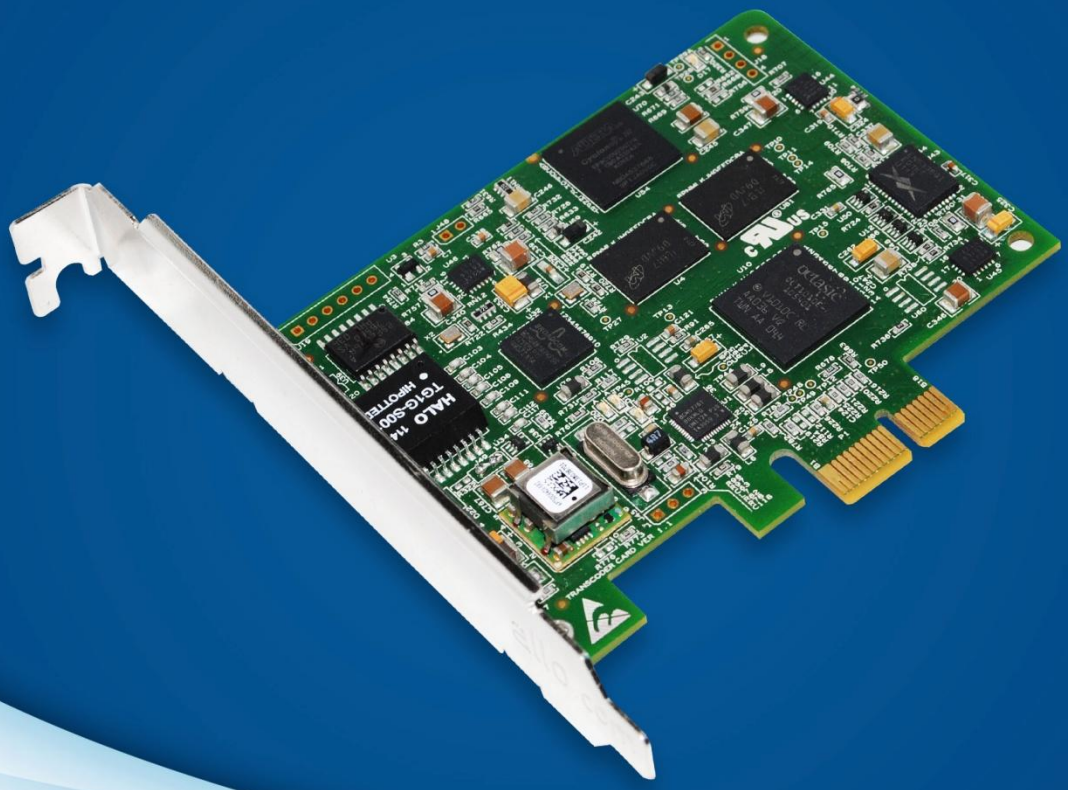
Transcoding Card

User Manual



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About this manual

This manual describes the Allo product application and explains how to work and use it major features. It serves as a means to describe the user interface and how to use it to accomplish common tasks. This manual also describes the underlying assumptions and users make the underlying data model.

Document Conventions

In this manual, certain words are represented in different fonts, typefaces, sizes, and weights. This highlighting is systematic; different words are represented in the same style to indicate their inclusion in a specific category. Additionally, this document has different strategies to draw User attention to certain pieces of information. In order of how critical the information is to your system, these items are marked as a note, tip, important, caution, or warning.

Icon	Purpose
	Note
	Tip/Best Practice
	Important
	Caution
	Warning

- **Bold** indicates the name of the menu items, options, dialog boxes, windows and functions.
- The color blue with underline is used to indicate cross-references and hyperlinks.
- Numbered Paragraphs - Numbered paragraphs are used to indicate tasks that need to be carried out. Text in paragraphs without numbering represents ordinary information.
- The Courier font indicates a command sequence, file type, URL, Folder/File name e.g. www.allo.com

Support Information

Every effort has been made to ensure the accuracy of the document. If you have comments, questions, or ideas regarding the document contact online support: http://support.allo.com

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1. Overview

The aCTe Series cards are PCI-E base cards. The aCTe Series cards are designed to handle, Transcoding in dedicated DSP hardware, it supports multiple voice codecs, to digitally compress voice signals and save on bandwidth. This function would otherwise be done by Asterisk in software.

VoIP communication needs the capability to mediate between endpoints supporting different codecs, but this requires DSP functionality that are resource-intensive, and can affect the quality of the voice signals, and may introduces latency and delay.

Asterisk, is capable of Transcoding some codecs into other codecs for the purposes of call origination or termination, these Transcoding in done by software and is very CPU intensive using substantial amount of CPU power.

