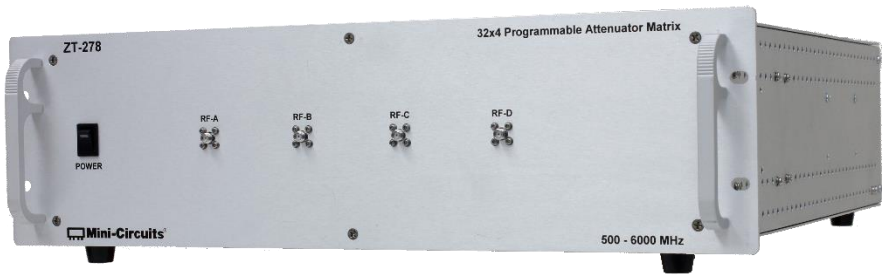
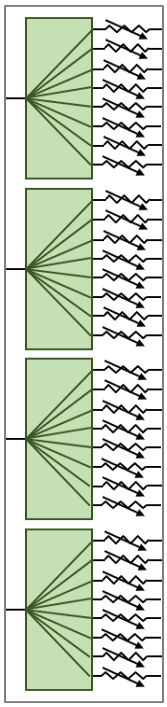
Rack-Mounted | USB & Ethernet Control

Handover / Fading Simulator ZT-278

50Ω 500-6000 MHz 4 in / 32 out





Product Overview

ZT-278 is an integrated splitter / combiner system housing 4 x 8-way devices with programmable attenuation on each path. The system is bi-directional and can be operated as a series of power splitters with variable path loss on each output, or as a series of power combiners with variable path loss on each input. The attenuation on each path can be independently controlled from 0 to 95 dB in 0.25 dB steps.

This configuration allows simulation of “real-world” conditions for wireless handsets, radio-heads, antenna systems, base-stations and nodes. Typical applications include:

- Varying path loss between a wireless device and node during transmission
- Hand-over from one node to another as a wireless device moves out of range
- Verification of device performance in the presence of multiple radio signals & interferers

The system is housed in a 3U height, 19-inch rack chassis with SMA RF connectors on the front and rear panels. The system can be controlled via USB or Ethernet (supporting SSH, HTTP & 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).

Key Features

Feature	Advantages
Splitter / attenuator matrix	Split or combine signals from multiple sources at precisely controlled signal levels
Rack chassis	Compact rack-mountable chassis for easy integration into automated test environments
Ethernet Control	Remote control from any computer or device with a network connection (SSH, HTTP or Telnet protocols).

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Mechanical Specifications

Dimensions	19” (W) x 3U (H) x 20” (D)			
Case Drawing	99-01-2761			
Case Material	• Aluminum (with protective coating to prevent corrosion)			
RF Connectors	**Panel**	**Connector**	**Quantity**	**Port Descriptions**
	Front	SMA female	4	Splitter sum ports (RF-A/B/C/D)
	Rear		32	Splitter output ports (A/B/C/D1-8)
Panel Items	**Front Panel**			**Rear Panel**
Panel Marking	• ZT-278 • 32x4 Programmable Attenuator Matrix • 500-6000 MHz			• CE • EAC • Serial number / date code / model name
Other Connectors				• AC mains power input (IEC C14 inlet) • USB type B socket • RJ45 (LAN) socket • Serial In (D-Sub 9-pin) • Serial Out (D-Sub 9-pin)
Other	• Power on / off switch with LED • Carry handles			
Power Supply	AC mains power input (90-260 V, 47-63 Hz)			
Fuse	2A, 250V rating			
Temperature	Operating: 0 to +50 ºC			

Electrical Specifications at 25°C

Parameter	Conditions	Min	Typ	Max	Units
Frequency		500	-	6000	MHz
Path Loss	@ 0 dB attenuation	-	18	22	dB
Return Loss		-	12	-	dB
Attenuation Range	Per path, 0.25 dB steps	0	-	95	dB
Isolation	Between splitter outputs	22	35	-	dB
	Between inputs or outputs of different splitters	-	100	-	
	Between attenuator channels	-	100	-	
Input Power	Per port into splitter sum ports	-	-	+30	dBm
	Per port into splitter outputs	-	-	+23	

