



A Quantum Switch for the Better

Precision 464kC Switch Matrix High-Density Programmable Solid State Switch Matrix System

The Precision 464kC switch matrix system is a reliable solid-state switch matrix system, providing computer-controlled connections between any input and any output. Configure a single 464kC for up to 256 inputs and 256 outputs, or build a larger system by bussing two or more systems together to form an array that has almost unlimited possibilities.

The balanced differential input buffers eliminate noise pickup problems and correctly reference the signal inputs to their corresponding ground. The built-in Go/No-Go test feature automatically verifies run-time setup by checking each programmed connection using a direct input-to-output measurement. The 464kC FAT routines measure switch system parametrics, including gain, crosstalk and open/short, in situ to verify performance and provides full test reports.



Save time and reduce errors on your switch system setups with the easy to use spreadsheet style Graphical User Interface. Save configurations and download them to your switch system over the network—and your tests are ready to go. Program the switch from your application via the high-level Ethernet interface. Edit configurations offline in Excel.

Salient Features

Switch Matrix Characteristics

- Solid-state switch matrix
- High density: Up to 65,536 crosspoints

Matrix Sizes

- Configurable from 64x64 to 256x256, all in single 10U mainframe
- Easily connect multiple mainframes to build larger systems

System Control

- Spreadsheet-style graphical user interface (GUI) for host PC control
- Remote Ethernet interface command control
- Front-panel control
- Nonvolatile storage of switch configurations: Store up to eight setups in the system; store unlimited setups on the host computer.

System Integrity

- System health monitoring of power supply and internal temperatures
- Solid-state switches are more reliable than mechanical relay systems
- Built-in self-tests, with reports, exhaustively test switch settings

Signal Switching

- ± 10 Vpk for each signal path

Input Characteristics

- Balanced Differential input

Frequency Response

- DC to 1 MHz

Output Characteristics

- Single-ended with manually selectable ground sense

Precision 464kC Switch Matrix System

Switch System Specifications

Matrix Size:

Up to 256x256, 3-stage non-blocking solid-state switch system

Input Characteristics

Type: Balanced differential

Differential Input: ± 10 Vpk

Protection:

± 40 Vpk maximum, without damage

Common Mode Rejection Ratio:

90 dB typical, DC to 1 kHz

Transfer Characteristics

Frequency Response:

DC to 16 kHz, 0 dB ± 0.02 dB
 16 kHz to 100 kHz, 0 dB ± 0.05 dB
 100 kHz to 200 kHz, 0 dB ± 0.25 dB
 200 kHz to 400 kHz, 0 dB ± 0.5 dB
 500 kHz, -0.5 dB typical
 1 MHz, -2 dB typical
 1.3 MHz, -3 dB typical

Level vs. Frequency:

± 10 Vpk for $f \leq 200$ kHz
 ± 10 Vpk (200 kHz/f) for $f > 200$ kHz

Linearity:

$\pm 0.01\%$ at 7 Vrms and 16 kHz

Channel Crosstalk:

-90 dB, maximum, at 16 kHz
 -75 dB, maximum, at 100 kHz
 -55 dB, maximum, at 1 MHz

Phase Match:

$\pm 0.2^\circ$ maximum, DC to 10 kHz
 $\pm 1^\circ$ maximum, 10 kHz to 100 kHz
 $\pm 2^\circ$ maximum, 100 kHz to 200 kHz

Delay: 500 nS typical

Slew Rate: 20 V/ μ s typical

Recovery Time:

$< 1 \mu$ s w/50% overload

Output Characteristics

Output Type:

Single-ended with manual switch-selectable ground sense

Maximum Output: ± 10 Vpk at 5 mApk

Output Noise: 25 μ Vrms in 100 kHz BW

Output Z: 50 Ω

DC Offset:

± 5 mV maximum

464kC Switch Matrix Overview

Description

Precision Filters 464kC High Density Programmable Switch Matrix is a 3-stage non-blocking architecture, providing the equivalent of up to 256 x 256 rectangular coordinate switch matrix (65,536 cross points) in a single 10U chassis. The 3-stage switching architecture provides a 63% reduction in cross points which translates not only to a smaller physical chassis size, but shorter input to output signal paths. The shorter paths mean lower capacitance, less crosstalk and higher bandwidth compared to a traditional rectangular coordinate design. Precision Filters' 464kC topology optimizes bussing of signals inside the chassis by using internal connection planes without requiring external bussing cables.

The 464kC uses high impedance (10 MΩ) differential buffers for each of its inputs. The differential buffers properly reference each input signal to its point of origin while the high common mode rejection (CMR) reduces noise pick-up on long input wires. The differential buffers are especially important when both the input and output devices are single ended (grounded low) signals. If these signals are connected using patch panel cables or relay switching, large ground loops would be created resulting in high power line related noise signals or hum in the measurement data.

Other switch system attributes include 0.02% amplitude accuracy through any input to output switch path, 0.2 degree channel to channel phase match, 1.3 MHz bandwidth and less than 25 μV_{RMS} noise while maintaining better than -90 dB channel to channel crosstalk.

