Message Central system

Mobile communication

Mobile phone

A mobile phone (also known as a cellular phone, cell phone and a hand phone) is a device that can make and receive telephone calls over a radio link whilst moving around a wide geographic area. It does so by connecting to a cellular network provided by a mobile phone operator, allowing access to the public telephone network. By contrast, a cordless telephone is used only within the short range of a single, private base station.

In addition to telephony, modern mobile phones also support a wide variety of other services such as text messaging, MMS, email, Internet access, short-range wireless communications (infrared, Bluetooth), business applications, gaming and photography. Mobile phones that offer these and more general computing capabilities are referred to as smartphones.

Use of mobile phones

Mobile phones are used for a variety of purposes, including keeping in touch with family members, conducting business, and having access to a telephone in the event of an emergency. Some people carry more than one cell phone for different purposes, such as for business and personal use. Multiple SIM

cards may also be used to take advantage of the benefits of different calling plans—a particular plan might provide cheaper local calls, long-distance calls, international calls, or roaming. The mobile phone has also been used in a variety of diverse contexts in society, for example:

- A study by Motorola found that one in ten cell phone subscribers have a second phone that often is kept secret from other family members. These phones may be used to engage in activities including extramarital affairs or clandestine business dealings.
- Some organizations assist victims of domestic violence by providing mobile phones for use in emergencies. They are often refurbished phones.
- The advent of widespread text messaging has resulted in the cell phone novel; the first literary genre to emerge from the cellular age via text messaging to a website that collects the novels as a whole.[34]
- Mobile telephony also facilitates activism and public journalism being explored by Reuters and Yahoo! and small independent news companies such as Jasmine News in Sri Lanka.

- The United Nations reported that mobile phones have spread faster than any other technology and can improve the livelihood of the poorest people in developing countries by providing access to information in places where landlines or the Internet are not available, especially in the least developed countries. Use of mobile phones also spawns a wealth of micro-enterprises, by providing work, such as selling airtime on the streets and repairing or refurbishing handsets.[36]
- In Mali and other African countries, people travel from village to village to let friends and relatives know about weddings, births and other events, which is avoided if the villages are within mobile phone coverage areas. In many African countries, mobile phone coverage is greater than land line penetration, so most people own a mobile phone. In the smaller villages without electricity, phones are recharged using a solar panel or motorcycle battery.
- The TV industry has recently started using mobile phones to drive live TV viewing through mobile apps, advertising, social tv, and mobile TV. 86% of Americans use their mobile phone while watching TV.
- In parts of the world, mobile phone sharing is common. It is prevalent in urban India, as families and groups of friends often share one or more mobiles among their members. There are obvious economic benefits, but often familial customs and traditional gender roles play a part.[39] For example, in Burkina Faso, it is not uncommon for a village to have access to only one mobile phone. The phone is typically owned by a person who is not natively from the village, such as a teacher or missionary, but it is expected that other members of the village are allowed to use the cell phone to make necessary calls.

Text messaging

The most commonly used data application on mobile phones is SMS text messaging. The first SMS text message was sent from a computer to a mobile phone in 1992 in the UK, while the first person-to-person SMS from phone to phone was sent in Finland in 1993.

The first mobile news service, delivered via SMS, was launched in Finland in 2000. Mobile news services are expanding with many organizations providing "on-demand" news services by SMS. Some also provide "instant" news pushed out by SMS.

GSM

GSM (Global System for Mobile Communications, originally *Groupe Spécial Mobile*), is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second generation (2G) digital cellular networks. Developed as a replacement for first generation (1G) analog cellular networks, the GSM standard originally described a digital, circuit switched network optimized for full duplex voice telephony. The standard was expanded over time to include first circuit switched data transport, then packet data transport via GPRS(General Packet Radio Services). Packet data transmission speeds were later increased via EDGE (Enhanced Data rates for GSM Evolution) referred as EGPRS. The GSM standard is more improved after the development of third generation (3G) UMTS standard developed by the 3GPP. GSM networks will evolve further as they begin to incorporate fourth generation (4G) LTE Advanced standards. "GSM" is a trademark owned by the GSM Association.

