

GCOM[®] Utilities White Paper

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Dave Grothe was the author and developer/subject matter expert for this manual.

GCOM Utilities

Gcom® Utility	Purpose
Gcom_cdi	Display CDI provider information.
Gcom_cdic	Change the configuration of an existing CDI UPA, including: <ul style="list-style-type: none"> • Baud rate • Clocking options and loopback mode associated with the <i>intsx25</i> protocol module • Keywords in the specified configuration file
Gcom_config	Used in conjunction with other Gcom utilities, particularly Gcom_monitor, to configure GCOM STREAMS driver protocol software.
Gcom_display	Print a visual representation of the STREAMS protocol trees constructed by Gcom_config and Gcom_monitor.
Gcom_dlpi	<ul style="list-style-type: none"> • Display DLPI provider information. • Delete a DLPI UPA. • Abort a connection. • Exit the monitor.
Gcom_dlpitst	Test the DLPI driver STREAMS in the kernel.
Gcom_dump	Gather diagnostic information from the kernel, configuration files, and the system's message file.
Gcom_getcp	List detailed code path information for various modules in the kernel.
Gcom_ivp	Display a specific Rsystem® process structure, or instance vector parameters (IVP).
Gcom_lumanager	Work in conjunction with the TN Server to provide access to: <ul style="list-style-type: none"> • Specific subgroups of LUs • LUs with associated printers
Gcom_monitor	<ul style="list-style-type: none"> • Log significant events to the <code>/usr/spool/gcom/logfile</code> file. • Keep the providers' control STREAMS open. • Configure the CDI, CLPI, and NPI layers of the protocol drivers at system boot.

Gcom® Utility	Purpose
Gcom_npi	Display NPI provider information.
Gcom_npilstn	Listen for incoming calls and echo the data received on the established X.25 connection.
Gcom_npitst	<ul style="list-style-type: none"> • Ensure the correct operation of Gcom X.25 protocol modules. • Test connectivity to remote sites.
Gcom_sdlc	Dynamically configure and delete DLPI UPAs.
Gcom_stats	Selectively set debug tracing options that write debug messages to the system console and the system log file.
Gcom_tnsvr	Start GCOM's TN3270 and TN5250 server.
Gcom_xray	Trace DLPI protocol operations by: <ul style="list-style-type: none"> • Attaching to a DLPI data tracing port • Converting the resulting messages into human-readable ASCII

For more information:

- Type the name of the utility followed by the `-h` (Help) option.
For example: `Gcom_stats -h`
- Type the name of the utility followed by the `-H` option for more verbose help.
NOTE: Verbose help is not available on all utilities.
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

GCOM Utility Syntax

All GCOM utilities require at least one option. The syntax is:

```
/usr/bin/Gcom_utility -options
```

where:

`/usr/bin/` = Path to utility location

`Gcom_utility` = Gcom utility name

`-options` = Options

- Always preceded by a dash
- Letter from a-z or A-Z
- May include an argument. The argument is optional if there is a specified default value. Otherwise, it is required.

NOTE: There is no space between the dash and the option letter, and between the option and the argument.

Examples

- `Gcom_npi -u2`
- `Gcom_stats -n -D0xff`

For More Information

- Type the name of the utility followed by the `-h` (Help) option.
For example: `Gcom_stats -h`
- Type the name of the utility followed by the `-H` option for more verbose help.
NOTE: Verbose help is not available on all utilities.
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

Most Commonly Used Gcom Utilities and Options

Utility	Purpose
Gcom_cdi	Display CDI provider information.
Gcom_dlpi	<ul style="list-style-type: none"> • Display DLPI provider information. • Delete a DLPI UPA. • Abort a connection. • Exit the monitor.
Gcom_dump	Gather diagnostic information from the kernel, configuration files, and the system's message file.
Gcom_npi	Display NPI provider information.
Gcom_stats	Selectively set debug tracing options that write debug messages to the system console and the system log file.

Option	Gcom_cdi (CDI Provider)	Gcom_dlpi (DLPI Provider)	Gcom_npi (NPI Provider)	Purpose
<i>-L</i>		Yes	Yes	List configured LPAs.
<i>-I</i>		Yes	Yes	Display LPA configuration and status information.
<i>-t</i>	Yes	Yes	Yes	Display trace information.
<i>-U</i>	Yes	Yes	Yes	List summary of configured UPAs.
<i>-u</i>	Yes	Yes	Yes	Display UPA configuration and status information.

