

# CCL 201 USER GUIDE

Dual Band CDMA Cellular Modem



Version 1.1  
Mar 21, 2003

**AYANTRA Inc.**

Distributed by  
ARC Electronics

## Contents

<b>1. CCL 201 DESCRIPTION .....</b>	<b>3</b>
1.1 LED Description .....	3
1.2 Serial Port Pins .....	4
1.3 DIP Switch Settings .....	4
1.3.1 DTE Speed .....	5
1.3.2 Auto Answer .....	5
1.3.3 Local Echo Enable .....	5
1.3.4 Result Code Enable .....	5
1.3.5 Result Code Terse .....	6
1.3.6 Flow control .....	6
1.3.7 Host DTR Control .....	6
1.3.8 DCD Indicator .....	6
<b>2. BASIC SETUP .....</b>	<b>6</b>
<b>3. “AT” COMMANDS REFERENCE .....</b>	<b>7</b>
3.1 Operational States .....	7
3.2 Basic Sets of Commands .....	8
3.2.1 Basic AT Parameters .....	8
3.2.2 Extended Configuration Commands .....	10
3.2.3 Cellular CDMA “AT” Commands .....	11
3.3 Result Codes .....	12
<b>4. LIMITED WARRANTY .....</b>	<b>13</b>

# 1. CCL 201 DESCRIPTION

The CCL 201, Dual Band (800 and 1900 MHz) CDMA Cellular Modem is an industrial grade digital modem incorporating data compression and error detection techniques for a data throughput of up to 57.6 Kbps.

CCL 201 can be configured without a PC by using the DIP switch located on the front of the unit. Typically no familiarity with “AT” commands is required.

This User Guide explains how to set up and configure the unit.



*Figure 1. CCL 201*

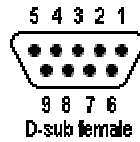
## 1.1 LED Description

The unit has five LED indicators that are located on top of the unit (see Figure 1).

LED name	Description
TX	Serial line activity (Transmit Data)
RX	Serial line activity (Receive Data)
DTR	Data Terminal Ready
CD	Carrier Detect indicating that modem connection is ON
MR	Modem Ready

## 1.2 Serial Port Pins

The DB9 serial port conforms to the standard RS232 connection as shown below:



*Figure 2. DB9 Female DCE Interface RS-232*

Pin No.	Signal Name	Description
1	CD	Carrier Detect
2	RX	Receive Data
3	TX	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

**Table 1. Serial Port Pins**

## 1.3 DIP Switch Settings

Most commonly used parameters can be set on the CCL 201 by using the DIP switches on the front of the unit (see Figure 3).



*Figure 3. DIP Switches*

Note: The default settings are highlighted in **YELLOW**.

### 1.3.1 DTE Speed

Host Serial Port baud rate settings:

Switch 1	Switch 2	Switch 3	Serial Baud rate
ON	ON	ON	1200 bps
ON	ON	OFF	2400 bps
ON	OFF	ON	4800 bps
ON	OFF	OFF	9600 bps
OFF	ON	ON	19200 bps
OFF	ON	OFF	38400 bps
OFF	OFF	ON	57600 bps
OFF	OFF	OFF	115200 bps

### 1.3.2 Auto Answer

Switch 4	Auto Answer
ON	Auto Answer On (Modem will answer incoming ring)
OFF	Auto Answer Off (Modem will not answer incoming ring)

### 1.3.3 Local Echo Enable

Generally local echo is turned ON.

Switch 5	Local Echo Enable
ON	Enable Local Echo (Input commands will be echoed back)
OFF	Disable Local Echo ATE0

### 1.3.4 Result Code Enable

Result code is enabled for most applications.

Switch 6	Result Code Enable
ON	Result code enable (Unit will send back results of actions taken)
OFF	Disable Result code

### 1.3.5 Result Code Terse

Switch 7	Format of the Result Code
ON	Unit will return result code in short (terse) form
OFF	Unit will return result code in long (verbose) form

### 1.3.6 Flow control

To set flow control parameters used to coordinate flow of data between the host and modem.

Switch 8	Switch 9	
OFF	OFF	No Flow control
OFF	ON	No Flow control
ON	OFF	Software Flow control
ON	ON	Hardware Flow control

### 1.3.7 Host DTR Control

Switch 10	Controls result of DTR changes
ON	Host DTR is passed to the Modem
OFF	Host DTR is ignored

### 1.3.8 DCD Indicator

Switch 11	Carrier detect operation
ON	Modem DCD is passed to the HOST (Normal)
OFF	Carrier detect always ON (Active)

## 2. BASIC SETUP

Step 1: Set the DIP switches to the desired configuration (Baud rate, Flow control, etc.)

