

CAR SERVICE VEHICLE TRACKING SYSTEM

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I. OBJECTIVES:

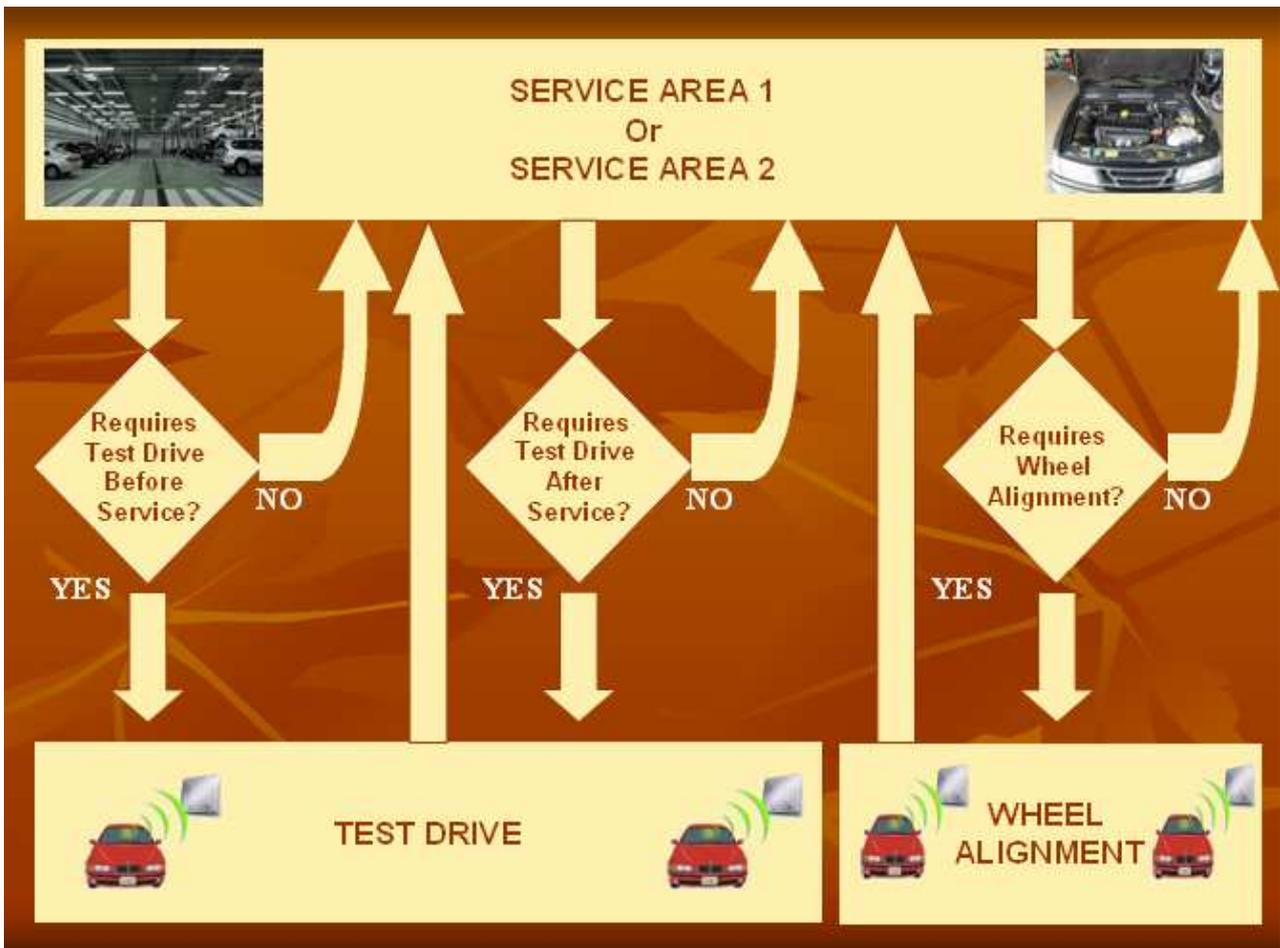
- Track The Vehicles under service
- Ensure Promised Time Delivery

- Generate Efficiency chart of Technicians
- Ensure Customer Satisfaction
- To keep the Customer informed about the status of his vehicle through SMS
- To Alert the Technicians by indicating their Deadlines

