



# **Electronic Business Course - SA 2008**

## **Project : E-Ticketing**

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# 1 Introduction

We will try through this work, to understand and to explain what “E-Ticketing” means, the place of this system in Electronic Business, the different concrete applications of such a system in everyday life. Then we will explain schematically how it works. At the end, we will realize such a platform using a LAMP solution stack<sup>1</sup> to show in details how it works, we will present a method to generate a ticket which could be checked instantly at the turnstiles of an event.

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<sup>1</sup> Linux operating system, Apache web server, MySQL databases and PHP programming language : The combination of these technologies is used primarily to define a web server infrastructure, define a programming paradigm of developing software, and establish a software distribution package.

## **2 What are E-Tickets ?**

An electronic ticket or e-ticket is used to represent a purchase usually through a website or by phone. This form of ticket is rapidly replacing the old paper tickets.

Since its apparition in 1955, E-Ticket's use is growing very quickly in USA because of the considerable cost reductions it allows. E-Tickets are used particularly by airlines companies.

This is the case of American Airlines, which sells now only E-Ticket for its national traffic and extends this service to international traffic since 2003, or charges \$50 for a traditional ticket.

One of its concurrent, Continental Airlines, is selling 95% of its flights by E-Ticket for its national traffic and 88% for its whole customers.

E-Ticket was introduced in Europe only in 1998 by Air France and the company is now selling 1 million E-Tickets per month. This number is growing fast and in 2005, e-ticket was representing 65% of its world's sales.

## **3 Domains of Application**

### **3.1 Flight booking**

As said before, one of the most important applications of E-Tickets can be considered to be the domain of flight booking, saving approximately US\$ 3 billion annually with a 100% conversion to E-Tickets (source : IATA<sup>2</sup>, 11.2006). So currently, a focus of IATA is to get airlines fully on board with E-Tickets. Their hoped-for deadline for saying bye-bye to paper

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<sup>2</sup> IATA, the International Air Transport Association, represents close to 300 airlines, and almost all international air traffic.

tickets is Jan 01, 2008, or non-compliant airlines would lose access to IATA's 60,000 accredited travel agencies. This deadline has been recently moved to May 31, 2008.

IATA is also tracking trends in attitudes and has presented the findings in the form of an annual Corporate Air Travel Survey. The survey revealed that **88%** of passengers prefer electronic tickets over paper tickets. The reasons include :

- 'I do not need to bring my airline ticket(s) when I check-in' (71%),
- 'I immediately receive my e-ticket confirmation by e-mail' (64%),
- 'I can access my e-ticket anywhere and at anytime' (49%) and
- 'I receive a receipt of my booking by e-mail' (34%).

Survey results also indicate that passengers welcome the proliferation of common use self-service (CUSS) kiosks in the travel experience. Some 70% of travelers have used CUSS or an automated check-in procedure in the last 12 months, with the machines achieving a 93% approval rating. The ability to check-in faster (31%) and at any time (31%) are highly rated advantages.

Printing boarding passes at home is also catching on. Some 43% of respondents have used this option over the last 12 months, 97% being satisfied with the process.

The easy way of purchasing a ticket is presented below in Fig.1, where you simply have to choose into the list sorted by your preferred departing/arriving time, price, # of stops or total travel time. You can also check-in directly on the website ( Fig.2 ), so you don't have to be present 1 or 2 hours before and wait at the airport.

Back 3 Days

Wed Mar 26 from \$329

Thu Mar 27 from \$329

Fri Mar 28 from \$329

Departure Sat Mar 29 from \$329

Sun Mar 30 from \$239

Mon Mar 31 from \$199

Tue Apr 01 from \$199

Next 3 Days

FARES per person, additional taxes and fees will apply.

Sort By: # of Stops

AA Non-Stops	Departure	Arrival	Economy Super Saver	Economy Saver	Economy Flexible	Instant Upgrade	Business Flexible	First Flexible
AA 1 <a href="#">Flight Details</a>	09:00 AM JFK	12:20 PM LAX	\$449	\$672	\$1434	\$1691	\$2118	\$2438
AA 43 <a href="#">Flight Details</a>	08:25 AM EWR	11:40 AM LAX	Not Available	\$609	\$882	Not Available	Not Available	\$1307
AA 201 <a href="#">Flight Details</a>	06:30 AM JFK	09:45 AM LAX	\$329	\$872	\$1434	\$1417	\$2118	\$2438
AA 3 <a href="#">Flight Details</a>	12:00 PM JFK	03:10 PM LAX	\$449	\$872	\$1434	Not Available	\$2118	\$2438
AA 117 <a href="#">Flight Details</a>	02:30 PM JFK	05:40 PM LAX	\$329	\$872	\$1434	\$1691	\$2118	\$2438
AA 133 <a href="#">Flight Details</a>	04:05 PM JFK	07:25 PM LAX	\$329	\$872	\$1434	\$1691	\$2118	\$2438
AA 181 <a href="#">Flight Details</a>	05:00 PM JFK	08:19 PM LAX	\$329	\$872	\$1434	\$1691	\$2118	\$2438
AA 119 <a href="#">Flight Details</a>	06:30 PM EWR	09:50 PM LAX	Not Available	\$609	\$882	\$799	Not Available	\$1307
AA 21 <a href="#">Flight Details</a>	07:00 PM JFK	10:34 PM LAX	\$329	\$872	\$1434	\$1417	\$2118	\$2438
AA 185 <a href="#">Flight Details</a>	08:45 PM JFK	12:14 AM LAX	\$329	\$872	\$1434	\$1417	\$2118	\$2438

Your Itinerary ?

Carrier	Flight Number	Departing City	Date & Time	Arriving City	Date & Time	Cabin Booking Code	Flight Status Notification	Flight Details
AA AMERICAN AIRLINES	1	JFK New York	Mar 29, 2008 09:00 AM	LAX Los Angeles	Mar 29, 2008 12:20 PM	Business J	CREATE	VIEW

Fare Summary ?

Average Fare per Person: Departure - 2118.00 USD	
Passenger Type Used in Pricing	Adult
Departure Fare per Person	2118.00 USD
Total Fare per Person	2118.00 USD
Additional Taxes and Fees per Person	10.50 USD
Total Price	2128.50 USD

- View [Fare Rules and On-Time Flight Information](#).
- Fares are not guaranteed until tickets are purchased.
- [Local taxes](#) may apply for non-U.S. billing addresses.
- Flights not on American Airlines, American Eagle, or AmericanConnection® are on a [request basis](#) only. Fares and availability are subject to change.
- In order to comply with federal security regulations, we may provide government agencies access to data you disclose to us. For more information, view our [Privacy Policy](#).

