Communication of Information in Elevator TFT Displays

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ABSTRACT

The 'Elite' Indicator for the Lift Car uses TFT technology screens, which can communicate any information required to the passengers. Full computer text and graphics are available not only to display position and direction, but floor information, timed messages, priority and emergency messages, building information, advertisements, time, temperature, date, and to communicate outside the building. The communication links, graphics and programming are demonstrated showing the immense possibilities of this system for architects, planners and building owners.

1. INTRODUCTION

Passengers in Lift Cars are generally nervous of being in a confined space and keen to be kept informed of the status of their journey. They are captive audiences who are very receptive to the information they receive. Present information given to the passengers rarely consists of more than indicator indication of the position and direction of travel of the Lift Car. Occasionally voice announcements are added.

In response to this C.E. Electronics developed a 'computer' screen, which is mounted in the Car to replace the position indicator, and which can be used easily to give graphic and text information in any form required, including messages. The software is so flexible that the customer can customize their own background, colours and textures, fonts and arrow styles and decide where the display elements appear on the screen. This has been successfully brought to market in the 'ELITE' TFT display, and is well ahead of other products in this field.

The basic elements of the system are

a) An easy interface to the Controller signals, including position, direction, and priority messages.
b) Only 3 shaft wires (unscreened) from the Controller to the Car
c) A TFT Screen in the Car with full computer capability, able to work unsupported
d) Custom software allowing the customer to decide where and how to display information
e) Link to Time, Date and Outside Temperature over the same 3 wires
f) Timed message support e.g. morning and evening, or weekend messages
g) A computer link to a host computer which can update a group of Lifts automatically with new information.
h) Modular design which can include other elements such as Speech and Landing products
i) Ability to add further interfaces to display information outside the Car such as TV, Video, and Traffic Information

The system is able to display

a) Floor position in both numeric and text form
b) Car direction, both Travelling and Arrival (next direction)
c) Time, Date and Temperature
d) Floor associated messages when the Car arrives at the floor
e) Priority and Emergency messages
f) Timed messages, e.g. Fire Alarm testing, Morning and Evening information
g) Timed Advertisements
h) Outside information, e.g. status of local traffic
i) TV and Video links
j) Include a Landing display showing the statues of all the Cars in a Group

Other elements able to be attached to the system include

a) Speech
b) Landing Indicators
c) Hall Lantern Arrival
d) Arrival Gong
e) Remote display link

This paper describes the specification, structure and applications of this product.

2. INTERFACE TO PRODUCT

Figure 1 shows elements used to link the controller to the TFT screen.

C. E. Electronics developed the MICRO-COMM™ 3-shaft-wire system for serially linking the Controller to all the elements used in fixtures to give information to passengers. The 3-shaft-wires are low voltage, unscreened, and are able to carry the information over long distances. Many different products can be connected to the MICRO-COMM™ 3-shaft-wire system, including 16 Segment and Dot Matrix Indicators, Arrival Gongs, Speech Units, Hall Lanterns, and scrolling Message Units and it is also able to drive existing Multi-lights. Time, Date and Temperature can be added, and messages changed down the same 3-shaft-wires.

3. CONTROLLER INTERFACE – CENTRAL CONTROL UNIT

A unit is attached to the Controller to receive signals including

- Position
- Travelling Direction
- Arrival Direction
- Car Overload
- Fire Recall
- Emergency Recall
- Nudging
- Slowing
- Doors Closing
- Doors Opening
- Attendant Service
- Under Maintenance

Three wires can drive position indicators, passing chimes, lanterns, arrival gong, scrolling message centers, and digitized voice units.

Figure 1.

The interface consists of a Central Control Unit on the Car Controller in the Motor Room, which accepts signals from

- 6 to 150 volts AC or DC positive or negative
- floor signal format in line per floor, binary, gray code, or units and tens

This allows for easy modernization of existing installations. We have also developed interfaces with individual controller manufacturers to be integrated into their controller.

4. TFT SCREEN

The TFT screen is a full computer with Hard Disc and RAM, with it's own special software and is able to display all the information received on the screen. The special software is compiled to work on Windows ^{TM} 95, 98 or NT. Other Windows ^{TM} compatible software such as graphics and video packages are supported.

The Screen is linked to the MICRO-COMM^{TM} 3-shaft-wire system and is therefore able to display any of the above information.