II. PROCESS FLOW:







III. SOFTWARE:

Mainly the Software is divided into 5 Modules,

REGISTRATION	JOB CONTROL & ALLOCATION	REPORTS
TRACKING	CONFIGURATIONS	

a. REGISTRATION

VEHICLE REGISTRATION

RFID ID /Bar Code No : 49053400358450

RO Number :

Vehicle Number :

Owner Name :

Owner Mobile :

Driver Name :

Driver Mobile :

FRT :

Include Wash 2 : Yes No

Include Test Drive : Yes No

Express Maintenance : Yes No

WAITING CUSTUMER : Yes No

This Part of the Software will be installed at the Registration counter. When ever an Appointed Customer approaches this counter, keeping the Repair order as the reference, all the required details will be entered. And During This Process, Either

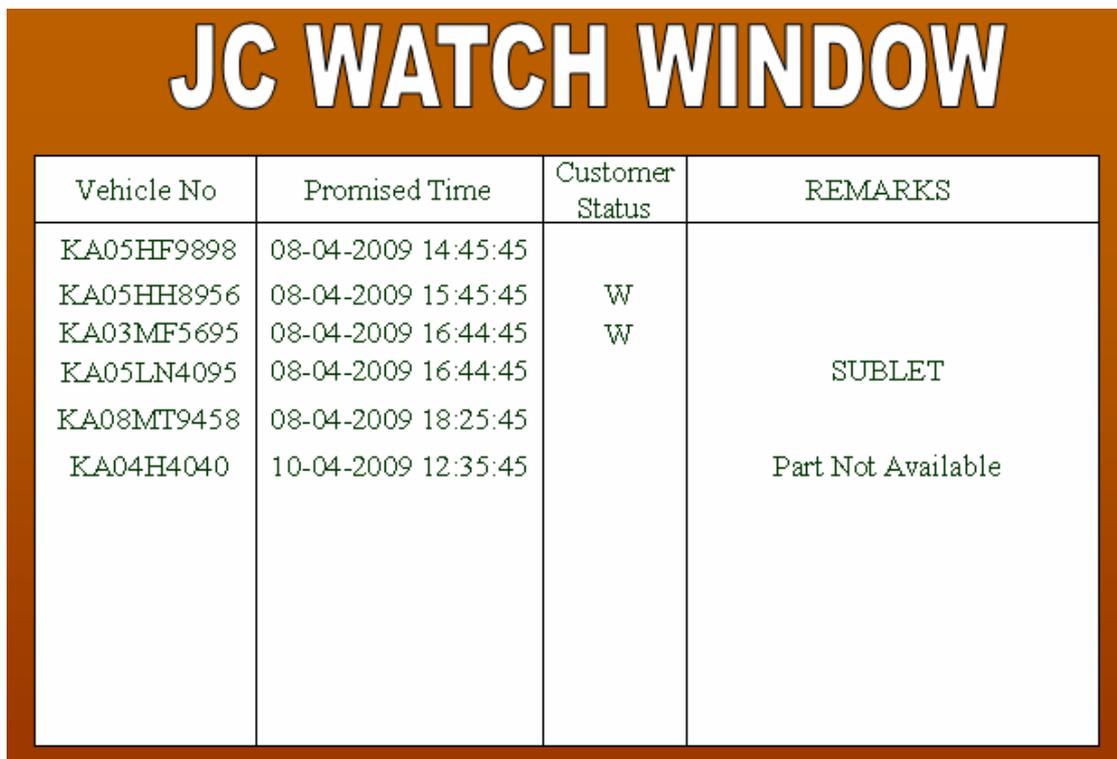
Barcode / RFID Tag will be assigned to the Vehicle, which will be used for the tracking purpose in the whole process.

Once the Vehicle is registered, an Automated SMS is being sent to both driver as well as the Owner, to indicate the status of the Vehicle. And this type of SMS will be sent to the customer at some particular stages.