This aCTe card will add Transcoding capability and provides excellent voice quality and Transcoding capacity, without affecting latency or using up precious host CPU resources.

The aCTe card comes with bundled software to make the product architecture independent.

Model No	Product Description
aCT32e	TRANSCODER 32 CHANNEL PCIe Card
aCT64e	TRANSCODER 64 CHANNEL PCIe Card
aCT128e	TRANSCODER 128 CHANNEL PCIe Card
aCT256e	TRANSCODER 256 CHANNEL PCIe Card
aCT400e	TRANSCODER 400 CHANNEL PCIe Card

The aCTe Series cards are capable of handling up to 200 Transcoding resources. All codecs are fully indemnified no additional licensing is required for their use.

Allo.com Transcoding card aCTe is telephony PCIe card used for various PBX software, e.g. Asterisk, FreeSWITCH, etc. with compatible drivers.

2. Features

- Capable of doing the various codec Transcoding.
- Suitable for PCIe 1.0 slots
- Provides up to 200 Transcoding resources.
- Supports G729, G723, a/u law, G726, ilbc (G722, AMR, AMR-WB, G722.1 HD etc will be implemented in future releases.)

3. Card Installation

This chapter provides the following information:

- Unpacking the Card
- Shipment Inspection
- Slot Compatibility
- Hardware Installation
- Software Installation

3.1 Unpacking the Card

When you unpack your card, carefully inspect it for any damage if present please contact and report to allo.com support.

3.2 Shipment Inspection

The following items are included in the shipment of the CT200E card:

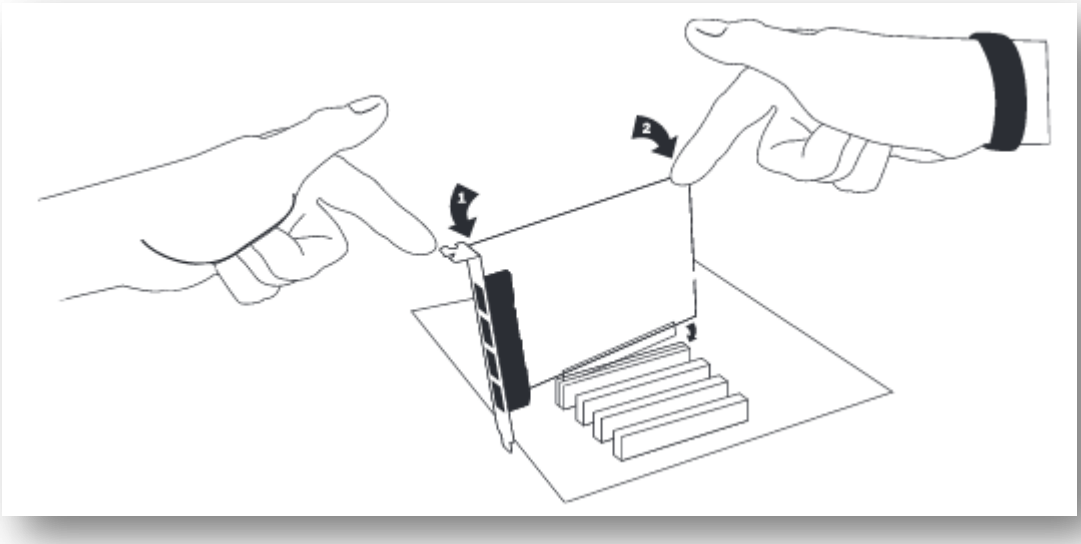
- CT200E PCIe card.
- Installation CD

3.3 Slot Compatibility

Check the type of card you received to be sure it is compatible with your PCIe slot. The CT200E will work in any PCI Express 1.x compliant slot.

4. Hardware Installation

1. ***Now that you are acquainted with the aCTe series cards, power down your computer and unplug it from its power source.***
2. Attach a static strap to your wrist and open the case.
3. Take away the section place holder and addition the card into a PCI or PCI Express Slot.



4. Replace the cover to your computer
5. Plug the T1 or E1 equipment cable into the RJ45 port.

Use only shield cables to ensure compliance with the international EMC standards.

5. Software Installation

Allo.com Digital cards hardware are only supported under Linux. It requires drivers and libraries which are not integrated with the Linux kernel.

