

Gcom Protocol Appliance Second Generation Version 3_0 User Guide

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This document serves as the base for the Gcom Protocol Appliance. The purpose of this document is to serve as a sort of extended table of contents for other documents which describe the various components of the GPA2G. Thus, there is more likely to be overview information contained herein with links to documents containing more details.

This document is better read online than on paper due to the number of hyper links contained within the document.

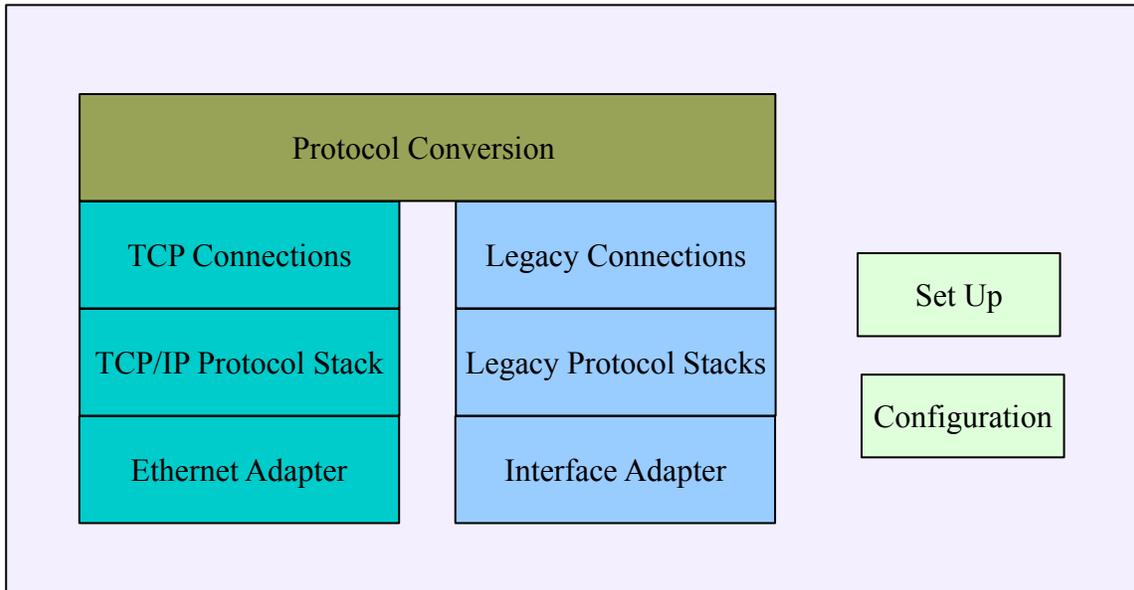
The purpose of the GPA2G is to convert between legacy protocols such as SNA, X.25 and Bisync, and TCP/IP. The appliance is best used to integrate legacy equipment into modern router-based IP networks. As such the GPA2G consists of components related to legacy protocols and components related to TCP/IP.

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GPA2G Structure

The GPA2G internal structure is illustrated by the following diagram. You can see a more detailed view of the internal components of the GPA2G at the following. [▶](#) In that diagram the individual components are active links to documentation that describes each component in more detail.



The components of the GPA are as follows. The brief descriptions that follow include links to more detailed documentation on each component.

The Interface Adapter is either a synchronous/asynchronous serial adapter or an on-board Ethernet adapter. More information available about the adapter [▶](#) and the adapter driver [▶](#).

The Legacy Protocol Stacks can be any combination of the following.

- [SNA](#)
- LU6.2
- [X.25](#)
- [3270 Bisync](#)
- [3780 Bisync](#)
- [HDLC](#)
- [SDLC](#)
- [LAPB](#)
- [LAPD](#)
- [LLC-II](#)
- [Raw Async](#)
- TTY Async
- ALC
- UTS

Legacy Connections are defined as individual connection end points. For some protocols, such as SNA, each logical connection requires an individual connection definition. For others a single connection definition can be used multiple times with each reference creating a new connection instance. These connections are managed by the Gcom SyncSockets Daemon (Gcom_ssd). [▶](#)

Protocol Conversion consists generally of managing Legacy Connections on one side and TCP/IP connections on the other. The GPA2G offers the following protocol conversion options.

- Protocol Converter Daemon (Gcom_pcd). [▶](#) Converts legacy payload data to TCP. Adds encapsulation header to TCP data.
- TN Server. Communicates using TN3270/TCP to terminal emulators and converts the data stream to SNA.
- XoT Daemon. [▶](#) Accepts XoT/TCP protocol and converts to X.25 using one of the synchronous interface ports.
- Traffic Director. [▶](#) Special purpose transaction routing software that directs point of sale transactions to either a Postilion host via TCP or an X.25 host.
- AMATPS. An application that accepts telephone billing records using BX.25 and forwards them to billing systems over TCP connections.
- SyncSockets Daemon (Gcom_ssd). [▶](#) Interacts with user application software using formatted messages over TCP. These messages provide for control of legacy connections at a lower level.