SMS -> Dear customer your CAR KA14 XXXXX being registered for service at 10AM, 11-12-2009. Expected delivery at 4PM, 11-12-2009

b. JOB CONTROL & ALLOCATION

The JOB CONTROL & ALLOCATION Part contains 3 windows as shown below



The screenshot shows a window titled "JC WATCH WINDOW" with a table containing the following data:

Vehicle No	Promised Time	Customer Status	REMARKS
KA05HF9898	08-04-2009 14:45:45		
KA05HH8956	08-04-2009 15:45:45	W	
KA03MF5695	08-04-2009 16:44:45	W	
KA05LN4095	08-04-2009 16:44:45		SUBLET
KA08MT9458	08-04-2009 18:25:45		
KA04H4040	10-04-2009 12:35:45		Part Not Available

The above picture is referred as the JC Watch Window, where, all the Unallotted Registered Cars will be displayed in the order of first most cars to be delivered based on the Promised delivery timings.

It also contains , the Remarks Column, where, some comments will be written, if the vehicle was already allotted previously, but, was stopped due to some or the other reason like, Part Not Available, Waiting for Customer Approval , SUBLET or any other Important reason.

And in this case, the promised delivery timings will be the rescheduled one, based on the details entered by JOB CONTROLLER.

JOB ALLOTMENT

RFID / Bar Code No : 49053400358450 RO Number : YA8934839
Vehicle Number : KA 05 HF 992 Express Maintenance : No
Owner Name : STEM TECH Owner Mobile : 09875654642
Include Wash 2 : Yes Include Test Drive : No

Delivery at 08-04-2009 16:46:59

ALLOT TECHNICIAN : ▼

ALLOT BAY NUMBER : ▼

FRT : 1.2 ▲▼

SUBMIT CANCEL

Above window is called as the JOB Allocation Window, which is used to allocate a technician for the unallocated Registered Cars. To enter this window, The Job controller, will double click on the Vehicle number displayed on the JC WATCH window, and all the settings in this window will be automatically filled.

Here JC can select the currently available technicians and Bays. This can be selected by clicking on the drop down button shown in the above picture, the listing of the dropdown menu will be based on the work shifts, unallotted technicians, and Unallotted bays or Type of Service like express maintenance or general.

Here the JC will also be having the option to change the Pre Stored FRT, if he thinks it as insufficient.

JOB RESCHEDULE

SELECT TECHNICIAN : ▾

BAY NUMBER : 4

Increase FRT by :

Reason For Reschedule : ▾

Date - Time to Resume Work :

WAITING CUSTOMER

Bar Code No : 49053400358450

RO Number : YA8934839

Vehicle Number : KA 05 HF 992 Express Maintenance : No

Owner Name : STEM TECH

Owner Mobile : 09875654642

Include Wash 2 : Yes

Include Test Drive : No

Delivery at 08-04-2009 16:46:59

RESCHEDULE

JOB STOPPAGE

CANCEL

Job Reschedule is once again divided into two types, one is just increasing the FRT by few more minutes and the other is releasing the technician from that vehicle to another vehicle, which is termed as JOB STOPPAGE.



In the case if the Technician has all the equipments and is not able to diagnosis the problem, he will go for JOB RESCHEDULE, and thus automatically the promised delivery timings will be updated.

But in case of JOB STOPPAGE the technician will exactly know the problem but, he might not have the equipment or customer approval or any other reason. So in this case, the technician will have to provide the approximate date and time to resume the work. And once, these details are provided, the technician can be assigned to work for another car.



With respect to the software, in the FRT part, the JC is supposed to enter the additional time required to complete the task.

d. CONFIGURATIONS

There are many configurations provided in this system,

- Adding / Deleting Technicians
- Updating the Leave Status of Technicians
- Adding the Type of Problems faced during the Servicing
- Adding New Bays

And lots more...

ADD TECHNICIAN

Technician Name :

Technician Code :

Technician Type : General EM

Shift : General 1st 2nd

e. REPORTS

Lots of Reports can be generated based on your requirements, but some of the main reports are as follows

- Technician Efficiency
- Frequency of Failing to Delivery vehicle before Promised Time
- Frequency of Job Stoppages & Reschedules
- Areas in which, delays are more frequent

And lots more...

