

A REPORT

ON

IMPORT & EXPORT SCRIPT

BY

Shivang Patel

2001U7PS098

AT

**ETA –MELCO ELEVATOR CO. L.L.C.
DUBAI, UAE**

A Practice School – II station of

Birla Institute of Technology and Science, Pilani-Dubai Campus
Knowledge Village, Dubai
UAE

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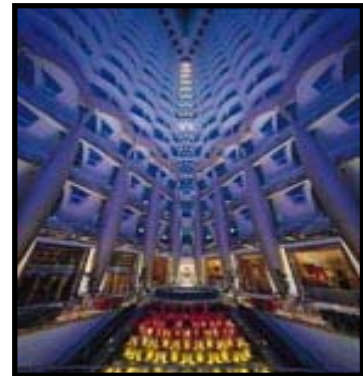
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ABOUT ETA MELCO

ETA-Melco Elevator Co. L.L.C., was formed as a joint venture between **Emirates Trading Agency**, Dubai and **Mitsubishi Electric Corporation**, Japan. ETA-Melco started its operations in 1975 in Dubai and expanded its operations to 13 countries including the U.A.E., the State of Qatar, Sri Lanka, the Sultanate of Oman, Kuwait, Turkey, Maldives, India, Bangladesh, Azerbaijan, Kyrgyzstan, Kazakhstan and Turkmenistan. They have grown to be market leaders in the region and earned the title "**Elevator People**" of the Gulf. There has been a steady growth of ETA Melco who have installed elevators in the most prestigious projects which includes:



- **Fastest Passenger Elevator** in the whole of Middle East & Europe with a speed of 7M/Sec. In the world's tallest hotel (321 Meters) "**Burj Al Arab**", Dubai.
- Fastest passenger elevator with a speed of 7M/Sec in the world's 9th tallest building (350 Meters) "**Emirates Towers**", Dubai.
- Installed the maximum number of 121 units (35 elevators, 30 moving walks and 56 escalators) at Dubai International Airport.
- Sold more than 14,000 units including 10,000 units alone in the U.A.E.
- Having more than 1600 employees in the company which is the largest of its kind in the Middle East.
- Obtained the prestigious **ISO-9001 Certificate** in 1999.

ETA - Melco follows a no-compromise on quality and service policy, which is synonymous to both parent companies - The ETA Group and Mitsubishi Electric

Corporation. ETA Melco assures that their elevators provide absolute safety and optimum reliability. Every individual member of the staff is trained to give utmost care to the quality of their work.

Over the last century, Mitsubishi has come to signify quality and cutting edge technology in all of its diverse range of products, be it industrial, electric, auto-mobile or domestic. **Melco (Mitsubishi Electric)** was formed in 1920's to target primarily at the fast growing elevator market. In due course of time, it went on to become one of the world's leading makers of elevators, escalators and other hoisting devices. Today, Mitsubishi Electric has earned a reputation as one of the most advanced elevator and escalator manufacturers in the world, offering many 'Firsts', in the Technology, including:



- The pioneers in introduction of **Variable Voltage Variable Frequency (VVVF)** Technology in the field of elevators.
- The world's fastest passenger elevator with a speed of 45 kms per hour, which has earned them a place in the '**Guinness Book of World Records**'.
- The only manufacturer in the world offering state-of-the-art technology with its **Spiral Escalator** considered an engineering genius in the industry.
- The First '**Zigzag**' **Elevators** manufactured in the world.
- Created **MELART II**, a full color graphic painting finish to create works of art for the artistic designs applied for passenger elevators.
- Supplied more than 320,000 units with latest production technology of delivering 12,000 units annually.
- Has a labor force of 117,000 with 120 facilities in 34 countries worldwide.

About the time when Melco was celebrating its 50th anniversary, there was an unprecedented construction boom in the Middle East. The Al Ghurairs saw a vast untapped market in the construction segment. Thus came into existence the **Emirates Trading Agency (ETA)**. Where high rise buildings on a 'rise', there was tremendous scope for high quality and easily available elevators. Thus ETA proposed to be sole agents for Mitsubishi Electric Corporation of Japan, and launched Mitsubishi Elevators and Escalators in the UAE Market. In its initial stages of development, Western suppliers dominated the UAE market and the majority of equipment then was of Conventional type.



ETA-Melco brought about a change in the acceptance of Modern Technology in place of Conventional Technology, with its fully Automatic Elevators. Despite the initial resistance that comes with change, ETA-Melco was able to convince customers and consultants in this region to accept the new technology, where other major elevators failed to make a mark.

Based on initial success achieved in the UAE market, in 1980, the ETA-Melco Elevator Co. LLC was formed as a joint venture between Emirates Trading Agency, Dubai and Mitsubishi Electric Corporation of Japan. Since then, the company has been carrying out Marketing, Selling, Design & Engineering, Installation and Maintenance of Mitsubishi's Vertical Transportation Equipment. With the growth of the operations in the UAE market, ETA-Melco expanded its operations in other countries Viz. State of Qatar, Sultanate of Oman, Kuwait, Turkey, Sri Lanka, Maldives, India, Bangladesh and the CIS countries.

Presently ETA - Melco has grown to be the market specialists in the region and enjoys 55% of the elevator market and has earned the title, **Elevator People of the Gulf**. There has been a steady stream of the latest technology and continuously improved versions of Mitsubishi's Vertical Transportation Equipment introduced in the market which includes:

- Fastest passenger elevators in the Middle East & Europe with a speed of 7 M/sec in the world's tallest hotel (321 M) "Burj Al Arab", Dubai.
- Fastest passenger elevators with a speed of 7 M/Sec in the 9th tallest building (350 M) in the world "Emirates Towers", Dubai.
- Installed the maximum number of 121 units (35 elevators, 30 moving walks, 56 escalators) at Dubai International Airport.
- Sold more than 14,000 units in all the above countries including 10,000 units sold in U.A.E. alone.
- Having more than 1600 employees in the company which is the largest of its kind in the Middle East.

ETA-Melco follows a no-compromise on quality and service policy, which is synonymous to both parent companies - The **ETA group** and **Mitsubishi Corp. Japan**. Under the commitment of placing quality first and foremost, the mission is to provide products of the highest caliber to our global clientele. Manufacturing processes, from initial design to shipment, and control thereof are conducted with the aid of an advanced computer network.

Public Safety is the foremost consideration in all of **ETA-Melco** products. Taking into consideration the fact that the products are utilized by the public and affect the daily activities of society as a whole, we assure that each of our products provides absolute safety and optimum reliability.

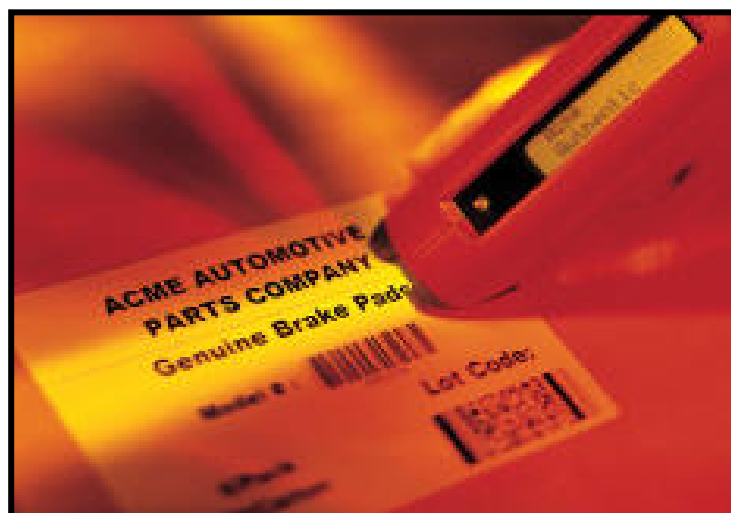
Every individual member of the staff is trained to give the utmost care to the quality of their work. This method creates a sense of pride for excellence among the employees, which enable effective development and manufacturing of elevator and escalators systems of the highest quality, yet that is economically competitive in the market.

ABOUT BARCODE SYSTEM

Barcode is an automatic identification technology. It allows data to be collected accurately and rapidly. It consists of a series of parallel, adjacent bars and spaces. More precisely, it is simply a series of stripes on a very light background that can be scanned and read directly into a computer.

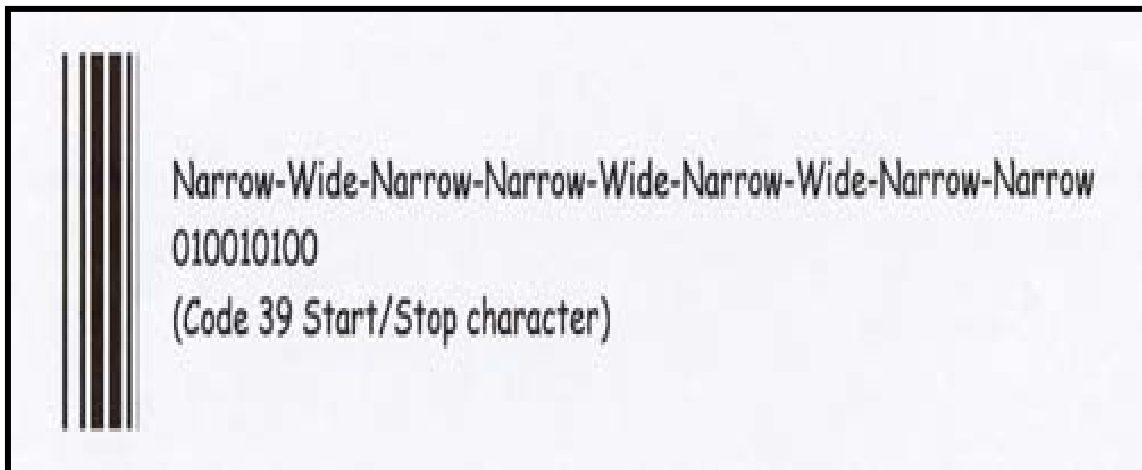
They are interpreted virtually instantaneously and unerringly by a bar code reading system. The elements (bars and spaces) in a bar code symbol must be of a consistent, proportional thickness and thinness. The widest element could be as thick as a pencil or as thin as a business card, as long as the corresponding thin bars and spaces in the bar code remain proportionally thin.

To read information contained in a Barcode symbol, a scanning device, such as a light pen is moved across the symbol from one side to the other. As a scanning device is moved across the symbol, the Barcode width pattern of bars and spaces is analyzed by the Barcode decoder, and the original data is recovered. The most visible application of this technology is the inventory management in warehouses since 1970. Barcode is now the de facto automatic identification technology, for virtually any application.

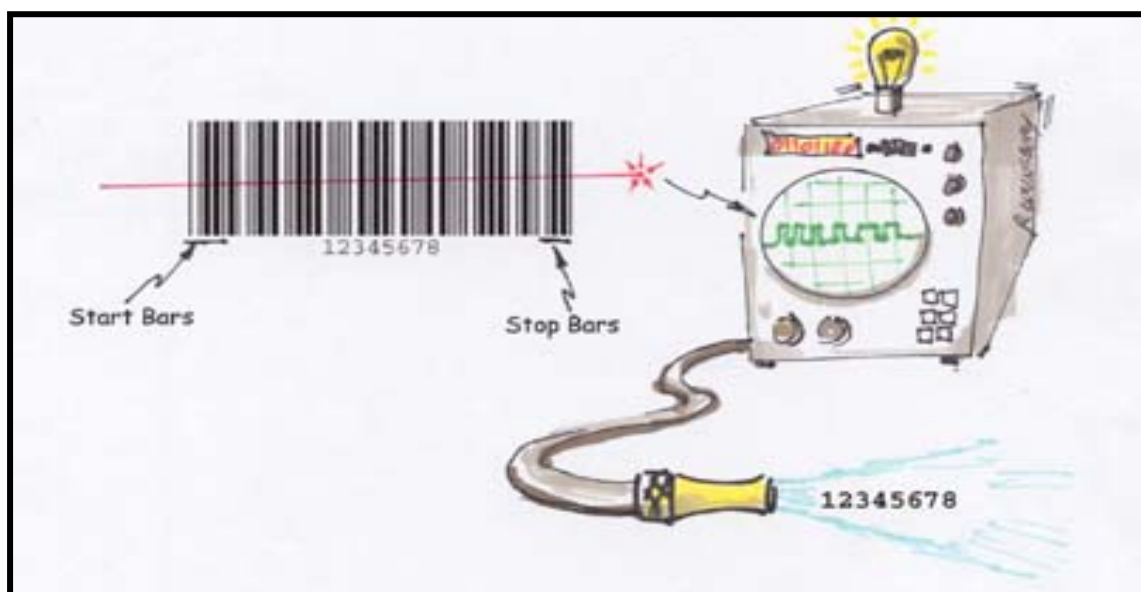


WORKING OF A BARCODE SYSTEM

Each character is represented by a pattern of wide and narrow bars as shown below:-



A barcode reader uses a photo sensor to convert the barcode into an electrical signal as it moves across a barcode. The scanner then measures the relative widths of the bars and spaces, translates the different patterns back into regular characters, and sends them on to a computer or portable terminal



Bar codes are read the same way that people read text from a page; the reflectance and absorption of light. A light of a given wavelength is beamed and moved across a bar code at a consistent speed. The reflected light is measured with a photoreceptor, tuned

to look for light of the given wavelength. The off-and-on (white and black) pattern of the bar code creates an electrical wave that is sent on to a computer chip called a “**decoder.**” The decoder then deciphers the signal into something the waiting computer understands. **Imager** and **CCD** (charge coupled device) bar code scanners read somewhat differently in that they “take a picture” of a bar code symbol, analyze it, and create a conditioned electronic signal that basically mimics that from the reader types described in the paragraphs above

Every barcode begins with a special start character and ends with a special stop character. These codes help the reader detect the barcode and figure out whether it is being scanned forward or backward. Some barcodes may include a checksum character just before the stop character. A checksum is calculated when the barcode is printed using the characters in the barcode. The reader performs the same calculation and compares its answer to the checksum it read at the end of the barcode. If the two don't match, the reader assumes that something is wrong, throws out the data, and tries again.