TCP Connections are a part of the conversion process. Each conversion application (PCD, etc) allows for configuration of TCP connections that are particular to that application. For more about TCP connections specific to a conversion application, see the documentation for that application.

The Configuration application is browser based. It is discussed in detail later in this document. There are two different versions of the Configuration application. They are version 1 and version 2 of the Gcom Management Console (GMC). The GMC1 is the default Configuration application. The GMC2 will supplant the GMC1 in the future. At present the GMC2 is installed on the version 3_0 GPA2G and is recommended for use for a certain subset of the functions that it can perform. For protocol stack definitions it is still recommended to use the GMC1. Online documentation for the GMC1 can be found at this link. [▶](#)

The Set Up application is an interactive program. Use this application when you first turn on your GPA2G to configure the desired IP address, gateway, firewall and other networking related functions of the device. You can access this program from a console screen, from a serial port or from an SSH session. This application is described in more detail in the following sections.

New Features in Version 3 of the GPA2G

The Version 3 GPA2G contains a number of new features that make the device easier to configure and to maintain:

The console setup menu system has been redesigned and extended. The setup menus now contain functions for explicitly saving and restoring network settings and protocol stack settings. You can use this system to copy these saved configurations to USB pen drives for safe keeping.

Also included are menu items to manage the installation of software packages from Gcom. These packages are the form in which updates are distributed by Gcom. The setup menu system makes it easy to properly install these update packages.

The Version 3 GPA2G makes an archive of all installed packages at installation time. Using the setup menu you can peruse the archive contents to see the update history of the device. You can also install any package from the archive if you decide (with consultation from Gcom) that it is preferable to revert to an earlier version of some software package.

The setup menu system now contains an FTP sub menu so that you can move files into or out of the GPA2G. Packages copied into the device in this manner can be installed from the FTP directory.

Still in the Alpha phase, but soon to become Beta, the second version of the Gcom Management Console (GMC2) makes protocol stack configuration and connection definition much simpler than with the GMC1. Many protocols can function effectively with little more than default configurations.

The Version 3 GPA2G comes with Gcom's STREAMS Protocol Suite (SPS) version 2.5 which incorporates a number of operational and maintenance features:

All log files and trace buffers in SPS 2.5 now have uniform time and date stamps so that different log files can be correlated with one another.

The GMC2 automatically names log files according to Gcom conventions so that the user need no longer be concerned with log file terminology.

Daemon processes in SPS 2.5 automatically set themselves up to generate a “core” file if the daemon crashes. This happens extremely infrequently, but when it does it is good to have the core file without the user having to configure anything to enable this function.

The daemon processes in SPS 2.5 now maintain a history of their last 10 log files so that restarting a daemon does not destroy valuable maintenance and diagnostic information.

The Gcom_dump utility captures much more information in a more reliable manner in SPS 2.5 than in previous versions. The sum of all of these features is a system that it easier to maintain.

SPS 2.5 also contains a daemon monitoring mechanism that allows for automatic restart and automatic running of Gcom_dump when a daemon changes state (up, down, crash).

Using the GPA2G

In order to use the GPA2G you will need to follow these steps.

1. Set up the GPA with the IP address and other networking parameters that you intend to use. [▶](#)
2. If you are concerned about security, change the default passwords. [▶](#)
3. Review the firewall settings in light of your intended use of the GPA2G. [▶](#)
4. Use the Gcom Management Console (version 1) browser based configuration tool to define your protocol stacks, connections and converter application. [▶](#)
5. Use the Gcom Management Console (version 2) to configure the daemon monitoring feature of the GPA2G. [▶](#)
6. Connect the legacy equipment and begin operations.
7. When your configuration is stable use the set up menu system to back up your configuration settings onto a USB pen drive, label it, and keep it in a known location. If you have a backup system (spare) that you want to place into service in the event of failure of the primary system, be sure to save the network settings of the primary system onto the pen drive so that they can easily be restored onto the backup system if it is put into service. [▶](#)
8. As an alternative you can use the GMC to create an archive of your protocol stack and protocol conversion settings and download the archive via your web browser.

The next sections will cover these topics in more detail.

Set Up Menu System

In order to set up the GPA for operation you must interact with the Gcom Setup Menu System. This is an application program that offers you a menu of setup and maintenance items to select from.

If you have a screen and keyboard connected to the GPA this application is already running on the “tty1” screen, accessed by typing Ctrl-Alt-F1.

If you connect a laptop running a terminal emulator, such as Windows Hyperterminal, via an async cable then you will find that the application will be automatically running there as well. The default speed is 9600 BPS. Hit the ESC key to cause the application to regenerate the screen image. From the console screen, or from an SSH session, you can change the baud rate on the serial interface if you like.