Summary Details ?

<b>Passenger Summary</b> <b>Passenger Name(s)</b> AAAdvantage Number (1) BIENZ NICOLAS	<b>Contact Information</b> Cell Phone: (41) 795-623456	<b>Business Extra Account Number</b> ID Number:
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Fig. 1 – Online Booking by American Airlines



**Fig. 2 – Online Check-in by Air France**

### 3.2 Railway companies

A derivative solution of flight booking that appears in 2003 onto the railway market is online reservation and home-printed-ticket.

Since March 2003, the French railway company SNCF proposes to book our seat online and to print our ticket at home to avoid losing time at the railway station by waiting at the ticket offices. (See Appendix 1)

The SNCF Company introduces these e-tickets first for last-minutes promotions and very early reservation ("Billets Prem's"). This was a success with 725.000 sold tickets during the first year on the French and German railway network.

The responsible of SNCF's railway department explain that on all tickets where this technology was available, 50% of customers have used it and in one year, the proportion of home-printed tickets increased about 50%.

Now, E-Tickets are also available in Switzerland on the CFF website (Fig.3) but after a test, we can see that it is limited to national traffic, TGV and big town in Germany. We can however book a seat but without price and availability confirmation.

The second possibility CFF offers under “SeasonTickets Switzerland” is to order directly our General Abonnement, Half-Fare Card or Track 7 Card.

A great advantage for people who lives in Switzerland is the “Traffic Communities”, where we can directly buy our monthly/annual subscription for local town fare, for example by Frimobil.

For foreigners, CFF gives the possibility to order the Swiss Pass online, which offers 4, 8, 15, 22 days or one month unlimited access to Swiss Travel System’s rail, bus and boat network at very attractive rates. So they can enjoy holidays, without being concerned about the pass.

Fig. 3 – Booking system by CFF (www.rail.ch)

### 3.3 Events organization

Another domain for recent applications of E-Ticket systems is the online reservation of concerts tickets or seats reservation. This system was quickly and recently extended to sports events like Football, Hockey and Tennis seat reservation. We can simply choose the zone of reservation on a map and search the availabilities and prices. This system provides a huge amount of time-saving in Sports events, where the capacity is for example 10000 persons.

Here is an example for the Swisscom Cup Final 2008 (AC Bellinzona - FC Basel) 06.04.2008 15:45 in St. Jakob-Parc. (Fig.4)

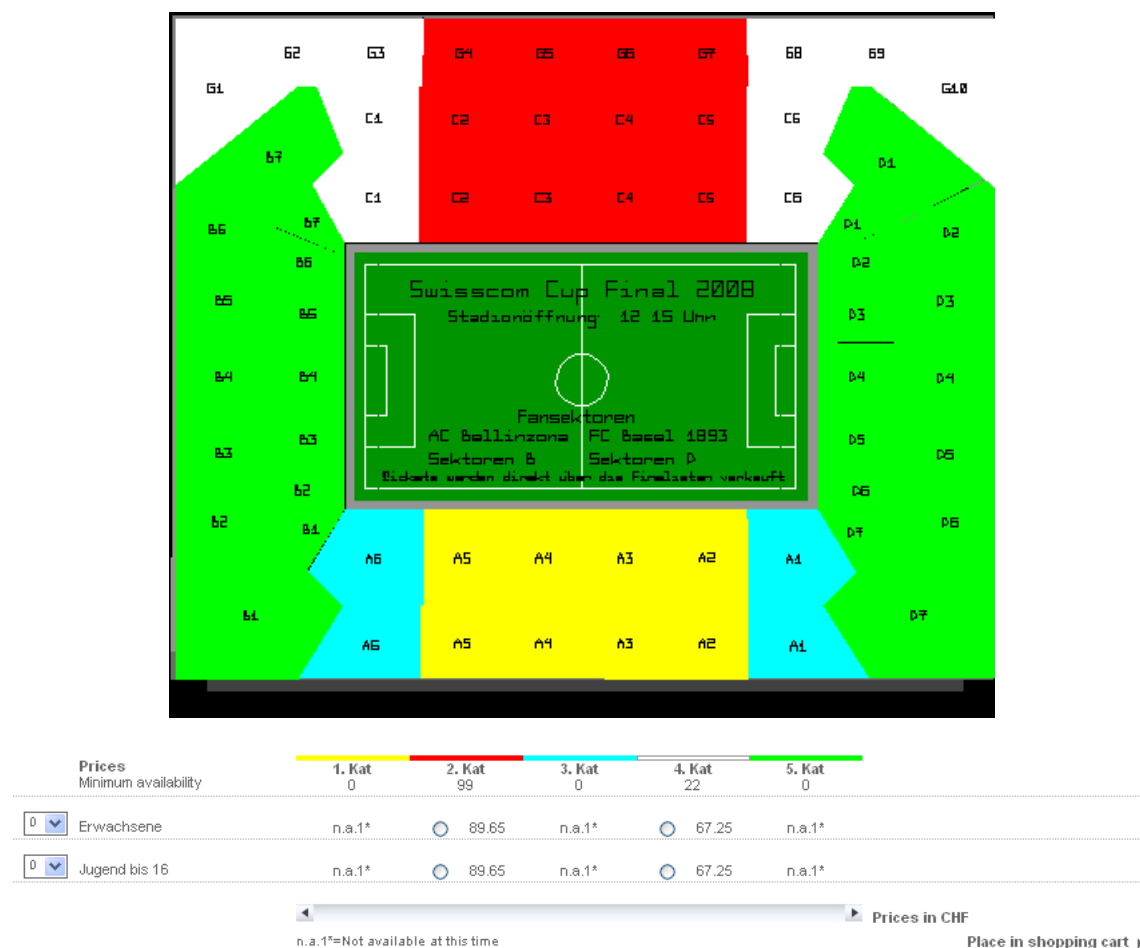


Fig. 4 – Zone reservation for Swisscom Cup

### 3.4 Ski-ticketing

The last application of the E-Tickets appears in Switzerland for skiing. The system of E-Tickets offers us to book our ski pass for the popular skiing regions from the comfort of our home and go straight to the turnstile and onto the slopes. In 2008, many stations are offering an e-ticket solution directly on their website using Skidata® Technology (e.g. For Davos - <http://www.parsenn.ch> (Fig.5), for Crans-Montana <http://www.mycma.ch>, ...) but Ticketcorner begins at the end of 2007 to regroup the different stations on its website, so we will perhaps have in some years the possibility to have an overview of all domains on one website and compare instantly the different offers.

