



## Product Overview

Mini-Circuits' ZTVX-16-75N is a flexible, 2 by 16 blocking switch matrix for 75Ω test applications, with low insertion loss and high isolation. The compact 19-inch rack-mountable chassis includes all RF connections (N-type) on the front panel. This system is ideal for expanding a standard 2 port VNA for multi-port or multi-device testing:

- Parallel testing of multiple 2 port devices such as filter or amplifier characterisation
- Production testing of splitter / combiner or switch components with high port counts
- Testing of MIMO systems with high channel counts

The system can be controlled via USB or Ethernet (supporting both HTTP and Telnet network protocols). Full software support is provided, including our user-friendly GUI application for Windows and a full API with programming instructions for Windows and Linux environments (both 32-bit and 64-bit systems).

The full ZTVX series also includes options for both 50Ω and 75Ω testing over a range of frequency bands, with switch configurations from 2 x 8 up to 2 x 32.

## Key Features

Feature	Advantages
High port counts	Bi-directional operation from 2 to 16 ports facilitates a wide range of switch applications
Compact package	The 4U height, rack-mountable chassis is easily located beneath a VNA or in a rack test environment.
Ethernet Control	Remote control from any computer or device with a network connection (HTTP or Telnet protocols).
USB HID (Human Interface Device)	Local control via USB connection with no driver installation required. Compatible with Windows® or Linux® operating systems using 32 and 64 bit architectures.
Full software support	The user friendly Windows GUI (graphical user interface automation) allows manual control straight out of the box. A full API (application programming interface), programming examples and manuals are provided to allow automation in most programming environments.

Please contact [testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com) for support