Technical details

GSM cell site antennas in the Deutsches Museum, Munich, Germany

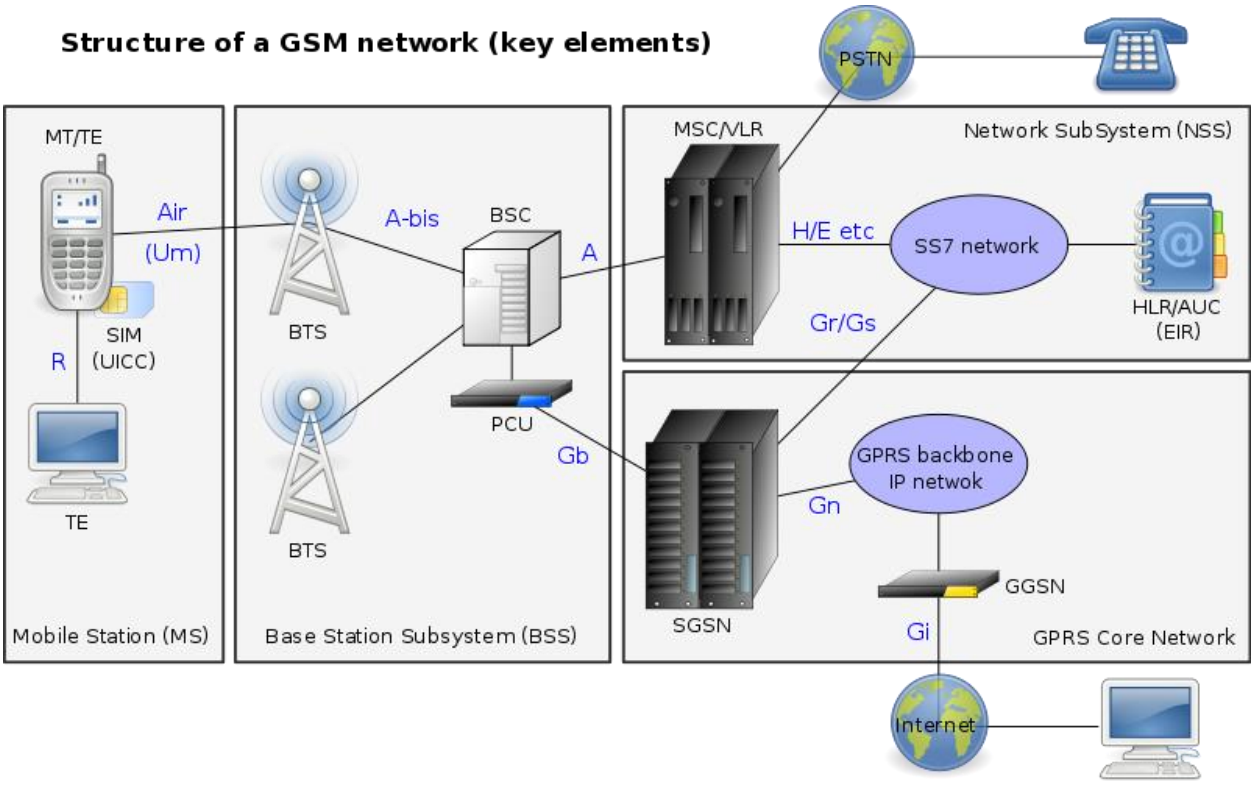
GSM is a cellular network, which means that cell phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network—
macro, micro, pico, femto and umbrella cells. The coverage area of each cell varies according to the implementation environment. Macro cells can be regarded as cells where the base station antenna is installed on a mast or a building above average roof top level. Micro cells are cells whose antenna height is under average roof top level; they are typically used in urban areas. Picocells are small cells whose coverage diameter is a few dozen metres; they are mainly used indoors. Femtocells are cells designed

for use in residential or small business environments and connect to the service provider's network via a broadband internet connection. Umbrella cells are used to cover shadowed regions of smaller cells and fill in gaps in coverage between those cells.

Cell horizontal radius varies depending on antenna height, antenna gain and propagation conditions from a couple of hundred metres to several tens of kilometres. The longest distance the GSM specification supports in practical use is 35 kilometres (22 mi). There are also several implementations of the concept of an extended cell,[8] where the cell radius could be double or even more, depending on the antenna system, the type of terrain and the timing advance.

Indoor coverage is also supported by GSM and may be achieved by using an indoor picocell base station, or an indoor repeater with distributed indoor antennas fed through power splitters, to deliver the radio signals from an antenna outdoors to the separate indoor distributed antenna system. These are typically deployed when a lot of call capacity is needed indoors; for example, in shopping centers or airports. However, this is not a prerequisite, since indoor coverage is also provided by in-building penetration of the radio signals from any nearby cell.

The modulation used in GSM is Gaussian minimum-shift keying (GMSK), a kind of continuous-phase frequency shift keying. In GMSK, the signal to be modulated onto the carrier is first smoothed with a Gaussian low-pass filter prior to being fed to a frequency modulator, which greatly reduces the interference to neighboring channels (adjacent-channel interference).



Headwind GSM modem

Headwind GSM modem driver is designed for sending and receiving SMS and WAP Push messages through a GSM modem. It implements the AT interface for GSM modem according to GSM 03.40 standard. After a serial connection with the GSM modem or mobile phone is established, Headwind GSM modem driver automatically configures the modem, and provides the user with a user-friendly GUI for sending and receiving short text messages. Headwind GSM modem driver also provides an ActiveX API which may be used by third-party applications for working with the GSM modem.

Connecting Mobile Phone To PC

several options of how can connect your PC to your cell phone.

Most phones allow to connect via infrared to your PC. However, connecting with infrared to computer does have drawbacks. You may need to buy extra equipment to be able to connect mobile phone to your PC with infrared. Also the transfer speeds a very slow compared with many connecting technologies available on phones today. Infrared connectivity also does have its limitations. For example, can not use your mobile as a web cam, as the speeds of infrared are too slow.

Bluetooth is a faster technology than infrared. There are many advantages to Bluetooth that make it a good way to connect your cell phone to your computer. The first is that of the speed, next is the ease with which can connect to your PC and start transferring files. The downside is that not all computers come equipped with Bluetooth connectivity. So, you may need to buy a device for your computer that enables Bluetooth on PC. They are easy to find and the cost is very low, in most cases.

The de-facto choice of the person who wants connectivity with ease and offer many other benefits is via USB connectivity or serial port connection(while be Explained later). All new computers come with USB, and most new phones offer USB connectivity, which is a match made in heaven! You can simply get a phone, which in most cases comes with the software to start using your PC with your mobile phone. also get a USB cable with phone, so from the get go, can start connecting! Some phones may not have this option however. I have found many of the Sony Ericsson range of phones and other brands do give all you need to start connecting your mobile phone to your PC.

Serial port

In computing, a serial port is a serial communication physical interface through which information transfers in or out one bit at a time (in contrast to a parallel port).[1] Throughout most of the history of personal computers, data transfer through serial ports connected the computer to devices such as terminals and various peripherals.

While such interfaces as Ethernet, FireWire, and USB all send data as a serial stream, the term "serial port" usually identifies hardware more or less compliant to the RS-232 standard, intended to interface with a modem or with a similar communication device.

Modern computers without serial ports may require serial-to-USB converters to allow compatibility with RS 232 serial devices. Serial ports are still used in applications such as industrial automation systems, scientific instruments, shop till systems and some industrial and consumer products.Server computers may use a serial port as a control console for diagnostics. Network equipment (such as routers and switches) often use serial console for configuration. Serial ports are still used in these areas as they are simple, cheap and their console functions are highly standardized and widespread. A serial port requires very little supporting software from the host system.