For more information:

- At the terminal associated with your Gcom hardware/software, type the name of the utility followed by the *-h* (Help) option. For example: `Gcom_dlpi -h`
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

Gcom_cdi

Purpose: Display CDI provider information.

Syntax: /usr/bin/Gcom_cdi *options*

Most common options:

Option	Argument	Default	Legal Values	Purpose						
-t	<i>upa</i>	1	1 to <i>n</i>	Display trace information for UPAs.						
-U				List summary of configured UPAs, including the CDI state and the number of I-frames transmitted and received over the UPA.						
-u	<i>upa</i>	1	1 to <i>n</i>	Display UPA configuration and status information. Output fields begin with the following character strings: <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>cd_</td> <td>CDI interface state</td> </tr> <tr> <td>ix25prm.</td> <td>Line driver configuration parameters</td> </tr> </tbody> </table>	Value	Description	cd_	CDI interface state	ix25prm.	Line driver configuration parameters
Value	Description									
cd_	CDI interface state									
ix25prm.	Line driver configuration parameters									

Sample output:

Gcom_cdi -U

```

                                     receive-errs  xmt-errs
UPA      CDI_State Frames-out  Frames-in  wd mf af  crc  ovr  abt  und  abt
-----
1  INPUT_ALLOWED          6          6  0  0  0    0   0   0    0   0

```

Column	Description						
UPA	Upper Point of Attachment (roughly equivalent to line number)						
CDI State	State of the CDI Provider Finite State Machine <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>INPUT_ALLOWED</td> <td>Line is correctly configured.</td> </tr> <tr> <td>*DRIVER-DOWN*</td> <td>Line is not correctly configured.</td> </tr> </tbody> </table>	Value	Description	INPUT_ALLOWED	Line is correctly configured.	*DRIVER-DOWN*	Line is not correctly configured.
Value	Description						
INPUT_ALLOWED	Line is correctly configured.						
DRIVER-DOWN	Line is not correctly configured.						
Frames-out	Number of frames successfully transmitted						

Column	Description
Frames-in	Number of frames successfully received
wd	Watchdog timer expirations Increments if a frame takes longer than five seconds (default) to transmit.
mf	Modem flood count Increments whenever the driver perceives it is being flooded with modem status change events.
af	Abort flood count Similar to modem flood count except for received aborts
crc	Number of CRC errors on received frames
ovr	Number of receiver overruns
abt	Number of received aborts
und	Number of transmit under runs
abt	Number of transmitted aborts

For more information:

- At the terminal associated with your Gcom hardware/software, type: `Gcom_cdi -h`
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

Gcom_dlpi

- Purpose:**
- Display DLPI provider information.
 - Delete a DLPI UPA.
 - Abort a connection.
 - Exit the monitor.

Syntax: /usr/bin/Gcom_dlpi *options*

Most common options:

Option	Argument	Default	Legal Values	Purpose										
<i>-L</i>				List configured LPAs and their UNIX STREAMS multiplexor IDs.										
<i>-l</i>	<i>lpa</i>	1	1 to <i>n</i>	Display LPA configuration and status information. Output fields begin with the following strings: <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>pollpar</td> <td>Refer to polling controller (a multiplexor) configuration.</td> </tr> <tr> <td>pollstats</td> <td>Statistics maintained by the poll module</td> </tr> <tr> <td>ldmxpar</td> <td>LAPD multiplexor parameters</td> </tr> <tr> <td>ldmsxt.n</td> <td>LAPD multiplexor statistics</td> </tr> </tbody> </table>	Value	Description	pollpar	Refer to polling controller (a multiplexor) configuration.	pollstats	Statistics maintained by the poll module	ldmxpar	LAPD multiplexor parameters	ldmsxt.n	LAPD multiplexor statistics
Value	Description													
pollpar	Refer to polling controller (a multiplexor) configuration.													
pollstats	Statistics maintained by the poll module													
ldmxpar	LAPD multiplexor parameters													
ldmsxt.n	LAPD multiplexor statistics													
<i>-t</i>	<i>upa</i>	1	1 to <i>n</i>	Display trace information for UPA maintained by the HDLC/frame protocol module and the lower multiplexor (such as the polling controller).										