After the initial setup you can also connect to the GPA2G via SSH and run the setup application in your terminal emulation window. Simply log in as user “setup” with default password “gcom.com” and the setup application will automatically run.

The Setup Menu System maintains a static screen image that you navigate using the up and down arrow keys. You can view a demonstration of the basic navigation features of the system here. [▶](#)

When you first access the Setup Menu System you will be shown the license agreement that comes with the GPA2G. Use the Page Down key to scroll to the bottom and select the “I accept” item. Hit Enter to accept the agreement and proceed to the main setup menu.

Set Up – Main Menu

The main menu screen looks like the following.

```
root@dellgpa: ~
Gcom Setup Menu>Main
Main Menu
Configure IP Networking...
Configure Hostname
Set Date and Time
File Transfer
Manage Network Settings...
Manage Protocol Stacks...
Manage Packages...
Manage Pen Drive...
Manage Gcom_dump files
Manage Passwords...
Manage Kernel Logging...
--- more ---
Select to goto the Configure IP Networking menu
Up/Down Arrow, Page Up/Down, <ENTER>=select

GMT Tue Apr 28 20:08:23 2009
gpa2gtest.gcom1.com
Pen: sdb sdc
GPA: U3_0_9
SPS: v2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
Copyright (c) 2005-2009
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```

Gcom provides a quick set up guide that you may find useful. You can view it here. [▶](#)

Set Up – Configure IP Networking

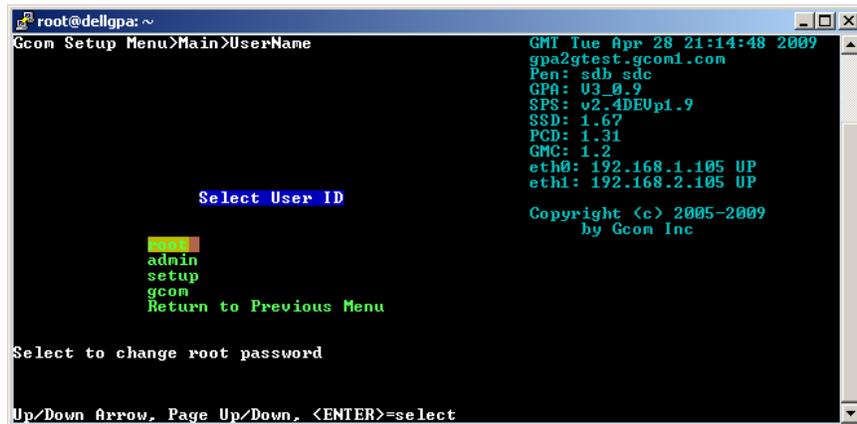
The first thing that you should do is to hit the Enter key to go to the sub menu for configuring your IP networking parameters. You can see a demonstration of this here. [▶](#)

```
root@dellgpa: ~
Gcom Setup Menu>Main>Networking
Configure IP Networking Menu
Configure Firewall...
Configure DNS Servers...
Configure SNMP Trap Sink IP Address
Configure Network Time Synchronization
Show Network Settings
Show Saved Network Settings
Save Network Settings
Restore Saved Network Settings
Clear Saved Network Settings
Show Factory Network Settings
--- more ---
Select to go to the Configure IPV4 Interface menu
Up/Down Arrow, Page Up/Down, <ENTER>=select

GMT Tue Apr 28 21:13:23 2009
gpa2gtest.gcom1.com
Pen: sdb sdc
GPA: U3_0_9
SPS: v2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
Copyright (c) 2005-2009
by Gcom Inc
```

Set Up – Manage Passwords

The next thing to do is to change the default passwords if you are at all concerned about security. The GPA2G comes with three user ids defined, “root,” “admin,” and “setup.” The default password for all three is “gcom.com.” All three have super user capabilities. If you change the password for “admin” the new password also applies to logging in to the GMC. To see a demonstration of this process follow this link. [▶](#)



```
root@dellgpa: ~
Gcom Setup Menu>Main>UserName
GMT Tue Apr 28 21:14:48 2009
gpa2gtest.gcom.com
Pen: sdb sdc
GPA: U3_0_9
SPS: v2_4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
Copyright (c) 2005-2009
by Gcom Inc

Select User ID
root
admin
setup
gcom
Return to Previous Menu

Select to change root password

Up/Down Arrow, Page Up/Down, <ENTER>=select
```

Set Up – Configure Firewall

The next thing to do is to review the firewall settings on the GPA2G. You will want to ensure that the ports that are associated with the protocol conversion application(s) that you intend to use are open. You might also want to ensure that ports that you do not intend to use are closed. There is a demonstration of this process here. [▶](#)

```

root@dellgpa: ~
Gcom Setup Menu>Main>Networking>FireWall
GMT Wed Apr 29 18:22:43 2009
gpa2gtest.gcom1.com
Pen: sdb sdc
GPA: U3_0.9
SPS: v2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
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Configure Firewall Menu