Settings In Serial Port

Many settings are required for serial connections used for asynchronous start-stop communication, to select speed, number of data bits per character, parity, and number of stop bits per character. In modern serial ports using a UART integrated circuit, all settings are usually software-controlled.

Speed

The speed includes bits for framing (stop bits, parity, etc.) and so the effective data rate is lower than the bit transmission rate. For example with 8-N-1 character framing only 80% of the bits are available for data (for every eight bits of data, two more framing bits are sent).

Common bit rates include 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600 and 115200 bit/s.[9]

Data bits

The number of data bits in each character can be 5 (for Baudot code), 6 (rarely used), 7 (for true ASCII), 8 (for any kind of data, as this matches the size of a byte), or 9 (rarely used). 8 data bits are almost universally used in newer applications. 5 or 7 bits generally only make sense with older equipment such as teleprinters.

Parity

Parity is a method of detecting errors in transmission. When parity is used with a serial port, an extra data bit is sent with each data character, arranged so that the number of 1 bits in each character, including the parity bit, is always odd or always even. If a byte is received with the wrong number of 1s, then it must have been corrupted. However, an even number of errors can pass the parity check.

The parity bit in each character can be set to none (N), odd (O), even (E), mark (M), or space (S). None means that no parity bit is sent at all. Mark parity means that the parity bit is always set to the mark signal condition (logical 1) and likewise space parity always sends the parity bit in the space signal condition.

Stop bits

Stop bits sent at the end of every character allow the receiving signal hardware to detect the end of a character and to resynchronise with the character stream. Electronic devices usually use one stop bit. If slow electromechanical teleprinters are used, one-and-one half or two stop bits are required.

Conventional notation

The D/P/S (Data/Parity/Stop) conventional notation specifies the framing of a serial connection. The most common usage on microcomputers is 8/N/1 (8N1). This specifies 8 data bits, no parity, 1 stop

bit. In this notation, the parity bit is not included in the data bits. 7/E/1 (7E1) means that an even parity bit is added to the seven data bits for a total of eight bits between the start and stop bits. If a receiver of a 7/E/1 stream is expecting an 8/N/1 stream, half the possible bytes will be interpreted as having the high bit set.

Flow control

A serial port may use signals in the interface to pause and resume the transmission of data. For example, a slow printer might need to handshake with the serial port to indicate that data should be paused while the mechanism advances a line.

XON/XOFF flow control is an example of inband signaling, in which control information is sent over the same channel used for the data. If the XON and XOFF characters might appear in the data being sent, XON/XOFF handshaking presents difficulties, as receivers may interpret them as flow control. Such characters sent as part of the data stream must be encoded in an escape sequence to prevent this, and the receiving and sending software must generate and interpret these escape sequences. On the other hand, since no extra signal circuits are required, XON/XOFF flow control can be done on a 3 wire interface.

Virtual serial ports

A **virtual serial port** is an emulation of the standard serial port. This port is created by software which enable extra serial ports in an operating system without additional hardware installation (such as expansion cards, etc.). It is possible to create a large number of virtual serial ports in a PC. The only limitation is the amount of resources, such as operating memory and computing power, needed to emulate many serial ports at the same time.

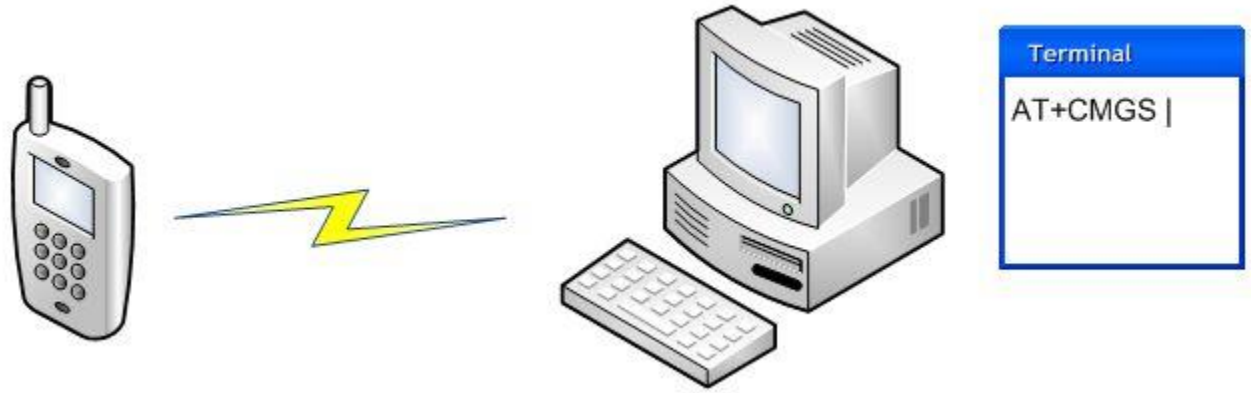
Virtual serial ports emulate all hardware serial port functionality, including Baud rate, Data bits, Parity bits, Stop bits, etc. Additionally they allow controlling the data flow, emulating all signal lines (DTR/DSR/CTS/RTS/DCD/RI) and customizing pinout. Virtual serial ports are common with Bluetooth and are the standard way of receiving data from Bluetooth-equipped GPS modules.

Virtual serial port emulation can be useful in case there is a lack of available physical serial ports or they do not meet the current requirements. For instance, virtual serial ports can share data between several applications from one GPS device connected to a serial port. Another option is to communicate with any other serial devices via internet or LAN as if they are locally connected to computer (Serial-over-Ethernet technology). Two computers or applications can communicate through an emulated serial port link. Virtual serial port emulators are available for Microsoft Windows and some of them run under Windows CE, Windows Mobile and Pocket PC.

