



G500 Access

G500 - 2051 | G500 Access v1

Learning & Development Learning Module



SME Source Markham





Learning Module Objective

At the completion of this module you will be able to identify and recite all concepts presented.

If you are viewing this as part of a structured training program *PLEASE* complete the associated assessment test. You are required to score above 80%.

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Here's What is Covered in this Module

- 1. G500 Interface Options
- 2. Local KVM Local HMI Task Functions
- 3. Local KVM Screen Layout and Virtual Keyboard
- 4. Local KVM MCP Local Configuration Utility (mcpcfg)
- 5. Local KVM MCP Settings GUI
- 6. Local KVM Local MCP Runtime HMI
- 7. Ethernet MCP Local Configuration Utility (mcpcfg) via SSH
- 8. Ethernet MCP Settings GUI via HTTPS
- Ethernet Remote MCP Runtime HMI via HTTPS 9.
- 10. Ethernet MCP Runtime HMI via Remote Desktop
- 11. Maintenance Serial Port MCP Local Configuration Utility (mcpcfg)

Learning & Development Module Objective

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G500 Interface Options

The following connection / interface options are available to connect to the G500:

Local KVM (Keyboard, Video and Mouse) :

- Connect the Display Port to a monitor with a display cable
- Connect a keyboard and mouse to any of the USB type A ports
- G500 supports up to 2 monitors
- Support Access: MCP Local Configuration Utility (mcpcfg) / MCP Settings GUI / Local MCP Runtime HMI

Ethernet Interfaces:

- Front Maintenance Ethernet Port:
- ✓ 100/1000 Base-T Maintenance Ethernet Port accessible via front of the unit
- ✓ Default IP address: 192.168.168.81
- Rear SFP Ethernet Ports:
- ✓ Support multiple 100 Base and 1000 Base SFP options
- ✓ Must be in Internal Zone to access the G500
- Support Access: MCP Local Configuration Utility (mcpcfg) / MCP Settings GUI / remote MCP Runtime HMI / MCP Runtime HMI via Remote Desktop

Maintenance Serial Port:

- USB 2.0 type B serial console port on the front of chassis
- Default settings 115200 Baud Rate
- First time users will have to install the required USB serial drivers, obtained from GE
- Support Access: MCP Local Configuration Utility (mcpcfg)











MCP Local Configuration Utility (mcpcfg) or MCP Settings GUI

To configure MCP system settings and perform the initial MCP setup (e.g., Users, network, serial, time sync etc.)

MCP Runtime HMI

To view and control the runtime statistics including One-line diagrams and to configure the MCP Settings (e.g., User Management, Automatic Login etc.)



Local KVM – Local HMI Taskbar Functions

The Local HMI provides access to the G500 through a local substation computer setup via KVM. The Taskbar shown in the Local HMI on the bottom of the screen provides the following functions:



- Access to Start applications 1.
- Minimize all windows and Show Desktop 2.
- Switch between active windows and workspaces 3.
- Launch a Terminal session to the MCP shell 4.
- Launch MCP System Settings GUI 5.
- Launch MCP Emergency access 6.
- 7. Launch Local Runtime HMI
- Network Interface 0 statistics 8.
- Memory statistics 9.
- **10. CPU statistics**
- 11. Local time clock

Terminal	
System Settings	
mcpemergency	
Applications	
System	
Windows •	<u>2</u> . W
Settings +	<u>3</u> . W
Logout	<u>4</u> . W
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The Color theme can be changed using Start \rightarrow Settings \rightarrow Themes

The Local HMI and all applications running can be restarted using Start \rightarrow Logout

Local KVM – Screen Layout and Virtual Keyboard

Screen Layout

- Screen/Monitor layout and resolutions may be configured using Screen Layout utility
- This utility can be launched from Local HMI start menu using Start → System → Screen Layout
- When two monitors are connected to the G500, by default, the Monitor A connected to DP 1 becomes Primary. And the Monitor B connected to DP 2 becomes Extended monitor
- The user can reconfigure the monitor layout without changing the backend connections by dragging & dropping the monitors and placing at the required position on Screen Layout canvas and then click **Apply**

Virtual Keyboard

- A virtual keyboard may be displayed on the screen using Start \rightarrow System \rightarrow **OnBoard**
- Clicking on the top right X will close the virtual keyboard

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Terminal System Settings mcpemergency Applications System ScreenLayout ▶ 📹 OnBoard Windows Settings Logout... G500 _ 🔁 🖬 🖬 🛒



The minimum resolution supported in Local HMI is 1280x1024 and the recommended resolution is FHD (1920x1024) or higher