Reliability and Dependability

Dependability and reliability are paramount as each switch system is a crucial link in the signal path of every measurement channel. Solid-state switches as opposed to electro-mechanical relays not only improves initial reliability in the early stages of deployment but becomes an even greater advantage later in the service life of the switch. Over time, mechanical relay systems exhibit an increasing rate of contact and coil related failures.

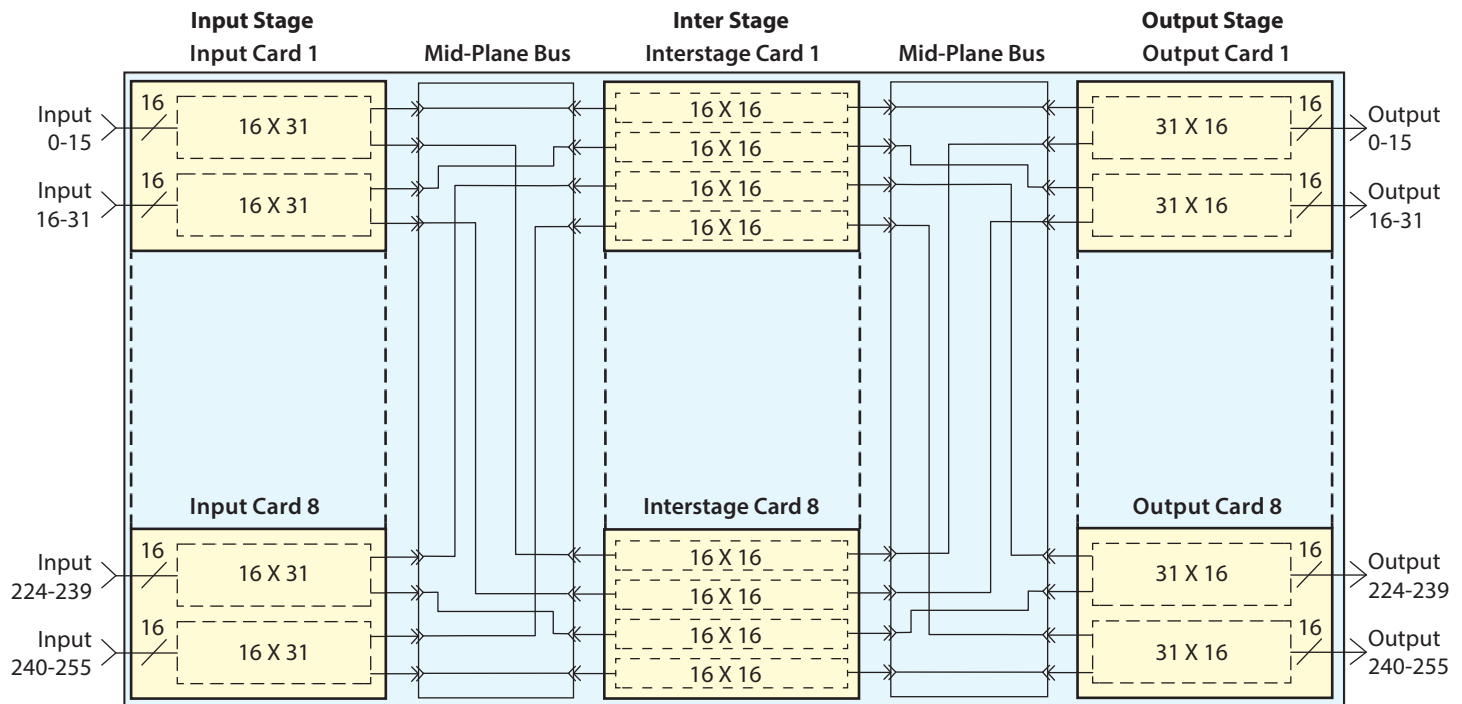
Scalability and Expandability

It is important at testing facilities that the switch system purchased for today's requirements are easily expandable for future requirements. For example, a 128x128 channel matrix system can easily be expanded to a 256x256 channel matrix by added four input cards and four output cards. To accomplish larger matrix systems, the 464kC architecture allows bussing multiple mainframes to expand the switch up to 512x512 channels and beyond.

Prove It and Document It

The Precision 464kC was designed with the philosophy that a switch matrix and its programmed configuration is of little use if you can't prove it and document it. This is especially important with a switch system having 65,000 possible switch connections. If only one of the connections is faulty, it could corrupt the test data from a critical and expensive measurement test.

The extensive built-in self-test capabilities allow full parametric factory acceptance test "FAT" of the entire system including all switch paths, while the quicker "Go/No-Go" test verifies and documents only the active switch paths in the present configuration. The fully automated tests confirm opening and closing of switches, crosstalk of the switch path to other outputs and the switch path input to output gain accuracy. Diagnostic test reports are saved as text documents and can be used to supplement quality and validity reports for the overall measurement system.