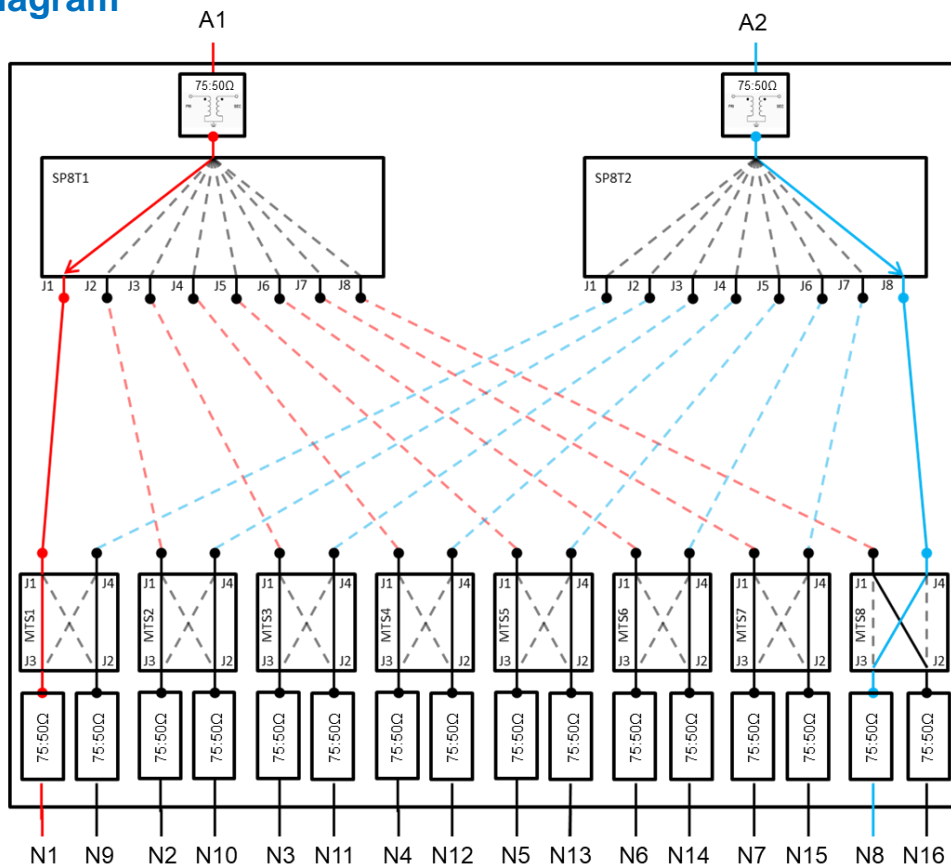
# 2 x 16 Blocking Switch Matrix

# ZTVX-16-75-N

## Mechanical Specifications

<b>Dimensions</b>	19" (W) x 4U (H) x 20" (D)			
<b>Case Drawing</b>	99-01-2630			
<b>Case Material</b>	<ul style="list-style-type: none"> <li>• Aluminum (with protective coating to prevent corrosion)</li> <li>• Reinforced cover to support VNA mounted on top of switch matrix</li> </ul>			
<b>RF Connectors</b>	<b>Panel</b>	<b>Connector</b>	<b>Quantity</b>	<b>Port Labels</b>
	Front	N-type female	2 16	A1 – A2 N1 – N16
<b>Panel Items</b>	<b>Front Panel</b>		<b>Rear Panel</b>	
<b>Panel Marking</b>	<ul style="list-style-type: none"> <li>• Model name</li> <li>• 2 x 16 Port</li> <li>• 75Ω Switch Matrix</li> </ul>		<ul style="list-style-type: none"> <li>• CE</li> <li>• EAC</li> <li>• Serial number / date code / model name</li> </ul>	
<b>Other Connectors</b>			<ul style="list-style-type: none"> <li>• AC mains power input (IEC C14 inlet)</li> <li>• USB type B socket</li> <li>• RJ45 (LAN) socket</li> </ul>	
<b>Other</b>	<ul style="list-style-type: none"> <li>• Power on / off switch with LED</li> <li>• LED switch path indicators</li> <li>• Carry handles</li> </ul>		<ul style="list-style-type: none"> <li>• Cooling fan</li> </ul>	
<b>Power Supply</b>	AC mains power input (90-260 V, 47-63 Hz)			
<b>Fuse</b>	2A, 250V rating			
<b>Temperature</b>	Operating: 0 to +50 °C			