SOFTWARE SPECIFICATIONS:

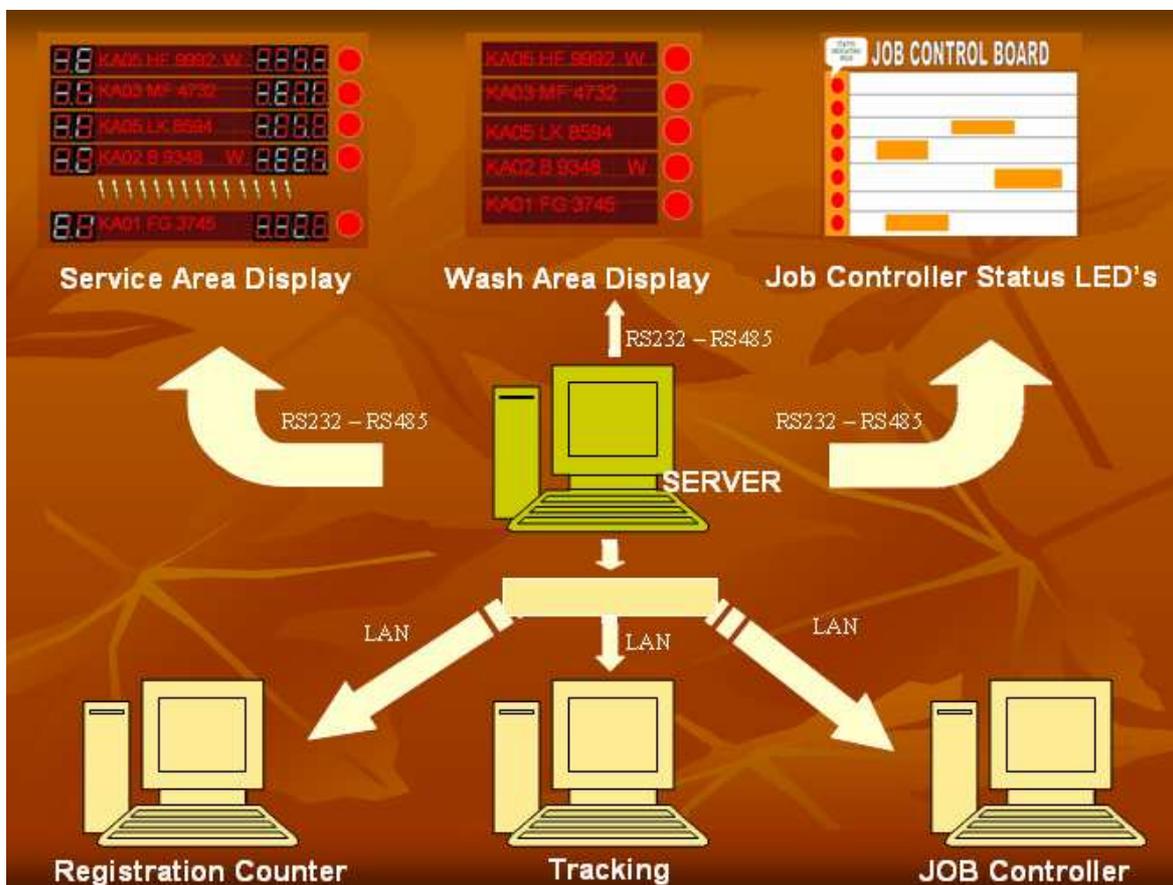
- Application software : VISUAL STUDIO
 - i. Applications Developed using Visual Studio will be very much user Friendly.
 - ii. Even a lay man can use the application comfortably.
 - iii. The look and feel of the applications will be very good

- **DATABASE : ACCESS 2003**
 - i. As it will be available in almost all the computers
 - ii. No need to purchase another database
 - iii. As both ACCESS and VISUAL STUDIO belong to same Vendor, many features are available.
- **REPORTS : EXCEL 2003**

SYSTEM REQUIRMENTS:

- **Windows 98 / NT / XP**
- **Microsoft Office 2003 or Later Version**
- **PC with 1.5GHz or higher processor clock speed**
- **Minimum 512 Mb Ram**
- **Any storage Media 10GB or higher HDD**
- **Serial communication Port – 2 ports minimum**
- **Ethernet Port**
- **LAN**

CONNECTIVITY:



IV. HARDWARE:

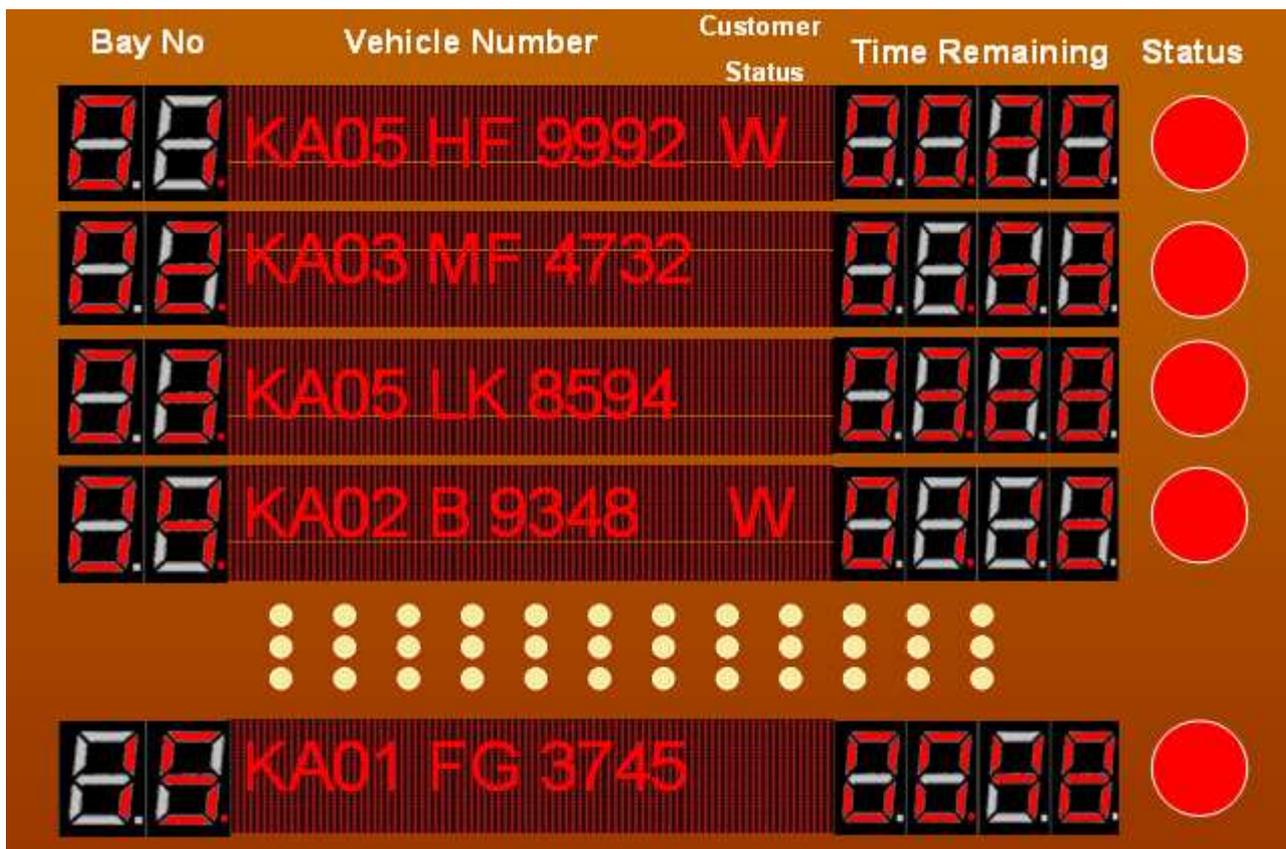
a. Displays

Basically Displays plays the main role in hardware part; these Displays are used to alert and inform the details of the tasks assigned to technicians.

Below shown picture gives us a brief idea of how our displays look. These types of Displays will be installed in all the service areas to indicate the tasks or vehicles assigned to a particular technician or a Bay. It also represents the time available to complete the task, weather the vehicle belongs to waiting customer or non waiting customer.

The Display board comes with a light indication for each bay; these are used for alerting purposes.

Say example, a task is being assigned at bay 4 with FRT as 30 minutes, so, every minute, that FRT Decreases and finally when it reaches 5 minutes, the light starts blinking. Seeing this technician can consult the Job Controller to reschedule the FRT. In case if it is not rescheduled before the time is elapsed, the light at technician place as well as JOB Controller's Place will be permanently ON.



Service Area Display



Wash Area Display



LED Lights next to JPCB

LED BLINKING – Alert before Dead line is Approaching
LED ON – Dead Line has been Crossed

Display SPECIFICATIONS:

The real core of the LED display is the custom driver circuit. This circuit uses a microcontroller for control purposes.

A master host PC (JPC) communicates with the LED display via RS485 serial communications. Commands to read and write memory locations on the display have been implemented, in addition to functions for clearing and shifting memory. In this scheme, the host PC thus has total control of the display memory.