FOR EXAMPLE:

A bar code found on a loaf of bread doesn't contain the product name, type of bread, or price; instead it contains a 12-digit product number. Now, when this number is scanned by the cashier at the check-out, it's transmitted to the store's computer which finds the record associated with that item number in its database. The matching item record contains a description of the product, vendor name, price, quantity-on-hand, etc. The computer instantly does a “price lookup” and displays the price on the cash register (it also subtracts the quantity purchased from the quantity-on-hand.) This entire transaction is done instantly; think of how long it would take the cashier to key in a 12-digit number for every item you wanted to buy!



To recap: A bar code typically has ID data encoded in it, and that data is used by a computer to look up all specific information associated with the data.

ADVANTAGES OF BAR-CODING

Improved Operational Efficiency: Since barcodes permit faster and more accurate recording of information, work in process can move quickly and be tracked precisely. Quite a bit of time can be spent tracking down the location or status of projects, folders, instruments, materials, or anything else that moves within an organization. Barcodes can help you keep better track so you can save time and respond more quickly to inquiries and changes.

Save Time: Depending on the application, time savings can be significant. Often the most dramatic examples involve the beloved chore of taking inventory. One customer needed a crew of 25 employees working over a weekend to take the 6-month inventory; with barcodes this was reduced to 4 employees and a total of about 5 hours. Even in routine day-to-day operations the time savings of barcodes add up and improve productivity. Consider a shipment of 10 cartons; it will take approximately 2 minutes or more to write down product codes and serial numbers compared to about 10 to 20 seconds to scan the barcodes. In a busy operation this can be a significant saving.

Reduce Errors: Clerical and data entry errors can be a significant source of costs and related problems: extra freight costs, unhappy customers, and time spent to track down problems are just a few examples. In some situations, clerical errors can have a much more dramatic impact; consider the importance of accuracy in pharmaceutical or blood bank applications. The typical error rate for human data entry is 1 error per 300 characters. Barcode scanners are much more accurate; the error rate can be as good as 1 error in 36 trillion characters depending on the type of barcode used.

Cut Costs: Barcodes are effective tools that can be used to address specific, localized problems or integrated into organization-wide information systems. When applied with thought and planning they can save time and reduce errors, resulting in a reduction of costs.

Benefit from Customer or Regulatory Requirements: Regulatory agencies or your customers may impose labeling requirements that you must meet. While these requirements may be a necessary part of doing business, you can save time and money by utilizing the barcodes within your own operations. For example, you can collect shipping manifest information quickly and accurately by scanning the barcode labels that you printed to satisfy the customer.

Improved Management and Better Decision Making: Although hard to measure, this is an important benefit. In many cases, improved management due to automated data collection technology could be the best benefit of a barcode system. A barcode system can easily gather information that would be difficult or impossible to gather in other ways. This allows managers to make fully informed decisions that can affect the direction of a department or company.

Customer Satisfaction: A proper barcode system will speed customer checkout. This will improve customer satisfaction enough to directly increase revenue over time.

Automated Reordering: Accurate stock levels allow for automated replenishment of low inventory

Inventory task become worker independent: Use of bar code readers for physical inventory, eliminates the need for a skilled worker and any one can be given a quick instruction to carry out what earlier would have been a specialist job.

Faster Reconciliation Process: Few errors by the use of bar code technology makes reconciliation faster. Reconciliation is over by the end of physical inventory and it Saves time and money by making the reconciliation faster.

Increased Accuracy: Bar coding increases the accuracy by reducing the likelihood of human errors from manual entry or miscommunication from misread or mislabeled items.

Work In Progress: Many manufacturing and other industries have work that must go through several steps to completion. Barcode systems can track material through each

step of the work and keep detailed records on each piece or batch. When a problem occurs in the output, supervisors and managers can track the work back and quickly resolve the issue. This is one of the best ways to improve both quality and yield in virtually any multi-step process.

Secured Access: A secured access system provides door and gate security by controlling access using encoded employee identification badges. Barcode badge scanners or magnetic stripe readers are mounted at doors and gate entrances, and authorization is provided from a central computer.

Time and Attendance: A time and attendance system uses encoded employee identification badges that are scanned when employees start and stop work. This allows automatic tracking for payroll and eliminates paper time sheets and time clocks.

Quality Control: Barcode systems in quality control can be used to tell a person which test to perform for a given part and where to send it if it fails. Barcode systems can also create permanent records for tracking component and subassembly failures.

BAR-CODING SYSTEM REQUIREMENTS

1. The Bar Code Printer

Bar-code labels are printed using bar code label printers. These printers print labels much faster and are of higher quality than those printed using a conventional laser printer.

2. The Bar Code Label

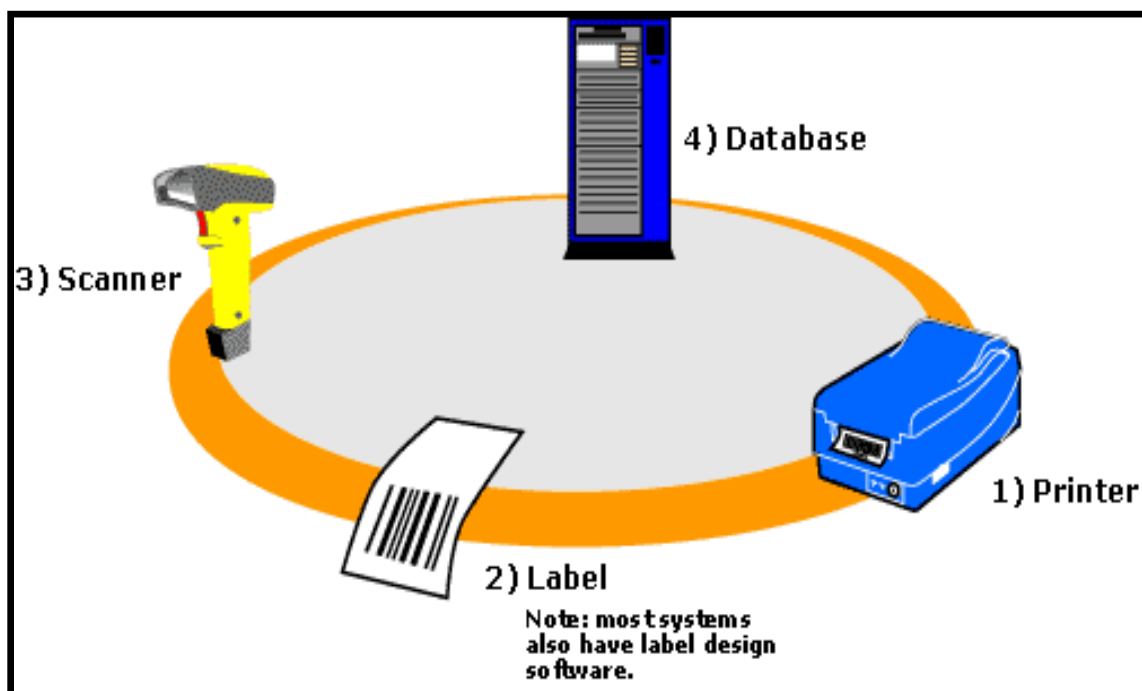
These are the same labels that you will first print than attach to asset for Identification

3. Scanning Equipment for Data Collection

The data collection phase occurs through the use of scanners that instantly and accurately read, capture and decipher the information contained in the bar code label. Scanners read information much faster and more reliably than humans can write or type. Thus, significantly reducing the likelihood of error.

4. Capturing the Data to an External Database

To be able to effectively use the codes you've created and scanned, you need a database of some type to relay and update information. a database can be as simple as an Excel file or an Access database



BARCODE SYMBOLOGY

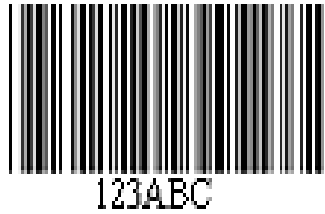
A bar code “symbology” is to bar codes in much what a particular alphabet is to language. Different symbologies of bar codes use different combinations of bars and spaces to represent different characters. Bar code symbologies, like languages, are given different names, like Code 39, UPC or Codabar.

Types of Symbology:-

Different symbologies have been developed in order to satisfy various application requirements. Each has a set of characteristics tuned to these various situations. Recently, there has been a trend toward standardization of symbology selection both within and between user groups and in specific industries.

It should first be determined whether or not a particular symbology is required to comply with an existing industry or organization standard. If no standard exists, it is wise to consult with other businesses like your own, in order to determine whether any standard is forthcoming. The second factor is the type and amount of data that needs to be encoded. Some codes allow full alphanumeric encodation, but usually do so at the cost of the symbol taking up more space. Also, the size of the article or label being encoded must be taken into account, keeping in mind that the density of the characters varies greatly between symbologies and printing method. Finally, compatibility with available reading and printing equipment must be taken into account.

CODE39 Barcode Format: The CODE 39 Barcode Format (aka: 3 of 9) is the most commonly used Barcode format because it enables numbers, upper case letters, and some punctuation marks (Capital Letters A-Z, Numbers 0-9, the "space" character, and the symbols: -, +, /, \$, ., %) to be Bar-Coded. CODE 39 is a variable length format, allowing for encoding any number of digits. This format has become the standard for Government, Manufacturing, Bar-Code Industry, Education, and Business applications.



UPC Bar Code Format: The UPC BarCode Format is the standard BarCode Format for items that are for sale to the public. Probably the largest user of the UPC code is your local supermarket. The UPC BarCode Format is used to encode a 12 digit number. The first number is the number system character, the next five are the manufacturer number, the next five are the product number, and the last digit is the checksum character. This BarCode Format only encodes numeric information and must have 12 characters in length (exactly).



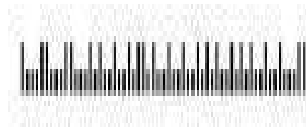
Interleaved 2 of 5 Bar Code Format: The Interleaved 2 of 5 BarCode Format (aka: CODE 25) is a numeric only code that prints out a little larger than the UPC BarCode when ten digits are encoded. The Interleaved 2 of 5 is an excellent choice for numeric only applications, because it has the flexibility of having from 2 to 30 digits. The Interleaved 2 of 5 code requires an even numbers of digits to be encoded. A leading 0 must be added if the digit count is not even.



CODE 128 Bar Code Format: The CODE 128 BarCode Format is a very compact BarCode for codes with all numeric information. Alphanumeric information can also be encoded, but at the expense of loosing the "very compact" benefit. The compact size of the BarCode printed with the CODE 128 when using only numeric digits is achieved by using "double density" (two numbers are included in one character width). When alphanumeric data is encoded, however, CODE 128 uses "single density", and the BarCodes are twice as long. This is not a simple BarCode Format to use, as there are several CODE 128 subsets, each with specific specifications and limitations.



Postnet: - Unique to the United States Postal Service, this symbology encodes zip codes for processing mail for speedy delivery.



PDF417: - Known as a 2D (two-dimensional) bar code, this is a high-density, non-linear symbology that reminds you of a crossword puzzle. But the difference between this and the other bar codes listed above is that PDF417 is really a portable data file (PDF) as opposed to simply being a reference number. Some states require a 2D bar code be printed your driver's license. If your state has this requirement, it's interesting to know that there's room enough in this bar code to encode your name, photo and summary of your driving record, and other pertinent information. As a matter of fact, a PDF417 bar code can encode the Gettysburg Address in a space the size of a postage stamp!



Most Popular Barcode Used:-The most popular BarCode format is the UPC (Universal Product Code) Format, which we find in all supermarket products. Available since the early 1970's this format is known worldwide, and is universally recognized and accepted by most of the companies.

For Automatic Identification Applications, however, **BarCode CODE 39 Format** is the de facto standard for Government, Manufacturing, BarCode Industry, Education, and Business applications. The popularity of the CODE 39 Format is based on several factors, which include: ease of use, ability to code numbers and letters, flexible word length capability (can generate BarCodes with any number of characters), and universal reading capability (BarCode equipment from any manufacturer can read this code).

ONE DIMENSIONAL V/S TWO DIMENSIONAL BARCODES

Typical bar code symbols obviously have both height and breadth. To most people, they'd be considered a two-dimensional object. So, why do we refer to them as one-dimensional bar code symbols? Because, when read, it is only the width of the bars and spaces that is taken into account—the height of the bars is only to give the symbol some built-in redundancy. Typical bar code symbols, therefore, are only read in one dimension.

One other important aspect of one-dimensional bar code symbols is that they seldom represent more than a dozen characters. Therefore, the bar code does not contain any data, per se. Rather; the bar code represents the key to a record in a database, where related information is stored. The best example is a car licence plate which, by itself, doesn't mean much but, when entered into a motor vehicle database, can access all sorts of information regarding the car it is attached to.

In the **Two-dimensional (2D) symbols**, data are encoded in both the height and width of the symbol, and the amount of data that can be contained in a single symbol is significantly greater than that stored in a one dimensional symbol. In fact, over thousands alphanumeric characters can potentially be placed in a single symbol the size of a large postage stamp! Obviously, the main advantage of using 2D bar codes is that possibly a large amount of easily- and accurately-read data can "ride" with the item to which it is attached. There are new applications being created for 2D bar code technology every day. few examples are at the conclusion of this document.

One of the amazing (and beneficial) aspects of two-dimensional symbols is their **potential durability**. To sabotage the readability of a conventional 1D symbol, one only has to add another bar to the beginning or end of the symbol or draw a line through the symbol, parallel to the stripes. This throws off the checks and a balance built into the decoding algorithms of a 1D bar code decoder and makes the symbol unreadable. By comparison, many degrees of redundancy can be built into a 2D symbol. While it makes the symbol somewhat larger, the remaining symbol is remarkably secure. We have experimented with vandalizing 2D symbols with holes,

black marker and tearing. The symbol has remained readable through all of this abuse!

Two-dimensional scanners were far more **expensive** than 1D scanners when were introduced. Recent microprocessor developments have brought the cost of 2D scanners down to about 125% of the cost of a comparable 1D scanner. Also, advancing decoding algorithms have made scanning quicker and easier and provided even greater readability of excessively-damaged symbols.

There are a number of two-dimensional symbologies in growing use today. They fall into two categories: **matrix** and **stacked**. An explanation of each is best done visually through the examples below—the difference is obvious. Two-dimensional bar code symbologies represent one of the biggest advances in the market of Automated Data Collection in the past few years. With advancements in technology, with smaller and faster processors, it can only get better. However, when analyzing any potential data collection system, the advantages must be weighed over the added costs. 2D bar code technology should be thought of as one that is complementary to the traditional 1D scanning technology, not its replacement.