The configured layout will always be persisted once the Screen Layout utility is closed. And whenever the HMI is relaunched, it will open as per the last configured layout



Local KVM – MCP Local Configuration Utility (mcpcfg)

The MCP Gateway Local Configuration Utility (mcpcfg) is used to configure system level settings on the G500

Once the G500 device is powered up and has a valid license installed, click on the G500 name via the taskbar then click **Terminal**

GE Multilin MCP Firmware Release 300 Production Build 2528 2023-04-23:23:22:58

admin@G500:~\$ sudo mcpcfg [sudo] password for admin:

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System Settings						
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Applications	•					
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Settings						
<u>L</u> ogout						
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A default Terminal application will be opened showing Login screen

- Login using Administrator credentials
- Shell based command line interface
- Type "sudo mcpcfg" and the user password when prompted

Proceed with the settings

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	7				С	0	n	f	i	g
	8				R	e	s	e	t	
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	1	9			С	0	n	f	i	g
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(0) Settings Menu

ure Authentication ure Network Settings ire Network Interfaces ure Secure Access ure Firewall ure Host Names ure Time & Time Sync System Logs Database Tables File Persistence Data HMI gure Sync Manager ancy

ss Forced Qualities To Masters D20 RTU IEC101 DPA Unbalanced Mode Functionality ure IEC101+104 DPA Startup Quality Event Suppress Interval ure Serial Ports ure D.20 Port Settings Host Chassis Intrusion State Clone Snapshot Factory Default Device

Enter Your Choice : (Between 0 and 24):

This interface is the Shell based equivalent of the MCP Settings GUI

Only one instance is allowed to run at any given time across both "mcpcfg" and "MCP Settings GUI".

Local KVM – MCP Settings GUI

The MCP Settings GUI is the Web based equivalent of the MCP local Configuration Utility (mcpcfg), is used to configure system level settings on the G500

Once the G500 device is powered up and has a valid license installed, click on the G500 name via the taskbar then click System Settings

Terminal	
System Settings	
🗾 <u>m</u> cpemergency	
Applications	٠
<u>System</u>	٠
Windows	•
Settings	٠
Logout	
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A default web browser will be opened showing MCP Settings Login screen

Login using Administrator credentials

Proceed with the settings





Gateway

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Settings	Logged in as: admin Logout
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Clone Snapshot	
Factory Default	
Device	

The functionality of the system is identical when system is configured via MCP Setting GUI or MCP Local Configuration Utility (mcpcfg). The only difference is that settings GUI is a Web based interface

Local KVM – Local MCP Runtime HMI

Local Runtime HMI will be started automatically once G500 is powered up and has a valid license installed

Local Runtime HMI can be launched by clicking on the G500 name via the taskbar then click **Application** \rightarrow **G500HMI**

The Local Runtime HMI access is protected by a Login screen that requires a username and password

If configured with Auto Login, then Local Runtime HMI will be launched automatically with G500 Home Page and the configured user privileges

Local HMI Settings

From system settings (mcpcfg or MCP Settings GUI), you can:

- Configure the settings of the monitor
- Enable/Disable Standby HMI Redirect to Active

Standby HMI Redirects to Active

If the Standby HMI redirects to the Active G500 when redundancy is enabled, both the Local HMI monitors connected to each G500 unit points to Active MCP only

The Local HMI Power Bar on each G500 indicates whether the Local HMI is showing information for this G500 or the PEER G500



Local HMI Setti

General Settings

Active gateway acces

Screen Settings

Desktop Mode:

Monitor Horizontal Re

Monitor Horizontal R

 <u>Terminal</u> <u>System Settings</u> <u>m</u>cpemergency 		
Applications	►	<u>G</u> 500HMI
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GE Grid Solutions						
MCP Substation Gateway						
	rname: sword:	Login				
ngs						
s from standby HMI (redundancy): Disabled \$						
		DPMS Settings				
	Window	Standby Timeout (in mins, 0=disabled):	10			
efresh Rate (hz):	30-64	Suspend Timeout (in mins, 0=disabled):	20			
efresh Rate (hz):	50-90	Off Timeout (in mins, 0=disabled):	00			
		Apply	Cancel			

The Local HMI provides the same functions for local display and control as the remote HMI with few exceptions

The User Login level/role determines which Local Runtime HMI features and functions the user can have access to/support

Multiple users can use the MCP Runtime HMI simultaneously, using any of the Local/Remote/Remote Desktop concurrently

The number of concurrent users is configurable under Systemwide \rightarrow Access Manager \rightarrow Max Simultaneous **Observers/ Operators/ Supervisors**