Step 2: Connect the Power cable and power up the unit.

The Modem Ready (MR) LED should rapidly flash indicating that the unit is being configured as per the DIP switches set.

Once the MR LED becomes constantly ON, the unit is ready for operation.

This sequence will occur every time on power up and also when the DIP switch settings are changed.

Step 3: Connect the unit to the Serial port of the PC or the instrument.

**The unit is now ready for operation.**

### **3. “AT” COMMANDS REFERENCE**

CCL 201 Cellular Modem functions are controlled using “AT” commands that are associated with landline modems.

Values set by “AT” commands are retained till power down.

#### **3.1 Operational States**

Similar to landline modems, CCL 201 has two operational states:

- Command state - on power up and when unit is not communicating with remote modem
- Online state – when the modem is communicating with a remote unit

On power up, CCL 201 is in the command state. After a successful connection, CCL 201 enters the online mode.

#### **Command Line Syntax**

A command line is a string of characters sent from DTE (host e.g. PC) to the modem (DCE) while the modem is in command state. A command line has a prefix, a body, and a terminator. Each command line (with the exception of the A/ command) must begin with the character “AT” and must be terminated by a carriage return.

The default terminator is the ASCII Carriage Return (CR) character (decimal 13). However it can be changed by changed by the S3 command (see the S-Registers Table 3). Spaces are ignored but may be included between commands, if desired.

The basic and S-register commands may follow each other on the command line without any separating delimiters. The extended format commands (those beginning with a “=” character) must be terminated by a “;” if they are followed by another command on the same line. A “;” is not required after the last command on the line. Commands may be edited by using the backspace character. The backspace deletes the last character in the command line. The backspace will not delete the "AT" at the beginning of the line.

The A/ command repeats the last command line received by the modem. The A/ is used in place of the AT and is not followed by a carriage return.

## **3.2 Basic Sets of Commands**

**Types of Commands:** For the CCL 201 there are three types of commands:

1. Basic AT parameters (including those for setting S-registers)
2. Extended Configuration commands
3. Cellular CDMA “AT” commands

### **3.2.1 Basic AT Parameters**

These commands control the basic configuration of the modem. The parameters can only be read back by &V command when in command state. The following Table 2. shows the command format.



Parameter	Description
A	Go off hook. Answer any incoming call
D<dial string> <CR>	The dial string may contain the following characters: Digits 0 to 9, *, #, A,B,C, and D The dial string may contain the following dial modifiers: T Tone dialing , Pause during dialing ; After dialing, the modem remains in command state
H0	Disconnect and return to command state
O0	Return to online data state from command state
E0	Do not echo commands when in command state
E1	Echo commands when in command state
Q0	Returns result codes. This is the normal mode.
Q1	Do not return result codes. Called quite mode.
V0	Display result codes as numbers. Called terse mode.
V1	Display result codes as words. Called verbose mode.
&C0	Carrier detect always ON
&C1	Carrier detect ON when modem is connected and OFF when connection is lost
&D0	Ignore DTR
&D2	Enter command state following On to Off transition of DTR
&V	Display configuration parameters

**Table 2. Basic AT Parameters**

**S-Registers**

Register	Value	Description
S0	0 (1)	Disable automatic answering Enable automatic answering on ring detect.
S7	1 to 255	Number of seconds to establish end-to-end data connection. The default is 50 seconds.
S8	0 to 255	Number of seconds to pause when “,” is encountered in dial string. Default value is two seconds.

S10	1 to 254	Time to detect loss of carrier. Default value of 14 indicates 1.4 seconds.
-----	----------	--

**Table 3. S-Registers**

NOTE: S-register values are not saved upon power down.