Some example applications for 2D technology:

- ✚ **Tax Return:** – In every nation around the world, there comes that time of the year when tax returns must be filed and, unfortunately, taxes must be paid. The taxpayer could use some tax software, enter the relevant data, and allow the program to perform all needed calculations. When the task is completed, the tax form can be printed out the data and the 2D barcode symbol using any ink jet or laser printer for mailing to the tax authority.

The benefits are obvious: when the form arrives at the tax authority, the data can be captured from the symbol in seconds using a scanner. The data is not only captured quickly, it is captured with 100% accuracy – no errors are introduced by the scanning process. Not only is the direct cost of paying someone to key the data eliminated, but the indirect costs – to both taxpayers and the government - of the errors introduced by

manual key entry are done way with. Since studies show that professional key entry can result in up to 1 error every 300 keys, we know these errors exist.

Moreover, this application has clear potential outside the income tax arena – any situation in which companies or individuals are supplying information to a government in paper form could benefit from this idea. This includes company excise/sales tax returns, the submission of company employment information, and the collection of government economic statistics from business enterprises, among others.

Just by adding a 2D barcode symbol to a form, you create what is, in effect, an "intelligent document", one that can be read by human beings, but that can also be automatically and accurately entered into a computer whenever was required.

✚ **Packing List:-** Trading partners agree on a standard methodology for encoding shipping information in a 2D symbol, attached to a shipped order. Order data (PO number, shipping date, product codes, quantities, etc.) can automatically be entered into the receiver's receiving computer terminal in a couple of seconds.

✚ **Driver's Licence:-** The driver's name, address, licence number, expiry date and driving restriction codes are encoded in a 2D symbol that is printed on the operator's licence. Police officers, car rental agencies, hotels (you name it!) can easily enter in information regarding the licence holder, with the possibility of adding any mis-keyed data.

✚ **Patient Record:-** On a hospital patient's chart record is a 2D symbol, encoding their name, health care number, doctor's name, date of admission, allergies, etc. When direct care is given to the patient, the caregiver or doctor records the action by scanning the bar code. Also, the bar code is scanned when medication is administered and the possibility of giving a patient the wrong medicine is virtually eliminated.

2D Stacked Symbolologies – Examples

PDF417 is a high-capacity two dimensional bar code developed by Symbol Technologies, Inc. A PDF417 symbol can hold approximately 2000 characters of information, whereas a traditional linear bar code has difficulty holding more than 30 characters. The key characteristic of PDF417 is its large information capacity. This also explains its name. "PDF" stands for **Portable Data File**. PDF417 is designed with



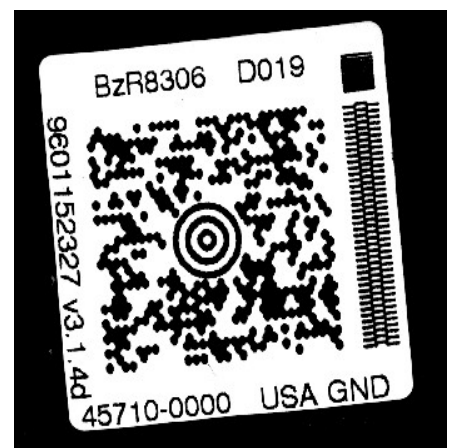
enough capacity to contain an entire data file of information. With traditional linear bar codes, the bar code contains only a key or "license plate". With PDF417, no external database access is needed, because the PDF417 symbol can hold all the information needed an entire portable data file. PDF417 is used today in a wide variety of applications, including logistics & transportation, retailing, healthcare, government, identification, and manufacturing

2D Matrix Symbologies – Examples

- + **DataMatrix** is a two-dimensional barcode that can store from 1 to about 2,000 characters. The symbol is square and can range from 0.001 inch per side up to 14 inches per side. DataMatrix is being used to encode product and serial number information on electrical rating plates; to mark of surgical instruments in Japan; to identify lenses, circuit boards, and other items during manufacturing.



- + **MaxiCode** is a fixed-size code that holds up to 93 data characters. The symbol is composed of a central bulls-eye locator and offset rows of hexagonal elements. Created by United Parcel Service (UPS), the MaxiCode symbol was designed for quick automated scanning of packages on high-speed conveyor lines (special cameras can read a



MaxiCode on a carton travelling at up to 500 feet per minute).

✚ The **QR Code** (Quick Response Code) It can encode up to 2509 numeric or 1520 alphanumeric characters and offers three levels of error detection. The smallest QR Code measures 21 X 21 cells (each cell encodes one bit) and can grow in increments of 4 cells to a maximum size of 105 X 105 cells. The squares in the bottom left, top left, and top right corners are locator patterns. The QR Code was developed in Japan by the Nippon Denso Company.



TYPES OF DATA-COLLECTION SYSTEMS

Barcode data-collection systems fall into three basic types: **Interactive, Batch, & Hybrid.**

➤ An **Interactive** system consists of one or more portables connected in real time to a computer. In these systems, the central computer manages data collection and verification as the user enters data.

➤ A **Batch** system uses one or more portables to gather data that is stored for later input to a computer. This is the most common and most economical portable system. Batch systems can do only limited validity checking.

➤ A **Hybrid** system is a combination of the two.

✚ **Interactive Systems:** Interactive systems have several advantages over batch systems. Almost all systems where barcode hardware is in a fixed location are interactive systems.

✚ **Batch Systems:** Batch systems are generally used with portable readers. They are also used in some fixed-mount systems where the reader must continue to collect data if the computer system goes down. While interactive systems are superior in the ways listed above, **batch systems do have some advantages:**

- I. **Economical for Standard Portables:** Portables can be used for batch or real-time applications. Real-time applications require a costly radio frequency (RF) network. On average, setup costs for batch systems are less than half the costs of RF systems.
- II. **Reliable in Mission-Critical Applications:** Since batch processing distributes data collection to stand-alone units, operation is not dependent on the central computer. If a particular unit fails, it can be replaced. If the central computer fails, data collection can continue.

✚ **Hybrid Systems:** Several systems combine attributes of both interactive and batch modes. The most common are radio frequency systems and batch/interactive

hybrids.

Radio frequency systems use RF signals to connect portable readers to a central computer in an interactive manner. This gives the advantages of an interactive system combined with portability. There are **different types of RF:**

➤The **simplest RF barcode device** is a portable scanner that communicates with a single receiver connected to a computer or terminal.

➤Another type of RF system connects a **portable** to a typical computer network through an RF access point. This has many advantages, such as the ability to "roam" from one access point to another. The range could be virtually unlimited, depending on the number of access points.

➤Batch/Interactive hybrids use **local batch processing** combined with an **interactive link** to a central computer. These work primarily as interactive systems, but they can function independently for a period of time if the central computer fails. These systems are best used for mission-critical applications where data collection is essential.

While most batch systems simply upload data to a central computer, dual mode batch systems can also download data from the computer to the batch system and use it for data verification and other uses. These are not quite so good as real-time interactive systems, but they are better than straight batch systems.

Multiple interactive systems connect more than one interactive system to a network. This way, if one computer fails, another can still manage critical parts of the system.

BARCODE SYSTEM ELEMENTS

- I. **Origin:** You must have a source of barcodes. These can be preprinted or printed on demand.
- II. **Reader:** You must have a reader to read the barcodes into the computer. The reader includes an input device to scan the barcode, a decoder to convert the symbology to ASCII text, and a cable to connect the device to your computer.
- III. **Computer system:** You must have a system to process the barcode input. These can be single-user, multi-user, or network systems

How Barcodes are read?

Bar codes are read by sweeping a small spot of light across the printed barcode symbol. Your eyes only see a thin red line emitted from the laser scanner. But what's happening is that the scanner's light source is being absorbed by the dark bars and reflected by the light spaces. A device in the scanner takes the reflected light and converts it into an electrical signal.



The **scanner's laser** (light source) starts to read the bar code at a white space (the quiet zone) before the first bar and continues passing by the last bar, ending in the white space which follows it. Because a bar code cannot be read if the sweep wanders outside the symbol area, bar heights are chosen to make it easy to keep the sweep within the bar code area. The longer the information to be coded, the longer the bar code needed. And as the length increases, so does the height of the bars and spaces to be read.

Barcode scanners: Bar code scanners are designed to read **imprinted bar / matrix code symbologies**. Bar code scanners can be **slot card scanners**, **fixed mount scanners**, or **hand-held scanners**.

- i. **Slot card bar / matrix code scanners** are designed to read imprinted bar or matrix code cards that are passed through the aperture on the reader. A horizontal scanner is basically a tabletop, where the code is passed over the scanner face. A vertical scanner sits on top of a counter or stand where the code is passed in front of the scanner face.



- ii. A **wand scanner** is typically made from 1/2" stainless steel tubing or from plastic; the optics are in the front with a cord out the back. The wand scanner must be moved by the user's hand across and in contact with the bar code. While the wand is moving across the bar code, the reflected light is converted to electrical signals through a photocell in the wand.



III. A **hand held or gun type scanner** can be non-contact or near-contact scanner, which generally uses a beam of focused light to read the bar code. The most common form of active non-contact scanner uses a laser beam that is automatically scanned back and forth across the symbol at a high rate. Near-contact scanners utilize a CCD device. Active non-contact or near-contact scanners may be stationary as an option. Gun type readers can also be fitted with optional fixed mounting. They can be configured to recognize a variety of bar code symbologies.







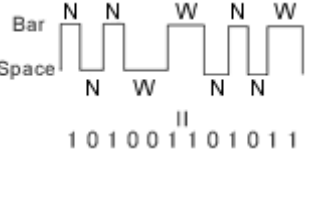

These include, but are not limited to, Codablock, Codabar, Code 1, Code 11, Code 128, Code 16K, Code 39, Code 49, Code 93, Data Matrix or Data Code, EAN, Interleaved 2 of 5, Matrix 2 of 5, Maxicode, MSI/Plessey, NW-7 Code and VeriCode.

Bar code scanners can be equipped with one of nine basic user interfaces including integrated graphic display, wand or laser emulation, keyboard connection, serial, parallel, modem, Ethernet, wireless, or PCMCIA (PC Card). An **integrated graphic display** is a LCD, etc. to indicate read or decoded info. Wand or laser emulation needs an external decoder. A **keyboard connection** is usually made through a keyboard decoder wedge. **Serial output** is a standard digital output protocol (serial) such as RS232, RS422, RS485, etc. Parallel output is a standard digital output protocol (parallel) such as IEEE488, Centronics port, printer port, etc. A **modem** is a modulator-demodulator. A modem is a device or program that enables a computer to transmit data over telephone lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms. Ethernet is a local-area network (LAN) protocol developed by Xerox Corporation in cooperation with DEC and Intel in 1976. Ethernet uses a bus or star topology and supports data transfer rates of 10 Mbps. The Ethernet specification served as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers. Ethernet uses the CSMA/CD access method to handle simultaneous demands. It is one of the most widely implemented LAN standards. A wireless interface is usually RF or IR. PCMCIA devices (PC Cards) are credit-card-sized peripherals predominantly used in laptop

computers. The **PCMCIA adapter** takes the place of a COM port on a standard bus. The card is plugged into a 68-pin host socket that is connected either to the motherboard or an expansion bus. An adapter then translates the PCMCIA signals into signals usable by the computer.

Common features on bar code scanners include audible or visual “good reading” indicators, omni-directional reading ability, numeric or alphanumeric keypad included, and memory for data and program storage.

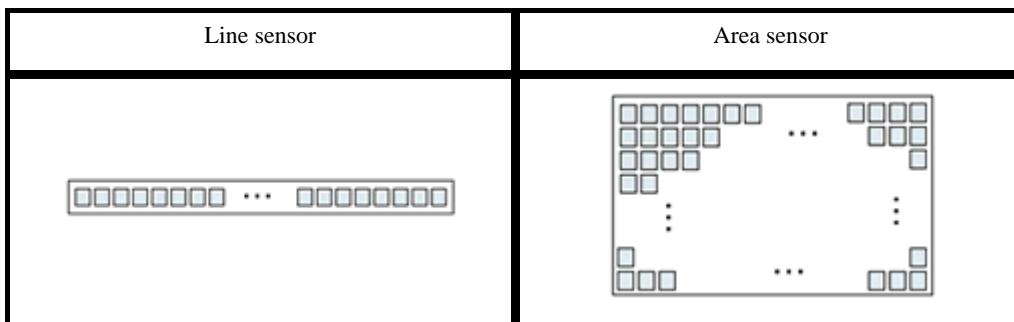
PRINCIPLES OF BAR CODE READING

	<p>A bar code consists of white and black bars. Data retrieval is achieved when bar code scanners shine a light at a bar code, capture the reflected light and replace the black and white bars with binary digital signals.</p>
	
	<p>Reflections are strong in white areas and weak in black areas. A sensor receives reflections to obtain analog waveforms.</p>
	
	<p>The analog signal is converted into a digital signal via an A/D converter. (Binarization)</p>
	
<p>"4" of CODE 39</p>	<p>Data retrieval is achieved when a code system is determined from the digital signal obtained. (Decoding process)</p>

TYPES OF BAR CODE SCANNERS

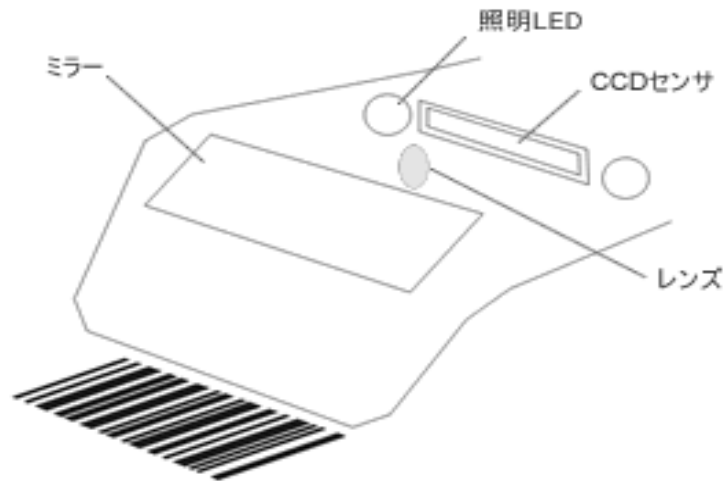
There are three major types of bar code scanner reading; CCD, laser and pen. Each mechanism and their characteristics are explained below:-

- I. CCD Sensor:-** This method uses a semiconductor device called CCD (Charge Coupled Device), which converts light signals into electric signals. The CCD sensor used in a bar code scanner uses a line sensor (linear sensor) in which elements are lined up in a single horizontal row. (The CCD used in a digital camera or two-dimensional code scanner is called an area sensor in which elements are lined up vertically and horizontally.)