Block Diagram of a 3-Stage 256 x 256 Non-Blocking Switch System

464kC Switch Matrix System Programming

Switch settings can be managed using the Graphical User Interface (GUI), the Ethernet remote interface or the front panel. The GUI is a convenient, ready to run solution that executes on a Windows based computer, providing an organized and efficient method to display and manage connections for a large number of switch system inputs and outputs.

GUI Ease of Use

A simple and intuitive graphical user interface (GUI) controls the 464kC switch matrix. The main GUI selection screen presents a spreadsheet type matrix consisting of columns and rows with each switch output channel represented by one cell. Programming of the switch is as simple as clicking the mouse on one of the output cells and then selecting an input from a drop-down list.

Factory default names (In 1, In 2, Out 1, Out 2 etc.) are easily changed to any user defined name up to 32 characters long. Output channels color assignments provide an

intuitive visual association of channel groupings similar to some manual patch panel configurations.

Given the frequent change-over of test articles in the test cells, it is important that an operator preparing for a subsequent test can program the switch and name the input channels off line without disrupting a test currently in process. The 464kC GUI accomplishes this by saving the current configuration to a standard comma separated variable (CSV) file format. Off line edits are easily done using Excel or any CSV file manager and imported back to the 464kC GUI as the active configuration.

System Health and Maintenance

The GUI displays the status of the power supply internal voltages, the cooling fans and the internal system temperature. If a failure condition is detected, the GUI warning LEDs indicators turn red. In addition, the system generates an audible warning and front-panel FAULT LED is activated.

Several other usability features are built in to the GUI to simplify the day-to-day operations of large test operations. The output Monitor architecture allows simple monitoring of any output channel in the system via a single connector without disrupting any output signals or removing any output cables. The Input Monitor architecture allows simple monitoring of any input channel in the system via a single connector without disrupting any input signals or removing any input cables. An internal 16 kHz test tone can be applied to any channel input. This allows quick verification of the switch path and provides a useful test signal for downstream devices attached to the 464kC outputs.

The Go/No-Go and Factory Acceptance Tests (FAT) are initiated from the GUI drop down menu. The Go/No-Go quickly checks the current programmed switch connections and is performed with all input and output cables connected. FAT is run at regular calibration intervals and performs an exhaustive test of all switch settings, internal switch connections, and input/output connectors.

The screenshot displays the main GUI section screen. At the top, there is a menu bar with options: System, Set, Matrix, Connections, Names, Test, Advanced, Help. Below the menu bar, there are several status indicators: Connected (green), Warning (red), Fault (red), Power (green), Temp (green), Fan (green), and a Monitor Bus (Inlet) set to Off. The main area is a large matrix of channels, each with a color-coded header and a dropdown menu. The channels are organized into groups: Safety (red), Accel (yellow), Bridge (blue), and Strain/DAS/BPF (green). The matrix shows the following connections:

Row	Input	Output	Input	Output	Input	Output	Input	Output
5	Safety 0	Abort OUT 0	Accel 0	Vibe Control 0	Strain 0	DAS IN 0	BPF OUT 63	IN 96
6	Safety 1	Abort OUT 1	Accel 1	Vibe Control 1	Strain 0	DAS IN 1	BPF OUT 64	IN 97
7	Safety 2	Abort OUT 2	Accel 2	Vibe Control 2	Strain 0	DAS IN 2	BPF OUT 65	IN 98
8	Safety 3	Abort OUT 3	Accel 3	Vibe Control 3	Strain 0	DAS IN 3	BPF OUT 66	IN 99
9	Safety 4	Abort OUT 4	Accel 4	Vibe Control 4	Strain 0	DAS IN 4	BPF OUT 67	IN 100
10	Accel 0	Vibe Control 0	Accel 0	Vibe Control 0	Strain 0	DAS IN 5	BPF OUT 68	IN 101
11	Accel 1	Vibe Control 1	Accel 1	Vibe Control 1	Strain 0	DAS IN 6	BPF OUT 69	IN 102
12	Accel 2	Vibe Control 2	Accel 2	Vibe Control 2	Strain 0	DAS IN 7	BPF OUT 70	IN 103
13	Accel 3	Vibe Control 3	Accel 3	Vibe Control 3	Strain 0	DAS IN 8	BPF OUT 71	IN 104
14	Accel 4	Vibe Control 4	Accel 4	Vibe Control 4	Strain 0	DAS IN 9	BPF OUT 72	IN 105
15	Accel 5	Vibe Control 5	Accel 5	Vibe Control 5	Strain 0	DAS IN 10	BPF OUT 73	IN 106
16	Accel 6	Vibe Control 6	Accel 6	Vibe Control 6	Strain 0	DAS IN 11	BPF OUT 74	IN 107
17	Accel 7	Vibe Control 7	Accel 7	Vibe Control 7	Strain 0	DAS IN 12	BPF OUT 75	IN 108
18	Accel 8	Vibe Control 8	Accel 8	Vibe Control 8	Strain 0	DAS IN 13	BPF OUT 76	IN 109
19	Accel 9	Vibe Control 9	Accel 9	Vibe Control 9	Strain 0	DAS IN 14	BPF OUT 77	IN 110
20	Accel 10	Vibe Control 10	Accel 10	Vibe Control 10	Strain 0	DAS IN 15	BPF OUT 78	IN 111
21	Accel 11	Vibe Control 11	Accel 11	Vibe Control 11	Strain 0	DAS IN 16	BPF OUT 79	IN 112
22	Accel 12	Vibe Control 12	Accel 12	Vibe Control 12	Strain 0	DAS IN 17	BPF OUT 80	IN 113
23	Accel 13	Vibe Control 13	Accel 13	Vibe Control 13	Strain 0	DAS IN 18	BPF OUT 81	IN 114
24	Accel 14	Vibe Control 14	Accel 14	Vibe Control 14	Strain 0	DAS IN 19	BPF OUT 82	IN 115
25	Accel 15	Vibe Control 15	Accel 15	Vibe Control 15	Strain 0	DAS IN 20	BPF OUT 83	IN 116
26	Accel 16	Vibe Control 16	Accel 16	Vibe Control 16	Strain 0	DAS IN 21	BPF OUT 84	IN 117