Send SMS from your PC

Any mobile phone is able to send short messages in the GSM network. However, to use this facility in a personal computer, the mobile phone must be connected with it. There is a standard for serial connection between the modem and the PC, which is also applicable for the GSM device (GSM modem).

First mobile devices were connected to the computers via cable (a real serial connection). Nowadays only pluggable GSM modems use real serial port to communicate with the computer, whereas ordinary mobile phones use Bluetooth connection (they use one of the Bluetooth services, the so-called virtual serial connection).



The AT communication protocol is a simple terminal protocol. It means that sending SMS by direct using the AT communication protocol consists of typing several text commands in a terminal window, which is obviously not an user-friendly interface. Headwind GSM modem driver is the application implementing this interface and providing a user-friendly GUI for sending messages from the PC.

AT Command Format

A command line is a string of characters sent from a DTE to the modem (DCE) while the modem is in a 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 sequence AT and must be

terminated by a carriage return. Commands entered in upper case or lower case are accepted, but
both the A and T must be of the same case, i.e., “AT or “at. The default terminator is the ENTER
key <CR> character. Characters that precede the AT prefix are ignored. The command line interpretation begins upon receipt of the ENTER key character.
Characters within the command line are parsed as commands with associated parameter values. The
basic commands consist of single ASCII characters, or single characters proceeded by a prefix character (e.g., “&” or “+”), followed by a decimal parameter. Missing decimal parameters are evaluated as 0.

Escape Code Sequence

When the modem has established a connection and has entered on-line data mode, it is possible to break into the data transmission in order to issue further commands to the modem in an on-line command mode. This is achieved by the DTE sending to the modem a sequence of +++AT<ENTER>. To issue a disconnect sequence type +++ATH<ENTER>. This format complies with the Time Independent Escape Sequence (TIES).

Famous AT Commands

1. First read SMS (AT+CMGR)

-Send to modem: AT+CMGR=1

Number 1 means message number :1 in GSM modem center

-Receive from modem:

+CMGR: "REC READ","+85291234567",,"07/02/18,00:12:05+32"

Hello, welcome to our SMS tutorial.

OK

“REC READ” : means message type is read message (another types is “REC UNREAD”,”UNSTENT”)

2. SEND SMS (AT+CMGW)

-SEND TO MODEM : AT+CMGW="+85291234567”

-SEND TO MODEM :> SMS text messaging.

-RECIVE FROM MODEM: +CMGW: 5

OK

-SEND TO MODEM :AT+CMSS=5

-RECIVE FROM MODEM :+CMSS: 20

OK

3. Delete message (AT+CMGD)

-send to modem : AT+CMGD=1,4

(where 1 message number , 4 flag number)

-receive from modem : OK

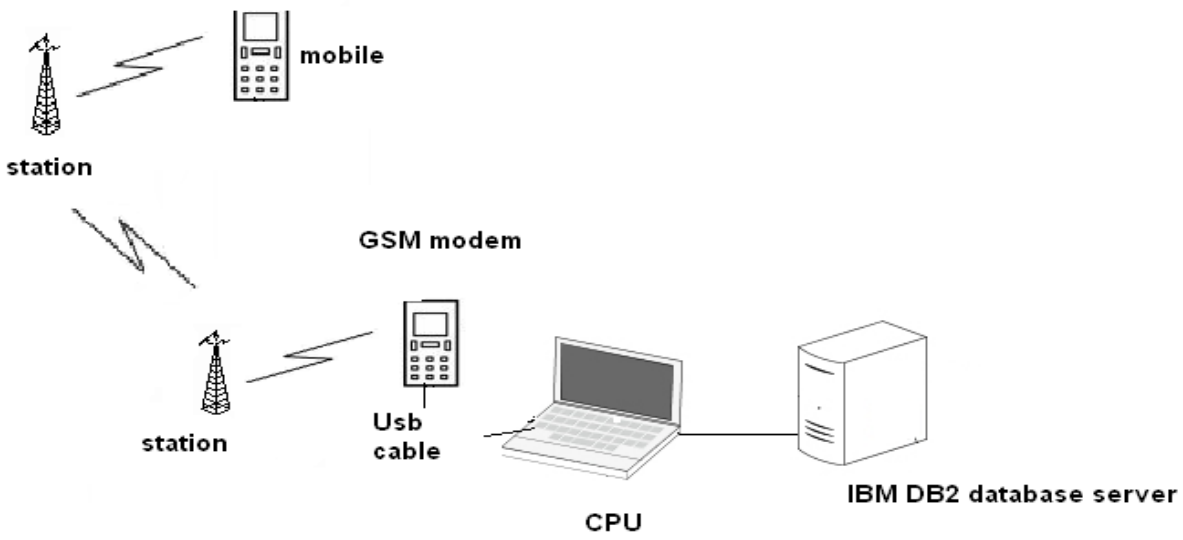
To see more AT COMMANDS see Appendix A

SMS central system

This project design for student affair service ,its idea is to introduce service to student by using mobile commutations ,which that student or their parent can send sms to college number using his private key , that the system while respond with attendance , mid term and final term exam for each subject , another application for this system allows admin or any employee use system to send sms to single or group (year or speaclization) which this user choose , also allow to delete message from mobile ,and to see history of mobile sending and receiving message.