Option	Argument	Default	Legal Values	Purpose												
<i>-U</i>				List summary of configured UPAs, including the DLPI state and the number of I-frames transmitted and received over the UPA.												
<i>-u</i>	<i>upa</i>	1	1 to n	<p>Display UPA configuration and status information. Output fields begin with the following character strings:</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>stream</td> <td>Refers to configurations used to configure a user's stream that is bound to the UPA and to the configuration required by the DLPI specification.</td> </tr> <tr> <td>ds_</td> <td>DLPI interface state variables</td> </tr> <tr> <td>frmpar</td> <td>HDLC frame-level parameters</td> </tr> <tr> <td>qllcpar</td> <td>QLLC frame-level parameters</td> </tr> <tr> <td>mlppar</td> <td>X.25 MLP frame-level parameters</td> </tr> </tbody> </table> <p>The remaining output consists of statistics maintained by HDLC/frame.</p>	Value	Description	stream	Refers to configurations used to configure a user's stream that is bound to the UPA and to the configuration required by the DLPI specification.	ds_	DLPI interface state variables	frmpar	HDLC frame-level parameters	qllcpar	QLLC frame-level parameters	mlppar	X.25 MLP frame-level parameters
Value	Description															
stream	Refers to configurations used to configure a user's stream that is bound to the UPA and to the configuration required by the DLPI specification.															
ds_	DLPI interface state variables															
frmpar	HDLC frame-level parameters															
qllcpar	QLLC frame-level parameters															
mlppar	X.25 MLP frame-level parameters															

Sample output:

Gcom_dlpi -U

```

UPA MODULE DLPI_STATE LPA MUX BIND LAP_TYPE PRIM SEC XMIT RCV
-----
 1 frame infoxfer 1 1 01 lapb 01 03 1 1

```

Column	Description
UPA	Upper Point of Attachment number

Column	Description								
MODULE	Type of protocol module								
	<table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>frame</td> <td>LAPB/LAPD/LLC-II</td> </tr> <tr> <td>hdlc</td> <td>HDLC/SDLC/ADCCP</td> </tr> <tr> <td>qllc</td> <td>QLLC</td> </tr> </tbody> </table>	Value	Description	frame	LAPB/LAPD/LLC-II	hdlc	HDLC/SDLC/ADCCP	qllc	QLLC
	Value	Description							
	frame	LAPB/LAPD/LLC-II							
hdlc	HDLC/SDLC/ADCCP								
qllc	QLLC								
DLPI_STATE	State of the protocol Finite State Machine For module type of <code>frame</code> :								
	<table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><code>infoxfer</code></td> <td>In information transfer state (link up)</td> </tr> <tr> <td><code>sabmuawt</code></td> <td>Attempting to set up the link</td> </tr> <tr> <td><code>verify_up</code></td> <td>Link may be up but the Finite State Machine to trying to verify this</td> </tr> </tbody> </table>	Value	Description	<code>infoxfer</code>	In information transfer state (link up)	<code>sabmuawt</code>	Attempting to set up the link	<code>verify_up</code>	Link may be up but the Finite State Machine to trying to verify this
	Value	Description							
	<code>infoxfer</code>	In information transfer state (link up)							
<code>sabmuawt</code>	Attempting to set up the link								
<code>verify_up</code>	Link may be up but the Finite State Machine to trying to verify this								
For module type of <code>hdlc</code> , the following equivalent values are displayed:									
<ul style="list-style-type: none"> • <code>info_xfer</code> • <code>sabm_ua_wt</code> • <code>link_up_verify</code> Other values are possible, but these three are the most common.									
LPA	Lower Point of Attachment to which this UPA is bound (in the DLPI <code>DL_BIND_REQ</code> sense)								
MUX	STREAMS multiplexor ID equivalent to the LPA								
BIND	DLSAP to which the user of this UPA issues a DLPI bind request								
LAP_TYPE	Link Access Procedure type (further detail as to what the protocol module is)								
PRIM	Primary address used to send frames on the link								
SEC	Secondary address used to send frames on the link								
XMIT	Information frames transmitted Does not count Supervisory or Unnumbered frames.								
RCV	Information frames received Does not count Supervisory or Unnumbered frames.								