Firewall: Enabled
HTTP Port (80): ALLOWED
SSH Port (22): ALLOWED
SNMP Port (161): ALLOWED
FTP Port (20): BLOCKED
NFS Port (2049): BLOCKED
PING responses: ALLOWED
SSD Port (8000): ALLOWED
SSDProbe Port (8100): ALLOWED
PCD Port (7000): ALLOWED
TN Server Port (10001): BLOCKED
XOT Port (1998): BLOCKED
Return To Previous Menu

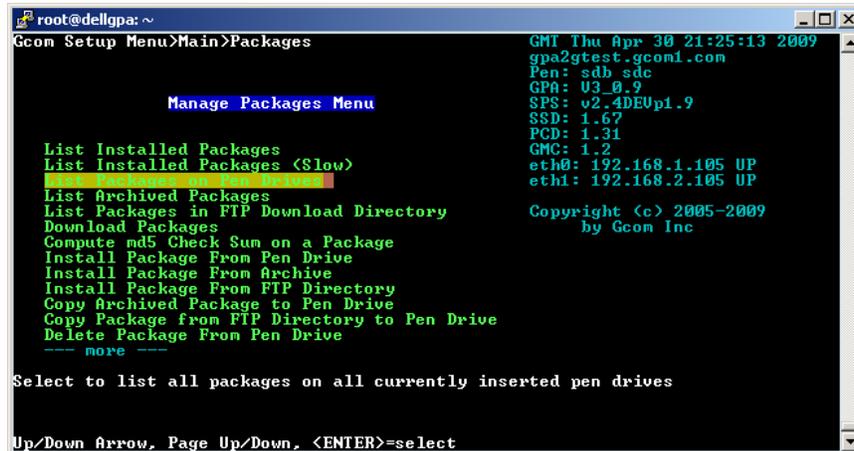
Select to turn the firewall OFF.
  
```

For reference the following table shows the various applications that you might want to use and the associated firewall port numbers.

Application	Port	Description
GMC	80	Gcom Management Console – browser base configuration tool.
SSH	22	SSH Daemon – allows logins via SSH protocol.
SNMP	161	Allows SNMP access to the GPA2G.
FTP	20	Allows FTP sessions in or out. Note: Using the FTP subsystem within the Setup Menu System automatically opens this port temporarily.
Ping	icmp	Allows the unit to be pinged from outside.
SSD	8000	SyncSocket Daemon – enable if you intend to make SyncSocket connections from outside the unit.
SSD	8100	This is the probe port for the SSD. Enable this only if you want to access probe data from <i>outside</i> the GPA. Probe data obtained via Gcom_dump from within the GPA is always accessible.
PCD	7000	Protocol Converter Daemon – enable if you are using PCD (encapsulated TCP) connections.
TN Server	10001	Enable if you are using TN 3270 connections.
XOT	1998	The XoT Daemon's standard listening port. Enable if you are using XOT.

Set Up – Manage Packages

The Manage Packages sub-menu allows you to perform various operations on the software packages that comprise the GPA2G. Operations include downloading via FTP, installing from various sources, copying to pen drives and deleting packages from certain locations.



```
root@dellgpa: ~
Gcom Setup Menu>Main>Packages

GMT Thu Apr 30 21:25:13 2009
gpa2gtest.gcom1.com
Pen: sdb sdc
GPA: U3_0.9
SPS: o2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
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Manage Packages Menu

List Installed Packages
List Installed Packages <Slow>
List Archived Packages
List Packages in FTP Download Directory
Download Packages
Compute md5 Check Sum on a Package
Install Package From Pen Drive
Install Package From Archive
Install Package From FTP Directory
Copy Archived Package to Pen Drive
Copy Package From FTP Directory to Pen Drive
Delete Package From Pen Drive
--- more ---