System Structure

The system overall system is as shown in figure (--)



1. **Hardware**
    a. **CPU equipped with the SMS central software**
    b. **IBM DB2 database server with students database**
    c. **Mobile / GSM modem**
    d. **Interface hardware between (a) and (c)**

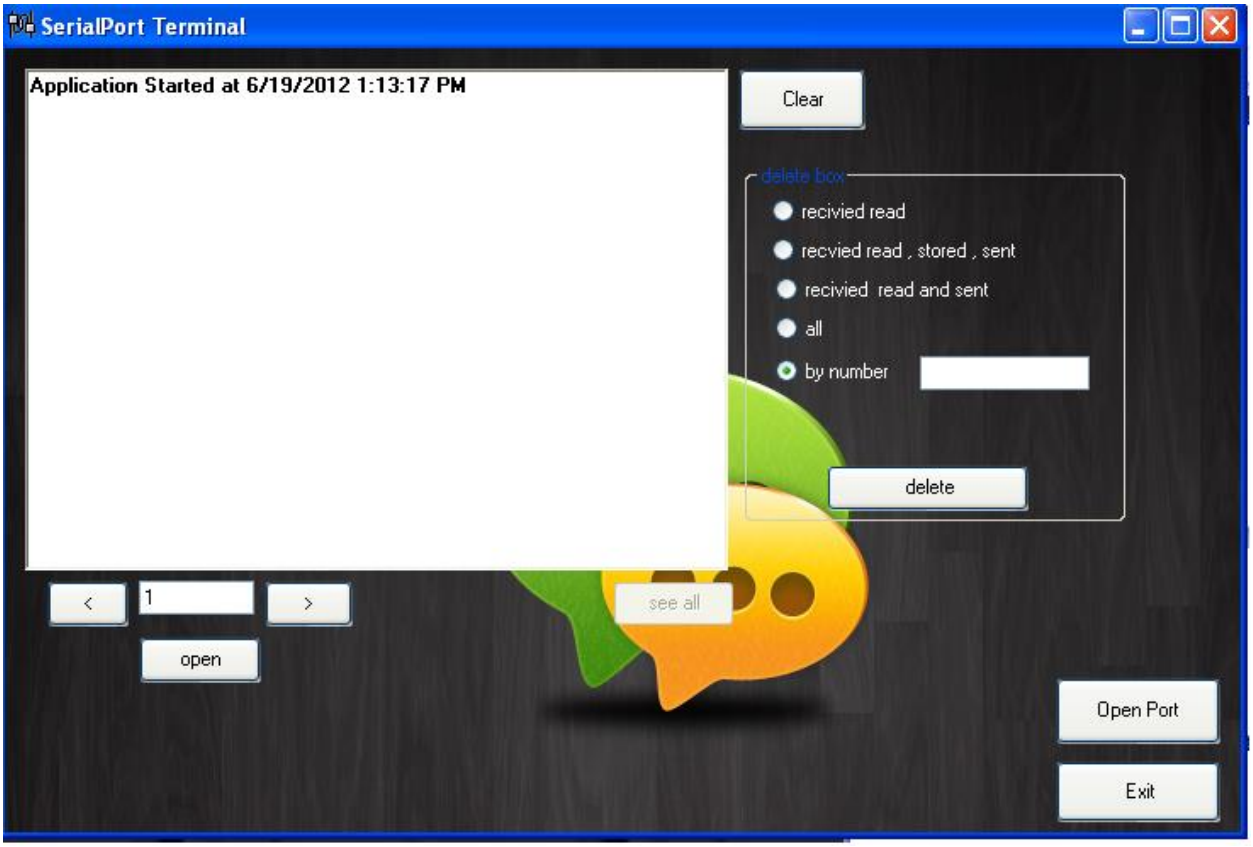
2. **SOFTWARE**
    a. **SMS central system.**
    b. **DB2 database server.**
    c. **DB2 client**

System contains of four basic Components:

1. **Message Center**
2. **sending sms**
3. **automatic send sms**
4. **Archive of old message**

Message center

The message center enables the user to manage the mobile messages. The user can see each message or see them all once , also delete message or Delete receive read , receive unread and sent



For . the user can perform The message center implements :

a. **Deleting messages : user can delete messages by 5 ways :**
   1. **Delete receive read only**
   2. **Delete receive read and sent**
   3. **Delete receive read , receive unread and sent**
   4. **Delete All**
   5. **Delete by number**

   By using (AT+CMGD=number , flag) ,GSM modem delete message depending on flag that Determines how to delete

   Flags:

   0. Meaning: Delete only the SMS message stored at the location index from the message storage area. This is the default value.

   1. Meaning: Ignore the value of index and delete all SMS messages whose status is "received read" from the message storage area.

2. Meaning: Ignore the value of index and delete all SMS messages whose status is "received read" or "stored sent" from the message storage area.

3. Meaning: Ignore the value of index and delete all SMS messages whose status is "received read", "stored unsent" or "stored sent" from the message storage area.