5. TFT DISPLAY

The TFT display is available in many sizes from 200mm to 600mm diagonal. It is only 60mm deep so can usually be incorporated in the Car Operating Panel.
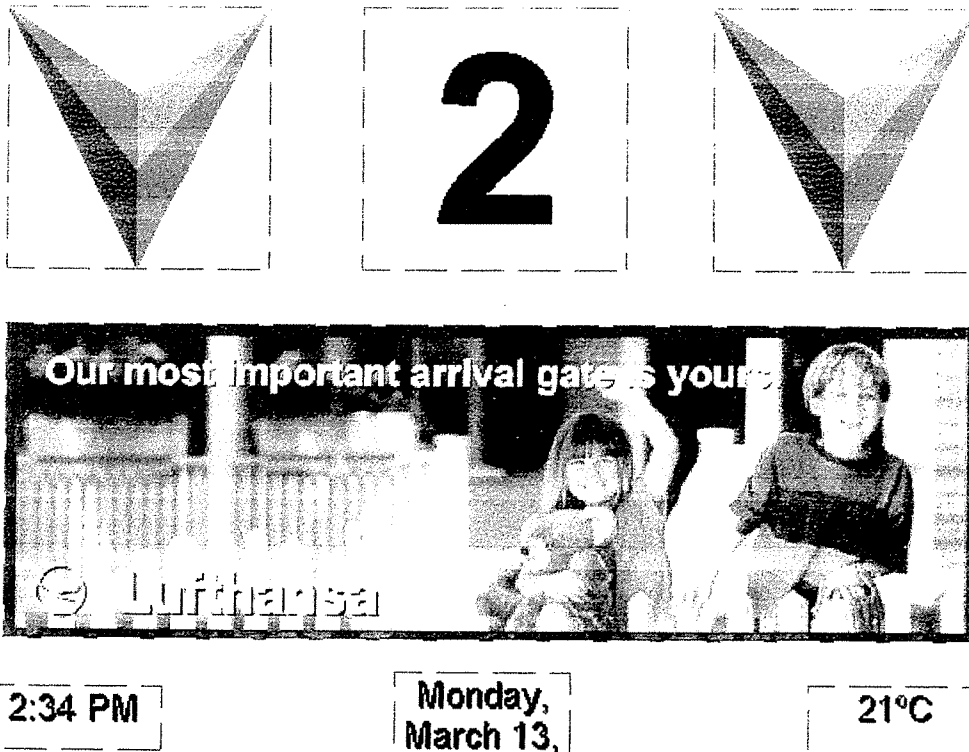

Figure 2.   Typical fields set up on the TFT screen

Fields are set up on the display to show the information required. Typical fields include

- Floor position
- Car Direction
- Priority and Emergency Messages
- Floor Messages

All this information is stored on the Hard Disc and initiated by the signals received from the controller. The display can be in text format or as a graphic file.

6. TFT MESSAGES

The most useful feature of the ELITE™ TFT screen is its' ability to display messages to the passengers. The customer can decide where the display elements appear on the screen and the presentation of the message. Three types of messages are usually considered.

6.1 Floor Messages

Any message associated with a floor can be displayed. For example tenants on that floor or points of interest or directions on exit. The message is initiated when the doors open, and can be text, graphics or AVI (animated).

6.2 Priority Messages

A priority message will overwrite any other message and is displayed as soon as the signal is received. This type of message is often used to display information regarding an emergency such as a fire recall.

6.3 Scheduled Messages

Scheduled or Timed Based messages are the most flexible element of the display and are really appreciated by the building owner, tenant and passenger. They can include elements time linked to days of the week, time of the day, and direction of the Car, and initiated automatically by the TFT display. They can be text, graphics or AVI (animated). Typical messages might include

- Menu for breakfast, lunch and dinner on each day of the week
- Meetings and locations for visitor navigation
- Welcome messages

6.4 Advertisements

A most successful element of the ELITE™ TFT display has been the ability to display advertisements and generate an income for the building owner. This takes advantage of the otherwise wasted time during travel, and a captive audience. Building owners sell the advertising space and can recoup the cost of the TFT display and produce revenue from the Lift. The advertisements can be linked to date, duration, days of the week, time of the day, and direction of the Car, and initiated automatically by the TFT display. They can be text, graphics or AVI (animated).

7. LIVE LINKS

We are able to link the ELITE™ TFT screen to give live data to give, for example, traffic information to the passengers as they descend the building in the Lift.

8. VIDEO TV AND AVI IMAGES

It is possible to link the TFT screen to Video, TV and AVI images. For example an area of the screen can display a television program or stock exchange information.