Select to list all packages on all currently inserted pen drives

Up/Down Arrow, Page Up/Down, <ENTER>=select
```

Whenever the Setup Menu System installs a package it makes an archive copy of it. You can list the package archive to see which packages have been installed over time. If you so choose you can re-install an archived package. This has the effect of “going back” to a previous version of a package.

Archived packages are names with the date and time of their installation. So an archived package with the name GcomSPS-2009-04-30-185938 was installed on April 30, 2009 at 18:59:38 GMT.

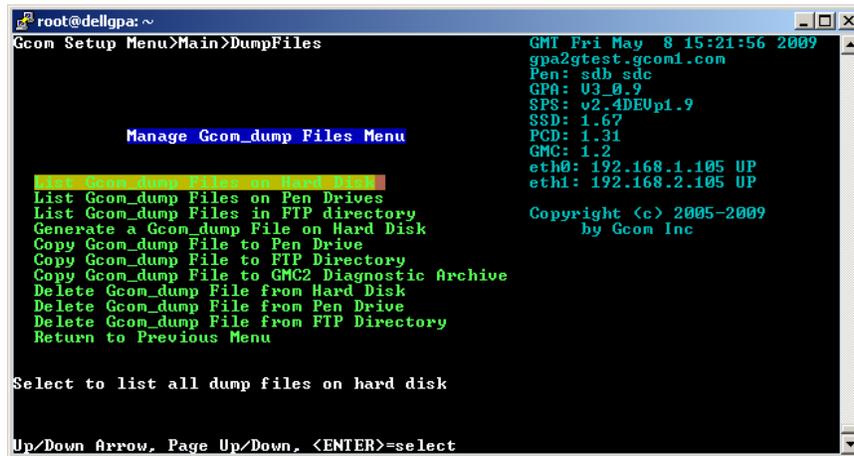
You can install a package from the FTP download directory, from a pen drive or from the package archive.

You will not need to use this mechanism during initial installation. The package management is useful for installing updates from Gcom.

You can see a demonstration of downloading and installing a package here. [▶](#)

Set Up – Manage Gcom_dump Files

This sub-menu allows you to generate diagnostic data using the Gcom_dump utility and to copy the resulting output to several different locations. When the Gcom_dump utility is run the output is diverted to a particular directory on the hard disk. This directory contains output from all Gcom_dump invocations. With this sub-menu you can copy one of these files to a pen drive, the FTP directory or to the GMC2's diagnostic data directory preparatory to sending the file to Gcom support for analysis.



```
root@dellgpa: ~
Gcom Setup Menu>Main>DumpFiles

GMT Fri May 8 15:21:56 2009
gpa2gtest.geomi.com
Pen: sdb sdc
GPA: U3_0_9
SPS: v2_4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
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Manage Gcom_dump Files Menu

List Gcom_dump Files on Hard Disk
List Gcom_dump Files on Pen Drives
List Gcom_dump Files in FTP directory
Generate a Gcom_dump File on Hard Disk
Copy Gcom_dump File to Pen Drive
Copy Gcom_dump File to FTP Directory
Copy Gcom_dump File to GMC2 Diagnostic Archive
Delete Gcom_dump File from Hard Disk
Delete Gcom_dump File from Pen Drive
Delete Gcom_dump File from FTP Directory
Return to Previous Menu

Select to list all dump files on hard disk

Up/Down Arrow, Page Up/Down, <ENTER>=select
```

If you have a machine that is completely isolated from the Internet then you may need to copy the dump file to a pen drive. You can then plug that pen drive into a machine with Internet connectivity and email it to Gcom support.

If the GPA itself is not connected to the Internet but there is another computer on the LAN that is so connected then you can copy the dump file to the FTP directory and then use the FTP sub-menu to transfer it to that other computer.

If you can reach the GPA with a web browser then you can use the Manage Gcom_dump Files sub-menu to copy the file to the GMC2's diagnostic data directory and then connect to the GMC2 with your web browser. From there you can download the file onto the computer on which your web browser is running. However, in this case it would be simpler to connect your web browser to the GMC2 and use the GMC2 itself to generate the dump file, bypassing the Setup Menu System altogether.

Here are the links to some demonstrations of Gcom_dump file handling.

- The Manage Gcom_dump Files sub-menu [▶](#)
- The GMC2 procedure for downloading one of these files [▶](#)
- The GMC2 procedure for generating a dump file [▶](#)

Set Up – Ethernet Bonding

With Ethernet bonding the two Ethernet ports are operated using the same IP address. This is usually used so that the GPA can be connected to two LAN segments for redundancy purposes.

The Gcom Setup Menu System allows you to enable or disable Ethernet bonding. By default bonding is disabled. When enabled you can also choose the type of bonding that is to be applied to the bonded interfaces.

Bonding is controlled via the Configure IP Networking Menu.

```
root@dellgpa: ~
Gcom Setup Menu>Main>Networking
GMT Fri May 1 20:34:18 2009
gpa2gtest.gcom1.com
Pen: sdb sdc
GPA: U3_0.9
SPS: v2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
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Configure IP Networking Menu

--- more ---
Configure SNMP Trap Sink IP Address
Configure Network Time Synchronization
Show Network Settings
Show Saved Network Settings
Save Network Settings
Restore Saved Network Settings
Clear Saved Network Settings
Show Factory Network Settings
Restore Factory Network Settings
Ethernet Bonding: Disabled
Return To Previous Menu

Select to return to the main menu

Up/Down Arrow, Page Up/Down, <ENTER>=select
```

Once enabled bonding mode is controlled from a sub-menu of the Configure IP Networking Menu.