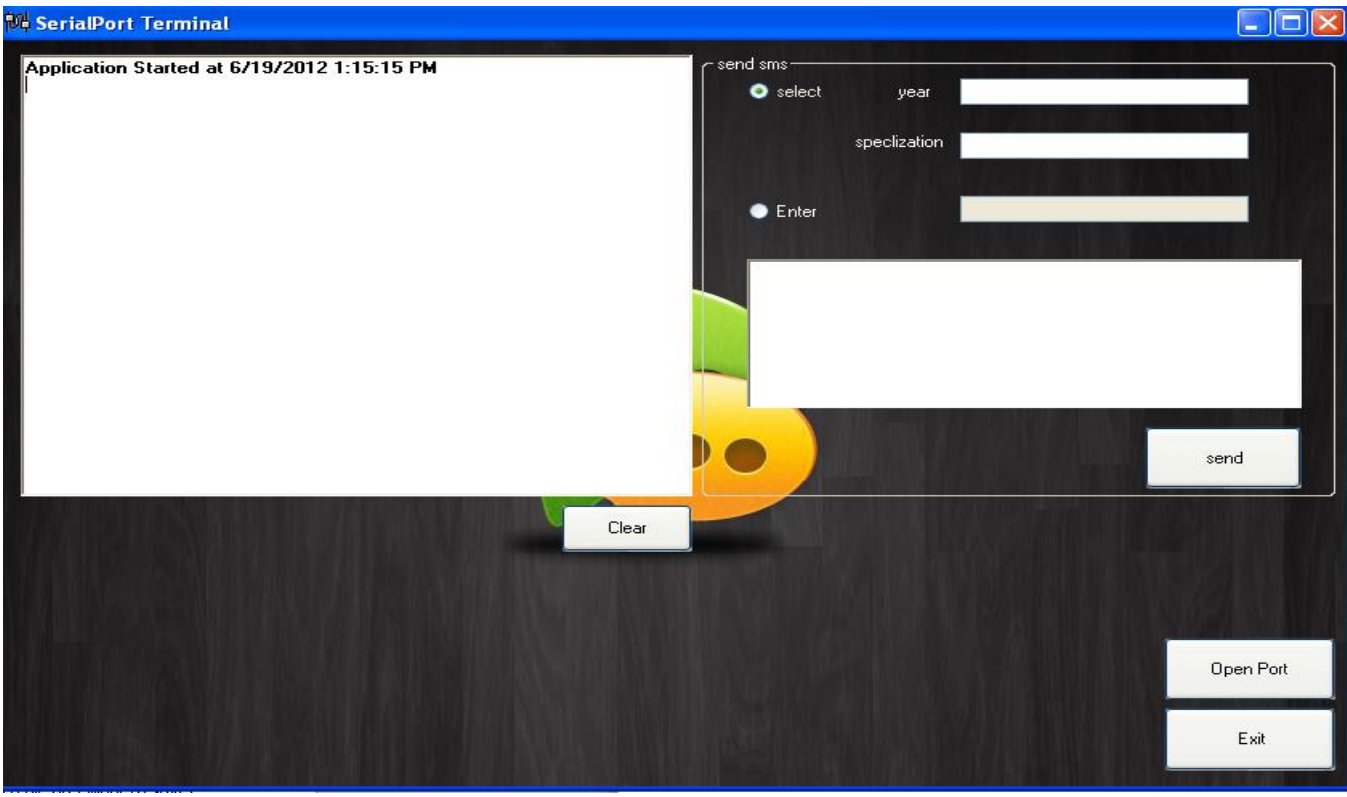
4. Meaning: Ignore the value of index and delete all SMS messages from the message storage area.

b. Read message : user can see message one by one or see them all

By using (AT+CMGR= number), modem read sms which user entered number ,and view to user

Sending sms

Through this facility the user can send message to specific specialization to inform them about something that will happen regarding that specialization. Also, it could be used to inform all the students about some events that is important for all students.



user has ability to send sms by two ways

1. **Send sms by enter year , spealization , in this case system query to db2 database to table " student" and choose all student that has same year and speclization send sms with text user entered .**
2. **Send sms to one person by entering his number and the text to send .**

AT command used is :

AT+CMGW="phone"

> SMS text messaging.

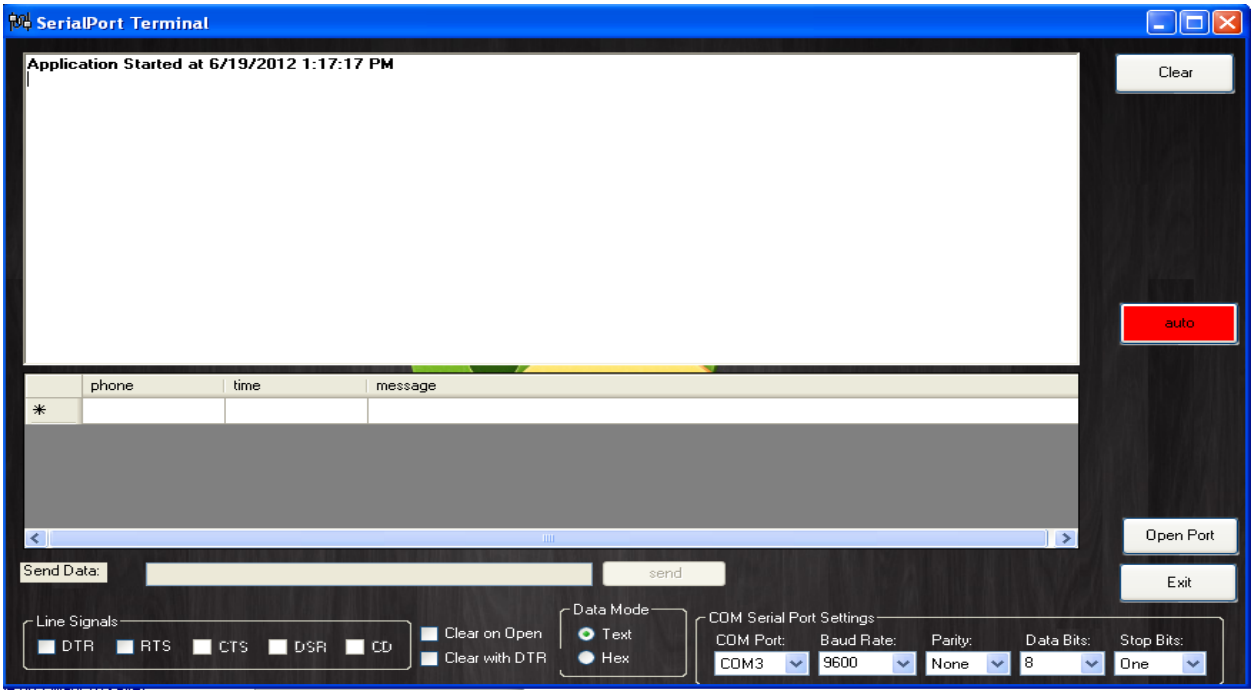
+CMGW: number

AT+CMSS=number

+CMSS: 20

Automatic send sms

This facility is the default service of 24 hours-seven days a week service that serve the sponsor of the students aware of their students upon their request. This facility implements a private key for securing the students information and facilitates the request by any mobile on hand. At any time the used can send as sms with the private key to the SMS central phone number to get an immediate replay with all the important data about the student in all subjects of his study.