9. LOBBY PANEL

We can display the positions and directions of a group of Cars in an ELITE™ TFT screen Lobby Panel, and also have the facility to display messages. These can be priority, scheduled, timed or advertisements as the Car units. Typical messages might include

- Meetings and locations for visitor navigation
- Welcome messages
- Advertisements

10. DESIGNING THE LAYOUT

C.E. Electronics supply with each ELITE™ TFT screen designer and transfer software which allow the customer to customize the display to their personal choice and requirements. This is done on a remote computer and loaded onto the ELITE™ TFT screen when complete. We also liaise with the customer to supply a demonstration CD of their requirements and load it onto the screen initially.

A practical demonstration of this will be given during the lecture

- First the background is selected. This can be a plain colour, a company logo, or any other graphic image.

- Then the size and shape of the floor position elements are added and the floor markings. These can be in text or graphics. Colour, font, size, and shadow are all selectable.

- Then the size and shape of the direction elements are added and these are linked to travelling or arrival (next direction) signals from the controller.

- If time, temperature and date options are required these elements are selected for size and shape and format e.g. 5 June 2000 or June 5th etc.

- At least one element is selected for size and shape for the message area. This is usually made as large as possible for maximum impact. If only one area is selected it will automatically show messages in priority as

- ○ Emergency Messages
- ○ Floor Messages
- ○ Scheduled or Timed Messages

All the messages can be selected as text, or graphic images.
Scheduled or timed messages are additionally selected for duration, start date and time, end date and time, day, period, and direction of travel.

Special graphics and AVI are prepared during this design and consultation period.

When the design is agreed it is collected for transfer to the ELITE™ TFT screen. Again it can be selected for date and time of update. This allows for example new tenant floor information to be agreed and pre-programmed early and updated only when the new tenant arrives.

11. UPDATING THE LAYOUT

At any time the layout can be retrieved from the remote computer and edited to new requirements by the customer. This very important feature gives the customer control over what is displayed for the first time. They can alter the information without having to refer back to the Supplier or Maintenance Company. For example

- Tenants can alter their floor messages immediately
- Visitors can be welcomed daily
- Menus can be changed
- Floor markings can be altered
- Advertisements can be added or deleted

Of course they can also refer back to us if they require assistance.

12. LINKING AND UPDATING GROUPS OF CARS

The system is designed to allow many groups of Cars to be linked to one central computer and updated either all at once or individually.

Each ELITE™ TFT screen works on its own displaying information received from the Controller and the messages selected. However they can also be linked via a RS485 protocol to MUX cards in the Motor Rooms and then on to the central computer. Each screen is set to a location and the computer selects which screens to update.

Other protocols including networking and web linking are also possible.

Figure 3. A typical set up for several cars in a group

13. RELIABILITY

The ELITE™ TFT screen is an industrial product used in many industrial applications. It has successfully passed test for vibration and screen deterioration with age.
The ELITE™ TFT screen is mounted in a special frame to the Car Panel so as to pass load and shock tests

The ELITE™ TFT front viewing panel is made in acrylic. For vandal resistant sites a laminated polycarbonate/acrylic lens is used for extra strength.

14. ADDING OTHER UNITS TO THE SYSTEM

The C.E. MICRO-COMM™ 3-shaft-wire system has all the information necessary to allow many different products in the C.E. range to be connected, including 16 Segment and Dot Matrix Indicators, Arrival Gongs, Speech Units, Hall Lanterns, and scrolling Message Units and it is also able to drive existing Multi-lights. Typically each unit requires 150mA. All units are connected serially (daisy chained) so minimum additional wiring is required. This makes it an ideal system for modernization.

Other links are available including RS232/RS485 and LAN.

15. CONCLUSIONS

In this paper we have explained the specification and structure of the newly developed C.E. Electronics ELITE™ TFT Screen and how it can be used to give superior information to the passenger, design freedom to the Architect, and revenue to the building owner.

Many units have been successfully installed and it is being recognized as the most versatile product available of its type.

16. AUTHOR BIOGRAPHICAL DETAILS:

The author John Trett, gained a degree in Electrical Engineering at Nottingham University in the UK and is an associate member if the Institute of Electrical Engineers. He has been associated with the lift industry for many years, including as Technical Director of Memco Ltd., and Managing Director of Formula Systems Ltd., both whom make safety edges, and has taken out a number of patents in this field. At present he is Chairman and Managing Director of Programmed Technology Ltd, P.O. Box 1679, Marlow, Bucks, SL7 2YR, UK, whose C.E. Electronics division designs and promotes Indicators, Speech Units and associated products extensively in Europe. They are designed and manufactured by C.E. Electronics Inc in the USA.