By using the E-Ski-Pass we can save ourselves the hassle of standing in line at the Valley Station pay desk.

**Ticket Online Shop Davos Klosters Mountains**

Welcome to our ticket online shop. We accept [the following credit cards](#).

---

**Starting date:**  (Day of first use)

**Winter sport region:**

**Number of days:**

**Card- /Swatch number:**

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Please make sure that the information you provide is correct. The ticket is only valid in combination with an official identity card and the onlineshop receipt. Davos Klosters Mountains reserves the right to make random checks!

---

**Sex:** female ☐ male ☒

**Date of birth:**  dd.mm.yyyy

**Persontype:**

**First name:**

**Last name:**

---

**Price:**  CHF

---

☒ I accept the general tariff provisions of Davos Klosters Mountains. [Click here to read the conditions.](#)

Fig. 5 – E-booking of a Ski Pass in Davos

## 4 How it works

The principle is nearly the same for all domains of applications we've seen under Ch.4 except for flight companies which have a huge database and network connections regrouping Travel agencies and almost all companies, so we can book a flight that needs more than one company.

We will examine the case of an Concert/Theatre/Sport Event because of its "simple" network.

### 4.1 Configuration

A management interface (Fig.6) gives the possibility to the manager of an events organizer company to configure the whole ticketing process.

First when an event is planned, he has to use the Configuration/Program menu, where he can found a graphical interface allowing him to easily configure the seating plan for each event (seat availability, category and priority) (Fig.7)

He can also define the ticket catalog, including season tickets and combined tickets. Moreover, he can also specify for each event, the sharing of the tickets between himself and their different sales partners and defining a sales limit

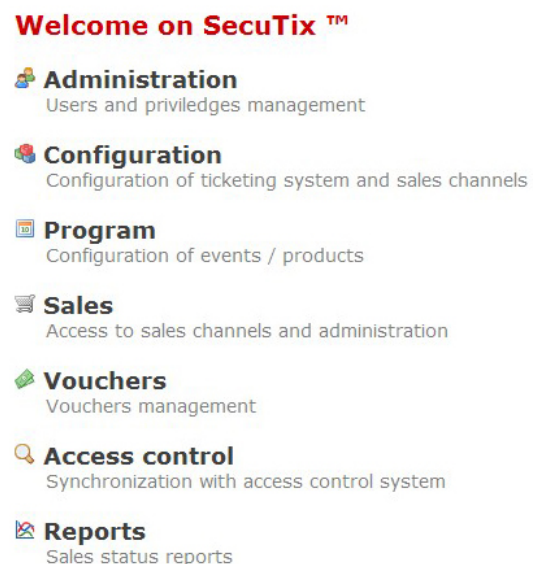
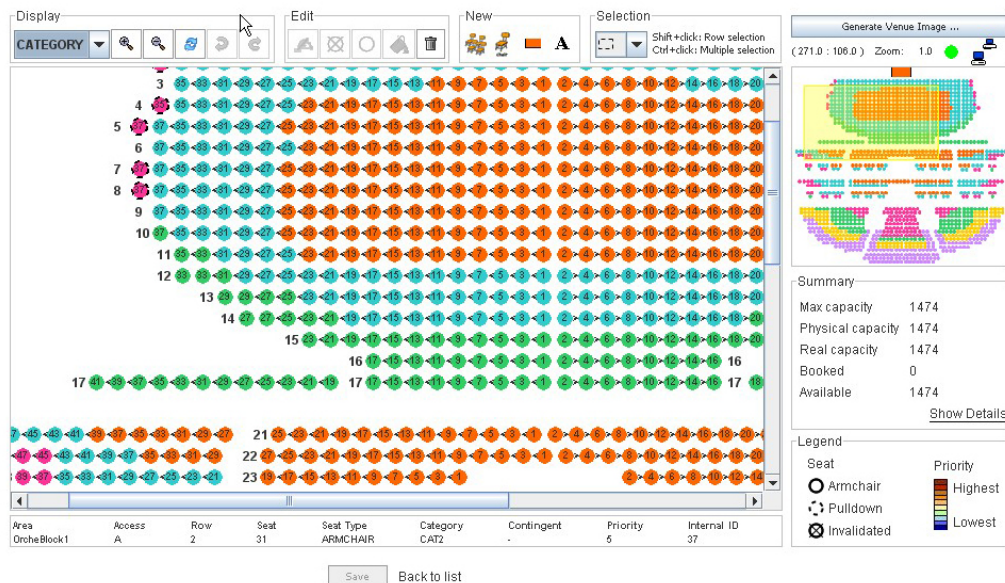


Fig. 6 – Administration Console



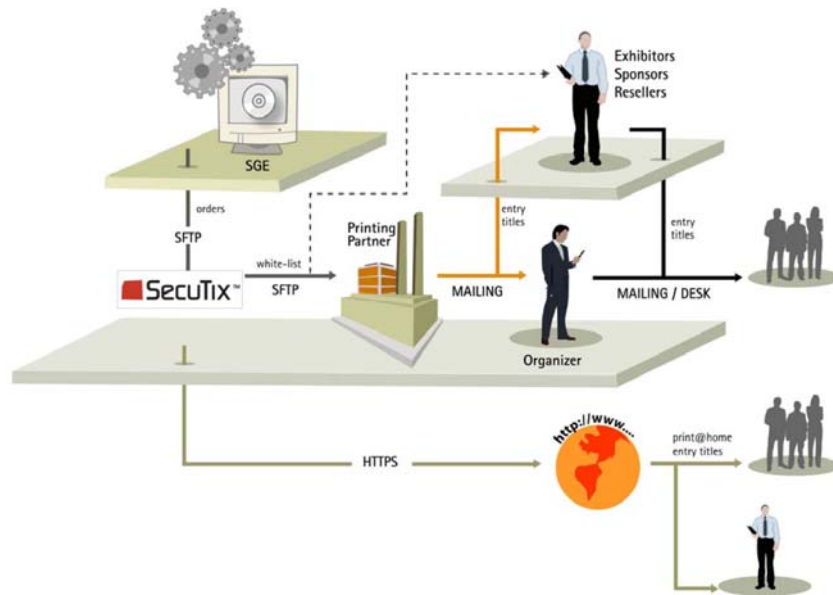
**Fig. 7 – Venue configuration**

## 4.2 Sales

Then the Sales menu enables him to easily create Internet sales channels for all their points of sales, but also for their ticket resellers and partners like sponsors, tourist offices, travel agencies, hotels, ...