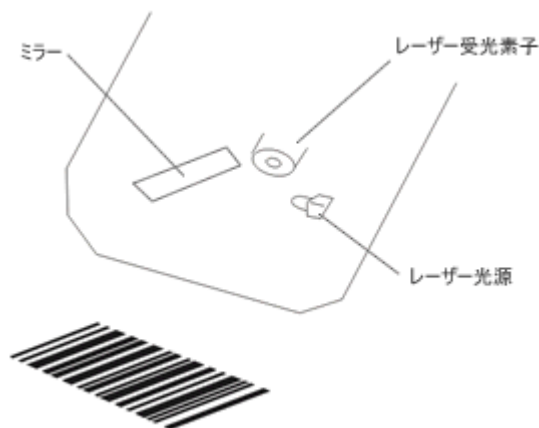


The CCD method bar code scanner has a built-in light. A scanner shines this light at a bar code and its reflection is captured via CCD for reading.

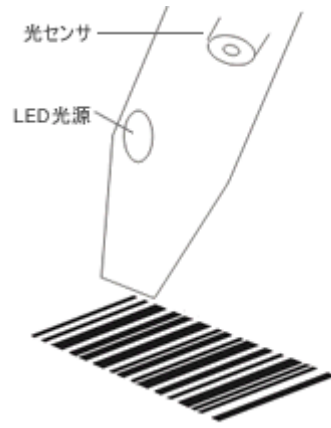
A bar code is captured once, allowing fast reading. There are no movable parts and the impact resistance is excellent and very accurate in measurement.



II. Laser Method:-Laser light is shone on the label surface and its reflection is captured by a sensor (laser photo detector) to read a bar code. A laser beam is reflected off a mirror and swept left and right to read a bar code. Using laser allows reading of distant and wide bar code labels.



III. Pen Method:-This method only has a LED light source and a sensor to capture its reflection. Since a person moves a scanner to read a bar code, practice is required for operation. The **mechanism is simple**, making this method **inexpensive**



ADVANCED SCANNING

Advanced scanning is a reading method with improvements to scanners that use the conventional CCD method. It demonstrates superior performance in reading compared to the conventional CCD method.

Characteristics of Advanced Scanning:-

- I. Poor quality and high density label reading:-**With various improvements to the reading mechanism in advanced scanning, high density and poorly printed bar code labels can be read easily. Even bar codes that caused reading to be stressful in the past can be read with ease, while the ease of use has been improved considerably.



Poor quality label



High density label

- II. Fast bar code reading:-**The laser method makes it possible to scan **approximately 30 times per second**. For a standard CCD, it only 100 to 200 scans per second are possible. The advanced scanning system achieves up to approximately **400 scans per second**. This is superior to conventional bar code readers.

TYPES OF BAR CODE READERS

Bar code symbols can be scanned many ways by many different devices. A bar code reading system is typically made up of two components: **an interface box**, commonly referred to as a **decoder**, and what is unexcitingly referred to as the input device. The decoder is where all the magic happens. The input device does the “grunt” work, the decoder does the sophisticated stuff. Almost always, these days, these two devices are one and are integrated into one package. That is, the decoding is done within the input device and not in a separate device. There are, essentially, three ways these devices are put together to scan bar codes. They are known as **on-line systems, off-line systems and wireless** (formerly referred to folks in our industry as RF—radio frequency systems. You may also have heard of cordless systems. Even though you may think this is just another name for wireless, you’re wrong. Read on for all of the dirt on bar code scanning.

✚ **On-Line Systems** :-These systems are semi-permanently attached to a computer, terminal, cash register or other “intelligent” device. Their main job is to scan a bar code symbol, interpret (decode) the bar code, and immediately transmit it. On-line systems generally take three forms; wedge, serial and USB, depending on the computer system and the preference of the user. Wedge systems are usually found being used on IBM and Apple PCs and compatibles, as well as IBM mainframe terminals. They “wedge” between the computer keyboard and PC or terminal. Serial systems are most often used with RS-232 dumb terminals (Wyse, Amdek, etc.) but are also interfaced with PCs and cash registers that accept serial data through their RS-232 port.



USB interface scanners can be used with desktop and laptop PCs, as well as Imacs and some other computers. It is worth noting here that on-line bar code readers are also available with interfaces such as PCMCIA and other add-on cards, often found in palmtop computers. Other interfaces allow bar code readers to be added to Handspring Visors, Palm computers, and Compaq Ipaqs.

Working of Online Decoders:- All on-line decoders work the same way; changing the analog signal sent to them by the scanner, converting that signal, and making the computer accept the scanned data as if in-keyed. Therefore, all on-line systems are, essentially a second keyboard to the computer - no software or device drivers are required as this is a “hardware” interface, only. On-line systems are programmable, usually by scanning bar coded programming commands into the system from a special programming menu included with the system. All program commands are held in a non-volatile memory area of the decoder. They can only be changed by scanning in new program commands and overwriting the previous program. Why would you want to program a bar code reader? Well, you may wish to have the “enter” character automatically transmitted after every scan, or you may need to set the decoder up to transmit keyboard codes from an XT-class PC, as opposed to an AT-class. Other programming techniques can actually edit, parse or not accept a bar code symbol before it is transmitted to the computer system. Recently, cordless on-line bar code readers have been developed. They all use wireless RF technology to transmit (up to 100 feet or more) the bar code data from the scanner to the computer, but they are not wireless bar code reader terminals! A cordless bar code reader functions just like the tethered readers described above, except that the tether is wireless. So, like the channel changer on your TV set (which is typically infrared, not RF—but who’s getting fussy?) the transmission is one way only. That means that, apart from getting an acknowledgement beep back from the base system attached to the PC or terminal, you have no assurance that the bar code data you’ve just scanned has gone into the appropriate screen field. Cordless scanners, therefore, are probably most practically used up to a few steps away from the computer, or for very simplistic (i.e., scan, scan, scan,...) data input.

✚ Off-line Systems :- While an on-line system tethers the operator to within a few feet of the terminal, off-line systems open up a whole new realm of applications. Such systems are simply a hand-held computer outfitted with a bar code reader and may also be called PDTs (Portable Data-Entry Terminals), hand-helds or portables. They are powered by batteries, which are usually rechargeable and typically weigh less than two pounds. Portables can be thought of in two different ways: they can be simply used as data collection devices, or they can be used as

an extension of the host computer system and do more than just store collected data. Originally, due to less-developed programming tools, obtuse operating systems and lack of RAM, portables could only function as storage for inventory counts or surveys. Now, with megabytes of RAM, familiar operating systems (like DOS) and powerful programming languages, hand-holds are virtually as powerful as a desktop computer. Hand-holds are typically pre-programmed for a particular data-gathering task. The standard program “boots” when the unit is turned on, insulating the operator from the operating system. Programming is done by generating



a program on a PC and downloading the program to the hand-held, or by utilizing a standard data collection program already residing in the unit. Communications to and from the portable are RS-232, or sometimes these days, USB. A PC is almost always used as the communicating device to hand-held as they are cheap, relatively easy to program and serve as an excellent “way station” for files traveling between the portable(s) and host system.

It carries portables in numerous configurations to fit a multitude of applications and application environments. Some hand-holds are as small as a credit card! Most all of the portable systems these days are integrated: combining both the bar code scanning device and the hand-held computer. Some can even operate underwater or at -40 degrees! Still, the majority of these devices utilize a text-based interface, displaying 2, 4, 8 or 16 lines on their integrated LCD. These can run a proprietary operating system, or often, MS-DOS. Newer systems use graphical user interface operating systems such as Palm, Windows CE/Pocket PC, Symbian, or EPOCH.

✚ **Wireless RF (Radio Frequency) Systems :-** These systems are essentially hand-holds with a radio frequency transmitter and receiver integrated within the



system. They provide the best of all worlds as they are constantly on-line to the host system, yet portable enough to be used far away from the host computer. Some are based on LAN technology, some are WAN—using public wireless networks to communicate to and from the device anywhere in a metropolitan area. With the advent of the IEEE 802.11x series of wireless standards, virtually all of the wireless bar code reader terminals we provide function within this universal standard for wireless LANs. Other devices such as desktop and laptop PCs, palmtops, telephones (using VoIP—voice over IP technology) or even local area pagers can utilize the same wireless network used by the mobile bar code readers.

BAR CODE INPUT DEVICES

The bar code scanners one sees at the grocery store are very sophisticated. Most applications do not call for such a method of scanning and are usually limited to bar code technologies scanners held in the hand of the operator. The proper scanner must be matched to the application and type of bar code being used in order to achieve reliability, accuracy, speed, and operator acceptance. This is one area where economy is not always best. Simply speaking, most any input device can be attached to any system (on-line, off-line or wireless). Wand (or Pen) Scanners used to be the most popular of all the bar code input devices, but the nominal cost difference between them and the lower end gun-type scanners has made them less fashionable. To use one properly, the operator must put the tip of the wand in the white zone preceding or trailing the bar code and slide the wand across the bar code at a consistent speed. The angle of the wand must be maintained throughout the scan. Scanning with a wand is an acquired “knack” and can only be practically used if the bar code is on a hard, flat, preferably horizontal surface.

✚ **Slot/Badge (or Swipe) Readers** are basically wand scanners mounted within a box. Scanning is achieved when a card or document with the bar code printed near its edge is slipped through the reader. First-time read rates are higher with this kind of reader than a wand, but the bar code must be aligned properly and be near the edge of the card. CCD Scanners use a Charge Coupled Device, like those found in digital or video cameras, to accomplish scanning. Use of a CCD Scanner involves placing the reading head on top of the bar code to be scanned. The code is “flashed” with LED light from the CCD and the resulting reflection is measured in the CCD’s photosensors. CCD Scanners typically require virtually contacting the bar code (although some will function from a distance of a few inches), yet there is no scanning movement, nor degradation of the image due to scratching the media surface as with wands.



Imaging Scanners are the latest and greatest versions of CCD scanners. With a CMOS chip at their heart, doing both the scanning and the decode processing, these scanners are very efficient. Most are capable of scanning both 1D and 2D bar code symbologies. One nifty potential feature with an imaging scanner is that it can not only scan a bar code, but also take a digital picture! Therefore, the signature of the person receiving a package (or a picture of their face!), the damage on some freight or a returned rental car, or the placement of boxes in the back of a transport truck, can all be captured by the same scanner that scanned the bar code.

✚ **Hand-Held Moving Beam Laser Gun Scanners**

utilize light emitted from a laser diode source. An oscillating or rotating mirror in the scanner moves the beam back and forth across the bar code, requiring no movement on the part of the operator. The scanner is usually anywhere from 3 to 10 inches from the bar code symbol, although special laser scanners are now available which will read bar codes from 20 feet away, or more!



✚ **Fixed-Mount Moving Beam Laser Scanners** are essentially the scanner noted above, mounted in a stand. The scanner head faces towards the bar code symbol (usually down) and is activated when the item to be scanned is put beneath it or crosses a sensor beam. These scanners are often used in libraries as they free the operator's hands to move the book through the scanner. ((Imaging scanners can also perform this trick.) Another place where fixed-mount moving beam laser scanners are used in factory and warehouse automation systems. The scanner is usually mounted above a conveyor belt where it scans objects as they move past.



✚ **Slot (Flat-Top or Projection) Laser Scanners** are usually seen at checkouts of large grocery stores.



They are only used when the items to be scanned can be moved past the scanning window by hand and where the “throughput” required is very great. The cost of these scanners is considerably less than it was a number of years ago, comparing favorably with hand-held laser scanners .

PREPRINTED BAR CODE LABELS

Anyone who thinks that the term “bar code label” means a bar code image, printed on paper, with a semi-permanent pressure-sensitive adhesive is very mistaken. These days, a bar code label can be made of everything from plastic to metal, fabric to film. There is literally a bar code label available for any application or environment.

- I. **Laser Imaged Labels :-** For an economical, high-quality image on paper, laser imaged labels are excellent for low- to high-density bar code symbols. Produced at a resolution of 200-600 dots-per-inch, laser labels can come with standard permanent or removable adhesives and with or without a protective, laminate or lacquer coating.



- II. **Photocomposed Paper:-**Produced in sheets or rolls with a print resolution of over 1200 dots-per-inch, each label is literally a photographic original. Used in applications where medium- to ultra-high densities are required, these labels are made of archival photographic paper with an application-specific adhesive applied on the back. The face of the label is protected with either a laminate or lacquer coating. Photocomposed labels provide the highest first-pass-read-rate of any bar code print technology.



- III. **Photocomposed Mylar/Polyester :-** Virtually the same as photocomposed paper labels, with the exception of being made completely from very durable plastic. These labels can stand up to great abuse and are resilient to water and many caustic or solvent-type chemicals.



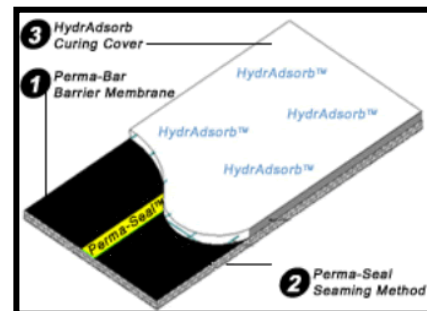
IV. **Anodized Aluminum**:-Usually classed as "tags" rather than labels, these are used in extremely-abusive environments. Sometimes supplied with a pressure-sensitive adhesive, they are also attached to articles with a rivet or wire loop. Capable of standing temperatures of over 1000 degrees F they are used in very special applications requiring the ultimate in durability.



V. **Fabric** :-Having the bar code bars indelibly printed into a fabric tag allows these labels to be used in tracking laundry, uniform and other textile products through multiple cleanings. The fabric labels can either be sewn into the article or "heat fused". Such labels will typically remain scannable for between 50 and 100 dry cleanings or washings.