Recommended Linux distributions: CentOS, Debian, Red Hat, and Ubuntu

Drivers and application software may be obtained from Allo.com's download server at: http://www.allo.com/transcoding-card.html

For an introduction to Asterisk, including additional information on its configuration, setups, and features, please refer to:

http://www.asterisk.org

To install your CT200E card, you will need:

- Full Linux kernel 2.6.15 (or later) source code.
- Development libraries and headers for ncurses
- Development libraries and headers for zlib and openssl
- Development libraries and headers for newt
- GCC and standard software build tools
- Bridge tools (brctl)

5.1 Installation Test Environment considered

OS : CentOS 5.5 (32 or 64 bit)

Kernel version : 2.6.18-194.el5

Asterisk version : Asterisk 1.4.43

Hardware : ALLO Transcoding card

Library : allotc libraries

1. After inserting the card into your PCIe slot, boot your machine to Linux and execute the following command to list the devices detected by the PCI bus:

```
# lspci
```

Confirm the output lists a device with Allo.com's PCI vendor ID which is "BCM57761". The output will be similar to the following:

```
02:00.0 Ethernet controllers: Broadcom Corporation NetXtreme
BCM57761 Gigabit Ethernet PCIe (rev 10)
```

The output of lspci may or may not state "Allo.com". If it does not, this does not indicate a problem.

The Allo.com card identifier should be listed. If a card identifier is not listed, then your machine is not PCI 2.2 (or higher), and the card will not work.

2. To install asterisk need to install the following prerequisite packages:

1. Centos:

```
yum install bison bison-devel zlib zlib-devel openssl openssl-devel
gnutls-devel flex gcc gcc-c++
```

2.Ubuntu/Debian:

```
apt-get install bison bison-devel zlib zlib-devel openssl openssl-devel
gnutls-devel flex gcc gcc-c++
```

Execute the following command to install the above mentioned packages:

```
#yum or apt-get installs bison bison-devel zlib zlib-devel openssl
openssl-devel gnutls-devel flex gcc gcc-c++
```

5.2 Asterisk compilation & Installation

For using Asterisk for your application, follow the steps below. Download Asterisk version 1.4.43. Expand the downloaded file, compile and install.

```
#wget http://downloads.asterisk.org/pub/telephony/asterisk/old-
releases/asterisk-1.8.11.0.tar.gz
#tar -zxvf asterisk-1.8.11.0.tar.gz
# cd asterisk-1.4.43/
# ./configure
# make
# make install
# make samples
```

5.3 Allo Transcoding Card Installation

1. Download the driver from allo web site http://www.allo.com/transcoding-card.html under "Guides & Drivers" depends on the OS architecture to directory /usr/src/

   ```
   #wget http://www.allo.com/firmware/transcoding/allo-transco-64bit-driver.tar
   ```

2. Untar the file

   ```
   #tar -xvf allo-transco-64bit-driver.tar
   ```

3. Change the directory to allotc and run "./network_install", this will install Broadcom driver(tg3) and once the installation is over reboot the machine to make the eth1 interface UP or else follow the steps to install Broadcom driver(tg3) as below,

   I. Download driver for BCM57761 linux-3.122j.zip from BROADCOM.

   II. cp linux-3.122j.zip to /tmp.

   III. Execute followings.

   ```
   # cd /tmp
   # unzip linux-3.122j.zip
   # cd Server/Linux/Driver
   # tar zxvf tg3-3.122j.tar.gz
   # cd tg3-3.122j/
   # make
   # make install
   # modprobe -r tg3
   # modprobe tg3
   ```

   IV.update initrd image

   ```
   ex. # mkinitramfs -o /boot/initrd.img-2.6.32-28-generic
   ```

   V.Reboot the system, and configure the network interfaces.

Tg3 file is enclosed.

(Refer: http://www.broadcom.com/support/ethernet_nic/netxtreme_desktop.php)

After reboot, Check for Allo Transcoding card eth interface may show as eth1 or eth2 depend upon the number of network cards present in the server & can be identified with MAC id "00:17:F7: XX: XX: XX"

Change the directory /usr/src/allotc and execute following command

```
#./install.sh <asterisk source path>" from the same directory
(ex:#./install.sh /usr/src/asterisk-1.8.11.0/)
```

In some machines Transcoding card eth interface may show as eth1 or eth2 depend upon the number of network cards present in the server. Allo Transcoding card can be identified with MAC id "00:17:F7: XX: XX: XX"

After reboot run **"./install.sh <asterisk source path>"** from the same directory

*If the asterisk source directory is not provided for ex: **"./install"** the process will continue with Trix-Box/Elastix Installation. Operating Systems Other than Trix-Box/Elastix should mention the asterisk source as said. For E.g.: "./install.sh /usr/src/asterisk-1.x.x." and for OpenSuse use **"./open_suse_install <asterisk source path>"***

Then untar on the path change directory to /usr/src/allotc/allo.i686/

```
# tar -xvf allo.i686.tgz
```

1. The script will prompt you to enter the Transcoding card based on the MAC address

E.g.: CHOOSE THE ETERNET DRIVER IN WHICH YOU HAVE HWaddr 00:17:F7:00:00:00 e.g.: If Transcoding card interface is eth2 select "2"

2. The script will prompt you to configure IP address for Transcoding card, configure IP address different from your network.