The Main GUI Section Screen with User-Defined Colored Coded Groups, Descriptive Channel Names and the Corresponding CSV File

System Components

Front Panel Controls and Indicators

Power Switch and Indicator:

The on/off power switch, located on the front panel, includes a Power On LED that indicates when the system is powered up.

Standby Indicator:

The Standby LED indicates that the system has power and that the primary power switch, located on the rear of the frame, is in the on position.

Menu Display and Programming Keys:

The front-panel menu display and keypad provide an alternative to the GUI or the remote interface to program the switch system and provide startup information.

Fault Indicator:

The warning LED indicates a system fault, such as over temperature or that an internal voltage on a power supply rail is out of factory specification.

Remote Indicator:

The remote LED indicates that the system is controlled either by GUI or the remote interface.

Rear Panel Components and Connectors

Power Supply

The field replaceable, low-noise AC power supply provides clean power to the signal conditioning cards. The 464kC system supports internal monitoring and reporting of power supply levels. Internal temperature and fan operations are also monitored, sounding an alarm if conditions are out of specified limits.

All 464kC systems are configured with the proper power supply input voltage and fuse(s) for your country when shipped from the factory, unless other requirements are specified.

Power Entry Connector and Primary Power Switch:

The power connector provides the port for an AC power source. The primary power switch puts the system in standby mode.

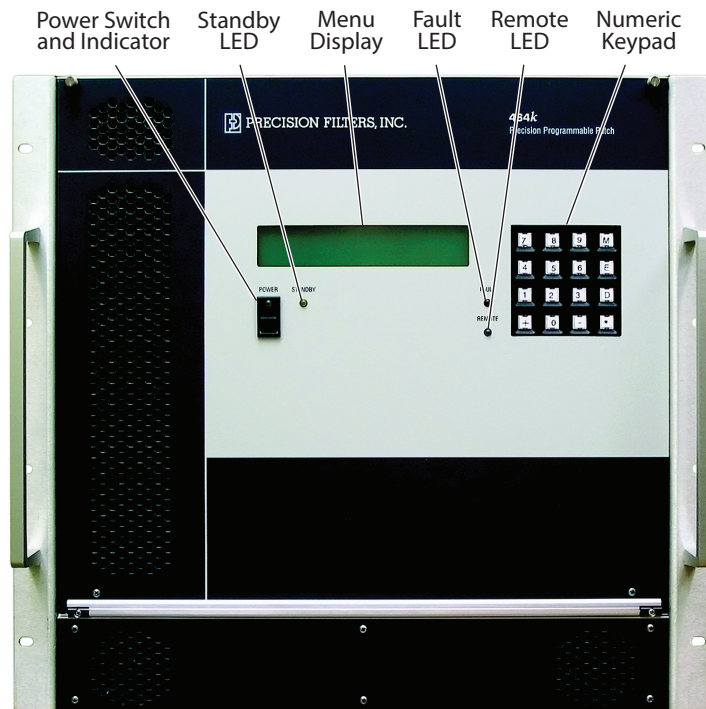
Chassis Ground and Signal Ground Posts:

Signal and chassis ground posts are provided to provide the optimal grounding configuration for the test facility. The signal ground can be conveniently tied to the chassis using the included ground strap. If the chassis ground at the facility is noisy, the signal ground can be isolated from the chassis and tied to a more suitable low-noise ground connection.