Technical specifications:

- 15 and 17 lines LED Message with mixed Alphanumeric and numeric display.
- 5 line Led message
- Each line will have a indication LED to indicate the completion-time approaching or passed
- Each line consists of two digit 2” LED numeric display to indicate the Bay number of the vehicle serviced.
- Twelve characters LED Dot matrix display to display Vehicle number and owner/driver waiting status.
- Four numeric 2” LED numeric display to indicate the time remaining to complete the task

- Led indicator to flash if time overrun has happened
- Display format of each line is shown below



- Automatic scrolling of display controlled by JPC computer PC
- Metal enclosure
- Service area display 1 and 2 Size : 36 inches X 60 inches X 6 inches
- Service area display 1 and 2 Size : 36 inches X 24 inches X 6 inches
- Power 180-250Volts, AC.
- Power Consumption
 - Service Area display 1 and 2: 85 watts Max. each
 - Wash Area display 1 and 2: 35 watts Max. each
- Communication - RS485 Full duplex mode.
- In RFID technology four frequency bands are used. The frequency band, description and range of the frequencies used in our system is given below

Frequency band	Description	Range
124 – 134 kHz	Low Frequency (LF)	Near Range Type Up to 18 inches
868 – 928 MHz	Ultra High Frequency (UHF)	Long Range 10 to 30 feet

b. RFID & BAR CODE

Radio Frequency Identification (RFID) is an automated object identification method that uses radio frequency technology.

RFID has three components:

- An RFID reader, which provides power and interrogates the tag, then receives and processes the information
- An RFID tag, which has an unique ID, with or without user memory;
- An antenna, which converts electrical power to RF power.

The reader sends out a radio signal and any tag (unique identifier of any item it is attached to) in the reading range sends out a signal to identify itself. The reader then converts the radio signals sent by the tag into data, which is then passed on to the processing system. The data received from the reader is processed to filter, categorize, analyze, and enable actions based on the identified information.

Asset Management:

Each asset, either movable or fixed, to be inventoried or tracked is tagged with a suitable RFID tag and the asset is tracked with Fixed or Handheld readers, whenever it is relocated from its original position. This technology helps in locating the required asset at any point of time.

Bar Code Reader & Printer Specifications:

Bar Code Reader is a Long Range Linear and 2D Scanner and Bar Code Label Printer will be used to print the Bar Codes.



TECHNICAL SPECIFICATIONS for BAR CODE READER:

Width of Window	74 mm
Light Source	660 nm visible red LED
Ambient Light	Up to 80000 Lux
PCS	30% or more
Resolution	0.1mm (4mils) - Code 39,PCS=45 %, on contact
Scan Speed	200 scans/sec
Maximum scanning distance	0-10 inches
Scanning angle	Front: 60 Rear: 60 Yaw: 75
Interface	Keyboard, RS232 , USB Interface
Codes Read	UPC/EAN/JAN & Add-on 2/5, Code 39, Code 39, Code 39 Full ASCII, Code 11, Interleave 25, Industrial 25, Matrix 25,China Postage, Code 128, Codeabar/NW7, Code 93, MSI/PLESSEY, Code 32, BC 412 and All Standard Linear Codes 2D Codes: PDF147, Code 16K
Environment	5% to 90% relative humidity, non-condensing
Options	Stand for continuous read mode
Shocks	1.5m drop onto concrete
Operating	0-40 C.

TECHNICAL SPECIFICATIONS for BAR CODE PRINTER:

