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1 OUTLINE

1.1 General Construction

SRCC (Sky Rav Clean Controller) consists of two control systems.

One control system is OPC (Object oriented Panel PC), which receives remote commands from MCS computer (Host) and sends transport commands to SRC. OPC also monitors transport status and errors in the control equipment, and it controls the functions of manual operations performed by operators. OPC's operations are compliant with GEM/IBSEM, and the functions such as a remote command, event management, alarm management and status variable management are provided.

The other control system is MPC (Murata Programmable Controller), which controls the devices and status (e.g.: the indicators, the power supply status, the SRC status, error displays and the fire shutter) on the rail.

1.2 FCC Warning

This equipment includes the wireless communication unit inside It is metal cased and locates at the center area inside of this equipment

FCC WARNING

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CAUTION

To keep proper efficiency, never use the parts such as wire harness which are not assembled originally.
To keep the frequency accuracy, avoid the mechanical shock.

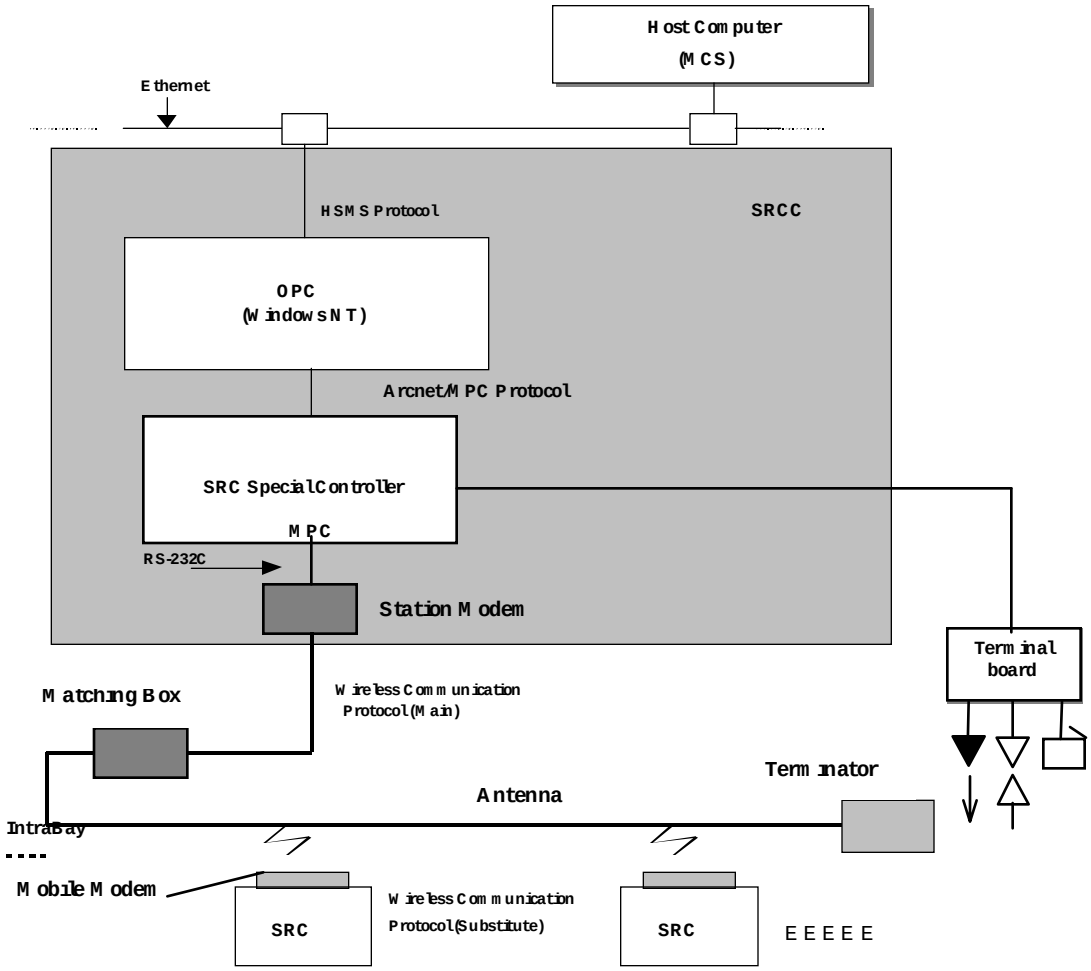
NOTICE

This equipment ha been tested and found to comply the limits for a Class A digital device, pursuant to part 15of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residual area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device is professionally installed and thus meets the antenna requirement of FCC 15.203.