For more information:

- At the terminal associated with your Gcom hardware/software, type:
`Gcom_dlp -h`
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

Gcom_dump

Purpose: Gather diagnostic information from the kernel, configuration files, and the system's message file.

Typical usage:

1. Run `Gcom_dump`.
2. Divert output to a file.
3. Send the file to Gcom Support for analysis.

NOTE: You can edit the file and find instances of `Gcom_cdi`, `Gcom_dlpi`, etc., and review the output of these commands if you so choose.

Syntax: `/usr/bin/Gcom_dump options`

Most common options: None

For more information:

- At the terminal associated with your Gcom hardware/software, type:
`Gcom_dump -h`
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

Gcom_npi

Purpose: Display NPI provider information.

Syntax: /usr/bin/Gcom_npi *options*

Most common options:

Option	Argument	Default	Legal Values	Purpose				
<i>-L</i>				List configured LPAs and their UNIX STREAMS multiplexor IDs.				
<i>-l</i>	<i>lpa</i>	1	1 to <i>n</i>	Display LPA configuration and status information.				
<i>-t</i>	<i>[lpa]</i>	1	1 to <i>n</i>	Display trace information for LPA packet level or SNA multiplexor.				
<i>-U</i>				List summary of active UPAs, including the NPI state and the number of Data Packets transmitted and received over the UPA.				
<i>-u</i>	<i>[upa]</i>	1	1 to <i>n</i>	Display UPA configuration and status information. Output fields begin with the following character strings: <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ps_</td> <td>NPI interface state</td> </tr> </tbody> </table>	Value	Description	ps_	NPI interface state
Value	Description							
ps_	NPI interface state							

Sample output:

```
Gcom_npi -L
```

```
LPA MUX  INTERFACE  MODULE      STATE  STYLE  ATT  BIND  IND  CONN
-----  -
  1   2  DLPI_IFACE  packet      IDLE   501   1   01   0   03
```

Column	Description						
LPA	Lower Point of Attachment number						
MUX	STREAMS multiplexor ID equivalent to the LPA						
INTERFACE	Type of lower interface <table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>DLPI_IFACE</td> <td>Driver below is the DLPI Provider.</td> </tr> <tr> <td>CDI_IFACE</td> <td>Driver below is the CDI Provider.</td> </tr> </tbody> </table>	Value	Description	DLPI_IFACE	Driver below is the DLPI Provider.	CDI_IFACE	Driver below is the CDI Provider.
Value	Description						
DLPI_IFACE	Driver below is the DLPI Provider.						
CDI_IFACE	Driver below is the CDI Provider.						

MODULE	Type of protocol module	
	Value	Description
	packet	X.25 packet level
	sna	SNA protocol
bisync	Bisync protocol	
STATE	The state of the lower interface This is either a DLPI state or a CDI state according to the interface type.	
STYLE	Indicates that DLPI attach and bind are required for this interface.	
ATT	LPA to attach within the driver below	
BIND	DLSAP used to bind to the UPA within the driver below	
IND	Always 0.	
CONN	DLSAP used to connect the UPA in the driver below	

For more information:

- At the terminal associated with your Gcom hardware/software, type: `Gcom_npi -h`
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

Gcom_stats

Purpose: Selectively set debug tracing options that write debug messages to the system console and the system log file.

Syntax: /usr/bin/Gcom_stats *options*

Primary usage:

- Set debug masks for STREAMS drivers.
- Set debug masks for protocol state machines within Gcom protocol stacks.

Setting Debug Masks for STREAMS Drivers

Use the following forms to set the CDI, DLPI, and NPI debug masks respectively:

- `Gcom_stats -c -D<mask>`
- `Gcom_stats -d -D<mask>`
- `Gcom_stats -n -D<mask>`

The Gcom Management Console provides a mechanism for setting these debug masks by individual bit using an English description and a check box for each option.

Caution: Use only upon request from Gcom support.

Setting Debug Masks for Protocol State Machines

Use the following form to set debug masks for protocol state machines, with the line driver serving as an example: `Gcom_stats -I<mask>`

Caution: Use only upon request from Gcom support.

