



SKYPARKS CONTROL SYSTEM (SCS)

## SKYPARKS CONTROL SYSTEM

The Skyparks Robotic Parking System (SRPS) is controlled and monitored by software known as the Skyparks Control System (SCS) which can be tailored to suit any site-specific requirements. The SCS has been designed with three modes of operation to allow for the greatest flexibility:

### AUTO MODE

The vast majority of the time the SCS is in Auto Mode. In this mode the car park runs automatically and there is no input required by the car park operator.

### SEMI-AUTO MODE

Semiauto mode allows you to perform the same functions as Auto mode, but it is a much longer process. One operation can be completed at a time, and each requires a prompt from the operator.

### SERVICE MODE

Service Mode allows the operator to change the following features of the system;

- Placing robots and/or lifts in or out of service
- Designating parking modules as:
  - exit only,
  - entry only,
  - entry/exit
  - out of use.
- Locking parking spaces from use
- Locking entire floors from use with a single selection
- Designating aisles as 'no go' areas for robots

## SYSTEM OPERATION

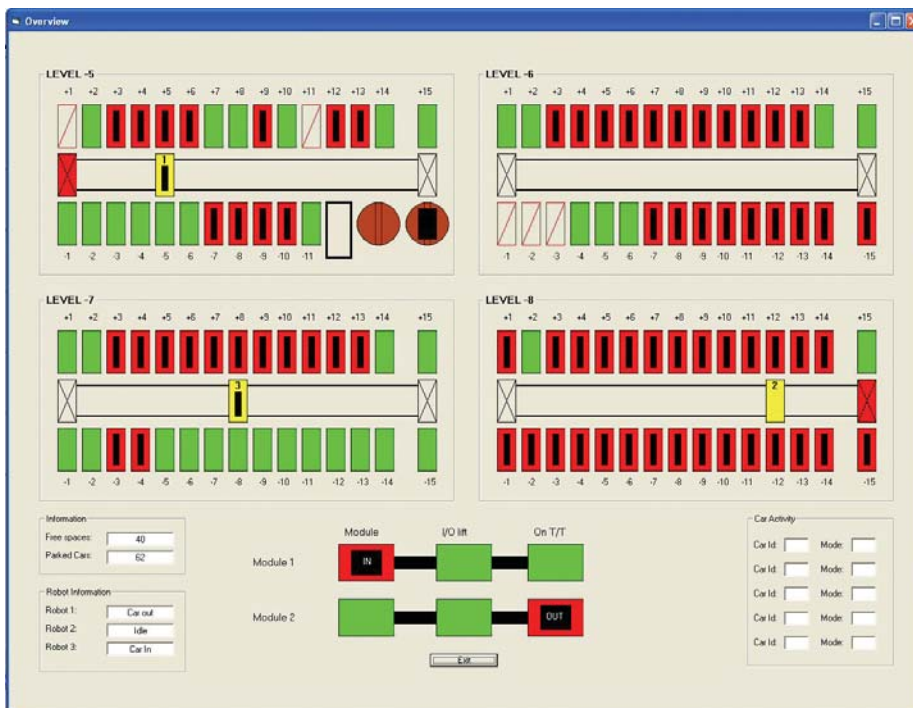
There are two sets of screens used on the control system; one set provides information on the status of the system, the second allows control of the system to be adjusted.

### STATUS INFORMATION SCREENS

#### Camera

A camera in each parking module feeds through live footage to the screen.

#### Overview



Selection of Overview shows a real time representation of the car park; when robots or lifts move in reality, their screen representations also move.

The current configuration of the car park is also clearly visible. The example above shows how usage of parking spaces on each level is clearly displayed; free spaces are green, occupied spaces are red. Spaces that are permanently locked have a black diagonal line through them and those that are temporarily locked, such as space +1 on level -5, have a red line through them. The location and activity of robots (in yellow) is also shown.

## DATABASE

The screenshot shows a software interface for a parking system. At the top, it displays 'Sky Park - Edinburgh B1[Auto.Run] - [Database]' and 'Alfia: Setting current time. Date: 07-12-02 Time: 14:33:30 Alarm: Module 2 7/12/02 / 14:13:17 Movement detector'. The main area contains a table with the following data:

Ticket	Time	Date	Robot	Position	Height	Mode	RecordID	Category	In Use
scrap	20:42	02-07-03	0	11:3	1	parked	1	11	In use
01500544	13:41	02-07-12	0	3: 6	1	parked	2	15	In use
01500534	08:31	02-07-12	0	5: 2	1	parked	3	11	In use
01500535	08:42	02-07-12	0	2: 2	2	parked	4	14	In use
01500536	08:45	02-07-12	0	3: 2	1	parked	5	15	In use
fiat	09:09	02-06-26	0	3: 2	1	parked	6	15	In use
01500541	11:52	02-07-12	0	4: 2	1	parked	7	11	In use
hyundai	21:37	02-07-11	0	3: 6	1	parked	8	15	In use
01500537	08:56	02-07-12	0	3: 7	1	parked	9	15	In use
01500540	10:55	02-07-12	0	3: 5	1	parked	12	15	In use

The interface also includes a sidebar with 'Robot 1', 'Robot 2', and 'Robot 3' sections, and a search area with fields for 'Ticket', 'Date', and 'Time', along with checkboxes for 'In USE', 'Height', and 'Level'. A 'Retrieve' button is located below the search fields. At the bottom, there are navigation buttons for 'Login', 'camera', 'Overview', 'database', 'Trouble', 'Reports', 'Alarms', 'Mode', 'Exit', 'Transfer', 'System', 'Semiauto', 'Config', 'Service', 'Help', and 'About'.