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Ethernet – MCP Local Configuration Utility (mcpcfg) via SSH

- Establish network connection between the PC and the G500 (any LAN port)
- Terminal session with SSH as Protocol type with Port number: 22
- Login with Administrator credentials
- Shell based command line interface
- Type "sudo mcpcfg" and the user password when prompted
- Proceed with the settings

Connection

SSH

Protocol:

-Connection se	ettings			
Host name:	10.14.24.136	Port:	22	
Login name:	admin			
Private key:				
Login				
UNAUTHORIZ	ED ACCESS TO THIS	DEVICE I	S PROHIBIT	ED 🔺
device. All ac governing this	e explicit permission tivities may be logge device may result in law enforcement. his device.	d. Violation disciplina	ons of policy ry action ar	/ nd may
User Name	admin			
Password				
[Login	Ca	ancel	

ΞE	Mul	tili	n MC	P F:	irmwa	re Rel
adm	in@	G500	:~\$	sud	o mcp	cfg
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======		======
	Gate	way (G5
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	Ο.	Back
	1.	Config
	2.	Config
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	4.	Config
	5.	Config
	6.	Config
	7.	Config
	8.	Reset
		Reset
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		Config
	13.	Redund
	14.	ARRM
	15.	Suppre
	16.	Emulat
	17.	Config
	18.	Config
	19.	Config
	20.	EdgeOS
	21.	Clear
	22.	Restor
		Restor
		Reboot
Enter	Your C	hoice :

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(Between 0 and 24):

The PC and the G500 shall be in the same subnet to establish communications

Ping is not enabled by default and can be enabled through the "Network Settings" option in mcpcfg

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Ethernet – MCP Settings GUI via HTTPS

- Web based equivalent of the MCP local Configuration Utility (mcpcfg)
- Establish network connection between the PC and the G500 (any LAN port)
- Using a supported web browser, disable proxy and enter the G500's IP address with port number 8081 into the address bar
- User is required to confirm security certificate exception
- The MCP Settings Login screen is displayed
- Login with Administrator credentials
- Proceed with the settings

ee ee	
MCP Settings	
💄 <u>admin</u>	-
Password	
Login	



Gateway

eway Settings	Logged in as: admin Logout
Configure Authentication	
Configure Network Settings	
Configure Network Interfaces	
Configure Secure Access	
Configure Firewall	
Configure Host Names	
Configure Time & Time Sync	
Reset System Logs	
Reset Database Tables	
Reset File Persistence Data	
Local HMI	
Configure Sync Manager	
Redundancy	
ARRM	
Suppress Forced Qualities To Masters	
Emulate D20 RTU IEC101 DPA Unbalanced Mode Functionality	
Configure IEC101+104 DPA Startup Quality Event Suppress Interval	
Configure Serial Ports	
Configure D.20 Port Settings	
EdgeOS Host	
Clear Chassis Intrusion State	
Restore Clone Snapshot	
Restore Factory Default	
Reboot Device	

The PC and the G500 should be in the same subnet to establish communication

Supported web browser: Internet Explorer, Microsoft Edge, Mozilla Firefox and Google Chrome

Only one instance is allowed to run at any given time between "mcpcfg" and "MCP Settings GUI".

Ethernet – Remote MCP Runtime HMI via HTTPS

The Remote Runtime HMI provides access to the G500 from a remote computer setup:

- Requires Windows x64 bit OS
- Requires download and installation of setup file
- The remote MCP Runtime HMI runs as a standalone application.
- Once launched, the login mode is always secure HTTPS and the default port number is 443
- The User Login level/role determines which MCP HMI features and functions the user can have access to/support
- By customizing MCP Runtime HMI shortcut, user can predefine the login User, IP Address, or Remote Port.
- When Remote HMI auto login is enabled, the configured user screen is launched automatically with the configure user and privilege level

🙀 User Management 🔒 Authentication 📀	Automatic Login		
Name			
Local UI Automatic Login	false		
Local UI Automatic Login Wait Time	60		
Local Automatic Login Privilege Level	Observer		
Local Automatic Login User			
Remote UI Automatic Login	true		
Remote UI Automatic Login Wait Time	60		
Remote Automatic Login Privilege Level	Observer		
Remote Automatic Login User	auto_observer		

	ne HMI v3.0 Properties 🛛 🗙 🕎	Login (172.12.236.215) – 2
Security General	Details Previous Versions Shortcut Compatibility	GE
P) M	CP Runtime HMI v3.0	Grid Solutions
larget type:	Application	
arget location arget:	. 3.0 _v3.0.exe" -host 172.12.236.215 -username admin	MCP Substation Gateway
Start in:	"C:IProgram Files/MCP Runtime HMI/3.0/"	
Shortcut key:	None	Username: admin
Run:	Normal window ~	Password: Login
Comment:	MCP Runtime HMI v3.0	
Open File L	ocation Change Icon. Advanced.	
Open File L	ocation Change Icon Advanced	
Open File L	ocation Change Icon Advanced	
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Open File L	ocation Change Icon Advanced	



Installation of Java/JRE on the Windows PC is not required.