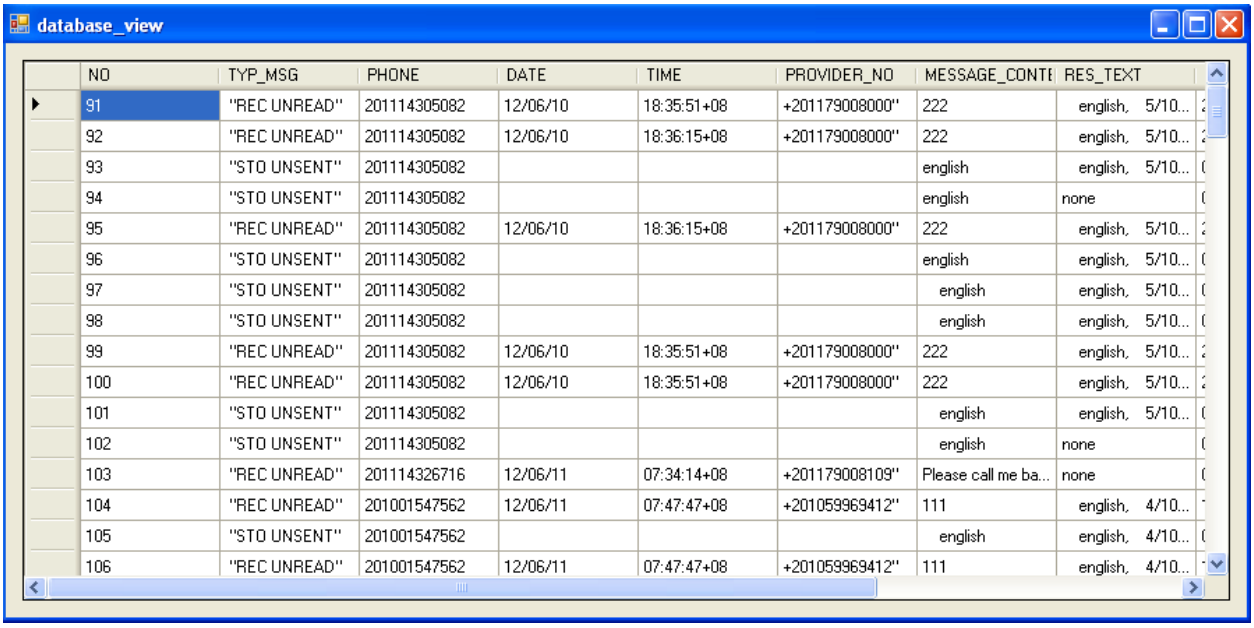


user can able or disable automatic send sms ,in case of enabling : system checks form message in GSM modem ,in each response from modem , system checks for type of message , in all cases system save message in database in table "message center" , in case of "REC UNREAD " , system checks the text message in message and query to database to known attendance , midterm and final term in "subject "table , in case of database responded , system send sms with this information , then save to database the respond message and then delete all types message in mobile .

also this branches offers send serial port command (ex.AT COMMANDS)

Archive of old message

This branch offer user to see old message that been saved to database , when form open system view all rows in "message center"table in database



NO	TYP_MSG	PHONE	DATE	TIME	PROVIDER_NO	MESSAGE_CONTE	RES_TEXT
91	"REC UNREAD"	201114305082	12/06/10	18:35:51+08	+201179008000"	222	english, 5/10...
92	"REC UNREAD"	201114305082	12/06/10	18:36:15+08	+201179008000"	222	english, 5/10...
93	"STO UNSENT"	201114305082				english	english, 5/10...
94	"STO UNSENT"	201114305082				english	none
95	"REC UNREAD"	201114305082	12/06/10	18:36:15+08	+201179008000"	222	english, 5/10...
96	"STO UNSENT"	201114305082				english	english, 5/10...
97	"STO UNSENT"	201114305082				english	english, 5/10...
98	"STO UNSENT"	201114305082				english	english, 5/10...
99	"REC UNREAD"	201114305082	12/06/10	18:35:51+08	+201179008000"	222	english, 5/10...
100	"REC UNREAD"	201114305082	12/06/10	18:35:51+08	+201179008000"	222	english, 5/10...
101	"STO UNSENT"	201114305082				english	english, 5/10...
102	"STO UNSENT"	201114305082				english	none
103	"REC UNREAD"	201114326716	12/06/11	07:34:14+08	+201179008109"	Please call me ba...	none
104	"REC UNREAD"	201001547562	12/06/11	07:47:47+08	+201059969412"	111	english, 4/10...
105	"STO UNSENT"	201001547562				english	english, 4/10...
106	"REC UNREAD"	201001547562	12/06/11	07:47:47+08	+201059969412"	111	english, 4/10...