System data can be displayed as follows:

- By ticket number (e.g. 001 – 004)
  - By date range (e.g. 01/01/05 – 03/01/05)
  - By time range (e.g. 10.00am – 3.00pm)
  - In use – shows data for occupied spaces only
  - Height – shows data for high parking spaces only
  - Level – shows data for selected level only
- For example, the system can show vehicles that entered the system between 10.00am and 3.00pm, on a certain level, on a certain date. Individual records can then be selected and vehicles retrieved if desired.

## TROUBLE

These are diagnostic screens for the robots, lifts and parking modules, allowing for quick and easy identification of any faults that may arise. Tool tips are available to assist in rectifying minor faults quickly.

## REPORTS

Two reports for monitoring system performance: entry / exit times and hardware response times.

## ALARMS

Type	ID	no	Date/Time	Alarms	Priority	Status
Module	2	8	07/12/02 / 13:14:55	Safety breaker humtable	7	Ack'd
Lift	2	9	7/12/02 / 13:45:00	LOCK NOT OPEN POS. SIDE	8	Sound
Module	2	18	7/12/02 / 14:13:22	Movement detector indication	8	Sound

This screen shows comprehensive data about all Skyparks equipment alarms. Should an alarm be activated, it is shown in the alarm bar at the top of the screen and as the last entry in the alarm table. For alarms with high priority a pop-up message will appear on the screen. Once a fault has been repaired, alarms will remain active until acknowledged by the operator.

Depending on the nature of the fault the car park will either remain in Auto;Run or Auto; Stop mode. This usually means individual components of the system are closed down.

## CONTROL SCREENS

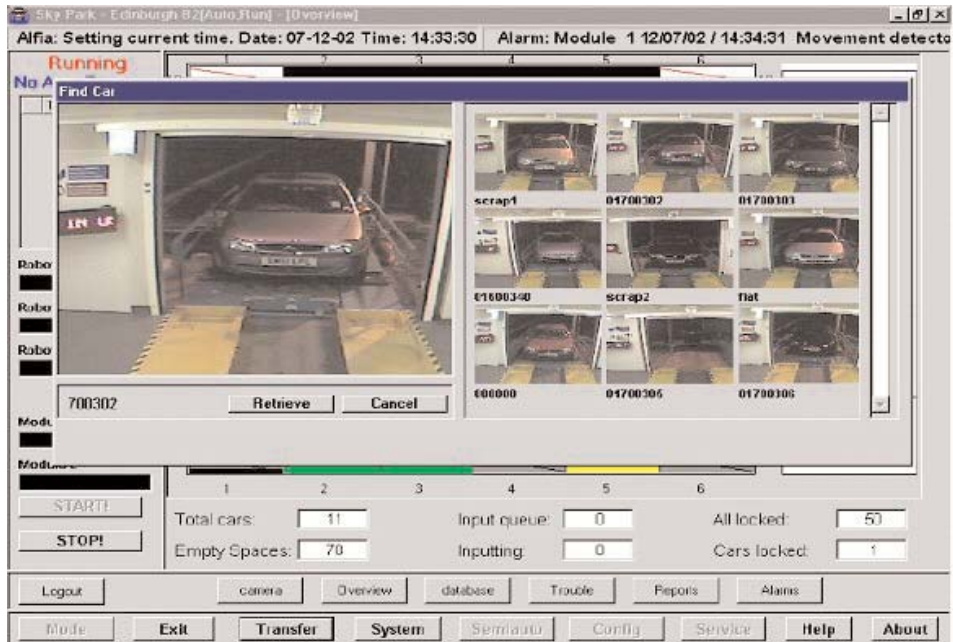
### MODE

This enables the operator to switch between Auto, Semiauto and Service mode.

### EXIT

To exit from SCS

### TRANSFER



This allows manual selection and retrieval of a vehicle when in Auto mode. This is usually used if a customer has lost their ticket.

The select facility on the database is used to identify the vehicle. The Transfer function is then used to display thumbnail pictures of the vehicle selected and the eight previous vehicles entered into the system. The Retrieve function can then be used to trigger retrieval of the vehicle.

#### SYSTEM

This allows the operator to change the flow of traffic in and out of the car park by designating the parking modules as exit only, entry only, exit/entry or out of use. The operator can also enable the system to accept a car by using the Entry Request facility.

#### SEMIAUTO

This allows the operator to perform certain operations with robots, lifts and parking modules; the SCS will allow only one operation to be completed at a time.

#### CONFIGURE

This allows the operator to configure the car park as desired, placing robots or lifts in or out of service, locking parking spaces or whole floors and designating aisles as no go areas for robots.

#### SERVICE

This allows the operator to reset equipment from the control room, if it has experienced an emergency stop.

#### HELP

This opens the help file for further information about the SCS.

#### ABOUT

This displays which version of SCS is in use.