```
root@dellgpa: ~
Gcom Setup Menu>Main>Networking>Bonding
GMT Fri May 1 20:35:27 2009
gpa2gtest.gcom1.com
Pen: sdb sdc
GPA: U3_0.9
SPS: v2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
bond0: Active Backup
bond0: 192.168.1.105 UP
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Bonding Mode Menu

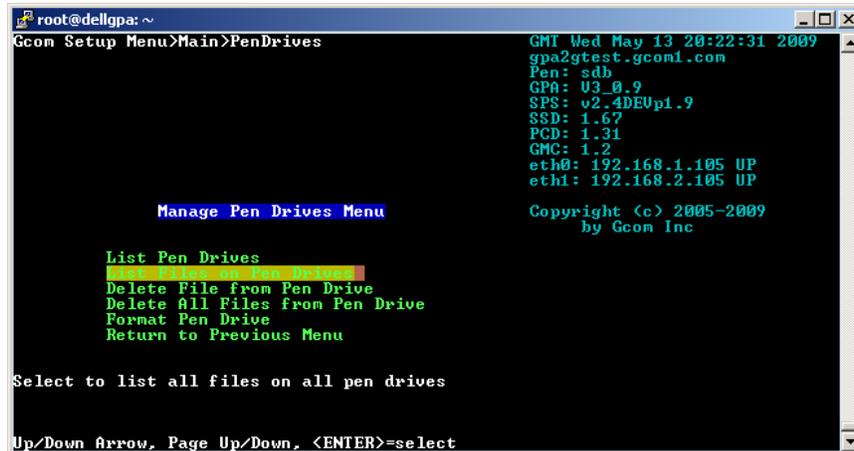
Bond Active Load Balance
Active Backup
XOR Load Balance
Broadcast
Return To Previous Menu

Select to transmit packets in sequential order from the
first available slave through the last. Provides load
balancing and fault tolerance.
NOTE: Ethernet switch required.
```

You can see a demonstration of Ethernet bonding here. [▶](#)

Set Up – Manage Pen Drives

This sub-menu allows you to manage pen drives and the files contained on them. You can list the pen drives, list files on them, delete files from them and format them.



```
root@dellgpa: ~
Gcom Setup Menu>Main>PenDrives
GMT Wed May 13 20:22:31 2009
gpa2gtest.gcom1.com
Pen: sdb
GPA: U3_0.9
SPS: o2.4DEUp1.9
SSD: 1.67
PCD: 1.31
GMC: 1.2
eth0: 192.168.1.105 UP
eth1: 192.168.2.105 UP
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Manage Pen Drives Menu

List Pen Drives
Delete File from Pen Drive
Delete All Files from Pen Drive
Format Pen Drive
Return to Previous Menu