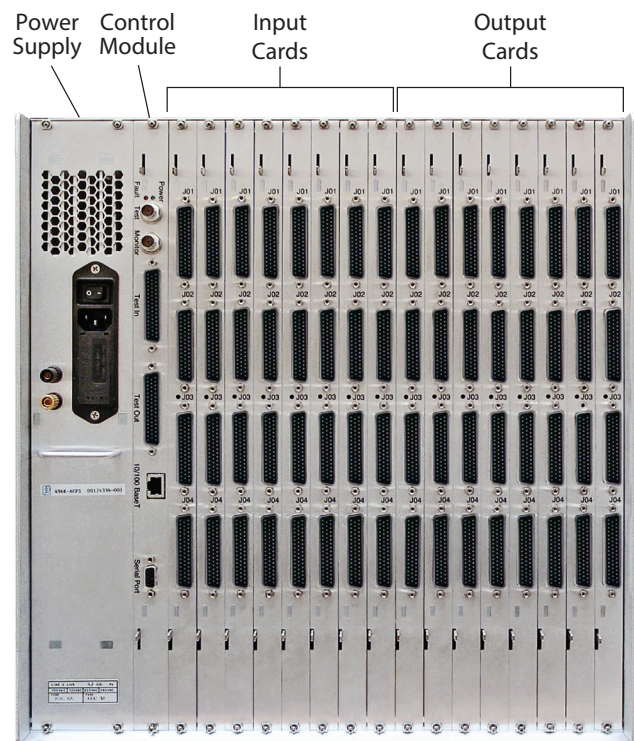
Control Module

The 464kC switch matrix control module processes commands from the host computer via a 10/100 baseT Ethernet connection, as well as operates the front-panel display and reads input keys on the front panel.

See the side bar on the next page for a description of the connectors located on the control panel.



464kC Switch Matrix System Front Panel



464kC Switch Matrix System Rear Panel (256x256 System shown)

Control Module Connectors and Indicators

Fault Indicator:

The warning LED indicates a system fault, such as over temperature or a power voltage out of factory specifications.

Power On Indicator

The Power On LED indicates that the system has power and that the primary power switch, located on the power supply is in the on position.

Ethernet Connector

The Ethernet interface 10/100BaseT connector (RJ45) provides the control link to a host computer.

Test BNC Connector:

The coaxial BNC external test source connector provides a connection for an external test signal from a programmable function generator.

Monitor BNC Connector:

The coaxial BNC monitor connector provides a means for viewing the output of a selected channel using a scope or other measurement device without disconnecting signal cables.

Test In Connector

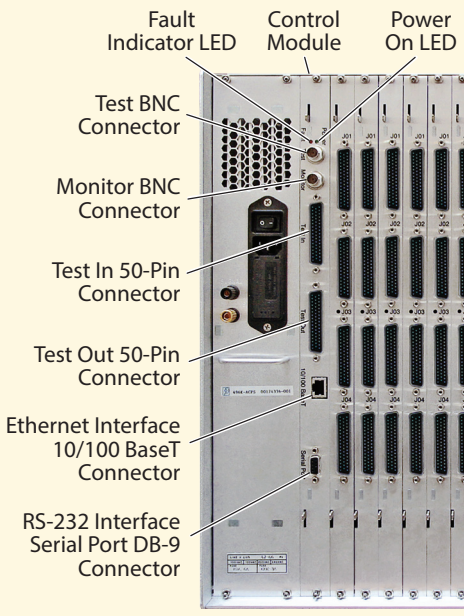
The 50-Pin Test In Connector is used during the FAT 1 test.

Test Out Connector

The 50-Pin Test Out Connector is used during the FAT 1 test.

RS-232 Connector:

The RS-232 Serial connector provides an alternative to the Ethernet connection to connect to the host computer.



Input, Output, and Interstage Cards

The input, interstage and output cards provide the building blocks for the 3-stage switching topology.

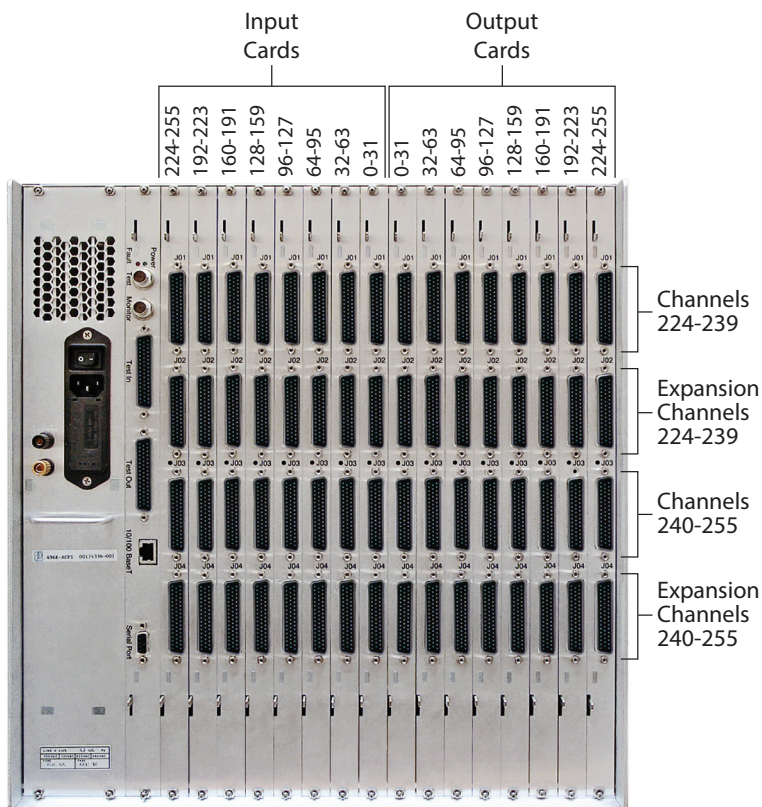
Input and Output Cards

The input and output cards are inserted at the rear of the chassis. Each input and output card has 32 channels inputs or outputs on two 50-pin D connectors and two 50-pin D Expansion connectors for bussing two or more systems together to form a larger matrix.

