



## Adjusting the LAN-Cell PPP LCP Parameters

### Tech Note LCTN0003

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## This Tech Note applies to LAN-Cell models:

### LAN-Cell 2:

LC2-411

### CDMA:

1xMG-401

1xMG-401S

### GSM:

GPRS-401

**Minimum LAN-Cell Firmware Revision:** 3.62(XF.0) April 16, 2004

## Document Revision History:

Date	Comments
March 9, 2006	First release
April 5, 2006	Fixed typo's
July 16, 2007	Updated for LAN-Cell 2
March 28, 2008	Revised syntax for commands on LAN-Cell 2 firmware 4.02AQP.2. Added WAN Continuity reference.

## Introduction

The LAN-Cell's TCP/IP connection to a cellular carrier's data network is implemented via a Point-to-Point Protocol (PPP) stack, similar to a traditional analog dial-up modem. While a PPP connection to the cellular carrier's data network exists, the LAN-Cell periodically sends Link Control packets to check the status of the connection. These are low-level PPP LCP Echo Request/Reply packets and are automatically generated by the LAN-Cell's IP/PPP stack. They are used to determine if the other side of the PPP connection was terminated unexpectedly.

Two parameters control the operation of this feature:

LCP Echo Time = how frequently the LCP Echo Requests are sent

LCP Echo Retry = the number of times to retry the LCP Echo Request before disabling the link

## Usage

The default values for the LCP Echo parameters are appropriate for most situations; however, there may be circumstances where you may need to change the default settings.

The main reason for adjusting the LCP Echo parameters is to limit the amount of "connection overhead" traffic that is generated when you must pay the cellular carrier on a "per byte transferred" basis. Whenever the LAN-Cell's cellular modem is connected to a carrier's network and no other packet traffic is present, LCP Echo Request packets (12 bytes) are periodically sent to the carrier's network in order to determine if the connection is still "alive". The carrier's network will respond with a 12 byte LCP Echo Reply as an acknowledgement. If the "retry counter" number of LCP Echo Requests are sent without an acknowledgement, the LAN-Cell's PPP stack assumes that the connection has been broken and the call will be dropped and the PPP stack reinitialized.

This "dead link detection" strategy happens at the Link level (LCP = Link Control Protocol) of the PPP stack and does not detect the status of a specific remote IP address, just the presence of the carrier's end of the PPP connection. Also, if the LAN-Cell is configured for "dial-on-demand", the packet inactivity timeout setting of the Call Budget will override the LCP Echo Request retry counter and disconnect the cellular modem when the inactivity timer expires, regardless of the LCP Echo Request state.

The LCP Echo parameters are only available via the LAN-Cell's Command Line Interface (CLI). See the LAN-Cell *User's Guide* for information on accessing the CLI via the System Management Terminal (SMT) using Telnet or SSH (SMT Menu 24.8).

Follow the examples below to set the parameter values for your specific needs.

## Command Syntax

PPP LCP ECHO TIME N

Set the LCP Echo Time counter to N seconds. A 12 byte LCP Echo Request packet will be sent every N seconds after the last regular data packet has been sent. The default is 10 seconds.

### LAN-Cell 2 (LC2-411):

PPP LCP ECHO RETRY <1: WAN, 2: CELL, 3: DIAL> <N>

Sets the LCP Echo Retry counter on interface #1, 2 or 3 to N retry attempts. After N consecutive LCP Echo Requests without an LCP Echo Reply acknowledgement from the other side of the PPP link, the LAN-Cell will drop and reset the PPP connection. The default is 5 attempts.

### Original LAN-Cell (1xMG-401, GPRS-401):

PPP LCP ECHO RETRY N

Sets the LCP Echo Retry counter to N retry attempts. After N consecutive LCP Echo Requests without an LCP Echo Reply acknowledgement from the other side of the PPP link, the LAN-Cell will drop and reset the PPP connection. The default is 5 attempts.

## Notes

- For an “always on” connection to the cellular carrier, the default LCP Echo parameter values will generate approximately 6 MB of traffic overhead per month (worst case, assuming no other IP traffic during the month during which the Echo Requests/Replies are suppressed).

