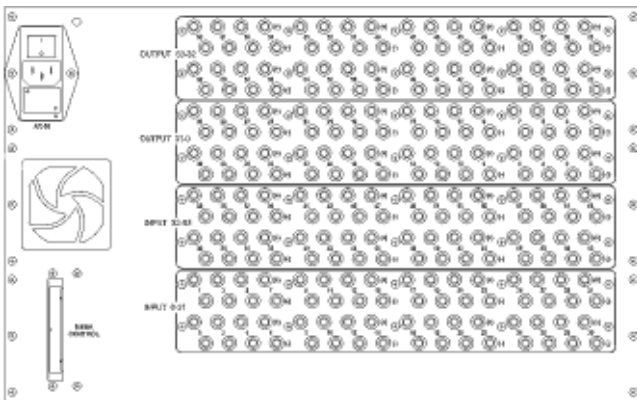
## UNUSED CHANNELS

Although leaving unused inputs and outputs floating will cause no harm, it is good practice to terminate one of the differential signals on unused inputs or outputs so that the signals do not generate unnecessary noise. Any quality 50 ohm SMA termination may be used, and installing it on the negative SMA connector seems to have the most beneficial result. Precision terminations are not necessary. Terminations rated to 1 GHz will suffice.

# CONTROL OPTIONS



DX/64x64 Mainframe with IF-5 and IF-6 Option (figure 1)



DX/64x64 Expansion Chassis connects to MESA Controller (figure 2)

## IF-5C IEEE488/RS232 CONTROL OPTION

This module is standard and provides remote control via both RS232 Serial and IEEE488 Talk/Listen interfaces as detailed in Applications Bulletin AP-5 (figure 1).

## IF-6 LAN OPTION

This module allows control over a 10BaseT Ethernet Local Area Network via TCP/IP protocols as described in Applications Bulletin AP-5 (figure 1).

## IF-7 USB OPTION

This module provides computer control via either USB or RS232.

## MESA with EXPANSION CHASSIS OPTION

Multiple Expansion Chassis are designed to interface with a Cytec MESA Controller (figure 2).

Custom options not listed above are also available. Please contact Cytec at 1-800-346-3117 for more information.

## PATCH PANELS

Patch panels are available to convert Dual SMA connectors (+ and -) to other connector types such as Triax, Dual BNC's or Twin BNC. Please contact Cytec for price and availability of your specific patch panel requirements (figure 3).

## CYTEC SWITCH MANAGER SOFTWARE



The Cytec Switch Manager provides a GUI interface for controlling matrices and multiplexers via remote computer. The software includes an intuitive graphical interface, security implementation, built in test functionality, multiple device control, switchpoint memory, as well as many other useful features. You can download the Switch Manager free of charge from our website.

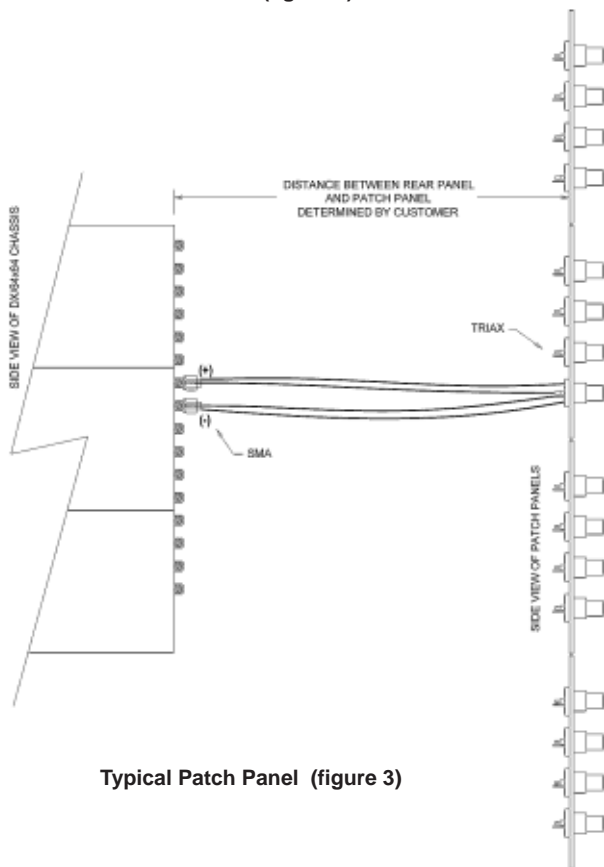
Available for Windows, Linux, Mac OS, or any other Java enabled platform

## SOFTWARE

Free drivers and/or sample programs are available for the most commonly available application programming languages.

## WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.



Typical Patch Panel (figure 3)

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