E.g.: CHOOSE DIFFERENT IP OTHER THAN YOUR NETWORK FOR TRANSCODING CARD E.g: 10.1.1.1:

3. Script will prompt you to select the Transcoding card depending upon the MAC id (00:17:F7:XX:XX:XX)

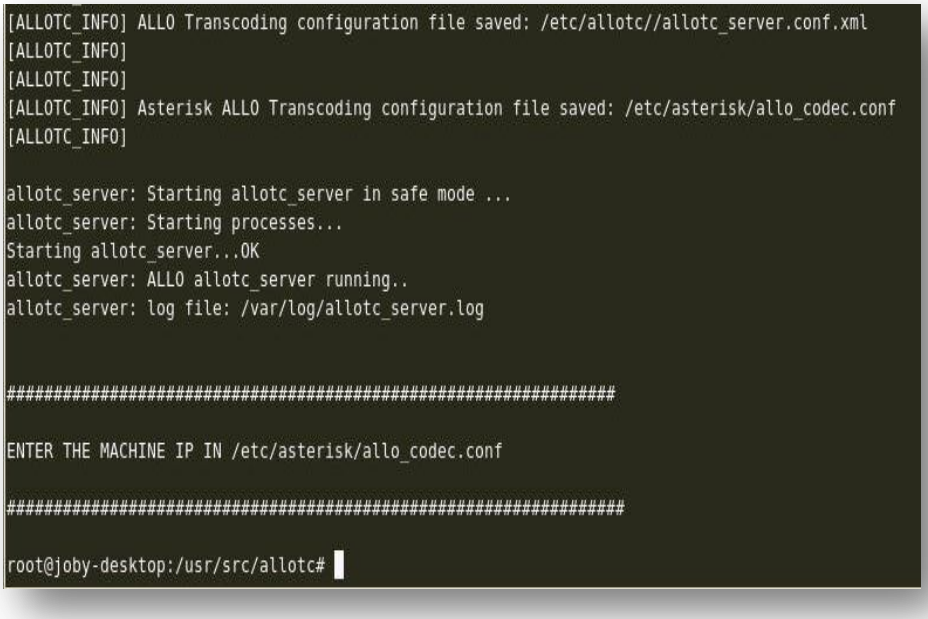
E.g.: Please select device to configure: [1-1] q: quit 1

4. Setup the IP address for DSP in the Transcoding module only the last octet

E.g.: Specify last octet of the IP address: [1-255] or <enter> for default:

5. Configure the port range with given interval

E.g.: Specify udp base value [9000-65000] or <enter> for default:



6. Configuration

This chapter provides a step by step instruction to configure the CT200E Transcoding card.

6.1 Configuring the System for Transcoding

1. Finally change the RTP IP address in the file **/etc/asterisk/allo_codec.conf** and change the "rtpip=<your machine ip>"
2. Configure SIP extensions by allowing all the codecs "allow=all"

Latest centos and ubuntu need to give the IP address to Transcoding card eth statically (manually**).**

```
allo_server_ctrl stop
Stop running asterisk

allo_server_ctrl start
Start asterisk
```

Status of card

1. Make sure the Transcoding sessions are configured properly in the asterisk CLI prompt,

```
Local host CLI> allo show translators
```

You should see the codec translators configured.

7. Testing

After installing the codec_allotc.so module, you can check the codecs which you have enabled in the configuration. As shown in following command.