VI. **Perma-Bar** :-The Perma-Bar system is an electroplating/etching system capable of applying a bar code to most any conductive metal surface. This is the closest thing one can currently come to a "permanent" bar code label. Perma-Bar allows things such as tools and surgical instruments to be identified with a bar code, without the physical addition of a label or tag. The image is almost impossible to remove and will stand up to autoclave and high temperature situations where other labelling systems fail.



VII. **Thermal Transfer** :-Thermal transfer technology provides excellent bar code quality at the expense of lower-resolution text. These labels are available



in small or large runs on paper or synthetic materials. Also available are plain or laminated labels manufactured on polyester or destructible vinyl; excellent materials for use in fixed asset control systems.

VIII. **Other Specialized Labels:**-We also have access to other very specialized labels for applications requiring stainless steel, ceramic or magnetic labels as well as PCB board manufacturing labels, capable of adhering to components through wave soldering processes.

TODAY'S SITUATION AT ETA MELCO

- 5003 unique codes
- 1334316 total units in the store
- Net Worth 15.966 million DHS/-
- Average 75 issues in a day , maximum 100 issues
- Physical inventory twice a year, High value items once a month

Practiced Procedures for Stores:-

- Receipts are received from the principal
- They are cross checked with the packing list
- Information of the received tools and material is entered into orbits
- The goods are then arranged in the store and placed in bins
- Tools and material is issued against a requisition
- A issue slip is printed and information is entered into orbits
- The pickers loads the tools and machine based of the issue slip
- Acknowledgement is received from the site for received goods

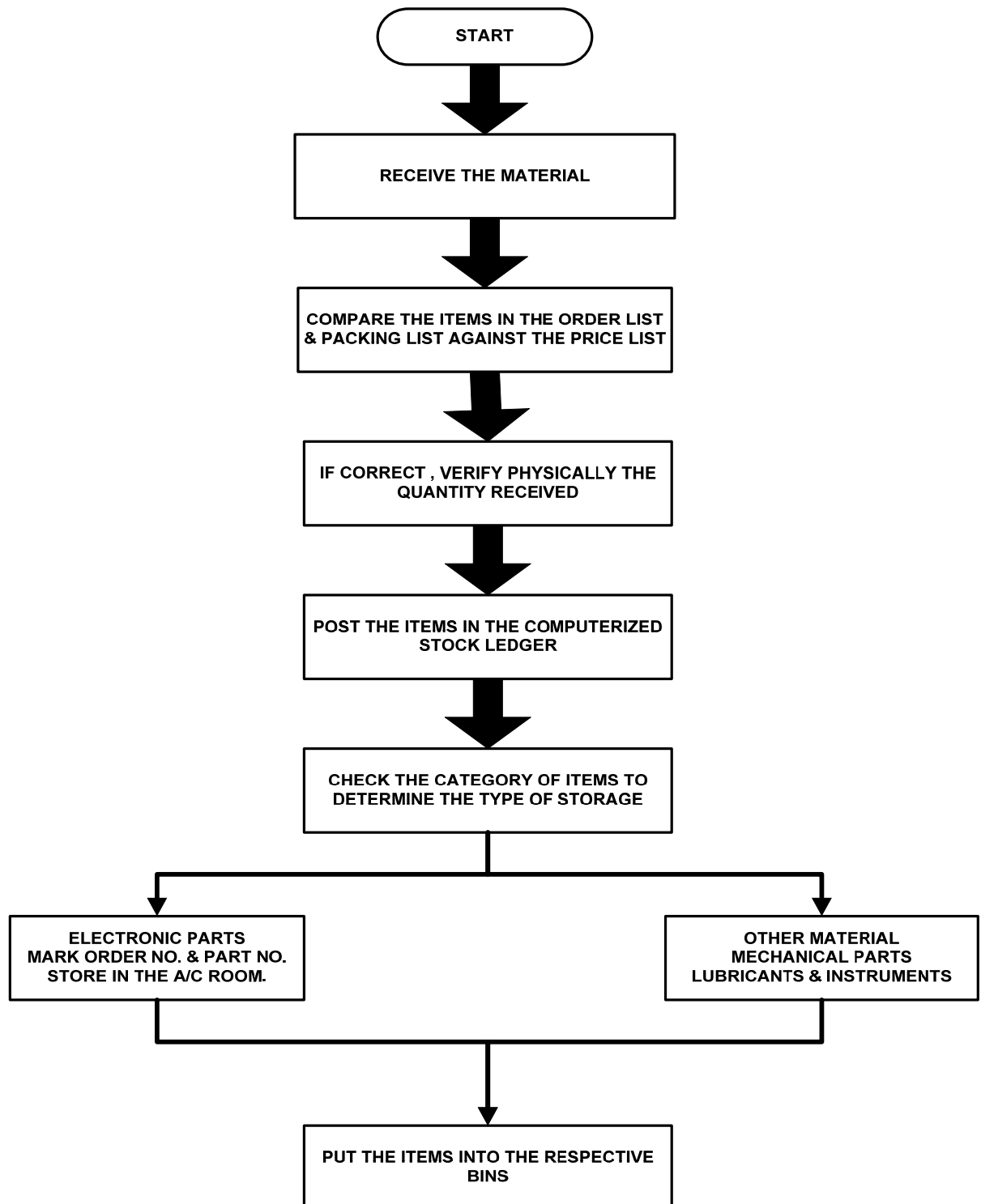
Bar Code system Implementation for ETA Melco Stores

- Develop a scheme or logic for bar coding or each tool and material to be stored.
- Create a master database storing this information (software logic & printer)
- Print the labels and affix them on the present inventory (printer and label)
- Use the implemented bar codes to carry out inventory using bar code readers

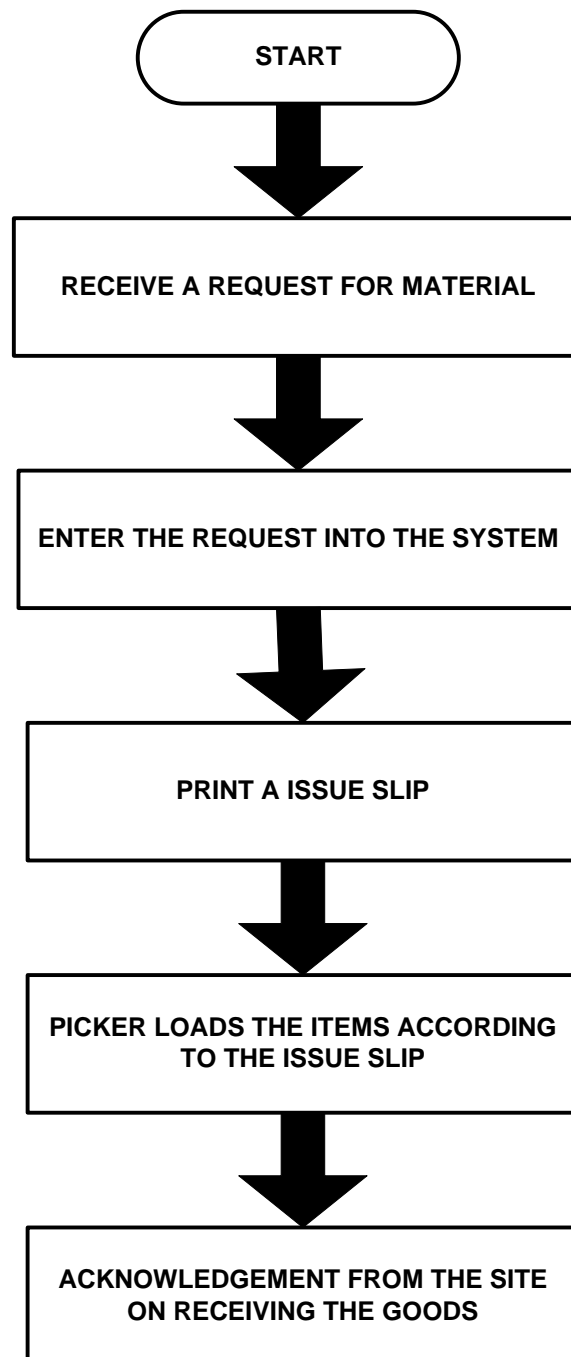
Integration with Present Procedures:-

- Uses the existing Item number
- Prints the existing description
- Stock take process reconciles till the general ledger
- Researches answers through the file using the purchase order, appropriation request, issues and returns
- Download and upload data to any BackOffice system

IN BOUND FLOW



OUT BOUND FLOW



PROPOSED IMPLEMENTATION PHASES

➤ **PHASE I**

- 1) Decide on the Bar-coding Symbology.
- 2) Design a Label Format.
- 3) Print the Labels.
- 4) Affix the Labels on the Product/Parts.

➤ **PHASE II**

- 1) Load Item Master into the PDA Scanner.
- 2) Do Physical Inventory using the Scanners.
- 3) Get Variance Report Instantaneously.

➤ **PHASE III**

- 1) Use PDA Scanners for Issue Transactions.
- 2) Integrate to Back Office System.

HW/SW Requirements:-

- 1. The Bar Code Printer:-**Bar-code labels are printed using bar code label printers. These printers print labels much faster and are of higher quality than those printed using a conventional laser printer.
- 2. Consumables:-**These are the same labels that you will first print than attach to asset for Identification. Thermal Transfer Ribbon for giving long life for the printed barcodes.
- 3. Scanning Equipment for Data Collection:-**The data collection phase occurs through the use of scanners that instantly and accurately read, capture and decipher the information contained in the bar code label. Scanners read

information much faster and more reliably than humans can write or type. Thus, significantly reducing the likelihood of an error.

- 4. Capturing the Data to an External Database:**-To be able to effectively use the codes you've created and scanned, you need a database of some type to relay and update information. a database can be as simple as an Excel file or an Access database

COST JUSTIFICATION

Estimated Infrastructure Cost for Barcode Implementation at ETA Melco

- Barcode Printer 5,000 DHS.
- 2 Keyboards Wedge 2,000 DHS.
Scanners
- 3 PDA's 12,000 DHS.
- Consumables 16,000 DHS.
(Labels & Resin Ribbons)
- Software Development 10,000 DHS.
- Integration with Back Office 10,000 DHS.

➤ Total Investment -----55,000 DHS.

Estimated Recurring Cost

- Consumables 25% of 16,000 DHS = 4,000 DHS.
- Integration with back office 25% of 10,000 DHS= 2,500 DHS.

➤ Total Recurring Cost----- 6,500 DHS.

Return On Investment

- Savings by reducing Manpower on Data Entry-**36,000 DHS./Year**
- Savings on Reduced Time and Manpower half-yearly Physical Inventory Process-**8000 DHS.**

➤ TOTAL SAVINGS:- 44,000 DHS./Year

- That's Substantial!!!

WHAT NEXT ...ASSET TRACKING USING BAR CODING

Searching for equipment, tools, or files can mean lost time, decreased productivity, and lower profits. If your asset management system is a liability, take control with an automated tracking system.

- Track tools and equipment to improve asset utilization
- Identify files and keep track of who is using them
- Automate shelf and bin management
- Track fixed assets and slash inventory time
- Help manage IT equipment and upgrades
- Identify pallets, totes, and returnable plastic containers

Why Bar-coding for Asset Management?

- Bar-coding allows asset numbers, locations, Organizations and other descriptive information to be gathered with keyless data entry that is simple and faster
- Barcoding helps to have more accurate data than manual data collection
- Use of Portable barcode readers in the field allows instant man-to-machine communication
- The readers are programmed to prompt even the most non-technical personnel through the inventory process
- It requires minimal staff training
- Barcoding system helps to track Assets on a perpetual basis.

HARDWARE & SOFTWARE REQUIREMENTS

Hardware Needs for Asset Tracking:-

At Site

- A Windows Based PC with
 - 64mb RAM
 - 20GB Hard disk
 - Barcode Scanner
 - Barcode Printer
 - An internal / external modem with dedicated telephone line

At Office

- A windows based Desktop PC with
 - 128mb RAM
 - 40GB Hard disk
 - An internal / external modem with dedicated telephone line

Software Needs for Asset Tracking:-

- **At Sites**
 - PC Application software for Asset management
 - Hot sync application for Handheld application interface
 - Handheld application on Asset Tracking
 - Label Printing software
- **Head Office**
 - Connectivity software to the sites
 - MIS reporting tools and consolidation modules

Advantages Of Asset Tracking:-

- Immediate Return on Investment
- Fast implementation type
- State of Art technology
- Improved Control on Fixed Asset Management
- Speed Up Asset Tracking Process
- Improve Accuracy
- Locate Assets Easily
- Track IT Related Information
- Maintain Insurance Records
- Comply with Government Regulations
- Meet Audit Requirements
- Improve Depreciation Reporting
- Minimize Paper Work
- Create One Central Asset Repository
- Keep History of Asset Use

➤ Fixed Assets At ETA Melco Includes:-

- 1) Computers
- 2) Printers
- 3) Fax Machines
- 4) Photo Copy Machines
- 5) Scanners
- 6) Furniture:-Tables, Chairs, Cabinets etc.

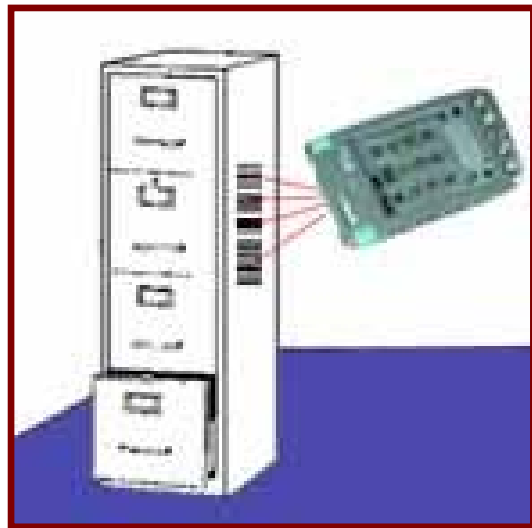
- These assets contribute to the fixed capital of the company and its value depreciates annually.
- Presently fixed assets are bought and checked in based on the requirements of the company.
- And the initial inventory count is done based on the receipts .

- No Regular annual physical inventory checks for fixed assets-Can eventually lead to loss of inventory as well as money.
- Items are replaced not based on the depreciated values but on the requests of the employees-Done after a thorough inspection by the accounts department.