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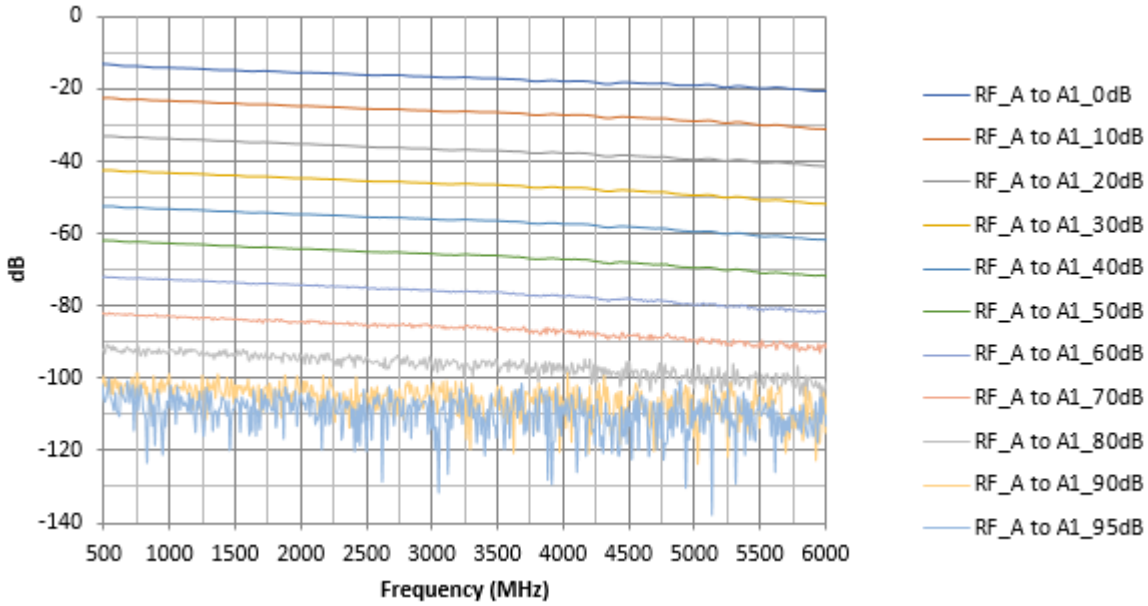
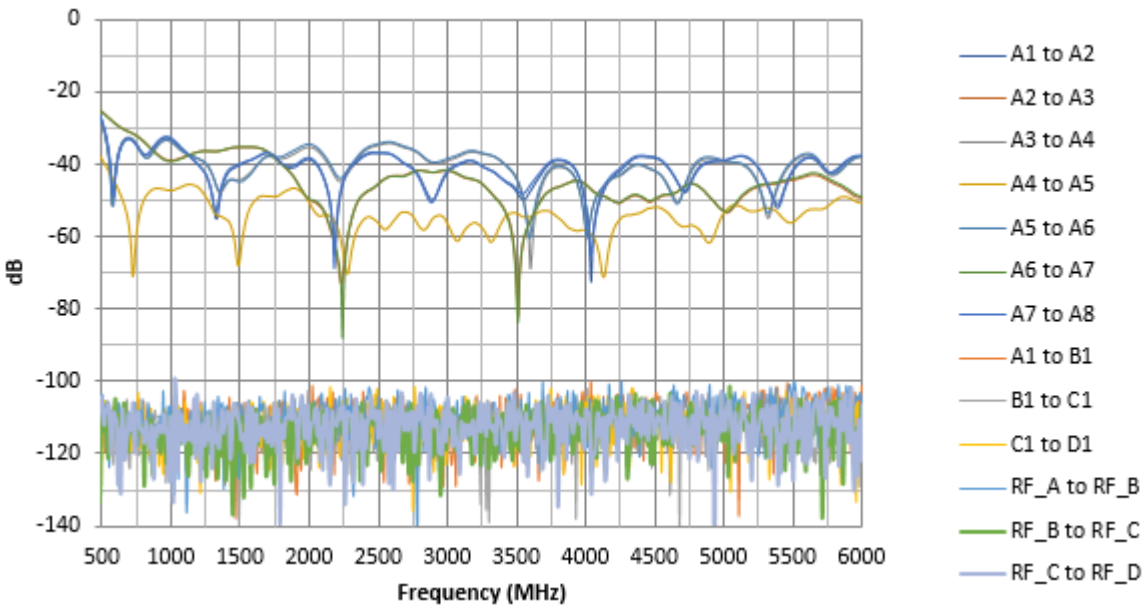
Typical Performance Data