## 4.3 Production

The Production menu manages the production of all their tickets, regardless of their format (traditional or dematerialized) and their printing and distributing method (Fig.8). Under this menu, we can also personalize the tickets depending on the business field, context, sales channel, ...



**Fig. 8 – Production Schema**

On the front-end website, as customer, once we have chosen our Event, we have to decide which kind of ticket we want. Nowadays we have many possibilities an organizer can use to produce E-Tickets:

#### **4.3.1 Traditional Ticket**

Although E-Tickets are more and more sold, traditional paper tickets are still sold in many situations and will surely not die in a near future. As everybody knows what a traditional ticket is, we won't say more about it.



**Fig. 9 – Traditional Ticket printer**



### 4.3.2 Ticket Card

A so-called Ticketcard (Fig.10) or a Swatch Snowpass (Fig.11) watch can be used as the data carrier. With this technology, we have simply to give our Card Type and Card number into a form field and once we have made the payment, the Card Type and Number information is transferred immediately to the resort and forwarded automatically to the turnstile.



Fig. 10 – Ticketcards (combined with MasterCard and Postcard)



Fig. 11 – SWATCH Snowpass, CHF 88.- to CHF 130.-



### 4.3.3 Print@Home

A Print@Home ticket (eg. SecuTix™, see appendix I) is a ticket we can securely print at home, on any standard printer, on normal paper.

Secured by using an imaging technology<sup>3</sup>, it is a safe Internet-emitted ticket.

The Ticket is delivered as a PDF file of about 300 KB, which contains the ticket itself as well as a large space available for adding dynamic information and advertising freely.

### 4.3.4 Mobile Ticket

The mobile ticket is sent directly as an SMS or an MMS to the customer's cell phone. (Fig.12)

The SMS ticket contains a verification code which validity can be checked using either security rules, known only by the inspector, or a decoding card or application, or by sending an SMS to a centralized verification server.

The MMS ticket, more complete and user friendly, contains an encrypted 1D or 2D barcode, which can be checked by using an appropriate reading device.

The MMS ticket can also contain a microstructured image, which validity can be verified visually.



**Fig. 12 – MMS Ticket**

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<sup>3</sup> The Microstructure Imaging technology solves one of the fundamental problems of the e-Business: the secure delivery of critical documents via the Internet, such as tickets for example. It uses a **patented fabrication process**, called **Microstructure Imaging**, which interweaves the background image with the data containing the validity elements of the ticket in a unique way

#### **4.3.5 Ticketless solution**

The "Ticketless" solution represents the final outcome of the ticket dematerialization. The customer books his ticket on the Internet or via a Call Center, by providing an ID that can be either his first or last name, a member ID, or a card number. He receives his booking confirmation by e-Mail or SMS, and his ID is sent to the checking system. Then, neither paper nor ticket is required any more. A simple visual or electronic identification of the user is all that is needed to obtain the access. Unfortunately, it is proved that customers like to have something in hands after a purchase and so don't like this system.

### **4.4 Access Control**

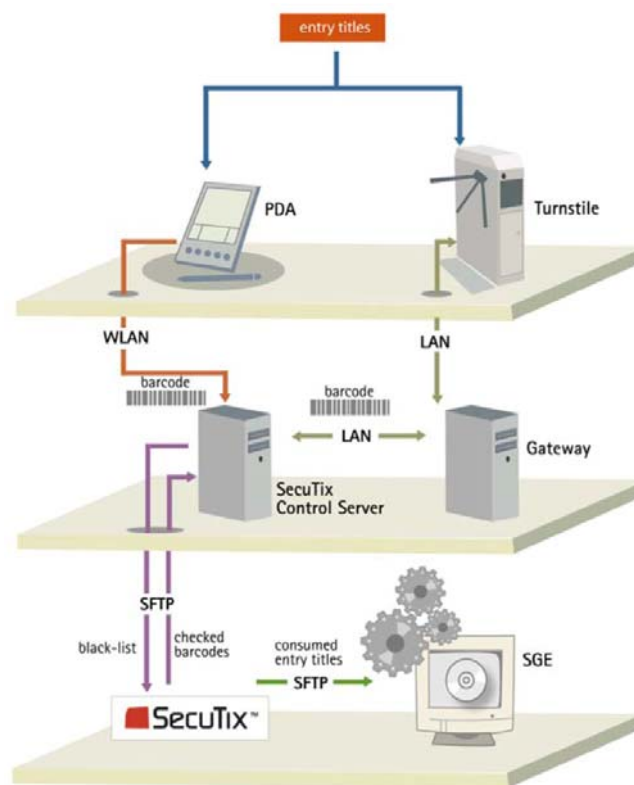
Once E-Tickets are sold, the event manager can then configure complex verification rules to verify the validity of the tickets, particularly for events with multiple entrances, containing restricted access areas. He will be able to manage tickets, badges and other entrance titles of various kinds and formats.

At the entrance, and if necessary at the exit, tickets are verified by using one or more access control devices equipped with proper readers and connected to a central server. The information encrypted in the 1D or 2D barcode ensures the ticket's validity for a given entrance.

Usually, Mobile access control devices are used to easily equip and with no major intervention, remote temporary or dedicated access points, like VIP or technical staff entrances.

When fixed access control is required, devices are interconnected using an Ethernet wired network, whereas mobile devices are interconnected using a wireless network (WLAN).

Each device has a degraded operating mode, which allows guaranteeing the availability of the system even in case of access control server or network break down.



**Fig. 13 – Schema of Access control system synchronized with Ticket Issue System**

## 4.5 The whole System

All these components (administration, sales, production, and verification) can be used individually or combined, in order to take the event type, the ticketing strategy adopted and the already existing systems and infrastructure into account. Moreover, a combination of independent reseller, Internet, ... can be made. The whole complex system can be represented onto Fig.14.