## Block Diagram

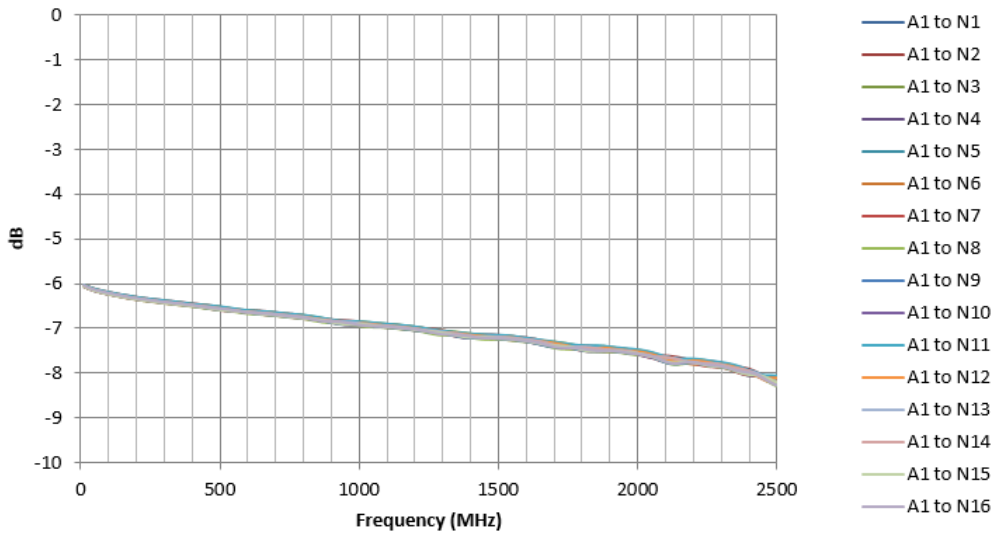


## Electrical Specifications at 25°C

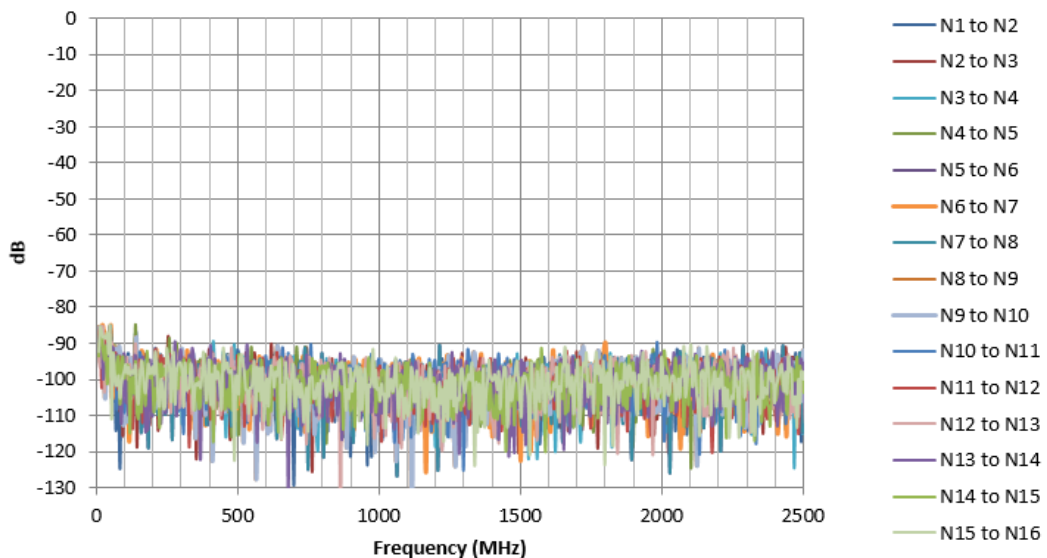
Parameter	Conditions	Min	Typ	Max	Units
Frequency		5		2500	MHz
Insertion Loss	5 - 1800 MHz		7.0	8.0	dB
	1800 - 2500 MHz		8.0	9.0	
Return Loss	A ports		18		dB
	N ports		20		
Isolation	A <sub>x</sub> to N <sub>y</sub> when disconnected	85	95		dB
	A <sub>x</sub> to A <sub>y</sub> or N <sub>x</sub> to N <sub>y</sub>	85	95		
Input Power				+25	dBm
DC	RF ports must be held at 0V DC or external DC blocks must be used				

## Typical Performance Data

Insertion Loss (A1 Paths)