Insertion Loss & Attenuation



Isolation



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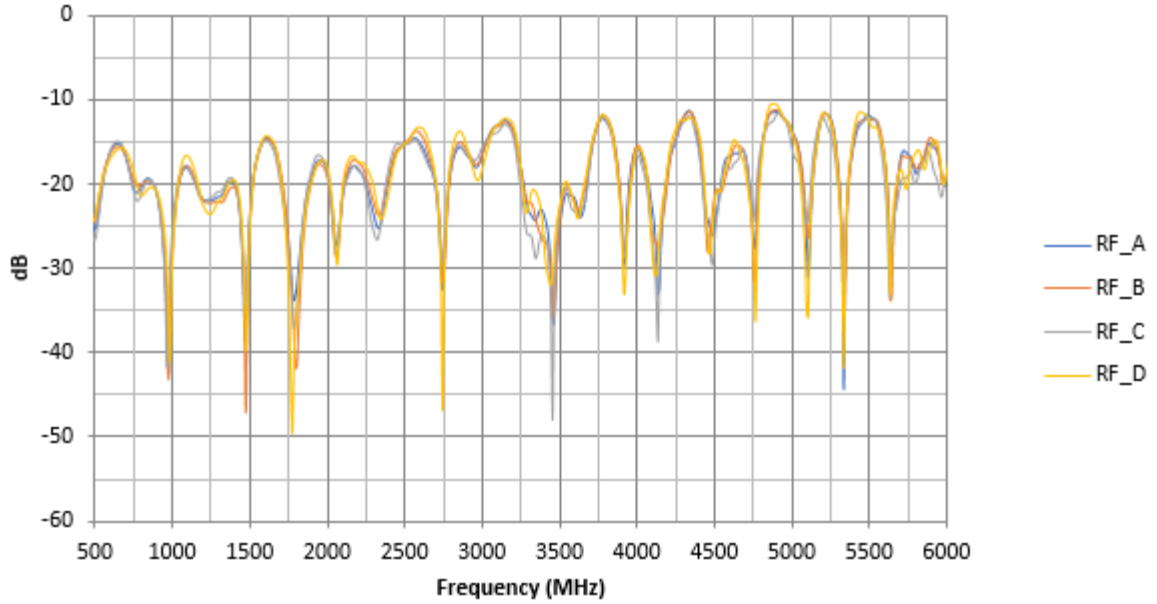
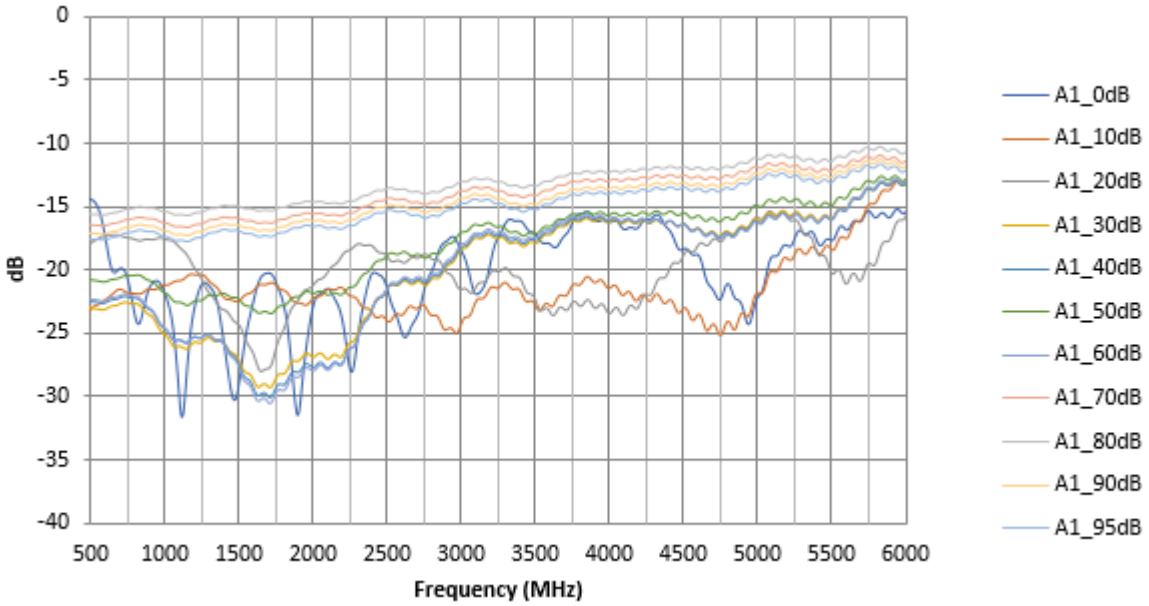
Typical Performance Data