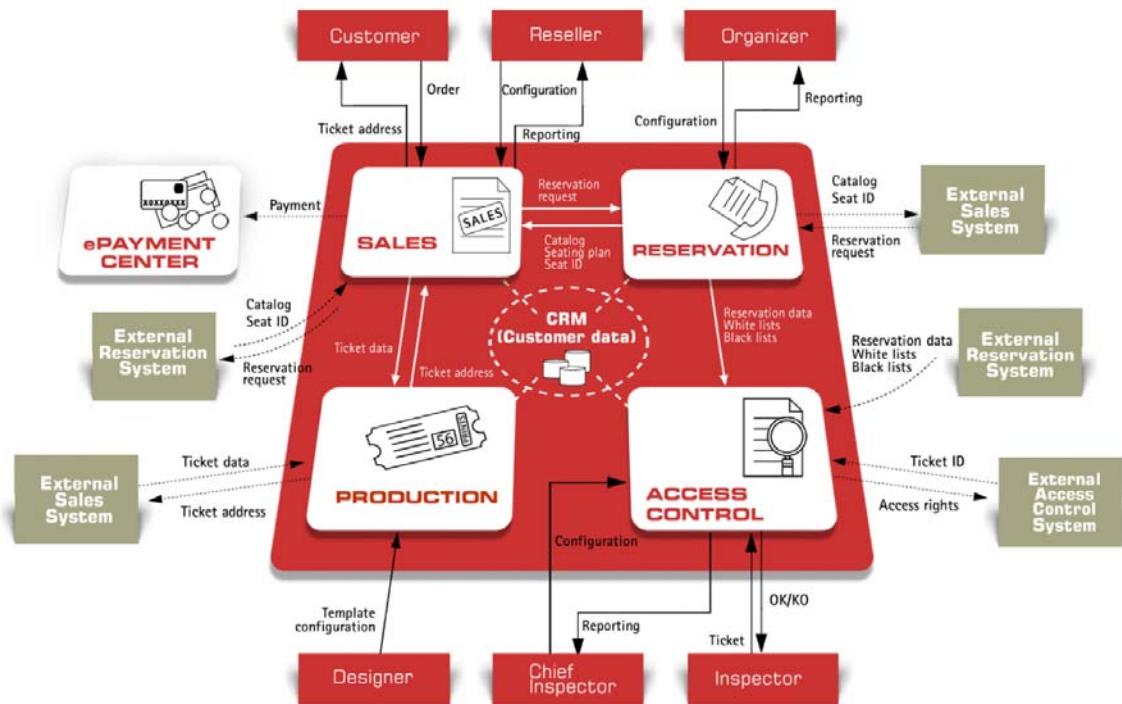


Fig. 14 – The whole System of E-Tickets

## 5 E-Tickets Benefits

- **Cost Savings** - Reduce the costs associated with printing and mailing tickets to our ticket buyers. Eliminate or reduce the need for ticket stock, envelopes and postage. 8-10€/ticket (Air France). IATA estimates that an electronic ticket costs about \$1 to process versus \$10 per paper ticket
- **Labor Savings** - Reduce the labor associated with printing and mailing tickets. Cut down on the effort required to retrieve tickets for Will Call pick up orders.
- **Safe and Secure** - E-Tickets are safe and secure. Barcode validation eliminates the possibility of counterfeit and duplicate tickets.
- **Actual Attendance Reporting** - Find out how many of our e-ticket patrons attended our event and when they arrived.
- **Instant Delivery** - Ticket buyers love being able to book or print their tickets immediately. There's no need to wait for the mail or wait in line at the event. Customers can print their e-tickets immediately after they purchase them or in some situation (e.g. E-Ski-Pass) they can enjoy immediately. This makes e-tickets ideal for the last minute gift or the last minute decision.
- **Additional Information** - E-Tickets provide space for additional useful information such as street maps, driving directions, and other information our customers may need to know.
- **Advertising** - E-Tickets provide unique advertising capabilities. Increase our organization's revenues by offering advertising space on our web ticket. We can also make some zipcode targeted promotions, member-restricted promotions and direct mail tracking codes with the information contained in the database.

## **6 E-Tickets Limitations**

E-tickets are sometimes not available for some flights from an airline which usually offers them. This can be due to a number of reasons, the most common being software incompatibility. If an airline issues tickets for a codeshare flight with another company, and there is no e-ticket interlining agreement, the operating carrier would not be able to see the issuing carrier's ticket. Therefore, the carrier who books the flight needs to provide hard copy versions of the tickets so the ticket can be processed. Similarly, if the destination airport does not have access to the airline who booked the flight, a paper ticket needs to be issued.

Since e-ticket interlining is still the exception rather than the rule, tickets valid for more than one airline are usually issued on paper.

Currently the ticketing systems of most airlines are only able to produce e-tickets for itineraries of no more than 16 segments, including surface segments. This means that tickets involving greater than 16 segments, such as Round the World tickets are issued on paper.

## 7 Design of an E-Tickets System

### 7.1 System configuration

To realize the E-Ticketing System, we have used a Dell PowerEdge 1850 Server running under Linux with Apache, PHP and MySQL installed. The project can be accessed using the following address:

<http://www.photoniceye.ch/projects/e-ticketing>

### 7.2 Database configuration

In order to have a simple demo system, we will only have a few tables but if the system was real, we will have more sophisticated tables and fields. For this demo system we will have one for the customers (Fig.15), one for the events (Fig.16), one for the seats (Fig.17) and one for the tickets (Fig.18).

```
/*Column Information For - e-ticketing.et_customers*/
```

Field	Type	Collation	Null	Key	Default	Extra	Privileges	Comment
cust_id	int(11)	(NULL)	NO	PRI	(NULL)	auto_increment	select,insert,update,references	
cust_lastname	varchar(40)	latin1_german1_ci	NO				select,insert,update,references	
cust_firstname	varchar(40)	latin1_german1_ci	NO				select,insert,update,references	
cust_address	varchar(60)	latin1_german1_ci	YES		(NULL)		select,insert,update,references	
cust_zip	varchar(6)	latin1_german1_ci	NO				select,insert,update,references	
cust_city	varchar(40)	latin1_german1_ci	NO				select,insert,update,references	
cust_email	varchar(80)	latin1_german1_ci	NO				select,insert,update,references	
cust_user	varchar(40)	latin1_german1_ci	YES		(NULL)		select,insert,update,references	
cust_pass	varchar(100)	latin1_german1_ci	YES		(NULL)		select,insert,update,references	