Select to list all files on all pen drives

Up/Down Arrow, Page Up/Down, <ENTER>=select
```

You can have more than one pen drive inserted at any one time, although relating device mnemonics to physical devices can sometimes be a challenge.

Note that this sub-menu is for manipulating the pen drive itself. Other sub-menus contain items that allow you to copy certain types of files to or from a pen drive. Those sub-menus are as follows.

Sub-Menu	Description
Manage Network Settings	Copy network settings to/from a pen drive
Manage Protocol Stacks	Copy GMC2 saved protocol stacks to/from a pen drive
Manage Packages	Copy packages from several places to a pen drive. Install a package from a pen drive.
Manage Gcom dump files	Copy Gcom dump output to a pen drive
Manage Serial Baud Rate Settings	These settings are copied along with network settings

You can view a demonstration of the Manage Pen Drive sub-menu here. [▶](#)

Configuration

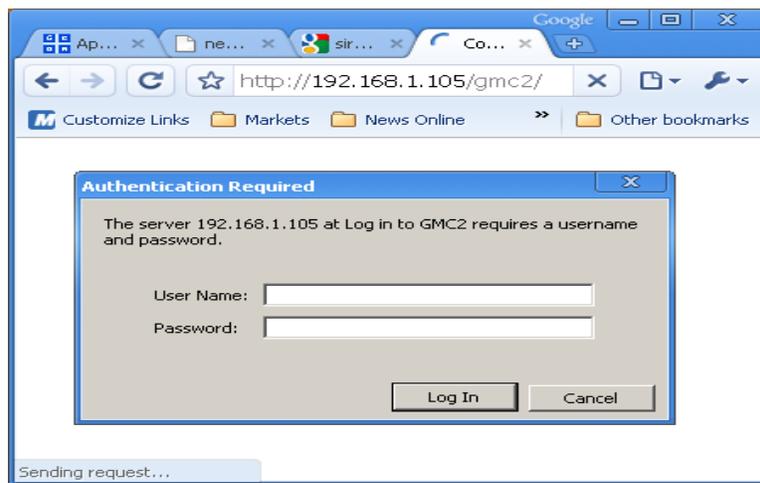
Note: The GMC version 2 is still in the Alpha stage and is not recommended for use in configuring protocol stacks at this time. Use it for daemon configuration and for generating and downloading diagnostic data.

The Configuration application is browser based. To access this application connect your browser to the GPA in the following manner:

<http://192.168.1.105/gmc2>

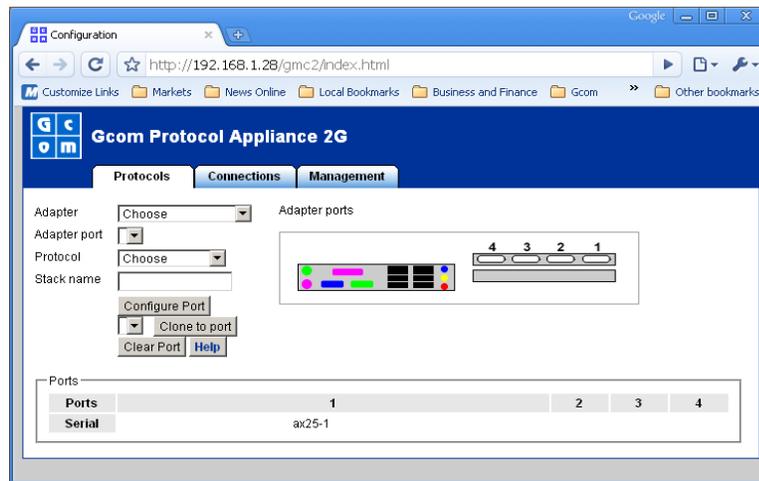
Substitute the IP address that you assigned to the GPA for “192.168.1.105”. See the section regarding [networking setup](#) for how to assign an IP address to the GPA.

Once the browser is connected you will see a login screen that looks like the following.



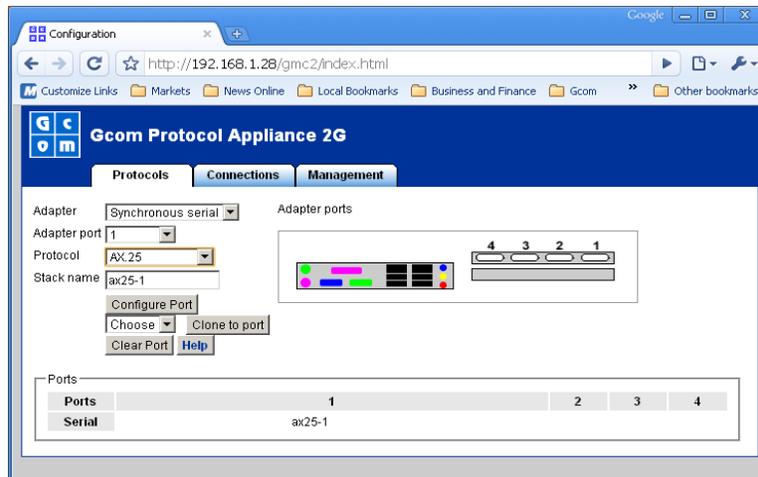
Enter the user name “admin” and the password “gcom.com” and click the “Log In” button. Or, if you have used the Setup Menu system to change the password for admin then use the password that you entered there.

The initial screen looks like the following. Follow this link for an overview of the functions of the GMC2. ►



Configuration – Configure AX.25

The GMC2 makes it easy to configure AX.25 protocol stacks. The AX.25 protocol is listed as a protocol type at the same level as selecting X.25.



AX.25 is used for airline applications. It differs from standard CCITT X.25 in that it uses a packet size of 240, a non-power-of-two size. Packet sequences longer than 240 bytes are transferred via a sequence of M-bit data packets each with 240 bytes. CCITT X.25 would not allow this and instead would force a packet size of either 128 or 256 bytes.

The GMC2's AX.25 configuration takes this into account so that no further option setting is needed for packet size-related issues once the protocol type of AX.25 is selected.

For a demonstration of how to set up an AX.25 protocol stack and connection definitions follow this [link](#). ▶

Configuration – Configure ALC

ALC is an old character sync protocol that is used in the airline industry to communicate with travel agent terminals. These terminals were originally made by IBM.