Appendix A

Basic AT Commands

Command	Function
AT	Attention - this precedes all commands except A/
A/	Execute previous command - does not require a <CR> *
A	Causes the modem to go off hook. If a call is coming in, the modem will try to answer it. The procedure for answering a call is a short silence and then an answer tone. Sending a character to the modem during this procedure will abort the answer procedure. The amount of time the modem will wait for a carrier is programmable by modifying the S7 register.
B0 B1 B2	Select CCITT V.22 (1200 bps) Select Bell 212A (1200 bps) Select CCITT V23 Originate mode will transmit data at 75 bps and receive data at 1200 bps. Answer mode will transmit data at 1200bps and receive data at 75bps. The command N0 (Disable auto mode) must be selected.
D	D alone will take the modem off-hook and wait for a dial tone. (See X command for exceptions) The length of time to wait for a dial tone before dialing is programmable in register S6.
Dmn	ATDmn will dial a phone number where m is a modifier: L, W, ,, ;, @, !, or S. It will dial the telephone number n.
L	Dial last number
W	Wait for dial tone. If you have selected X0 or X1 (disable dial tone detection), then you can use this modifier to override that setting.
T	Tone dialing Pulse and Tone dialing cannot be mixed on the same command line.
P	Pulse dialing allows the modem to work on telephone networks where tone dialing is not supported. Pulse and Tone dialing cannot be mixed on the same command line.
,	Pause during dial. The amount of time to pause is determined in register S8.
;	Return to command mode after dialing. It doesn't wait for carrier or hang up.
@	Wait for 5 seconds of silence. This is used to access systems that do not provide a dial tone.
!	Hook flash. Causes the modem to go on-hook for 0.5 seconds. This is used in PBX systems and for voice features like call waiting.
^	Send 1300Hz calling tone
S=(0-9)	Dials a stored number. Up to ten numbers can be stored, and the addresses are from 0 to 9. To store a number into one of these addresses, use the & Z command.
E0	Commands issued to the modem are not echoed to the local terminal. This only matters in the command mode. It does not affect the modem's ability to send response codes.
E1	Commands are echoed to the local terminal.
H0	Force modem on-hook (hang-up).
H1	Force modem off-hook (to answer or dial).
I0	Return numeric product code
I1	Return hardware variation code
I2	Report internal code
I3	Report software revision number
I4	Report product feature listing
I5	Highest Speed Modulation

L0	Speaker volume zero
L1	Speaker volume low
L2	Speaker volume low
L3	Speaker volume low (Hardware currently limits volume adjustment to on/off)
M0	Speaker always off
M1	Speaker on until carrier detected
M2	Speaker always on
M3	Speaker on during answering only
N0	Disable auto-mode. This forces the modem to connect at the speed specified in register S37.
N1	Enable auto-mode. The modem will connect at the highest available line speed and ignore any ATBn command.
O0	Return to data mode. If you have entered the command mode using the time independent escape sequence, this will put you back in data mode without going on-hook.
O1	Retrain the modem. If the line condition has changed since the original connection, retraining the modem will cause it to reconnect at the most efficient speed for the current line condition.
Q0	Enable response to DTE.
Q1	Disable response to DTE. The modem does not send responses to the terminal. Issuing a command will not produce a response (unless the command is something like ATZ, which will restore this setting to default.)
Sn	Set default S-register. Any subsequent = or ? commands will modify the default S register.
Sn=m	Set register n to value m
Sn?	Return the value of register n
V0	Result codes will be sent in numeric form. (See the result code table)
V1	Result codes will be sent in word form. (See the result code table.
W0	Report DTE speed only. After connection, there will be no message about what Error Correction or Data Compression protocol is in use.
W1	Report DCE speed, Error Correction/Data Compression protocol, and DTE speed.
W2	Report DCE speed only
X0	Send OK, CONNECT, RING, NO CARRIER, ERROR and NO ANSWER. Busy and Dial Tone Detection is disabled.
X1	Send X0 messages and CONNECT speed
X2	Send X1 message and NO DIALTONE
X3	Send X2 messages and BUSY and RING BACK. Dial Tone Detection is disabled.
X4	Send all responses
Y0	Disable long space disconnect
Y1	Enable long space disconnect; with error correction, hang up after sending 1.6 second long space; without error correction, hang up after 4 second long space.
Z0	Uses profile in & W0 Reset to configuration stored in profile 0
Z1	Uses profile in & W1 Reset to configuration stored in profile 1
=n	Sets the value of the default S register
?	Reports the value stored in the default S register.

&	Ampersand Commands
&C0	Force DCD on
&C1	DCD follows remote carrier
&D0	DTR is assumed on
&D1	DTR drop causes modem to enter command mode without disconnecting
&D2	DTR drop causes modem to hang up
&D3	DTR drop causes modem to hang up and be reinitialized; &Y determines which profile is loaded.
&F	Load factory profile
&G0	Disable guard tone
&G1	Enable 550Hz guard tone
&G2	Enable 1800Hz guard tone on answering modem
&K0	Disable flow control
&K3	Enable RTS/CTS flow control
&K4	Enable XON/XOFF flow control
&K5	Enable transparent software flow control
&K6	Enable both RTS/CTS and XON/XOFF flow control
&P0	Selects 33%-67% make/break ratio at 10 pulses per second
&P1	Selects 33%-67% make/break ratio at 20 pulses per second
&P2	Selects 39%-61% make/break ratio at 10 pulses per second
&P3	Selects 39%-61% make/break ratio at 20 pulses per second
&S0	Force DSR on
&S1	DSR on at the start of handshaking and off after carrier loss
&T0	Terminate test
&T1	Start ALB test (not supported in MicroModem series)
&U0	Enable trellis coding
&U1	Disable trellis coding
&V0	Display active profile
&V1	Display stored profiles
&V2	Display stored telephone numbers
&W0	Save active profile to profile 0
&W1	Save active profile to profile 1
&Y0	Use profile 0 on powerup
&Y1	Use profile 1 on powerup

AT "*" Commands

*	Asterisk commands
*Q0	Send the "CONNECT xxxx" result codes to the DTE when an invalid TIES escape sequence is detected after the "OK" response has already been sent
*Q1	Does NOT send the "CONNECT xxxx" result codes to the DTE when an invalid TIES escape sequence is detected after the "OK" response has already been sent

AT "+" Commands Summary

+	+ Commands
+DR	Data Compression Reporting
+DS	Data Compression
+ER	Error Control Reporting
+EB	Break Handling in Error Control Operation
+ES	Error Control Selection
+ETBM	Call Termination Buffer Management
+ICF	Character Format
+IFC	PC to Modem Local Flow Control
+ILRR	PC (DTE) – Modem (DCE) local Rate Reporting
+GMI	Request Manufacturer Identification
+GMM	Request Model Identification
+GMR	Request Revision Identification
+MA	Modulation Automode Control
+MR	Modulation Reporting Control
+MS	Modulation Selection