Fig. 15 – “Customers” Table

```
/*Column Information For - e-ticketing.et_events*/
```

Field	Type	Collation	Null	Key	Default	Extra	Privileges	Comment
events_id	int(11)	(NULL)	NO	PRI	(NULL)	auto_increment	select,insert,update,references	
events_name	varchar(40)	latin1_german1_ci	NO				select,insert,update,references	
events_date	date	(NULL)	NO				select,insert,update,references	
events_infos	text	latin1_german1_ci	YES		(NULL)		select,insert,update,references	

Fig. 16 – “Events” Table

```
/*Column Information For - e-ticketing.et_seats*/
```

Field	Type	Collation	Null	Key	Default	Extra	Privileges	Comment
seats_id	int(11)	(NULL)	NO	PRI			select,insert,update,references	
seats_event	int(11)	(NULL)	NO	PRI			select,insert,update,references	
seats_price	int(11)	(NULL)	NO				select,insert,update,references	

**Fig. 17 – “Seats” Table**

```
/*Column Information For - e-ticketing.et_tickets*/
```

Field	Type	Collation	Null	Key	Default	Extra	Privileges	Comment
tickets_id	int(11)	(NULL)	NO	PRI	(NULL)	auto_increment	select,insert,update,references	
tickets_cust_id	int(11)	(NULL)	NO				select,insert,update,references	
tickets_event_id	int(11)	(NULL)	NO				select,insert,update,references	
tickets_seat_id	int(11)	(NULL)	NO		0		select,insert,update,references	
tickets_used	int(1)	(NULL)	NO		0		select,insert,update,references	

**Fig. 18 – “Tickets” Table**

## 7.3 PHP Program

First we have made the design of the website into a CSS file and have used a header and footer to have similar pages during the process.

The first part was the creation of the Events list, where we can see all the next Events at our Arena. It works simply using a mysql\_query request on the “events” table.

The second part of the program was the seat selection. It works with a map of the event’s room. Each seat has a tag containing his number and when we click on it, it indicates us if it’s available or not. At the same time the price of the selected seat is searched into the “seats” table, because it’s normal that the first row of seats is more expensive than the second and so on. To simplify we have just created a virtual room with 7 seats, but it can contain an infinite number.

Then when the customer has chosen his seat, a query on the table “seats” and “tickets” mixed with an if condition on a mysql\_num\_rows command (Fig.19) says if it’s available or not and the price we have to pay for. The next step is collecting details about the customer. Here are only name,



street, city and E-Mail but we can imagine that if we want to make customer profiling for future advertising of Events, we can ask the customer to enter some other details.

Once the seat is selected, the customer is invited to pay for it. Here we just have inserted an image which simulates the payment because it's just a project but we can imagine implementing a Saferpay Solution <sup>4</sup> which offers the possibility to pay with a lot of credit card (MasterCard, Visa, Diners, Maestro, JCB) but also others solutions like Postfinance (online), Postcard, ClickandBuy, Bonus Card, and My One. This solution is very secured and simple to implement on a website.

```
$seats_query = tep_db_query("select tickets_id from ".TABLE_TICKETS." where
tickets_event_id='".$event_id.'" and tickets_seat_id='".$seat_id.'");
if ((tep_db_num_rows($seats_query)) > 0){
    $results=SEAT_NOT_FREE;
} else {
    $seats_price = tep_db_fetch_array(tep_db_query("select seats_price from
".TABLE_SEATS." where seats_event='".$event_id.'" and seats_id='".$seat_id.'"));
    $results=sprintf(SEAT_FREE, $seats_price['seats_price'],$event_id,$seat_id);
}
```

**Fig. 19 – PHP Code for Seats-request**

Then the last part of the program is the one which finalizes the transaction and generates the ticket data. It is also the most complicated file.

We can resume the procedure of finalization as follows:

---

<sup>4</sup> <http://www.saferpay.com>

1. Insertion of customer data into the "customers" table
2. Take the customer's record ID of the insertion
3. Insert ticket data and the returned customer's record ID into the "ticket" table
4. Create a empty PDF file
5. Generate the barcode picture
6. Fill the PDF File with the data about the Ticket bought
7. Save the PDF in a temp folder
8. Send the PDF file to the customer's E-Mail

We have generated the PDF file using the PDFLib AINSI C Library<sup>5</sup> and the GD Library<sup>6</sup> to generate the barcode picture. The encoding used for the barcode is "code128"<sup>7</sup> with his B-subset, that means that we can encode all 128 characters of ASCII.<sup>8</sup>

Code128 described in ISO/IEC 15417, is good at encoding alpha-numeric data and numeric-only data. Code128 has three subsets: code128A, code128B and code128C.

- Code 128A is used to encode uppercase alpha and control characters.
- Code 128B is used to encode both uppercase and lowercase alpha and numeric data.
- Code 128C is used to encode numeric-only data.

Code128 has many variations, such as EAN 128 and ISBT 128.

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<sup>5</sup> <http://www.pdflib.com/>

<sup>6</sup> <http://www.libgd.org/>

<sup>7</sup> <http://www.barcodeisland.com/code128.phtml>

<sup>8</sup> See appendix II

Code128 barcode has six sections :

- Quiet Zone
- Start Character
- Encoded Data
- Check Character
- Stop Character
- Quiet Zone

The check character is calculated from a modulo 103 calculation of the weighted sum of all the characters.



Fig. 20 – Code128 sections

## **8 Conclusion**

We can see through this work that E-Tickets are more and more used nowadays. The possibilities of supports for introducing an ID for E-Tickets are increasing (eg. Watch, Credit-Card, ...) and people are using them everyday. E-Tickets will have a good future thanks to all their benefits, in particular cost reduction of its use and moreover because of they have no inconvenience.

Lastly, by creating an E-Tickets system, we could better understand the subject with all the difficulties and subtleties it contains. This implementation was a good example to know how E-Ticketing works although some elements were deliberately missing: For example the main elements are that no secured transaction is present; the E-Mail addresses are not verified and can be invalid and the last one is that there is no basket, so we can only buy one ticket at the same time.