*CLI> core show translation

Translation times between formats (in microseconds) for one second of data Source Format (Rows) Destination Format (Columns)

```
*CLI> core show translation

        Translation times between formats (in microseconds) for one second of data
         Source Format (Rows) Destination Format (Columns)

           g723   gsm  ulaw  alaw g726aal2 adpcm  slin lpc10  g729 speex  ilbc  g726  g722 slin16
      g723    -  4001     2     1        -     -  2001     -     1     -     -     -     -      -
       gsm 3000     -  3000  2999        -     -  1999     -  3000     -     -     -     -      -
      ulaw    1  4001     -     1        -     -  2001     -     1     -     -     -     -      -
      alaw    1  4000     1     -        -     -  2000     -     1     -     -     -     -      -
   g726aal2    -     -     -     -        -     -     -     -     -     -     -     -     -      -
     adpcm    -     -     -     -        -     -     -     -     -     -     -     -     -      -
      slin 1001  2000  1001  1000        -     -     -     -  1001     -     -     -     -      -
     lpc10    -     -     -     -        -     -     -     -     -     -     -     -     -      -
      g729    1  4001     1     1        -     -  2001     -     -     -     -     -     -      -
     speex    -     -     -     -        -     -     -     -     -     -     -     -     -      -
      ilbc    -     -     -     -        -     -     -     -     -     -     -     -     -      -
      g726    -     -     -     -        -     -     -     -     -     -     -     -     -      -
      g722    -     -     -     -        -     -     -     -     -     -     -     -     -      -
    slin16    -     -     -     -        -     -     -     -     -     -     -     -     -      -
```

*CLI>allo show Transcoding sessions

```
[581]ulaw to g729
Tx Frames: 123 Rx Frames: 123 Rx Nulls
0 Rx Calls 123 AvgRxCallTime 19ms AvgRxTime 19ms AvgTxTime
```

```
19ms
Total Sessions: 1
```

8. Limitations

Allo.com Transcoding card comes with some of limitations, which are listed below;

1. G711 a/u law codec Transcoding will be done for max 50ms of latency.
2. You might be expressing some delay if the other codec has 60ms or greater latency.

9. Specifications

This chapter provides specifications, required environmental conditions for the CT200 Series cards.

Physical card dimension	Size : 63.5 mm (height) × 94.3 mm (Length)
Interfaces	PCI Express Bus - Compliant with PCI-E X1 1.0 or greater
Environment	Temperature: 0 to 50° C (32 to 122° F) operation -20 to 65° C (4 to 149° F) storage Humidity: 10 to 90% non-condensing.
Supported Codecs	G.729a (8.0 Kbit) G.723.1 (5.3 Kbit and 6.3 Kbit) u-law a-law

10. Reference

http://www.allo.com

http://www.linuxfoundation.org/collaborate/workgroups/networking/bridge

http://www.asterisk.org

http://www.voip-info.org

11. Glossary and Acronyms

Term	Definition
a-law	It is mainly used in European telephone networks for the conversion between analog and digital signals in PCM applications. It's similar to the North American mu-law standard.
Bandwidth	The capacity is to carry traffic. Higher bandwidth indicates the ability to transfer more data in a given time period.
bps -bits per second	A measurement of transmission speed across a data connection
DTMF -Dual Tone Multi-Frequency	Push-button or touch tone dialing.
G.711	A recommendation by the Telecommunication Standardization Sector (ITU-T) for an algorithm designed to transmit and receive mulaw PCM voice and A-law at a digital bit rate of 64 Kbps. This algorithm is used for digital telephone sets on digital PBX.
G.723.1	A recommendation by the Telecommunication Standardization Sector (ITU-T) for an algorithm designed to transmit and receive audio over telephone lines at 6.3 Kbps or 5.3 Kbps.
G.729a	A recommendation by the Telecommunication Standardization Sector (ITU-T) for an algorithm designed to transmit and receive audio over telephone lines at 8 Kbps.
ILBC - internet Low Bit rate Codec	A free speech codec used for voice over IP. It is designed for narrow band speech with a payload bit rate of 13.33 kbps (frame length = 30ms) and kbps (frame length = 20 ms).
Interface	A point of contact between two systems, networks, or devices
Linux	A robust, feature-packed open source operating system based on UNIX that remains freely available on the internet. It boasts dependability and offers a wide range of compatibility with hardware and software. Asterisk is supported exclusively on Linux.

Term	Definition
Multiplexing	Transmitting multiple signals is over a single line or channel. FDM (frequency division multiplexing) and TDM (time division multiplexing) are the two most common methods. FDM separates signals by dividing the data onto different carrier frequencies, and TDM separates signals by interleaving bits one after the other.
MUX multiplexer	A device which transmits multiple signals over a single communication line or channel
PBX private branch exchange	A smaller version of a phone companies larger central switching office. Example: Asterisk.
PCI peripheral component interconnect	A standard bus used in most computers to connect peripheral devices.
SIP- Session Initiation Protocol	An IETF standard is used for setting up sessions between one or more clients. It is currently the leading signaling protocol for Voice over IP, gradually replacing H.323.
u-law	Also known as mu law is the PCM quasi-logarithmic curve. It is the 64 Kbps standard North America voice amplitude sample used for encoding/decoding.
VoIP Voice over IP	Technology used for transmitting voice traffic over a data network using the Internet Protocol.

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