The protocol is a six bit character sync protocol. Gcom's implementation of this protocol consists of the driver and synchronous hardware to transmit and receive messages in ALC format. In terms of configuration the protocol stack for ALC consists of just the driver level.

To be supplied is a demonstration of using the GMC2 to set up an ALC protocol stack.

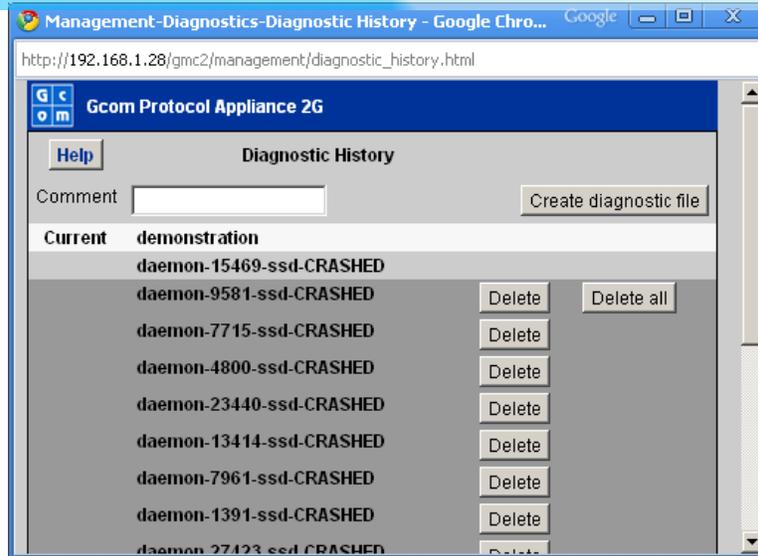
Configuration – Configure UTS

UTS is an old character sync protocol that is used in the airline industry to communicate with travel agent terminals. These terminals were originally made by Unisys.

The protocol is an eight bit character sync protocol. Gcom's implementation of this protocol consists of the driver and synchronous hardware to transmit and receive messages in UTS format. In terms of configuration the protocol stack for UTS consists of just the driver level.

To be supplied is a demonstration of using the GMC2 to set up a UTS protocol stack.

Configuration – Diagnostic Data



The GMC2 has a mechanism for managing so-called diagnostic data. Diagnostic data consists of the output of the Gcom utility program Gcom_dump plus, in some cases, core image files from daemon processes that may have faulted.

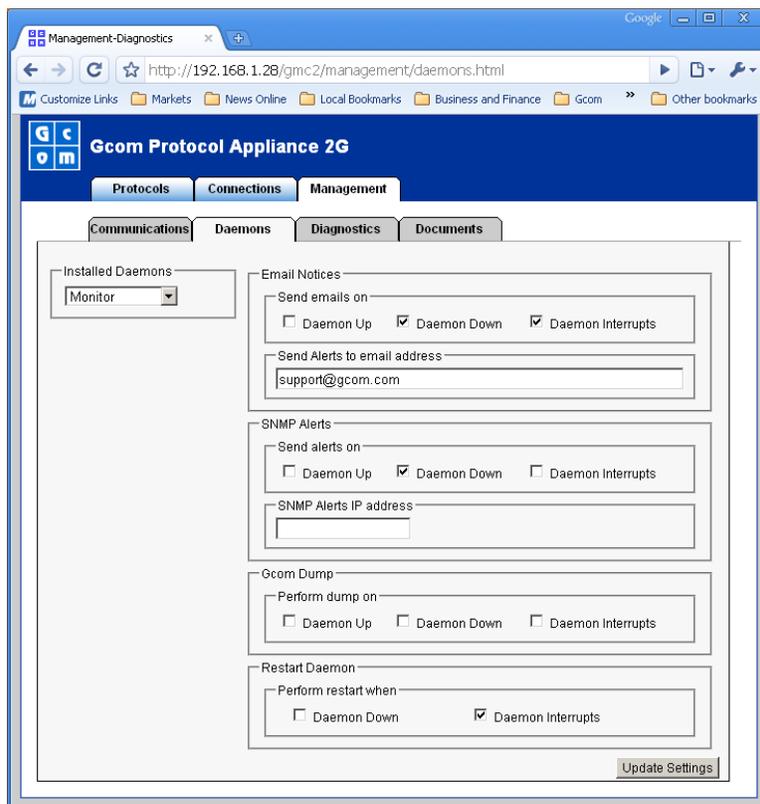
The Gcom_dump utility program gathers as much information as it can about the currently running protocol stacks and the system as a whole. Included in this information is all relevant log files that may be helpful in diagnosing any sort of problem with the GPA2G.

The GMC2 contains a mechanism for triggering a run of the Gcom_dump utility. It also contains a mechanism for downloading the resulting data. The form of the diagnostic data is that of a compressed tar file. Gcom customer support will almost always ask for such data whenever a problem is reported concerning a GPA2G.

You can view a demonstration of generating diagnostic data with the GMC2 here. [▶](#)

You can view a demonstration of downloading diagnostic data with the GMC2 here. [▶](#)

Configuration – Daemon Management



The GMC2 contains a configuration page for managing the Gcom daemon processes. Each daemon process is run via a monitoring script. The monitoring script is capable of performing certain functions as a result of the daemon process starting up, terminating or crashing. The GMC2 daemon management configuration panel allows you to set up the options that apply to each daemon process.

You can view a demonstration of the setup process at the following link. ►

Here are a few tips for configuring these daemons.

- The SNMP features are for future implementation.
- It is not practical to select the Restart Daemon option for the Monitor daemon.
- If you want to use email notifications and you do not have a DNS configured then use email addresses of the form 'name@1.2.3.4'.
- The default values are probably satisfactory for the majority of cases.