Input Return Loss



Output Return Loss



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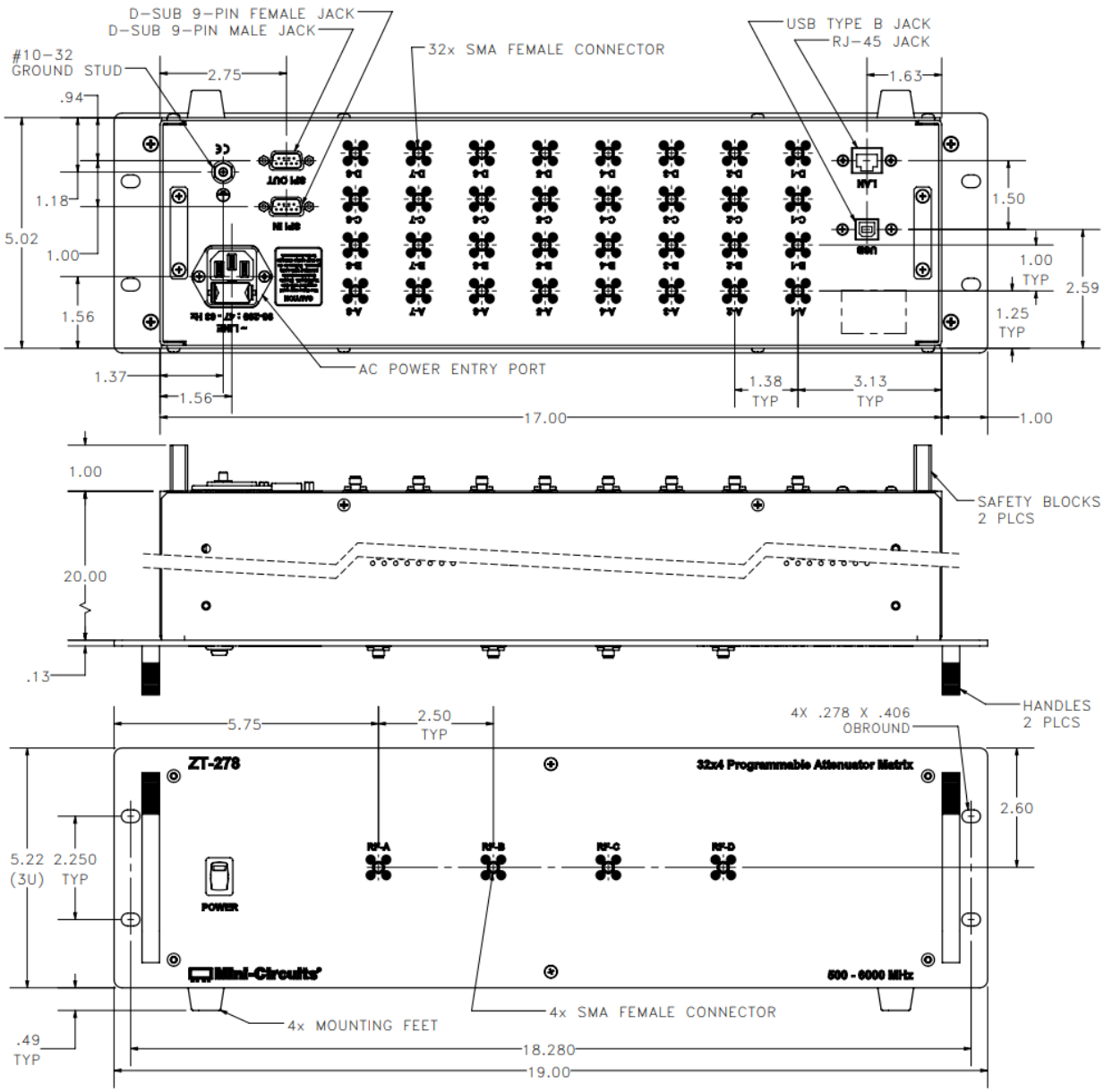
Outline Drawing



Software Specifications

- Please contact testsolutions@minicircuits.com for support

Ethernet Control	**Supported Protocols**	TCP / IP, SSH, HTTP, Telnet, DHCP, UDP
	Max Data Rate	100 Mbps (100Base-T Full Duplex)
USB Control	**Supported Protocols**	HID - High Speed
	Min Communication Time	400 µs typ
Software Support	• Mini-Circuits' Universal GUI for USB & LAN control (Windows only) • ASCII / SCPI command syntax for LAN programming (all OS) • ActiveX / .Net DLL APIs for USB programming (Windows only) • Interrupt codes for direct USB programming (all OS) • Full programming instructions and examples for a wide range of languages	
Downloads	**Software & Documentation**	https://www.minicircuits.com/softwaredownload/multiatt.html