Both input and output connectors support 3-wire twisted/shielded cables and have configurable switches for grounding or floating the shield. In addition, the outputs may be configured for single-ended or ground sense operation. Single-ended mode is used with driving systems with differential inputs. Ground sensing is used to drive single-ended loads to prevent ground loops.

Interstage Cards

Interstage cards are installed through the front of the system by opening the front panel. Connections between the three card types are made via a "mid-plane" inside the 464kC chassis.



Input and Output Connectors (256x256 System shown)

464kC Built-in Self-Test

The 464kC system contains a built-in test subsystem to verify the integrity of the switch system and cables. Provisions for injecting test signals at any input and for monitoring and measuring any output is provided. Precise measurement circuits for accurately determining gain through a switch path and for measuring faults such as switch opens, shorts and crosstalk between channels is intrinsic to the system. The test subsystem uses a synchronous detector or RMS detector to measure the monitored signal.

Two levels of tests are provided. The Go/No-Go test can be run to quickly verify the present test configuration. The Factory Acceptance Test (FAT) is used to perform exhaustive parametric tests on the system at regular calibration intervals. Together, the Go/No-Go and FAT provide the user with a complete suite of tests to verify system performance over the lifetime of the system.

Go/No-Go Test

The Go/No-Go test checks the integrity of the current matrix configuration. The test is performed in situ with I/O cables attached and no signal paths are changed during the test. Each programmed connection from the input card, through the interstage card and midplane, to the output card is tested.

The Go/No-Go routine tests every connected input-to-output path of the current system setup for correct gain measurement. A test signal is measured and injected at the input card. This signal is then measured at the output of the signal path. The resulting gain is calculated for each programmed path of the user setup and is reported and saved in a file.

Factory Acceptance Tests (FAT)

FAT 0 Test

During FAT 0, the gain through each path of every card is tested and a verification that every switch can be opened is performed. Using the built-in test and monitor busses, test signals are injected into each signal path and associated outputs are monitored and measured. Optionally, crosstalk can be measured during the FAT 0 test routine which requires that the user disconnect all I/O cables and install special grounding plugs on the input connectors. The results of the test is reported and saved in a file. After the test is performed the matrix settings are restored to the last setup.

FAT 1 Test

The FAT 1 test adds additional functional checks for the integrity of all input connectors, all output connectors. This test is run with all input and output cables disconnected and special test cables installed (464k-I/O-TEST). The FAT 1 test procedure provides a series of directions for connecting test cables and moving them during the test. The FAT 1 test results are reported and saved in a file.

FAT 2 TEST

The FAT 2 test only applies to systems comprised of multiple 464kC chassis. Tests are performed which check the integrity of all the inputs and outlets in a matrix comprised of two or more 464kC switch matrix systems in order to verify the bussing connections between systems.

Test Reports

At the conclusion of a FAT or No-Go test, a summary status report is provided with detail useful to pinpoint failures. The stored test report can be accessed from the GUI. A test report summary identifies the time the test was started and an overview of the pass/fail information. Detailed test results of each card are provided.

```
FAT 0 Test Results for 464KC-0-MP2-(2)31x16 board in
slot 'OUT6'
Serial #192160-006
```

```
Closed Switch Gain Results
  992 tests      0 failures
minimum gain -0.004279 dB
maximum gain 0.000268 dB
all gain average      -0.001736 dB
pass only gain average -0.001736 dB
  0              gain < -0.022500 dB
  0  -0.022500 dB <= gain < -0.020000 dB
  0  -0.020000 dB <= gain < -0.017500 dB
  0  -0.017500 dB <= gain < -0.015000 dB
  0  -0.015000 dB <= gain < -0.012500 dB
  0  -0.012500 dB <= gain < -0.010000 dB
  0  -0.010000 dB <= gain < -0.007500 dB
  0  -0.007500 dB <= gain < -0.005000 dB
109 -0.005000 dB <= gain < -0.002500 dB
875 -0.002500 dB <= gain < -0.000000 dB
  8  -0.000000 dB <= gain <  0.002500 dB
  0  0.002500 dB <= gain <  0.005000 dB
  0  0.005000 dB <= gain <  0.007500 dB
  0  0.007500 dB <= gain <  0.010000 dB
  0  0.010000 dB <= gain <  0.012500 dB
  0  0.012500 dB <= gain <  0.015000 dB
  0  0.015000 dB <= gain <  0.017500 dB
  0  0.017500 dB <= gain <  0.020000 dB
  0  0.020000 dB <= gain <  0.022500 dB
  0  0.022500 dB <= gain
```

```
Board FAT 0 test elapsed time 0:05:15
```