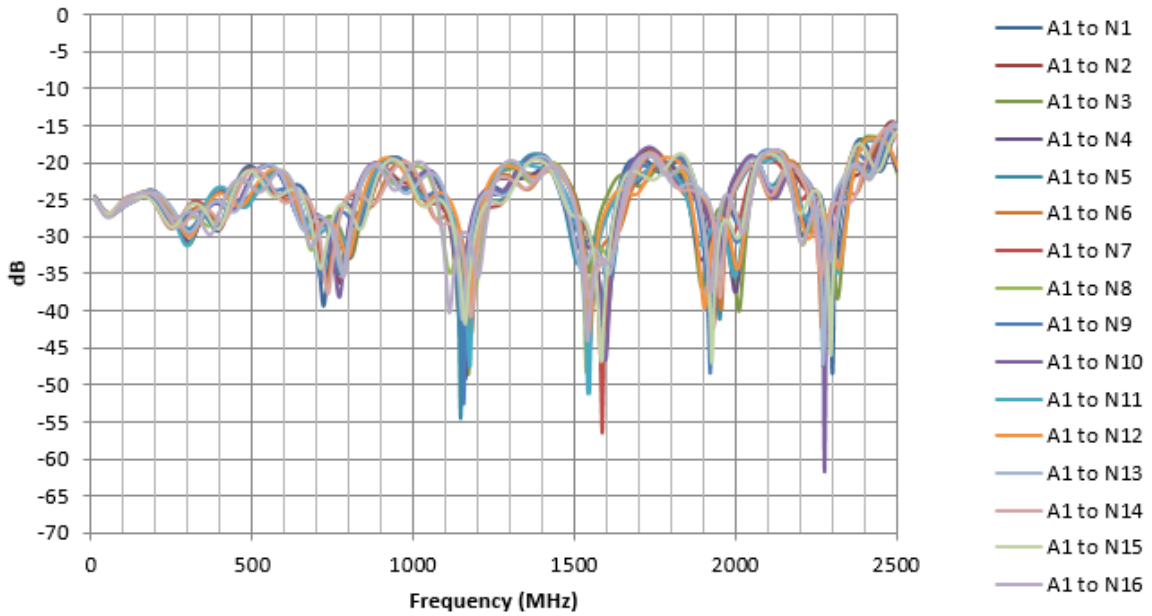


Isolation (Adjacent Ports)