Printing Method	Thermal transfer and direct thermal
Resolution	203dpi (8 dots/mm)
Max Printing Speed	1~3"/sec (25.4~76.2 mm/s)
Max Printing Length	45" (1143mm)
Max Printing Width	4.13" (105mm)
Fonts	Internal character sets standard 5 alpha-numeric fonts from .049"-.23"H (1.25mm~6.0mm) All fonts are expandable up to 24 x 24 4 direction 0°X ~270°X rotation Soft fonts are downloadable
Barcodes	Code 39, Extended Code 39 Code 93, Code 128 UCC, Code 128 (Subset A,B,C) Coda bar, Interleave 2 of 5, EAN-8 2&5 add on, EAN-13, EAN-128, UPC, UPC-A, E 2&5 add on , POSTNET, German POST, Matrix 25 2D Barcodes Maxi code, PDF-417, Data matrix
Interfaces	RS-232 serial, Centronics parallel, Keyboard wedge (for IBM compatible Keyboard and CCD Reader)
Media Sensing	see through, reflective sensor
Media	Roll-feed, die-cut, continuous, fan-fold, tag, ticket in thermal paper or plain paper
Max width	4.3" (110mm)
Min width	1.0" (25mm)
Max length	45" (1143mm)
Min length	0.4" (10mm)
Supply roll	OD 4.3" (109mm) with ID 1.0" (25mm) core
Ribbon	Wax, Wax/Resin, Resin Standard width 4.3" Max. Ribbon roll OD - 1.4"(36mm) with ID 0.5"core (12.5mm)
Ribbon length	3600"(91m)
Dimension	9.8" x 16.1" x 9.4" (W x D x H)
Weight	4.6 lbs (2.1kgs)
Power source	110/220 VAC
Agency listing	CE, UL, CUL, FCC class B
Operation environment	40°K ~ 100°K (4°J~38°J) Humidity : 10~90% non condensing
Options	Cutter, Dispenser kit, Extension SRAM, Extension Flash memory, Real time clock, External 8"OD media stacker Argokee (Standalone KDU), Argo Net print server
Software	Windows driver 2000/XP/3.1/95/98/NT3.5 1/NT4.0Free Windows Label design Software

SHORT RANGE RFID READER SPECIFICATION:

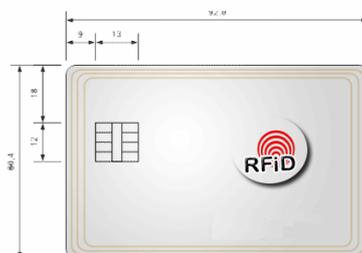
OEM RFID Handheld Reader is a compact, lightweight, portable and programmable reader that works at the industry-standard 125 kHz frequency.

- **USB model with 8 MB internal memory and a built-in Real Time Clock (RTC)**
- **Designed to detect and read Unique and TK5530 tags**
- **Designed to detect and read/write Hitag2 and TK5561 tags**

TECHNICAL SPECIFICATIONS:

Size (L X B X H) in mm	130 X 50 X 32
Operating Frequency	125 kHz
Memory	8 MB
Battery	Lithium-ion
Charging Voltage	+9 V DC
Reading Range	>= 50 mm
Output Format	ASCII Type
Tag Types	Unique, Hitag2, TK5530, TK5561
Antenna	Built-in
Package	ABS Plastic

RFID TAG SPECIFICATIONS:



- **Operating Frequency: 100-150 kHz**
- **Total Memory Size (bit): 256**
- **Sawn Wafer FFC: YES**
- **Integrated Resonant Capacitor: YES**
- **Read/Write Memory: YES**
- **MOA2 Chip On Board: YES**
- **Read-only mode (tag talks first): YES, user configurable**
- **Anti-collision Protocol: -**
- **Encrypted Mutual Authentication: YES, user configurable**
- **Irreversible memory lock: YES, user configurable**
- **Transponder Stick: YES**
- **ISO 11784/85 Compliance: YES, user configurable**

The Following session gives you a brief idea about the differences, advantages, disadvantages or using RFID / Bar Code

BAR CODE	RFID
1. Require line of sight to be read	Can be read without line of sight
2. Can only be read individually	Multiple RFID tags can be read simultaneously
3. Cannot be read if damaged or dirty	Can cope with harsh or dirty environments
4. Require manual tracking and therefore are susceptible to human error	Can be automatically tracked removing human error
5. Cannot be Reused	Reusable

c. GSM ENGINE

This Device is used for sending the SMS to Customers.

GSM TECHNICAL SPECIFICATIONS:

Designed for global market, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies GSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz

SIM300 FEATURES:

- GPRS multi-slot class10/ class 8
- GPRS coding schemes CS-1, CS-2, CS-3 and CS-4
- Module size 40mm x 33mm x 2.85mm



Hardware:

In this hardware, SIM300 is interfaced with RS232, Regulated power Supply 4.0V SIM Tray Antenna with LED indications.

A software SMS engine runs in JPC computer will intelligently determine the SMS message to be sent to customers at various configured levels.

Thanks&Regds

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