## Acknowledgements

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# Appendix

## Appendix I : Secutix Tickets

**PALEO**  **FESTIVAL NYON**





**MIGROS** 

**Mercredi** **Isabelle Chritin**  
**19.7.2006** **Adulte - CHF 62.90**  
**Ouverture des portes : 16h30** **Frais de vente (CHF 2.90) inclus**

**www.paleo.ch**



**Billet n°122475**



3219-7674-0841-2443-6049-0125-80

**IMPORTANT!** Le contrôle de ce billet s'effectue par la lecture électronique de son code-barres (un seul passage possible, par jour de validité du billet). Conservez-le en un lieu sûr et protégez-le de toute détérioration.

**N'ACHETEZ PAS CE BILLET A UN INCONNU, VOUS N'AURIEZ AUCUNE GARANTIE DE VALIDITE.**  
**DON'T BUY THIS TICKET FROM SOMEONE YOU DON'T KNOW. IT MIGHT NOT BE VALID.**

**A VOTRE SERVICE**

Transports en commun - Faites un geste pour l'environnement et pensez à votre sécurité. Choisissez les transports en commun pour une mobilité responsable! Grâce au soutien du TCS et des CFF l'offre de transports en commun a été étoffée:

- lignes de bus spéciales et gratuites dans la région Nyon, Gland et Terre Sainte;
- train NSICM depuis La Cure, gratuit avec le billet d'entrée du Festival;
- train CFF: trains de nuit spéciaux entre Genève et Lausanne pour le retour, prix spécial aller-retour sur présentation du billet d'entrée du Festival;
- transfert gratuit entre la gare CFF de Nyon et la halte de l'Asse par navettes de train NSICM;
- organisation par le TCS de trajets en cars pour les régions de Suisse romande suivantes: Jura/Neuchâtel, Yverdon/Aubonne, Fribourg, Chablais/ Riviera et Valais. Réservation obligatoire sur le site [www.paleo.ch](http://www.paleo.ch) ou auprès des agences TCS. Tous les horaires sur [www.paleo.ch](http://www.paleo.ch) dès le 1<sup>er</sup> juillet 2006

**Parking** - Gratuit (en cas d'intempéries, les parkings peuvent être partiellement ou totalement fermés et les véhicules dirigés en ville de Nyon et ses alentours)

**Garderie** - Gratuite, jusqu'à 22h (ve et sa, 23h)

**Camping** - Gratuit. Accès limité aux titulaires d'un billet. Du 17 juillet à 12h au lundi 24 juillet à 12h.

**Privilèges abonnement** - L'abonnement 4, 5 ou 6 jours offre pendant le Festival l'accès libre à la piscine de Nyon, ainsi qu'aux musées de Nyon et au Musée national suisse de Prangins.

**DISPOSITIONS GÉNÉRALES**

La reprise, le remboursement ou l'échange des billets sont généralement exclus, même en cas d'annulation d'un concert ou de modification de programme. Le Festival a lieu par tous les temps. Le tarif Etudiant est réservé aux enfants des 12 ans, étudiants, apprentis, chômeurs et titulaires d'une rente AVS ou AI. Les bénéficiaires doivent pouvoir présenter une pièce de légitimation à l'entrée. Les photos et les enregistrements audio et vidéo des concerts ne sont pas autorisés. Les animaux ne sont pas admis au Festival et au Camping. Par l'achat de ce billet vous reconnaissez les présentes dispositions ainsi que les principes de sécurité et d'accès du Festival. Tout usage abusif sera poursuivi. Ce billet ne vous dispense pas de la pose d'une contremarque en cas de sortie temporaire du site.

**EN SAVOIR PLUS...**

**Infos** - [www.paleo.ch](http://www.paleo.ch) - (programme, photos, extraits musicaux, dernières nouvelles, infos pratiques, transports, ...) ou par tél. au + 41 (0) 22 365 10 10.

**La newsletter du Festival...** Recevez toutes les infos du Festival en vous inscrivant sur [www.paleo.ch](http://www.paleo.ch)

**Guide du Festival** - Disponible sur place et à paraître dans l'édition du 15 juillet du quotidien Le Matin.

**Le Village du Monde entre les oreilles!** - Retrouvez toutes les sonorités du Village du Monde 06 sur CD. Dès le 1<sup>er</sup> juillet chez votre disquaire et sur [www.paleo.ch](http://www.paleo.ch).

**BON FESTIVAL!**



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Nous soutenons  
les événements  
qui vous animent.

[www.bcv.ch](http://www.bcv.ch) 



SecuTix™

**OrangeCinema**

MEMOIRE D'UNE GEISHA / VO  
Port Noir  
08.07.2006 22:00

Vincent  
Henriod  
Loge CREDIT SUISSE  
13.00 CHF

1329-0212-1506-0021-2631-0049-01  
TVA incl. 2.40%  
No 351 384

12.06.2006 18:13  
2009012

Attention : Ce billet n'est valable que pour la prestation indiquée, et fera l'objet d'une vérification électronique garantissant l'unicité de passage. Il pourra être conservé par le personnel de sécurité à l'entrée de la manifestation. Tout abus sera poursuivi. Le billet peut être imprimé en noir/blanc ou en couleur. Conservez-le en un lieu sûr et protégez-le de toute détérioration. **N'ACHETEZ PAS CE BILLET A UN INCONNU. VOUS N'AURIEZ AUCUNE GARANTIE DE VALIDITE.**

vince vaughn jennifer aniston

la  
rupture  
the break-up

...châlez votre camp.

DES LE 21 JUIN AU CINÉMA

**L'imbattable  
PrePay en-ligne.  
Un simple clic!**

**orangeclick.ch**  
Simple. Libre. Service.

SNCF

Édité par voyages-sncf.com

**BILLET** MARIE DUPOND  
Né(e) le 02.08.1983

Départ 01/01 à 17H27 de PARIS GARE LYON  
Arrivée à 20H29 à MARSEILLE ST CHAR  
Période Normale - TGV 6123  
Internet Dernier Min/NI Ech NI Remb

Classe 2  
Voiture 115 Place No 113  
Assis Non Fumeur  
Duplex: En Haut Fenêtre  
Espace 5

Prix: EUR \*\*33.00

Ce billet est non échangeable, non remboursable et incessible.  
Une pièce d'identité officielle doit être présentée conjointement à ce billet.