### 3.2.2 Extended Configuration Commands

Command	Description
+GMI	This command causes the modem to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the modem to identify the manufacturer. Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired (e.g., address, teledem number for customer service, etc.)
+GMM	This command causes the modem to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the modem to identify the specific model of the device. Typically, the text will consist of a single line containing the name of the product, but manufacturers may choose to provide any information desired
+GSN	This command causes the modem to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the modem to identify the individual device. Typically, the text will consist of a single line containing a manufacturer determined alpha-numeric string, but manufacturers may choose to provide any information desired
+IFC	Local Flow Control. This extended-format compound parameter is used to control the operation of local flow control between the host terminal and modem
+IPR	Fixed data rate. This numeric extended-format parameter specifies the data rate at which the modem will accept commands, in addition to 1200 bit/s or 9600 bit/s (as required in EIA/TIA-602). It may be used to select operation at a rate at which the modem is not capable of automatically detecting the data rate being used by the host terminal

**Table 4. Extended Configuration Commands**

### 3.2.3 Cellular CDMA “AT” Commands

+CXT=<value>	<p>Cellular Extension command</p> <p>0: Do not pass unrecognized commands to the IWF (Inter Working Function)</p> <p>1: When detecting an unrecognized AT command, open transport layer connection and pass unrecognized command to the IWF</p>
+CAD?	<p>Query Analog or Digital Service</p> <p>0 if no service is available</p> <p>1 if CDMA Digital Service available</p> <p>2 if TDMA Digital service available</p> <p>3 if Analog service is available</p> <p>(values 4-255 reserved)</p>
+CSS?	<p>Serving System</p> <p>Returns &lt;AB&gt;, &lt;SID&gt;</p> <p>AB:</p> <p>A The mobile station is registered with an A-band system</p> <p>B The mobile station is registered with a B-band system</p> <p>Z The mobile station is not registered</p> <p>SID: System ID</p> <p>0-16383 The mobile station is registered with the system indicated</p> <p>99999 The mobile station is not registered</p>
+CSQ?	<p>Query Received Signal Quality</p> <p>Returns the Signal Quality Measure &lt;SQM&gt; and the Frame Error Rate &lt;FER&gt; as follows:</p> <p>Signal Quality Measure &lt;SQM&gt;</p> <p>0-31 Signal Quality Measurement</p> <p>99 SQM is not known or is not detectable</p> <p>All other values are reserved</p> <p>Frame Error Rate &lt;FER&gt;</p> <p>0: &lt;0.01%</p> <p>1: 0.01% to less than 0.1%</p> <p>2: 0.1% to less than 0.5%</p> <p>3: 0.5% to less than 1.0%</p> <p>4: 1.0% to less than 2.0%</p> <p>5: 2.0% to less than 4.0%</p> <p>6: 4.0% to less than 8.0%</p> <p>7: ≥8.0%</p>

**Table 5. CDMA “AT” Commands**

### 3.3 Result Codes

When in the command mode, nine possible result codes may be returned.

The digit code (terse) is returned when the verbose mode is OFF; the word code (verbose) is returned when the verbose mode is ON. See the ‘V’ command in the Basic AT Parameters Table 2.

<b>Digit</b>	<b>Verbose</b>	<b>Description</b>
0	OK	Command executed without errors
1	CONNECT	Connected to remote modem
2	RING	Incoming Call
3	NO CARRIER	Carrier from remote modem lost or never present
4	ERROR	Error in the command line
6	NO DIALTONE	No dial tone detected within time out period
7	BUSY	Busy signal detected
8	NO ANSWER	Five seconds of silence not detected after ring back when @ dial modifier is used

**Table 6. Result Codes**

## **4. LIMITED WARRANTY**

Ayantra (“Company”) warrants that its product shall be free from defects in material and workmanship for a period of one year from the date of shipment.

Ayantra warrants any software sold alone or with any of its’ products shall be free from defects (according to the Company’s specification) for a period of sixty (60) days from the date of shipment.

During the warranty period, if the customer experiences difficulties and is unable to resolve the problem by modem with Company’s Technical Support, the Company will issue a Return Material Authorization (RMA) number. Following the receipt of a RMA number, the customer is responsible for returning the product to the Company, freight prepaid. Upon verification of the warranty, the Company will, at its option, repair or replace the product in question, and return it by prepaid freight. This warranty does not cover any work or services at the customer’s site.

Any software revisions required hereunder cover supply of distribution media only. The warranty does not cover, or include, any installation that may be required.

Company shall have no obligation to make repairs or to cause replacement required through normal wear and tear necessitated in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized use of the Product, or use of the Product in such a manner for which it was not designed, or by causes external to the Product, such as, but not limited to, power or failure due to extreme temperatures.

The information, recommendation, description and safety notations in this or other documents supplied by Company are based on general industry experience and judgment with respect to such hardware and software. This information should not be considered to be all-inclusive or covering all contingencies.

In no event will Ayantra be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss of equipment, plant or power system, cost of capital, loss of profit.

The above represents the entire obligation of the Company and understanding between the parties. There are no other understandings, agreements, representations or warranties, express or implied, including warranties of merchantability or fitness for a particular purpose.