FAT 0 Switch Gain Test Report Example

```
FAT 0 Test Results for 464KC-0-MP2-(2)31x16 board in
slot 'OUT6'
Serial #192160-006
```

```
Crosstalk Gain Results
14880 tests      0 failures
minimum gain -109.005943 dB
maximum gain -94.114372 dB
all gain average      -104.718376 dB
pass only gain average -104.718376 dB
  0              gain < -120.0000 dB
  0  -120.0000 dB <= gain < -118.5000 dB
  0  -118.5000 dB <= gain < -117.0000 dB
  0  -117.0000 dB <= gain < -115.5000 dB
  0  -115.5000 dB <= gain < -114.0000 dB
  0  -114.0000 dB <= gain < -112.5000 dB
  0  -112.5000 dB <= gain < -111.0000 dB
  0  -111.0000 dB <= gain < -109.5000 dB
 714 -109.5000 dB <= gain < -108.0000 dB
5329 -108.0000 dB <= gain < -106.5000 dB
2042 -106.5000 dB <= gain < -105.0000 dB
1454 -105.0000 dB <= gain < -103.5000 dB
2328 -103.5000 dB <= gain < -102.0000 dB
1937 -102.0000 dB <= gain < -100.5000 dB
 486 -100.5000 dB <= gain <  -99.0000 dB
 384  -99.0000 dB <= gain <  -97.5000 dB
 139  -97.5000 dB <= gain <  -96.0000 dB
  55  -96.0000 dB <= gain <  -94.5000 dB
  12  -94.5000 dB <= gain <  -93.0000 dB
   0  -93.0000 dB <= gain <  -91.5000 dB
   0  -91.5000 dB <= gain <  -90.0000 dB
   0  -84.0000 dB <= gain
```

```
Board FAT 0 test elapsed time 0:51:51
```

FAT 0 Crosstalk Gain Test Report Example

Building a 464kC Switch Matrix System

Single Systems

All 464kC Matrix systems are shipped ready to use. Just connect your inputs and outputs, add power and program your matrix setup. Standard systems are available in a variety of sizes from 64x64 to 256x256, systems include the mainframe, power supply, controller card, input and output cards, interstage modules, blank panels and operating and test software. See table 1, below, for standard matrix sizes and the components included with each matrix system size.

Future expansion of smaller systems, up to 256x256, are accomplished by just adding new input and output cards.

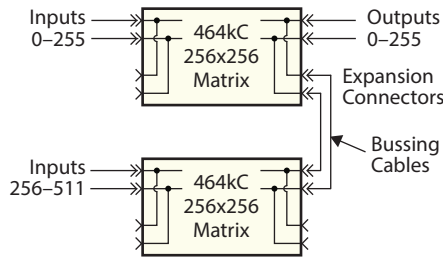


Diagram of a 512 Inputs x 256 Output Multiple Mainframe Switch System

Systems with Multiple Mainframes

Multiple system can be used for increasing the number of inputs, increasing the number of outputs or both.

Building a larger system is as easy as bussing two or more systems together, connecting the systems to the host PC computer and programming the GUI recognizing the systems IP addresses.

Each input and output card have expansion connectors that are internally tied to the input connector or the output connector depending on the card type and connected to additional systems using a bussing cable.