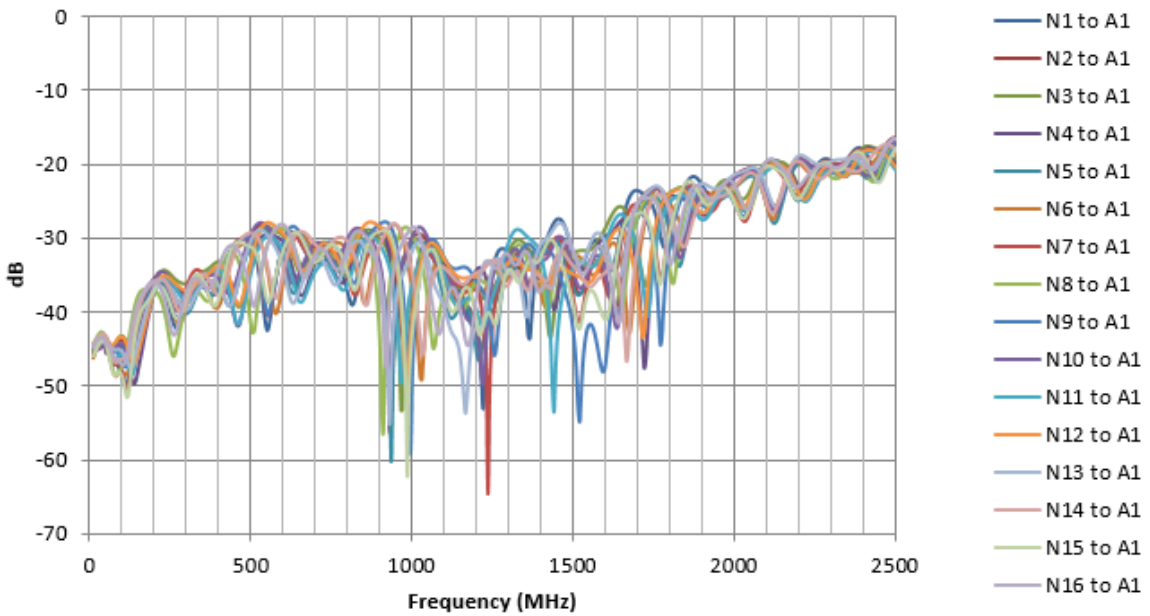


## Typical Performance Data

### Input Return Loss (Port A1)



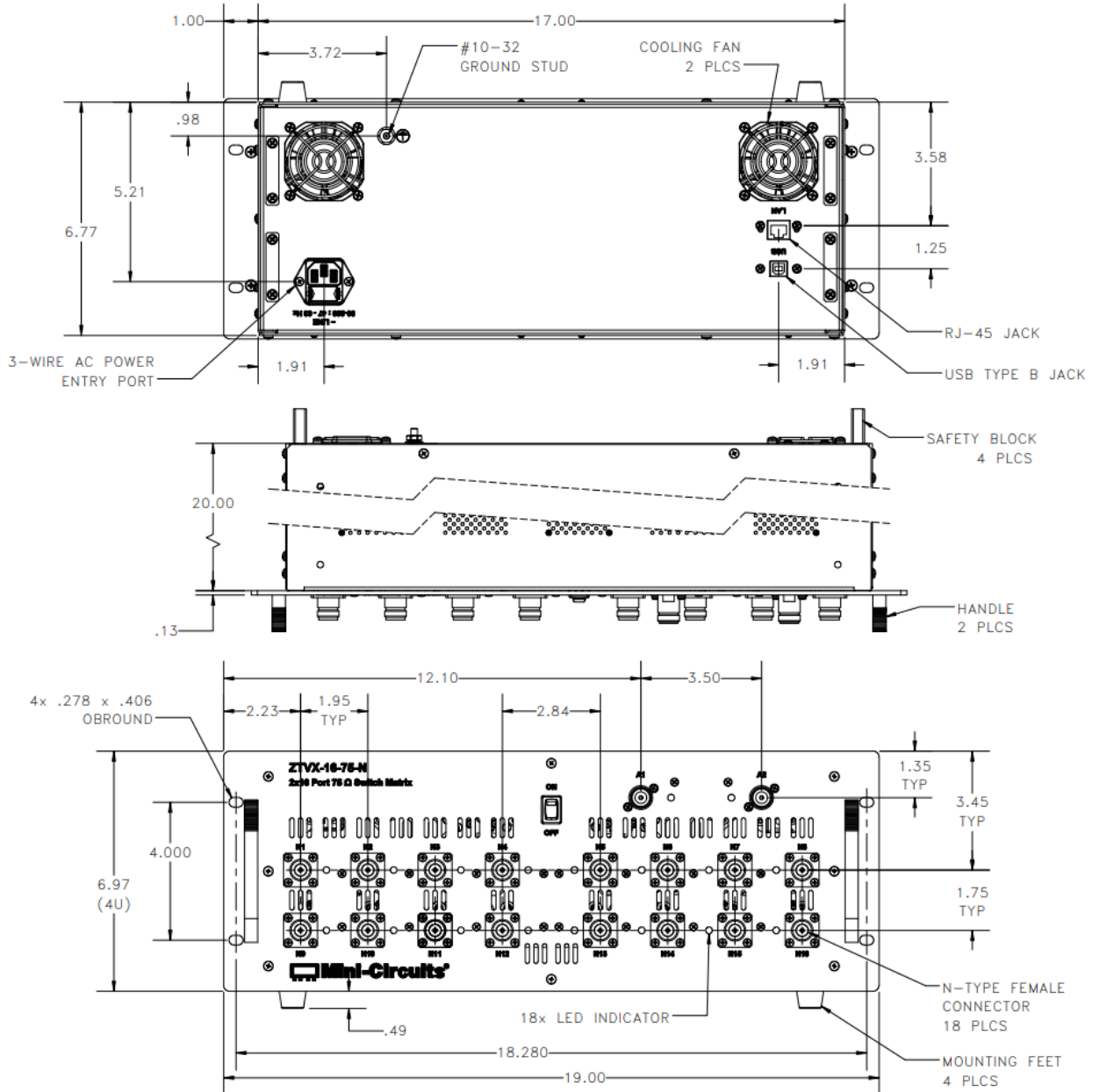
### Output Return Loss



# 2 x 16 Blocking Switch Matrix

# ZTVX-16-75-N

## Outline Drawing



## Software Specifications

- Please contact [testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com) for support