Commonly Used Debug Settings

Setting	Description
<code>Gcom_stats -I0x2000</code>	Line driver prints information concerning baud rate and time constant calculation.
<code>Gcom_stats -I0x4000</code>	Line driver runs a memory test on the adapter prior to use. Use if you suspect there may be onboard RAM problems with the adapter.

Setting	Description
Gcom_stats -n -D0x42004	The NPI driver prints all connects (0x2000) and disconnects (0x04) together with information concerning its call routing decisions (0x4000).
Gcom_stats -S0xfbffff	Turns on SNA tracing and BIND/RH/RU interpretation.

For More Information

- At the terminal associated with your Gcom hardware/software, type:
Gcom_stats -H
- See Appendix A of the [STREAMS Troubleshooting Guide](#).

STREAMS Layer States

Below are the state names and descriptions for the states seen in output generated by:

- Gcom_cdi -U
- Gcom_dlpri -U
- Gcom_npi -U
- Gcom_display

Under ordinary circumstances, most of these states will never be displayed.

CDI

State	Description
UNATTACHED	No PPA attached
UNUSABLE	PPA cannot be used
DISABLED	PPA attached
ENABLE_PENDING	Waiting ack of enable req
ENABLED	Awaiting use
READ_ACTIVE	Input section enabled; disabled after data arrives
INPUT_ALLOWED	Input section permanently enabled
DISABLE_PENDING	Waiting ack of disable req
OUTPUT_ACTIVE	Output section active only
XRAY	Xray-ing another ppa

DLPI

State	Description
UNBOUND	PPA attached
BINDING	Waiting ack of
UNBINDING	Waiting ack of
IDLE	dlsap bound, awaiting use
UNATTACHED	PPA not attached
ATTACHING	Waiting ack of
DETACHING	Waiting ack of
UDQOS_PEND	Waiting of DL_UDQOS_REQ
CONNECTING	Awaiting outgoing connection
INCON_PEND	Awaiting incoming connection
CONN_RES	Waiting ack of DL_CONNECT_RES
DATAFER	Connection oriented data transfer

State	Description
USER_RESET	User-initiated reset, awaiting
PROV_RESET	Provider-initiated reset, awaiting
RESET_RES	Waiting ack of DL_RESET_RES
DISCON8	Waiting ack of DL_DISC_REQ
DISCON9	Waiting ack of DL_DISC_REQ
DISCON11	Waiting ack of DL_DISC_REQ
DISCON12	Waiting ack of DL_DISC_REQ
DISCON13	Waiting ack of DL_DISC_REQ
SUBS_BIND	Waiting ack of DL_SUBS_BIND_REQ
DISCON_IND	Peer-initiated disconnect
U_WAIT_CONN_RES_OK	Initially rcvd CONN_IND, sent sabm
U_WAIT_RESET_RES_OK_2	RESET_REQ crossed DL_RESET_IND
U_WAIT_DISC	Received a DISCONNECT_IND
U_WAIT_DISC_2	Much like DLU_WAIT_DISC, except
U_WAIT_DISC_OK	Received user disc

NPI

PreConnecting/Setup States

State	Description
UNBOUND	NS user not bound to network address
WACK_BREQ	Awaiting acknowledgment of N_BIND_REQ
WACK_UREQ	Pending acknowledgment of N_UNBIND_REQ
WACK_OPTREQ	Pending acknowledgment of N_OPTMGMT_REQ
IDLE	Idle, no connection

Connecting States

State	Description
WCON_CREQ	Pending confirmation of N_CONN_REQ
WRES_CIND	Pending response of N_CONN_IND
WACK_CRES	Pending acknowledgment of N_CONN_RES

Connected States

State	Description
DATA_XFER	Connection-mode data transfer

Reset States

State	Description
WACK_RRES	Pending acknowledgment of N_RESET_RES
WCON_RREQ	Pending confirmation of N_RESET_REQ
WRES_RIND	Pending response of N_RESET_IND

Disconnecting/Disconnect States

State	Description
WACK_DREQ6	Waiting ack of N_DISCON_REQ
WACK_DREQ7	Waiting ack of N_DISCON_REQ
WACK_DREQ9	Waiting ack of N_DISCON_REQ
WACK_DREQ10	Waiting ack of N_DISCON_REQ
WACK_DREQ11	Waiting ack of N_DISCON_REQ
WRES_DIND	Received disconnect ind, wait client res