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
:[address]:CHAN:[channels]:SETATT:[Att]	Set attenuation: [address] • Address of the 4-channel attenuator module • SL can be used to refer to all 4-channel modules [channels] • Channel number (1 to 4) within the 4-channel module • Multiple channels can be listed, separated by ":" [Att] • Attenuation value (0-95) Examples: **:01:CHAN:1:SETATT:10.25** Sets channel 1 of RS4DAT 01 to 10.25dB **:01:CHAN:1:2:3:SETATT:10.25** Sets channels 1, 2, & 3 of RS4DAT 01 to 10.25dB **:SL:CHAN:1:2:3:4:SETATT:10.25** Sets channels 1, 2, 3, & 4 of all RS4DATs to 0.25dB
:[address]:CHAN:[channels]:ATT?	Returns the attenuation of a single channel • [address] : Address of the RS4DAT (01, 02, …, SL) • [channels] : Channel of the RS4DAT (1, 2, 3, 4) Examples: **:01:CHAN:1:ATT?** Returns the attenuation of channel 1 of RS4DAT 1

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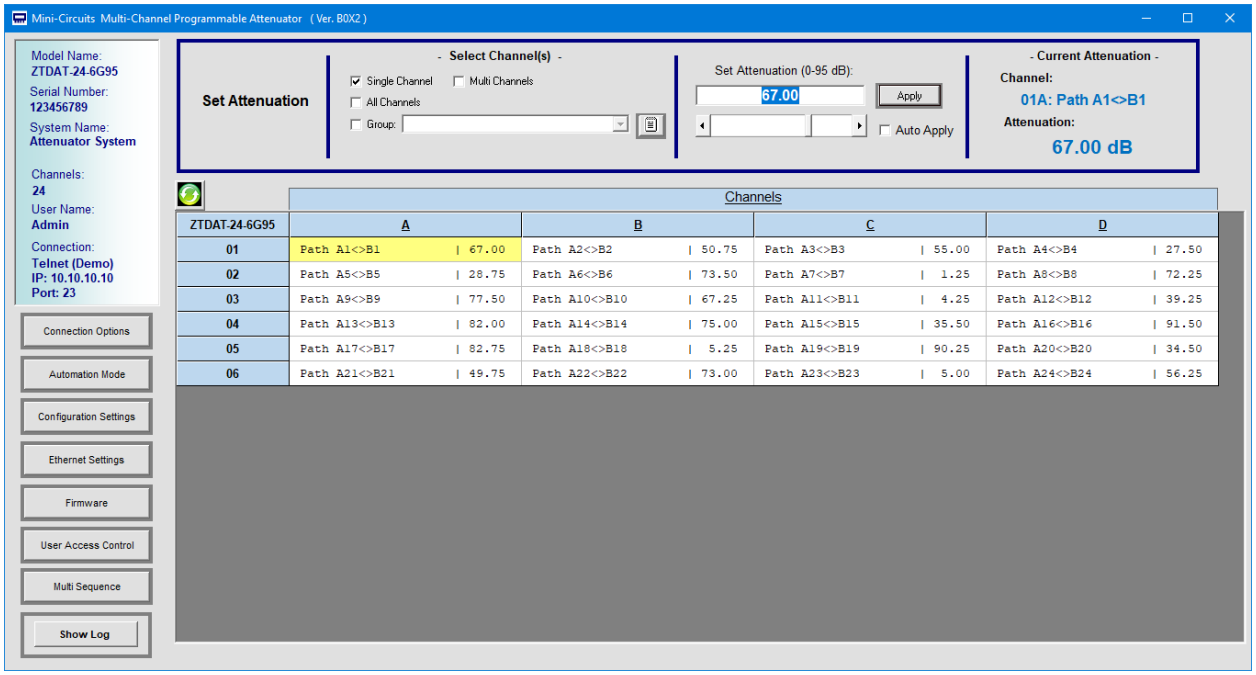
Graphical User Interface (GUI) for Windows - Key Features

- Connect via USB or Ethernet
- Run GUI in “demo mode” to evaluate software without a hardware connection
- View and set all attenuator states
- Configure Ethernet settings
- Upgrade firmware



Ordering Information

Please contact Mini-Circuits' Test Solutions department for price and availability:
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)
HT-4-SMA	1	SMA Cable Wrench (4 in)

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

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

Additional Notes

A. 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.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. 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