666776401 BI 080403 No compta. 6123CP10A4FMVMTD2U34 Dossier XXXXXX

**CONDITIONS D'UTILISATION :**

Ce titre est soumis aux conditions générales du Tarif Voyageur de la SNCF ainsi qu'aux conditions particulières suivantes que vous avez acceptées avant l'impression de ce titre :

Ce titre de transport est uniquement valable s'il est imprimé sur du papier A4 blanc, vierge recto et verso, sans modification de la taille d'impression, en format portrait (vertical) avec une imprimante laser ou à jets d'encre. Il ne peut en aucun cas être présenté sur un autre support (électronique, écran...).

Une bonne qualité de l'impression est nécessaire. Les billets partiellement imprimés, souillés, endommagés ou illisibles ne seront pas acceptés à bord et seront considérés comme non valides. En cas d'incident ou de mauvaise qualité d'impression, vous devez impérativement à nouveau votre facture pdf.

Ce titre s'est ni échangeable, ni remboursable.

Ce titre est personnel et incessible. Lors des contrôles, vous devez obligatoirement présenter une pièce d'identité officielle en cours de validité avec photo : carte d'identité, passeport, permis de conduire ou carte de séjour.

Ce titre est uniquement valable pour le train, la date, la classe et le parcours désignés ci-dessus. Dans les autres cas, ce titre sera considéré comme non valide et vous devrez vous munir d'un autre titre pour être en règle.

Ce titre est dispensé de compostage.

Ce titre doit être conservé jusqu'à la sortie de la gare d'arrivée.

La SNCF décline toute responsabilité :

- pour les anomalies pouvant survenir en cours de commande, de traitement ou d'impression du titre de transport dans la mesure où elle ne les a pas provoqués intentionnellement ou par suite de négligence.
- en cas de perte, vol ou utilisation illicite de ce titre de transport.

En cas de non respect de l'une des règles précitées ci-dessus, ce titre sera considéré comme non valide.

**INFO PUB**


















Avec le nouveau mail Yahoo!  
attendez-vous à ne plus attendre.

yahoo mail  
gratuit, titre antispam






















www.yahoo.fr






















Impression utilisant la technologie SecuTix™






















## Appendix II : Encoding Table






















Value	Set A	Set B	Set C	Encoding
0	space	space	00	 XX XX XX
1	!	!	01	 XX XX XX
2	"	"	02	 XX XX XX
3	#	#	03	 X X XX
4	\$	\$	04	 X X XX
5	%	%	05	 X X XX
6	&	&	06	 X XX X
7	'	'	07	 X XX X
8	(	(	08	 X XX X
9	)	)	09	 XX X X
10	*	*	10	 XX X X
11	+	+	11	 XX X X
12	,	,	12	 X XX XXX
13	-	-	13	 X XX XXX
14	.	.	14	 X XX XXX
15	/	/	15	 X XXX XX
16	0	0	16	 X XXX XX








17	1	1	17		X XXX XX
18	2	2	18		XX XXX X
19	3	3	19		XX X XXX
20	4	4	20		XX X XXX
21	5	5	21		XX XXX X
22	6	6	22		XX XXX X
23	7	7	23		XXX XX XXX
24	8	8	24		XXX X XX
25	9	9	25		XXX X XX
26	:	:	26		XXX X XX
27	;	;	27		XXX XX X
28	<	<	28		XXX XX X
29	=	=	29		XXX XX X
30	>	>	30		XX XX XX
31	?	?	31		XX XX XX
32	@	@	32		XX XX XX
33	A	A	33		X X XX
34	B	B	34		X X XX
35	C	C	35		X X XX
36	D	D	36		X XX X
37	E	E	37		X XX X

38	F	F	38		X XX X
39	G	G	39		XX X X
40	H	H	40		XX X X
41	I	I	41		XX X X
42	J	J	42		X XX XXX
43	K	K	43		X XX XXX
44	L	L	44		X XX XXX
45	M	M	45		X XXX XX
46	N	N	46		X XXX XX
47	O	O	47		X XXX XX
48	P	P	48		XXX XXX XX
49	Q	Q	49		XX X XXX
50	R	R	50		XX X XXX
51	S	S	51		XX XXX X
52	T	T	52		XX XXX X
53	U	U	53		XX XXX XXX
54	V	V	54		XXX X XX
55	W	W	55		XXX X XX
56	X	X	56		XXX X XX
57	Y	Y	57		XXX XX X
58	Z	Z	58		XXX XX X

59	[	[	59		XXX XX X
60	\	\	60		XXX XXXX X
61	]	]	61		XX X X
62	^	^	62		XXXX X X
63	_	_	63		X X XX
64	NUL	`	64		X X XX
65	SOH	a	65		X X XX
66	STX	b	66		X X XX
67	ETX	c	67		X X XX
68	EOT	d	68		X X XX
69	ENQ	e	69		X XX X
70	ACK	f	70		X XX X
71	BEL	g	71		X XX X
72	BS	h	72		X XX X
73	HT	i	73		X XX X
74	LF	j	74		X XX X
75	VT	k	75		XX X X
76	FF	l	76		XX X X
77	CR	m	77		XXXX XXX X
78	SO	n	78		XX X X
79	SI	o	79		X XXXX X

80	DLE	p	80		X X XXXX
81	DC1	q	81		X X XXXX
82	DC2	r	82		X X XXXX
83	DC3	s	83		X XXXX X
84	DC4	t	84		X XXXX X
85	NAK	u	85		X XXXX X
86	SYN	v	86		XXXX X X
87	ETB	w	87		XXXX X X
88	CAN	x	88		XXXX X X
89	EM	y	89		XX XX XXXX
90	SUB	z	90		XX XXXX XX
91	ESC	{	91		XXXX XX XX
92	FS		92		X X XXXX
93	GS	}	93		X X XXXX
94	RS	~	94		X X XXXX
95	US	DEL	95		X XXXX X
96	FNC3	FNC3	96		X XXXX X
97	FNC2	FNC2	97		XXXX X X
98	SHIFT	SHIFT	98		XXXX X X
99	Code C	Code C	99		X XXX XXXX
100	Code B	FNC4	Code B		X XXXX XXX

101	FNC4	Code A	Code A		XXX X XXXX
102	FNC1	FNC1	FNC1		XXXX X XXX
103	START A	START A	START A		XX X X
104	START B	START B	START B		XX X X
105	START C	START C	START C		XX X XXX
n/a	STOP	STOP	STOP		XX XXX X XX