<b>Ethernet Control</b>	<b>Supported Protocols</b>	TCP / IP, HTTP, Telnet, DHCP, UDP
	<b>Max Data Rate</b>	10 Mbps (10Base-T Half Duplex)
<b>USB Control</b>	<b>Supported Protocols</b>	HID - Full Speed
	<b>Min Communication Time</b>	3 ms typ
<b>Software Support</b>	<ul style="list-style-type: none"> <li>• Mini-Circuits' Universal GUI for USB &amp; LAN control (Windows only)</li> <li>• ASCII / SCPI command syntax for LAN programming (all OS)</li> <li>• ActiveX / .Net DLL APIs for USB programming (Windows only)</li> <li>• Interrupt codes for direct USB programming (all OS)</li> <li>• Full programming instructions and examples for a wide range of languages</li> </ul>	
<b>Downloads</b>	<b>Software &amp; Documentation</b>	<a href="https://www.minicircuits.com/softwaredownload/ztvx.html">https://www.minicircuits.com/softwaredownload/ztvx.html</a>

## Programming Commands

- The key ASCII / SCPI commands for control of the system are summarized below
- These can be sent via the USB or Ethernet API
- Please refer to the programming manual for full details

Command / Query	Description
:MN?	Read model name
:SN?	Read serial number
:FIRMWARE?	Read firmware version
:PATH:a_port:n_port	Set the path between 2 switch ports: <ul style="list-style-type: none"> <li>• a_port = "Input" port</li> <li>• n_port = "Output" port</li> <li>• Example: :PATH:A1:N8 (connect A1 to N8)</li> </ul>
:PATH:input?	Check which "output" is connected to a specified input port

**Software Specifications**

- Connect via USB or Ethernet
- Run GUI in “demo mode” to evaluate software without a hardware connection
- View and set all switch paths
- Configure Ethernet settings
- Upgrade firmware
- Send SCPI commands
- View temperature & fan status

The screenshot displays the ZTVX (Ver. A3X2) software interface. At the top, it features a 'Main Control' section with a 'Mini-Circuits' logo, a 'Help' icon, and a 'Block Diagram' button. Below this, the 'Set Path' section includes 'From' and 'To' dropdown menus (set to A1 and N5), a 'Show Command' button, a 'Save to Quick Set Button', and a 'SEND' button. To the right, the 'Model Name' is 'ZTVX' and 'Serial Number' is 'Demo Mode'. There are fields for 'Protocol', 'IP', and 'Password', along with 'Firmware Upgrade' and 'Ethernet Config' buttons. The 'Connection Status' is 'Demo Mode'. On the far right, the 'Switch Status' table shows the following data:

Switch	State	Count
1	0	325
2	1	179
6	0	470
7	0	461
8	1	430
9	1	254
10	0	479

The 'Quick-Set Buttons' section shows a grid of buttons for paths like 'A1 -> N1' through 'A1 -> N15', plus 'Query A1 Path', 'EMPTY18', 'EMPTY19', and 'EMPTY20'. There are 'Modify Buttons', 'Load Config', and 'Clear All' options. Below this is the 'Manual Commands' section with dropdowns for 'Switch Commands', 'Switch States' (set to ':PATH:A1?'), 'Switch Counters', and 'Additional Commands'. A 'Command' input field contains ':PATH:A1?' and a 'SEND' button. The 'Command History' at the bottom shows a list of successful SCPI commands and their results. On the right side, the 'Connection Status' section shows 'A1 - NX' and 'A2 - NX'. The 'Temperature / Fans Status' table at the bottom right shows:

Temperature	Normal
Fan1 operation	OK
Fan2 operation	OK
Fans state	OFF

## Ordering Information

Please contact Mini-Circuits' Test Solutions department for price and availability:

[testsolutions@minicircuits.com](mailto:testsolutions@minicircuits.com)

## Included Accessories

Model Name	Quantity	Description
CBL-3W-xx*	1	AC power cord (IEC C13 connector to local plug)
USB-CBL-AB-7+	1	USB cable (6.8 ft)
CBL-RJ45-MM-5+	1	Ethernet cable (5 ft)

Cable Model	Region
CBL-3W-US	USA
CBL-3W-EU	Europe
CBL-3W-IL	Israel
CBL-3W-UK	UK
CBL-3W-AU	Australia / China

\*Please specify one option on the purchase order, at no charge

### Additional Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)