STEP BY STEP APPROACH

1. Scan a location barcode as you enter a room, building, etc.
2. Track assets by - building, room, floor, office, cubicle, campus, etc.
3. Put a location barcode on the doorjamb.
4. Scan asset barcodes
5. Can configure your own scanner

- **Palm Pilot**
SPT 1550 Scanner shown here



6. Next enter or scan in asset Description, serial, condition, etc
- **Can be done using DataKeyer Software or any customized software**



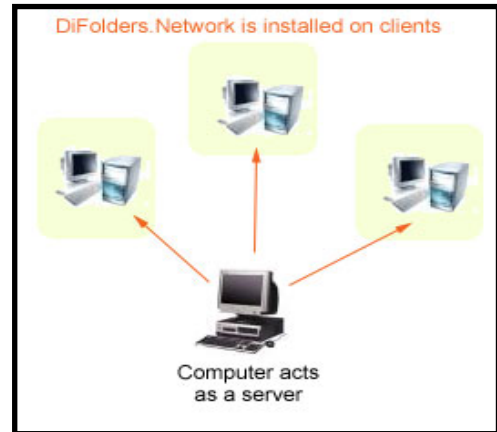
7. Upload from the scanner to The Tracking Software on your PC
8. Easily print reports, sort, select, locate
9. Know everything about your assets.

- Months later, go back with your Auditor Software.
- Scan location barcodes and asset barcodes. No data entry required. Scan Only.
- Upload the scans.
- Know what is missing, where it is located, what has moved, who is responsible, etc.



10. Share data and reports across your network

- Install on your network
- Share data with multiple users



Inventory Counting----Know What's in Inventory

- ❖ Scan an item barcode.
- ❖ Count the number of items in inventory.
- ❖ Upload & Update Inventory.
- ❖ Print Reports - Stock Status, Re-Order, Inventory Valuation, Inventory Location



Use Data Lookup

- Download data to your scanner.
- Scan barcodes on assets
- Find out what you need to know about your assets, your PC's, your test equipment



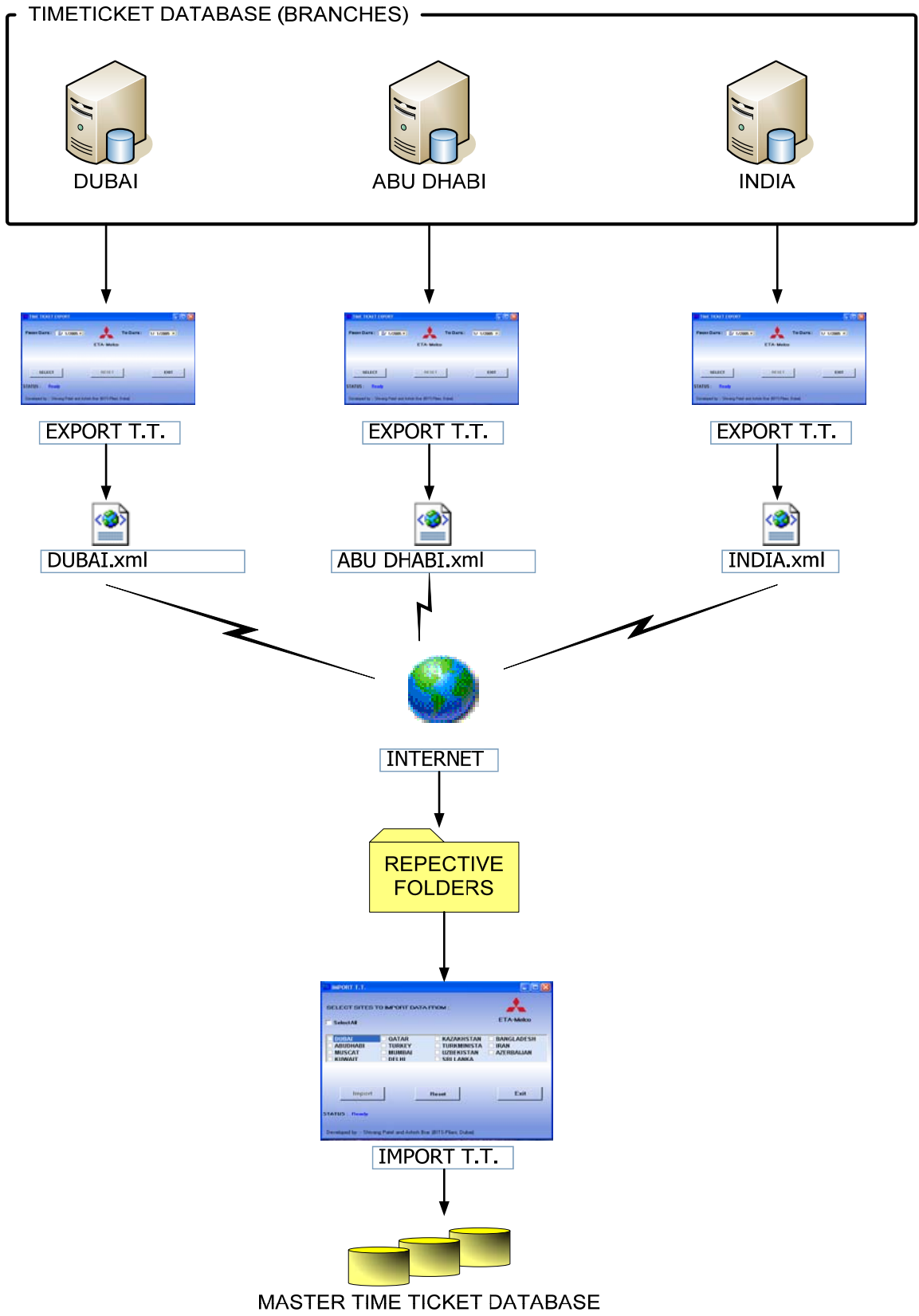
EXPORT IMPORT SCRIPT

As a part of our practice school 2 program at ETA Melco we took the task of developing a suite of two software's to add functionality to the time ticket software being used by various branches of ETA Melco. The software we developed, EXPORT T.T. & IMPORT T.T. will allow the users to export time ticket data from a computer which has TIME TICKET installed on it and import it into the master database in the head office which allows us to generate reports locally.

The software's were developed in Visual Studio .NET and make extensive use of SQL ADO .NET and XML. The software's developed require that the system should have .NET framework installed. Presence of Time Ticket Analyzer is also a pre requisite.

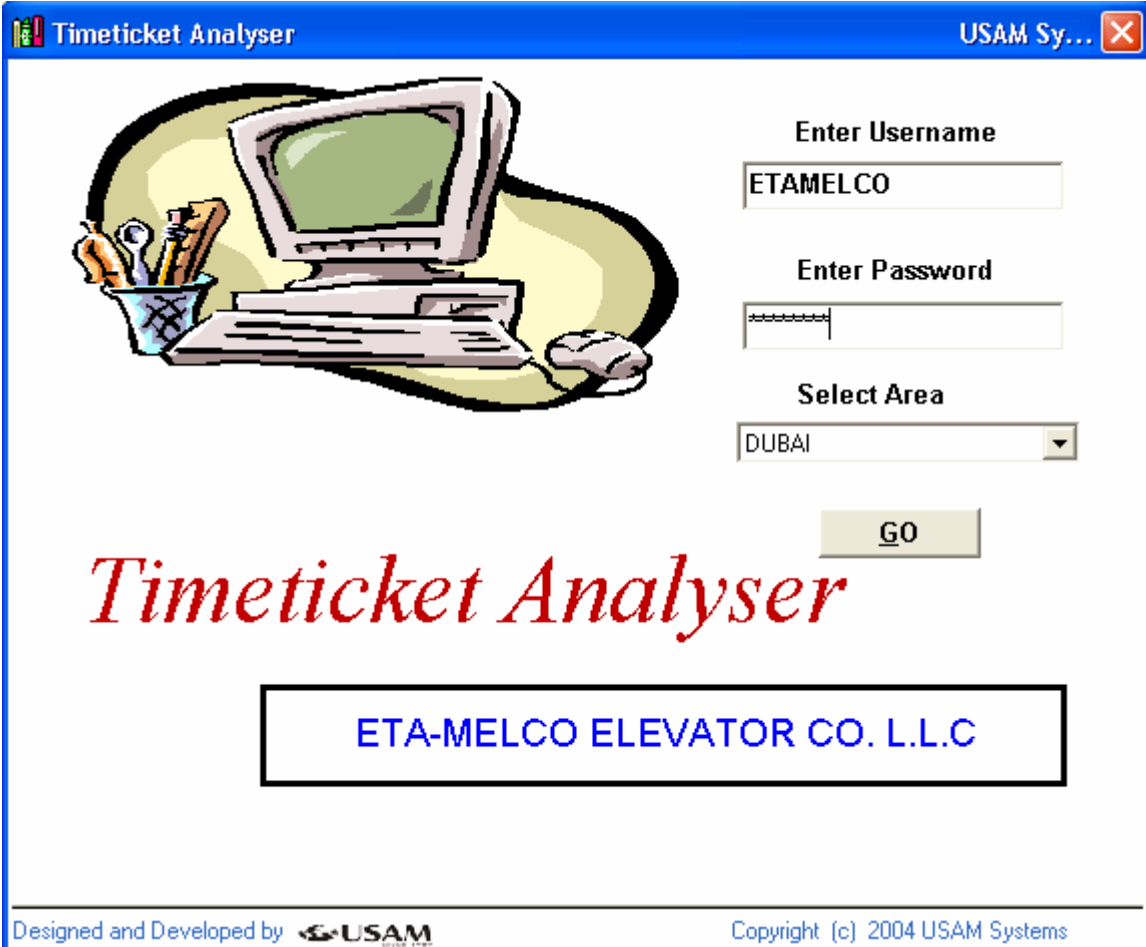


While developing of this software emphasis was made on the efficiency of the database transactions, size of the export file and friendly user interface.



TIME TICKET ANALYSER

TIME TICKET software as the name suggests is responsible for tracking the man hours that are put into a particular job. It identifies the person using a card number given to him. It is also used for keeping track of the status of the job and keeps a record of when the status was changed from one stage to another.



Timeticket Analyser

USAM Sy...

Enter Username
ETAMELCO


Enter Password

Select Area
DUBAI

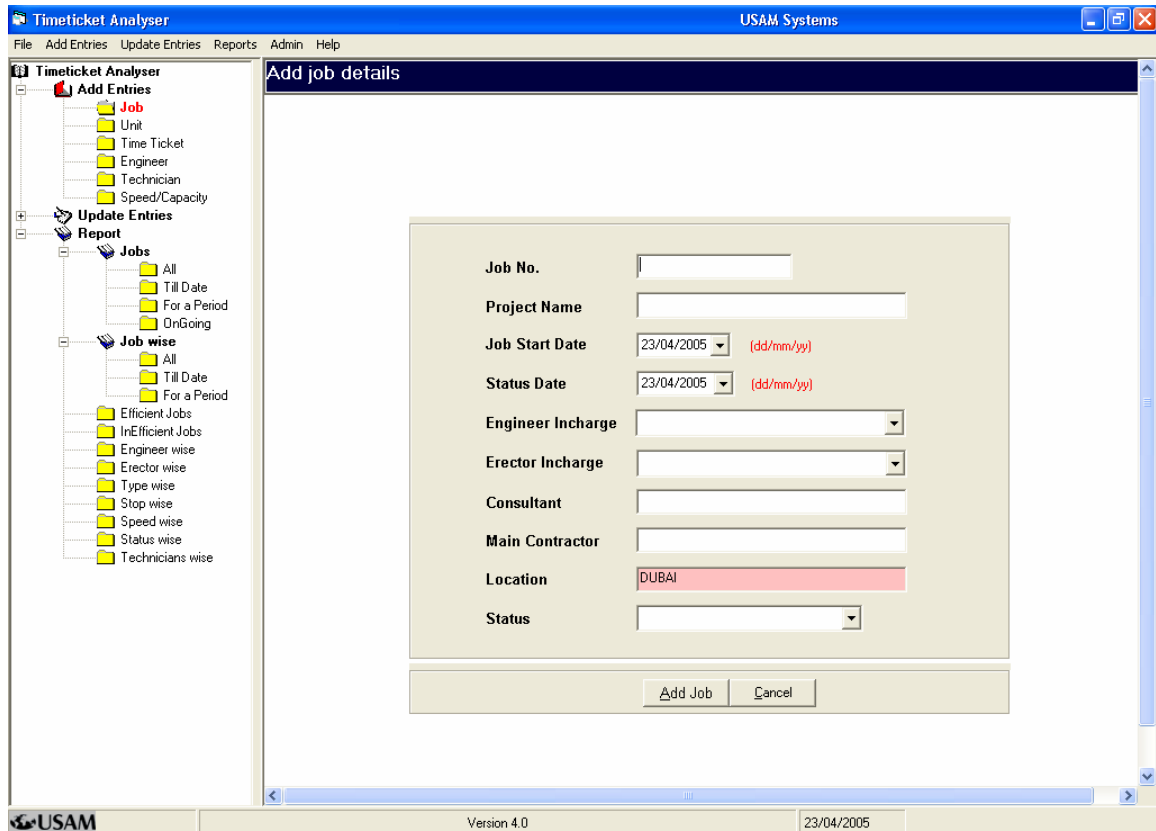
GO

Timeticket Analyser

ETA-MELCO ELEVATOR CO. L.L.C

Designed and Developed by  USAM

Copyright (c) 2004 USAM Systems



The database of TIME TICKET has been designed in Microsoft access and consists of 15 tables which capture all the necessary information. It has detailed description of all the jobs and also about each unit under that job.

SCOPE OF THE SOLUTION

This solution facilitates flow of information from a branch to the head office of ETA Melco. Instead of receiving hard copies or printed copies of the various reports that are generated, it will allow us to receive the data behind the generated reports and generate the reports as needed locally.

The data will be exported using conventional internet, therefore it does not require a dedicated network of any sort. The use of internet to send the data greatly reduces the time taken to send and receive the information. When necessary the branches can send the required data to the head office immediately with a press of few buttons.