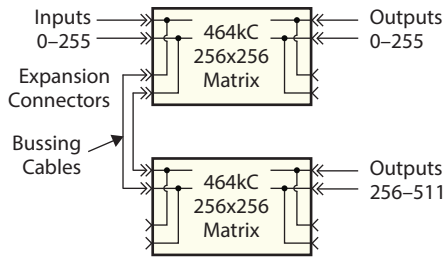


Diagram of a 256 Inputs x 512 Output Multiple Mainframe Switch System

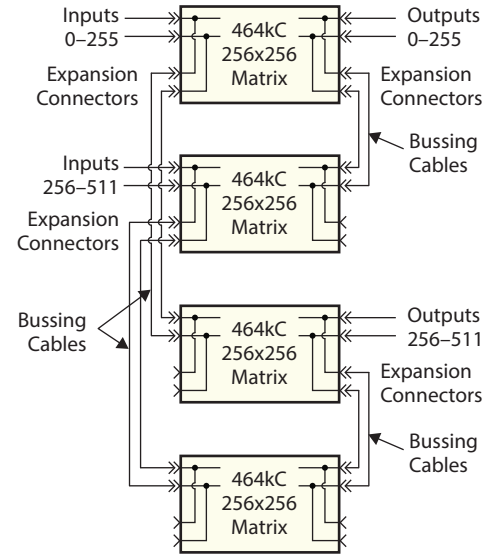


Diagram of a 512 Inputs x 512 Output Multiple Mainframe Switch System

Table 1 464kC System Components

Components Supplied with System		464kC Standard Matrix Sizes						
Model Number	Description	256x256	224x224	192x192	160x160	128x128	96x96	64x64
464kB-R1	Basic chassis with front panel and integral midplane	1	1	1	1	1	1	1
464kD-ACPS	Power supply	1	1	1	1	1	1	1
464kC-C5-S1T	Controller with 10/100 BaseT and RS-232 control interface	1	1	1	1	1	1	1
464kC-I-MP2-(2)16X31	Input Cards	8	7	6	5	4	3	2
464kC-O-MP2-(2)31X16	Output Cards	8	7	6	5	4	3	2
464kB-INTER-(4)16X16-SSX	Interstage Modules	8	8	8	8	8	8	8
464k-BP1A	Blank Rear Panel, 1-Slot	0	2	4	6	0	2	4
464k-BP4	Blank Rear Panel, 4-Slots	0	0	0	0	2	2	2
464k-GUI-WIN	Graphical User Interface	1	1	1	1	1	1	1
464k-TEST-WIN	Go/No-Go and FAT Software	1	1	1	1	1	1	1
464K-LCS	Remote Command Line Interface	1	1	1	1	1	1	1

464kC Switch Matrix Specifications

General Characteristics

Mainframe

Size:

19 W x 17.5 H (10U) x 15 inches for standard RETMA rack installation

Weight:

62 lb. (net) with front panel, power supply, and inter stage cards

Input and Output Cards

Size:

6.25 W x 13.5 H (net) approximately.

Weight:

1.5 lb. (net)

Temperature and Humidity

Operating Temperature:

0° C to 40° C

Storage Temperature:

-20° C to 70° C

Relative Humidity

Less than 80%, non-condensing

Power Supply

464kD-ACPS

Voltage Configurable, 100, 120, 230 or 240 VAC

Frequency:

47 to 66 Hz

Accessories

Mating Connectors

Precision Filters mating connectors accommodate up to 24-AWG wire and are supplied with high quality metal backshells with strain relief and gold plated screw machined contacts for high reliability connections and long service life.

CONN-OUT-50D-SC-A

High-Density 26-pin D-shell mating for both input connectors and output connector with machined solder cup pins. (PF part number A5092G6)

CONN-OUT-50D-A

High-Density 50pin D-shell mating for both input connectors and output connector with machined crimp pins. (PF part number A5092G5)

Cables and Rack Mount BNC Panels

CB-MP2PP-L

16-Channel Twisted/Shielded Cable, DD50P to DD50P, for Bussing between Multiple 464kC Systems. L = Length in Feet.

CB-DD50P/16BNCL-L

16-Channel BNC Cable. DD50P to 16-Channel BNC Male. L = Length in Feet.

PNL-64BNCBH-3U

Female BNC Panel for 64 Bulkhead Mounted BNC's, Standard 19-inch Rack Mount, 5.25-inch Height (3U). Labelled 0-63.

PNL-64BNCBH-64/127-3U

Female BNC Panel for 64 Bulkhead Mounted BNC's, Standard 19-inch Rack Mount, 5.25-inch Height (3U). Labelled 64-127.

PNL-64BNCBH-128/191-3U

Female BNC Panel for 64 Bulkhead Mounted BNC's, Standard 19-inch Rack Mount, 5.25-inch Height (3U). Labelled 128-191.

FAT Test

464k-I-SHORT

Input Shorting Plugs used during FAT 0 to test crosstalk (two required per input card).

464k-I/O-TEST

Test cables for FAT 1 to test all connections from the input connectors through the system and to the output connectors (two required per mainframe).

Mounting Kit

SM??B Slide Mount Kit

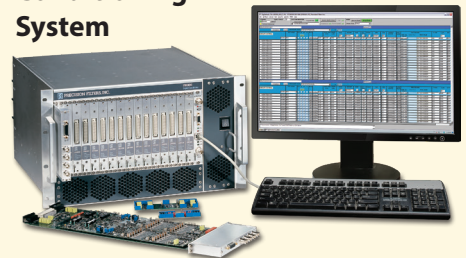
Slide Mount Kit: ?? = Cabinet Rail Depth: 18, 20, 22 or 24 Inches

Precision Product Solutions

For over 40 years Precision Filters has been a global provider of instrumentation for test measurements. You can rely on a single source for signal conditioning and switching—a *complete range of instrumentation*—products optimized to work together to provide high performance at a reasonable cost.

Precision Products

28000 Analog Signal Conditioning System



The new standard for the world's most discriminating test labs.

The 28000 system makes it easy to manage a test, with up to 256 channels of fully programmable transducer conditioning. Choose a mix of bridge, charge, IEPE w/TEDS, voltage (filter/amplifier), strain, thermocouple, RTD/potentiometer, frequency, or other transducers.

Precision 4164 64x64 Switch Matrix System



Computer-controlled analog signal switching replaces tedious manual patch panels.

The Precision 4164 switch matrix system is a reliable solid-state switch matrix system in a compact, rack-mountable or benchtop package, providing computer-controlled connections between any input and any output. Connect between 64 input and 64 output channels with 4,096 crosspoints.