24 bytes every 10 seconds X (6/minute) X (60 minutes) X (24 hours) X (30 days) = 6.075 MB

- Increasing the LCP Echo Time and/or Retry counters will cause the LAN-Cell to react more slowly to situations where the PPP link has been broken (e.g. dropped connection to the cell tower, etc). This may impact your perceived “downtime” before the PPP link is reestablished by the LAN-Cell.
- While it is possible to set the LCP Echo Time to zero, we do not recommend disabling this feature. Doing so will prevent the LAN-Cell from ever detecting a dead PPP link and taking the necessary actions to re-establish communications. This is particularly important in applications where you are accessing the LAN-Cell and/or connected equipment remotely over the cellular connection. If necessary, you could disable the LCP Echo timer and implement a scheduled system restart timer (see *LCTN00006 – System Restart Timer*) to ensure that the LAN-Cell periodically attempts to make a connection to the cellular network. On the LAN-Cell 2, you can use the WAN Continuity feature to periodically ping a known Internet host to generate regular traffic on the cellular interface. The WAN Continuity feature has its own ability to monitor the results of the ping traffic and reset the cellular interface if necessary.

## **Making LCP Echo Parameters Permanent**

The LCP Echo parameters are not saved as part of the LAN-Cell's non-volatile memory configuration parameters. You may set these values interactively using the CLI to test the impact of various parameter values.

If you want to permanently modify the LCP Echo settings, then you must edit the LAN-Cell's AUTOEXEC.NET file and insert the necessary commands.

From the CLI, enter:

```
SYS EDIT AUTOEXEC.NET
```

Press *i* to insert a new line. At the colon prompt (:), enter your command and press return:

```
PPP LCP ECHO TIME 20
```

Then press *x* to Save and Exit.

At the CLI prompt, type:

```
SYS VIEW AUTOEXEC.NET
```

to ensure that your new command was correctly saved.

Note: CLI editor commands are case sensitive. Use lower case letters to insert, delete, and save the file.

The commands in the AUTOEXEC.NET file are not checked for syntax; incorrect command syntax will cause the commands to fail to execute upon the next system restart.

Do not modify any other lines in the AUTOEXEC.NET file. This file works similarly to the autoexec.bat file in DOS and includes numerous commands that are required to be executed at startup for the LAN-Cell to function correctly.

Once the AUTOEXEC.NET file is saved, the new LCP Echo parameters will be set every time the LAN-Cell restarts.

Performing a hard reset of the LAN-Cell by using the Reset Button will return the LCP Echo parameters (and AUTOEXEC.NET file) to their default factory values.

Please see the example screenshots on the following page.

1. System Status
2. System Information
3. Log and Trace
4. Diagnostic
5. Backup Configuration
6. Restore Configuration
7. Upload Firmware
8. Command Interpreter Mode
9. Call Control
10. Time and Date Setting
11. Remote Management Setup

Enter Menu Selection Number: 8

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```
LAN-Cell> sys edit autoexec.net
EDIT cmd: q(uit) x(save & exit) i(nsert after) d(elete) r(eplace) n(ext)
: PPP LCP ECHO TIME 20
LAN-Cell>
```

Figure 1: Inserting AUTOEXEC.NET commands

```
LAN-Cell> sys edit autoexec.net
EDIT cmd: q(uit) x(save & exit) i(nsert after) d(elete) r(eplace) n(ext)
: PPP LCP ECHO TIME 20
LAN-Cell> sys view autoexec.net
PPP LCP ECHO TIME 20
sys errctl 0
sys trcl level 5
sys trcl type 1180
sys trcp cr 64 96
sys trcl sw off
ip tcp mss 512
ip tcp limit 2
ip tcp irtt 65000
ip tcp window 2
ip tcp ceiling 6000
ip rip activate
ip rip merge on
ip icmp disc enif0 off
ppp ipcp com off
sys wd cnt 600
sys wd sw on
sys mbuf debug off
ip nat loopback on
LAN-Cell>
```

Figure 2: Viewing the AUTOEXEC.NET file

### Removing the PPP LCP ECHO Command:

To delete commands from the AUTOEXEC.NET file, in the CLI enter:

```
SYS EDIT AUTOEXEC.NET
```

Press n to view the next line. Press n until the line with the desired command is displayed.

Press d to delete the current line.

Then press x to Save and Exit.

At the CLI prompt, type:

```
SYS VIEW AUTOEXEC.NET
```

to ensure that the desired command was successfully deleted.

```
LAN-Cell> sys edit autoexec.net
EDIT cmd: q(uit) x(save & exit) i(nsert after) d(elete) r(eplace) n(ext)
PPP LCP ECHO TIME 20
sys errctl 0
LAN-Cell> sys view autoexec.net
sys errctl 0
sys trcl level 5
sys trcl type 1180
sys trcp cr 64 96
sys trcl sw off
ip tcp mss 512
ip tcp limit 2
ip tcp irtt 65000
ip tcp window 2
ip tcp ceiling 6000
ip rip activate
ip rip merge on
ip icmp disc enif0 off
ppp ipcp com off
sys wd cnt 600
sys wd sw on
sys mbuf debug off
ip nat loopback on
LAN-Cell> _
```

Figure 3: Deleting AUTOEXEC.NET commands

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