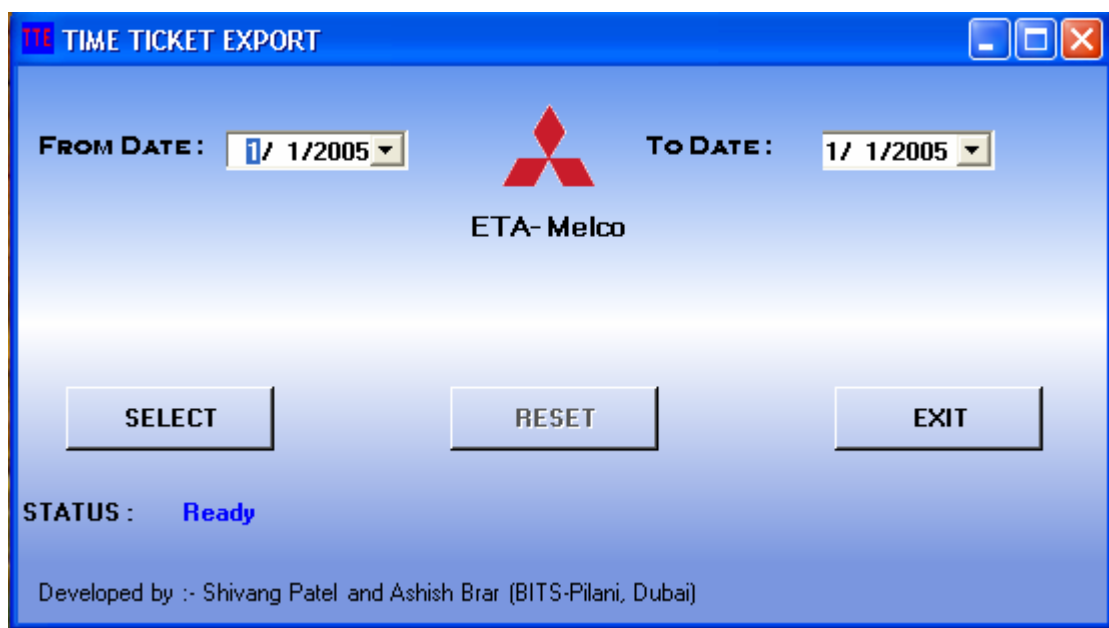
The data to be exported will be in XML format as compared to Microsoft Access which makes it very small in size on disk and therefore make the sending and receiving all the more efficient

The user interface designed for the software is very simple and it only requires trivial input from the user, thus can be operated by anyone.

With the incorporation of this solution with TIME TICKET the data becomes mobile and it creates unity in diversity.

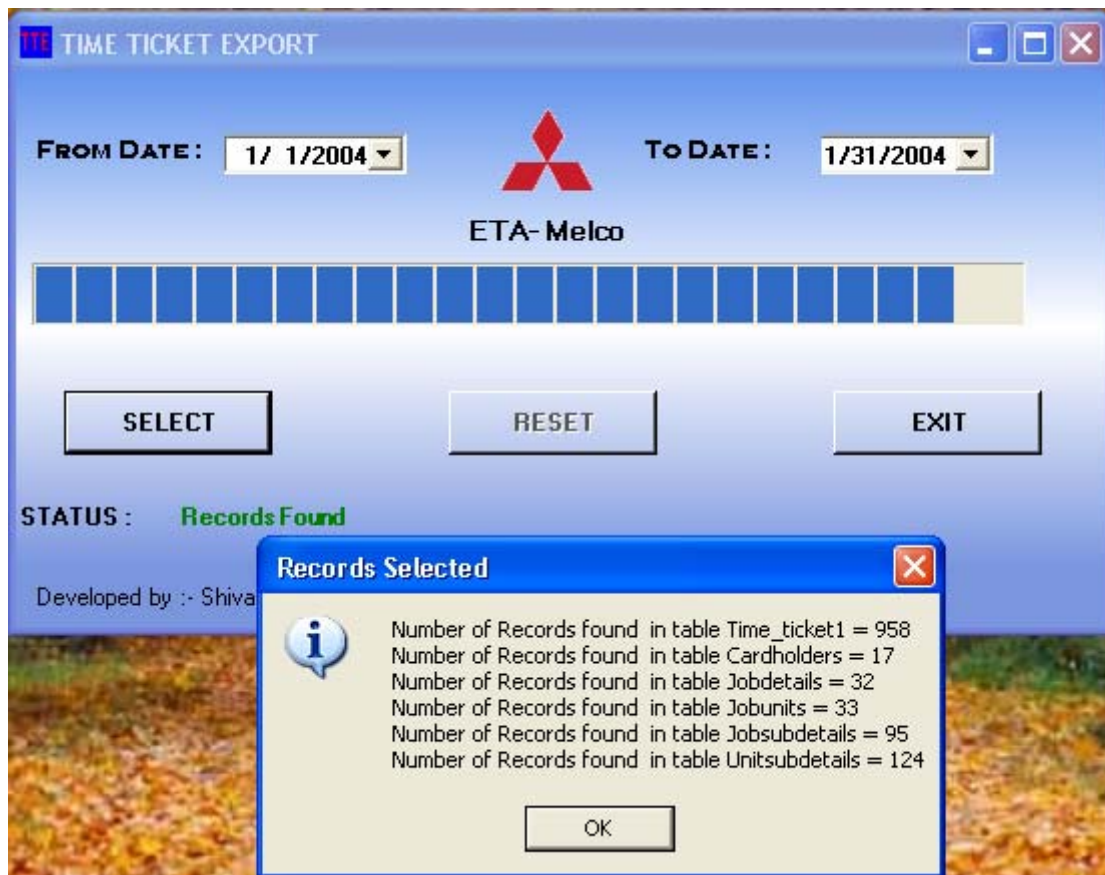
EXPORT T.T FUNCTION

This software is designed to be used by the branches to export data. It was created in Visual Studio .NET 2002 Enterprise edition. Its function is to extract data from six critical tables from database of the TIME TICKET software for the period specified by the user. It then converts this extracted information into a simple xml (extensible mark up language) file. This file is then sent as an e mail attachment to the head office.



- ✚ The first step involves getting the period for which the user wants the data to be exported. This is achieved by getting the user to select the date from date picker.
- ✚ After this step the software establishes a connection to the Melco.mdb file which is the database of the TIME TICKET software.
- ✚ Based on the period specified the export software extracts data from the six critical tables of the database.
- ✚ It first extracts data from the time_ticket table which has the date parameter and creates a temporary table called time_ticket1.

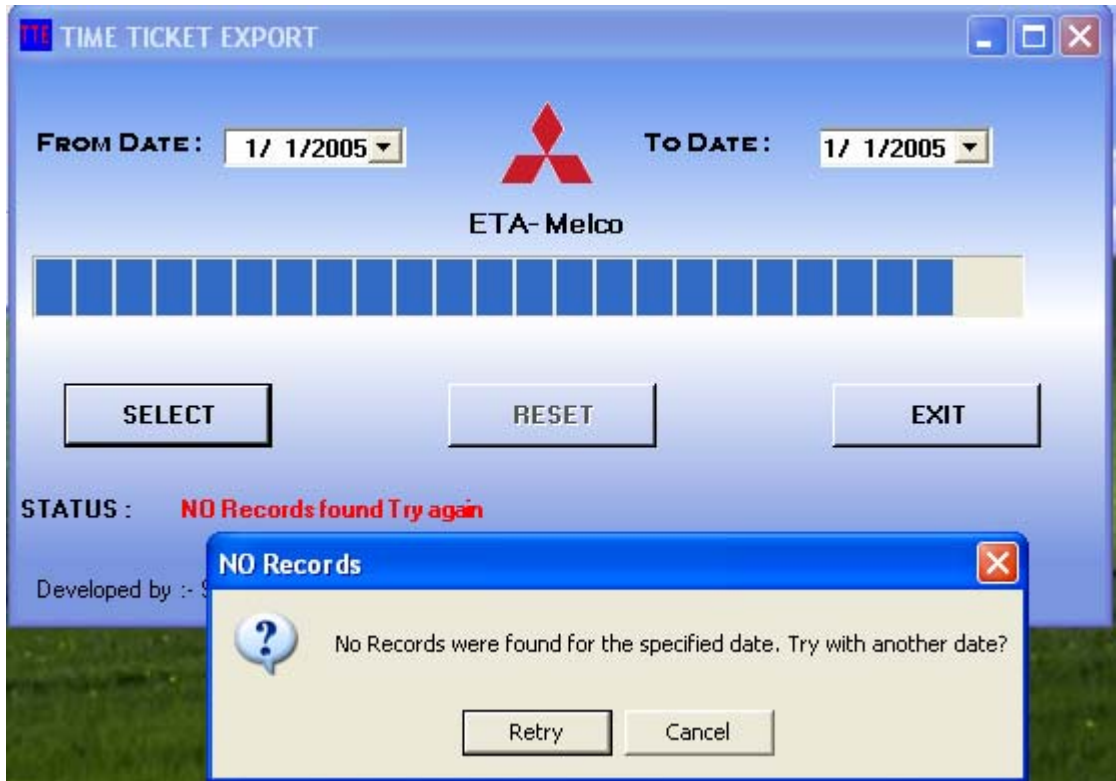
- ✚ Information from rest of the tables is extracted based on the primary keys in the temporary time_ticket1 table.



This creation of temporary table increases the efficiency of the software by reducing the number of records the software has to scan for every successive transaction. All the extracted information is first temporary stored in the memory of the computer. It then writes the extracted data in an xml file which is named after the site (e.g. DUBAI.xml). It also creates a folder showing the specified period.

e.g. “C:\Timeticket\Export File\Saturday, January 01, 2005 TO Monday, January 31, 2005\AZERBAIJAN.xml”

In an event where no records were found for a specified period the software prompts a message and guides the user to enter the period again or exit



When the software is run first time it creates a log file called Export Log which is a normal text file. It logs all the events that take place during the entire operation of the software. This includes the start time, the records exported and any errors if they occur.



```
Export Log - Notepad
File Edit Format View Help

***** NEW SESSION *****

Export Process Started At 4/8/2005 12:58:05 PM

Selected Date Parameters: 1/1/2005 TO 3/1/2005

Records Found

Number of Records found in table Time_ticket1 = 2
Number of Records found in table Cardholders = 4
Number of Records found in table Jobdetails = 2
Number of Records found in table Jobunits = 2
Number of Records found in table Jobsubdetails = 2
Number of Records found in table Unitsubdetails = 2

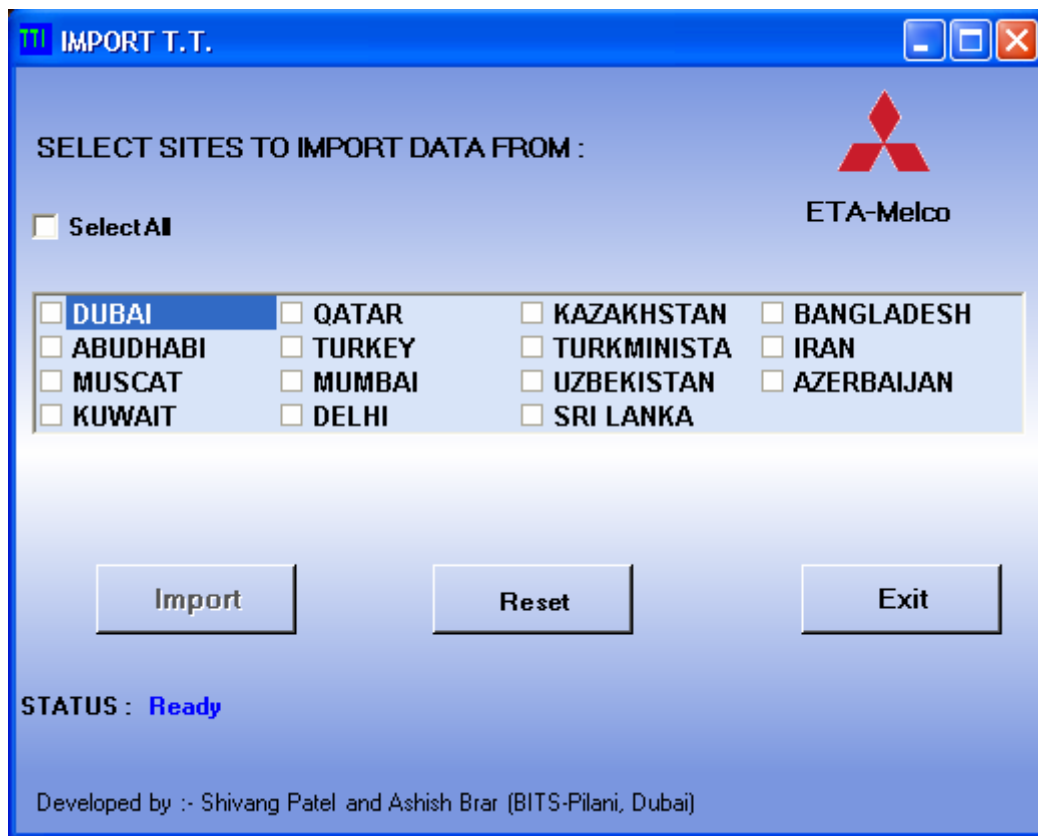
Export file create successfully
Path of the file
C:\Timeticket\Export File\Saturday, January 01, 2005 TO Tuesday, March 01, 2005\Abu
dhabi.xml

Export Program Exited At 4/8/2005 12:58:11 PM

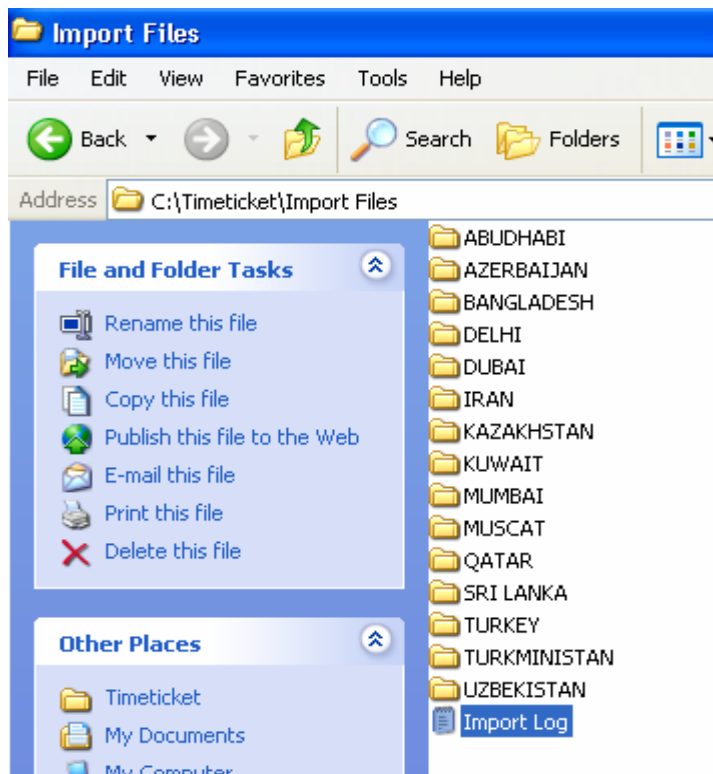
***** END OF SESSION *****
```

IMPORT T.T.