After successful login, the MCP runtime HMI shows either G100 or G500 automatically, by detecting the connected device type.

The G500 contains a lock out feature which prevents you from logging in after several failed attempts for a set period.

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Ethernet – MCP Runtime HMI via Remote Desktop (RD)

Starting with MCP v3.00 is possible to connect to a separate instance of the Local HMI using Remote Desktop (RD)

- Requires a Remote Desktop MCP license and a separate RD HMI Application installed using PETC based workflow
- RD sessions use the Windows Remote Desktop Connection application
- For security reasons, all RD sessions are handled inside an RD SSH tunnel.
- Only users declared Rdtunnel role will be able to initiate the RD SSH Tunnel session.
- Only one RD session is allowed at a time

RD Configuration and Settings

- Declare users with Rdtunnel role
- Enabled /Disabled RD functionality
- Configure RD inactivity timeout (default 15 mins)



Command Pron

C:\>ssh -N -p UNAUTHORIZED /

You must have may be logged action and may ing this device.



mpt - ssh -N -p 53389 -L 33389:127.0.0.1:3389 rduser1@192.168.168.81	<u> </u>		×
53389 -L 33389:127.0.0.1:3389 rduser1@192.168.168.81 ACCESS TO THIS DEVICE IS PROHIBITED			
explicit permission to access or configure this device. Violations of policy governing this device may result be reported to law enforcement. There is no right to p	in disc:	iplinar	rу

rduser1@192.168.168.81's password:

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-	Remote Conn							
General	Display Local	Resources	Experience	Advanced				
Logon s	-	ne of the rer	mote computer	ł.				
	Computer:	<u>C</u> omputer: 127.0.0.1:33389 ~						
	User name:	hmi				1		
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ote Desktop Co	onnection					_		

	_ ×
GE Grid Solutions	
MCP Substation Gateway	
Username: Password: Login	
E Login	05:00:20 PM

The RD HMI application is not included in firmware images of MCP 3.0 (G100 and G500), unless was factory ordered

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Users can operate independently the KVM Local HMI and the RD Local HMI Sessions

RD sessions with HMI application runs in the target, therefore the user experience relative to performance depends on the target device resources and loading

Maintenance Serial Port – MCP Local Configuration Utility (mcpcfg)

- Connect a USB 2.0 type B cable to your computer USB port and to the G500 front Maintenance Serial Port
- First time users will have to install the required Windows USB serial driver CDM21228_Setup.exe:
 - Download G500 Resource ISO image file from GE Grid Solutions website
 - Under /Software folder when opened ISO image
- Launch the Terminal Application such as **Secure Terminal Emulator** from the **DS Agile Studio** folder in the start menu
- Select File
 Connect and ensure the Protocol is set to Serial
 Port. Select the simulated G500 USB Serial Port with Baud rate – 115200 and then Connect.
- Login with Administrator credentials at the G500 command shell prompt.
- Type "sudo mcpcfg" and the user password when prompted
- Proceed with the settings

Connection	×
Protocol: Serial Port ~	
Port settings	
Serial port: COM5: USB Serial Port - Baud rate: 115200 -	
Connect	

admin@G500:~\$ sudo mcpcfg [sudo] password for admin:

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	5	2				С	0	n	f	i	ç
	2	3				С	Ó	n	f	i	ç
		4				С	0	n	f	i	ç
	2	5				С	0	n	f	i	ç
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		1	5			S	u	p	p	r	f
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		1	9			С	0	n	f	i	ç
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Settings Menu

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ss Forced Qualities To Masters D20 RTU IEC101 DPA Unbalanced Mode Functionality ure IEC101+104 DPA Startup Quality Event Suppress Interval are Serial Ports are D.20 Port Settings Host assis Intrusion State Clone Snapshot Factory Default Device

Between 0 and 24):

Only one instance is allowed to run at any given time across both "mcpcfg" and "MCP Settings GUI".





Learning & Development Thank You







Technical Support by Location

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