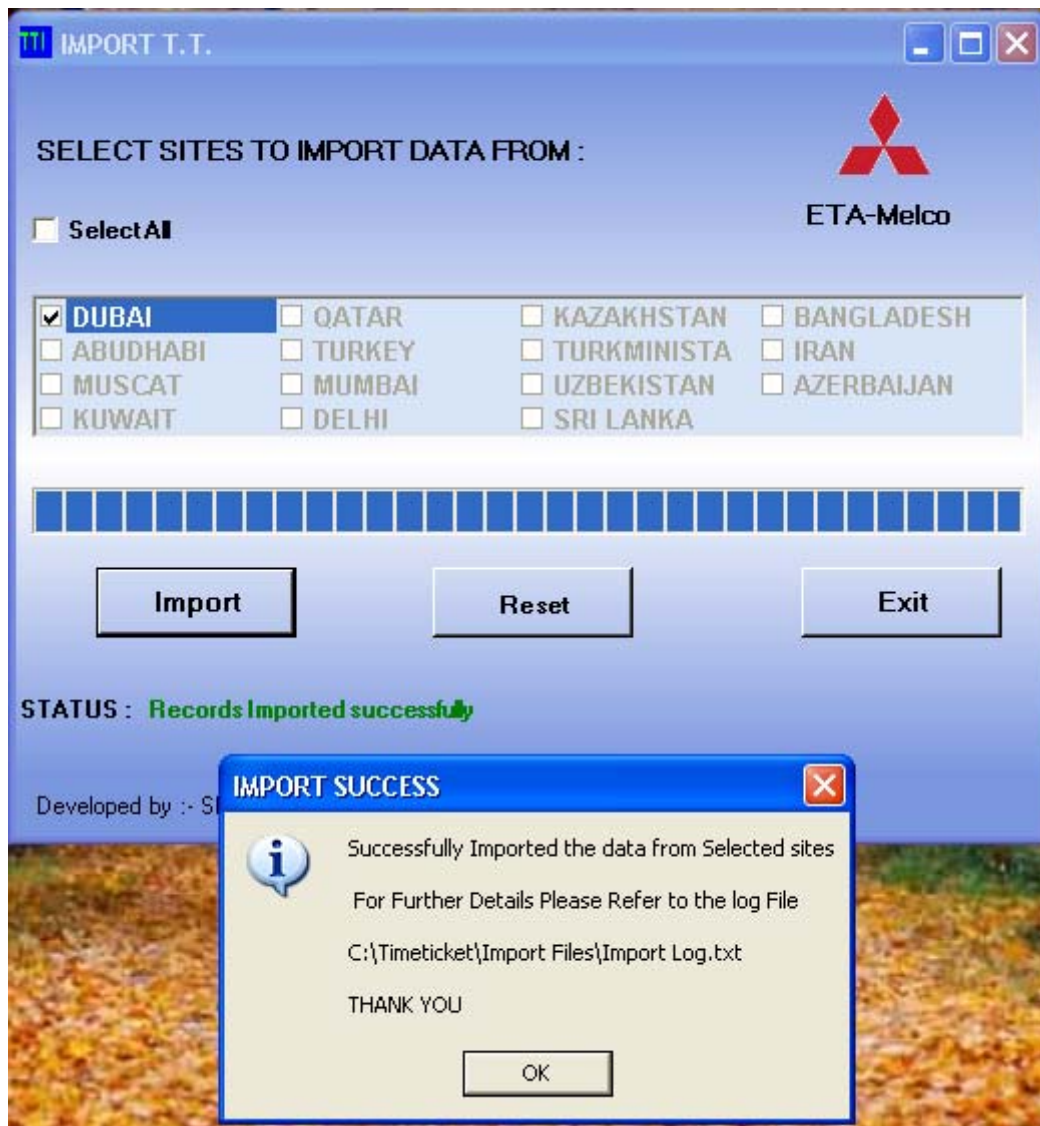
This software has been designed to be used at the head office and is used to merge the data received from various branches in xml files generated by the EXPORT T.T. This software was also created using the .NET framework. This software reads the data in xml format, checks the master database for redundant data as to avoid duplicate entries, and then updates the data by inserting new entries in the tables as and when encountered.



When run for the first time, this software creates a folder for each branch named after that branch



- ✚ The received xml files from all the braches are to be saved in their respective folders.
- ✚ The software gives the user a choice to select multiple sites to import data from.
- ✚ The user can select the site by checking the box against the site name
- ✚ The software than scans the folder of that site for xml files and starts the import process.

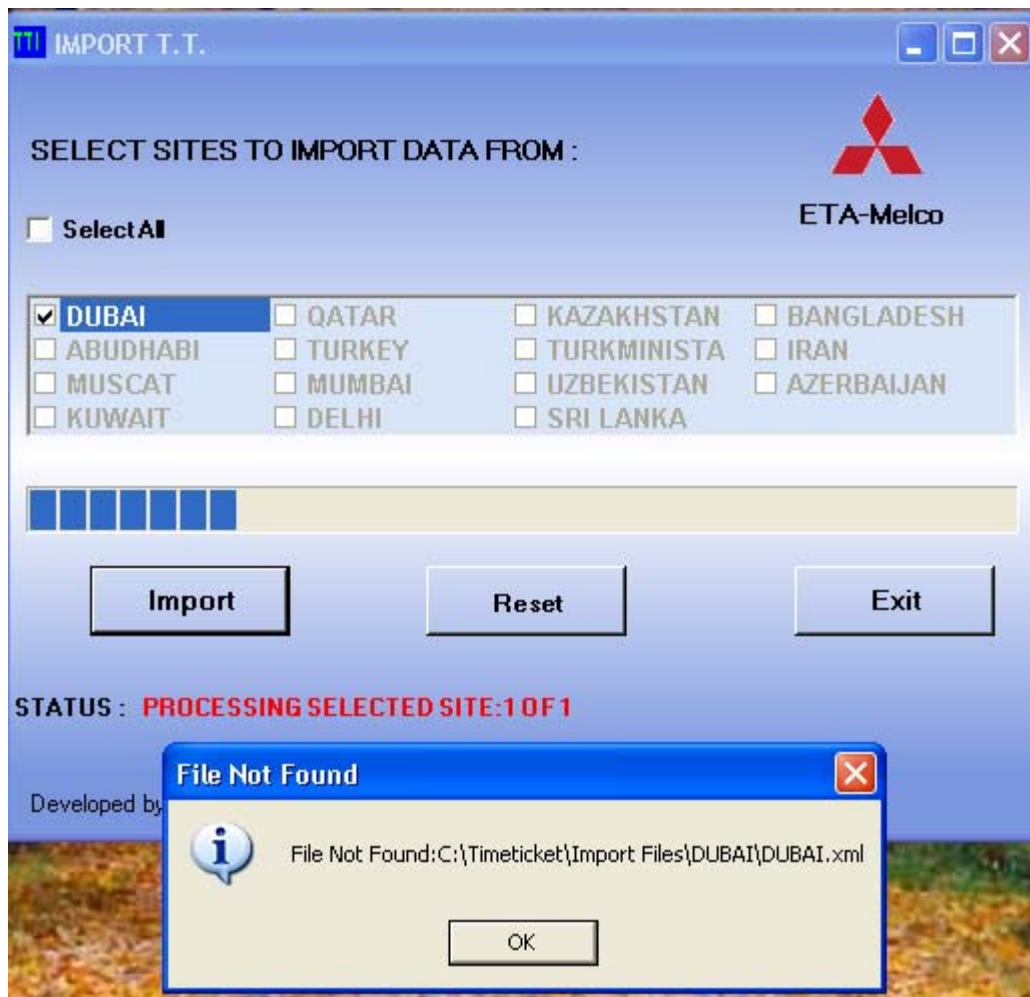


The import process involves multiple steps.

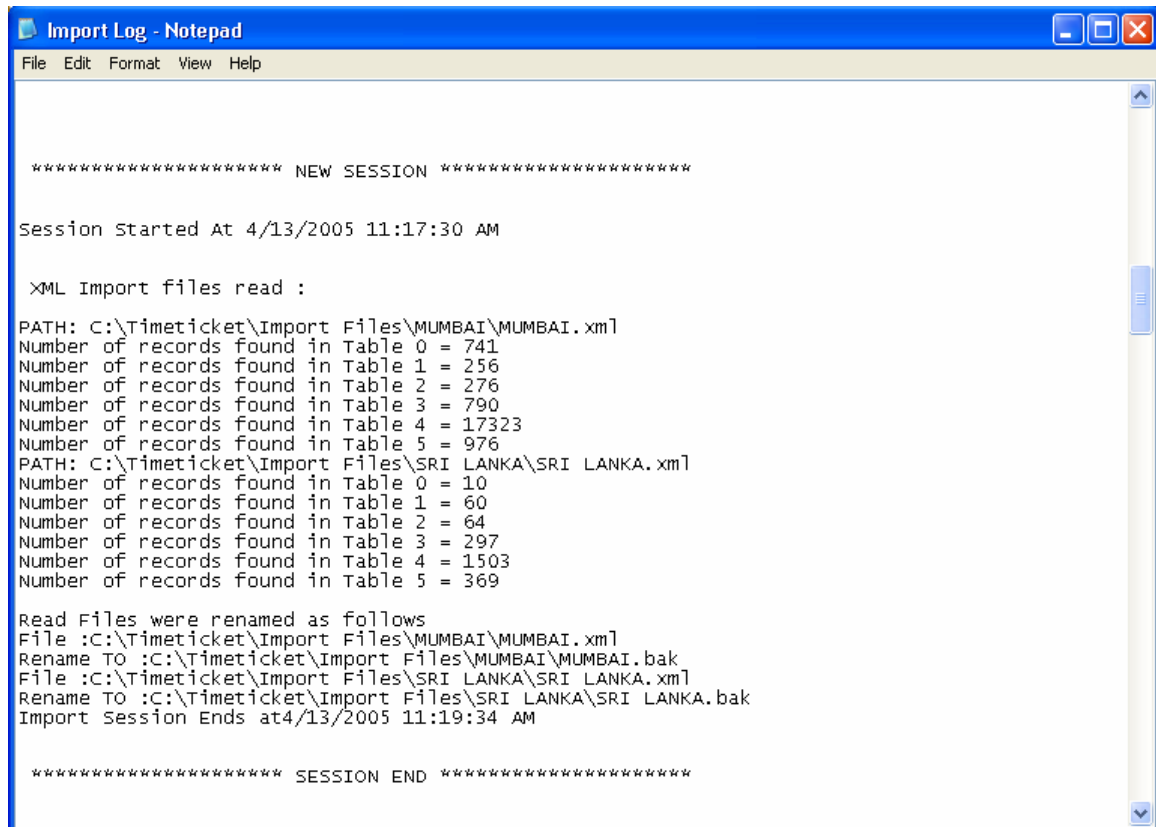
- ✚ Firstly it creates six temporary tables in the master Melco.mdb.
- ✚ It then copies the xml data into these temporary tables.
- ✚ To avoid duplicate entries it then checks the data in the temporary tables to the respective tables in the master database for entries which are already present.
- ✚ On finding such an entry it deletes the respective entry from the temporary table.
- ✚ It repeats this process till all the duplicates are deleted from the temporary tables.
- ✚ The remaining entries are then inserted into the master database.

- ✚ After shifting the remaining entries from the temporary table to the master tables the IMPORT T.T. software converts the xml file into a .BAK file and creates a one of back up just in case it was need later on for data recovery.

In an event where the site was selected but no xml file was found in its folder the software will show a message informing the user that the file was not found.



Like the EXPORT T.T. software this also maintains a log and records all its functioning and errors. The log file is a text file and is named Import Log.txt.



```
Import Log - Notepad
File Edit Format View Help

***** NEW SESSION *****

Session Started At 4/13/2005 11:17:30 AM

XML Import files read :
PATH: C:\Timeticket\Import Files\MUMBAI\MUMBAI.xml
Number of records found in Table 0 = 741
Number of records found in Table 1 = 256
Number of records found in Table 2 = 276
Number of records found in Table 3 = 790
Number of records found in Table 4 = 17323
Number of records found in Table 5 = 976
PATH: C:\Timeticket\Import Files\SRI LANKA\SRI LANKA.xml
Number of records found in Table 0 = 10
Number of records found in Table 1 = 60
Number of records found in Table 2 = 64
Number of records found in Table 3 = 297
Number of records found in Table 4 = 1503
Number of records found in Table 5 = 369

Read Files were renamed as follows
File :C:\Timeticket\Import Files\MUMBAI\MUMBAI.xml
Rename TO :C:\Timeticket\Import Files\MUMBAI\MUMBAI.bak
File :C:\Timeticket\Import Files\SRI LANKA\SRI LANKA.xml
Rename TO :C:\Timeticket\Import Files\SRI LANKA\SRI LANKA.bak
Import Session Ends at 4/13/2005 11:19:34 AM

***** SESSION END *****
```

CONCLUSION

The projects undertaken will go a long way in reducing the response time .The bar caode inventory system implementation is a step in the right direction to incorporate various changes in the current work environment of ETA Melco Stores Departement. It not only makes work flow more streamilined but also emphasises on quality work, efficiency and excellence.

The import export script is intended to increase the efficiency of data communication between the head office and various branches and is a first step towards developing software of larger scale, inteneded for monthly reporting of various details to the head office by the branches.

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