2 System Configuration:

SRC System is configured with the basic devices shown below:



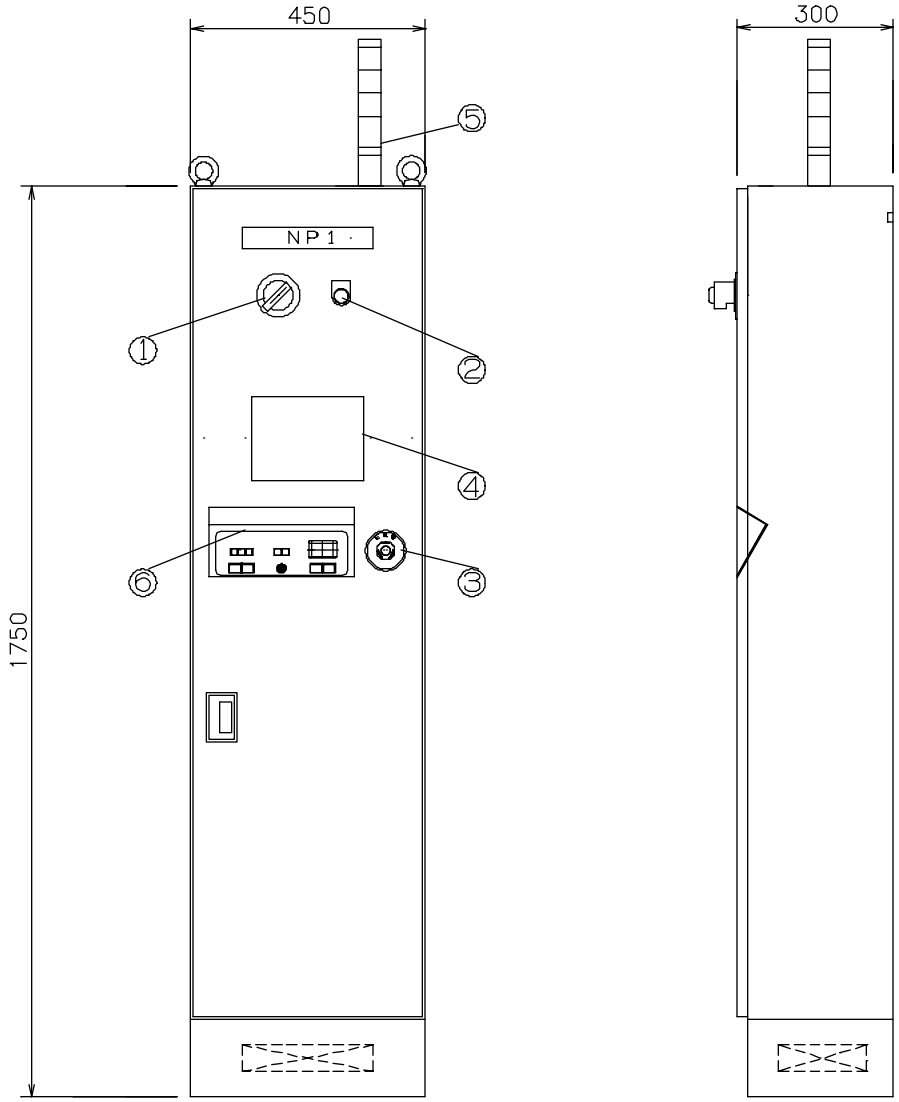
3 Electric Specifications

3.1 Supplied Power Source

Please supply the power according to the below conditions.

System Name	Phase	Power	Frequency	Capacity	Current (MAX.)	Breaker of Main Control Panel	Power Receiving Method	Quantity of Circuits
SRCC system	3	AC208V ±5%	60Hz ±1%	2KVA	10A	10A	Terminal block on breaker	1
	The 3rd class grounding for ensuring safety						Terminal block	1 for each

3.2 External Appearance of Control Panel



No.	Item	Color	Note
1	Main breaker	---	Turn ON and OFF the power supplied to the control panel.
2	Power supply display light	White	Lit when the power is being supplied to the control panel.
3	EMO switch	Red	EMO switch for the SRC system. Press this switch to turn off the power of the whole SRC system.
4	OPC		Displays the operation screens of SRCC.
5	Signal tower		Red : This lamp flashes when an error is detected in the SRC system. Yellow : Green : Blue :
6	Operation panel		See the next page.

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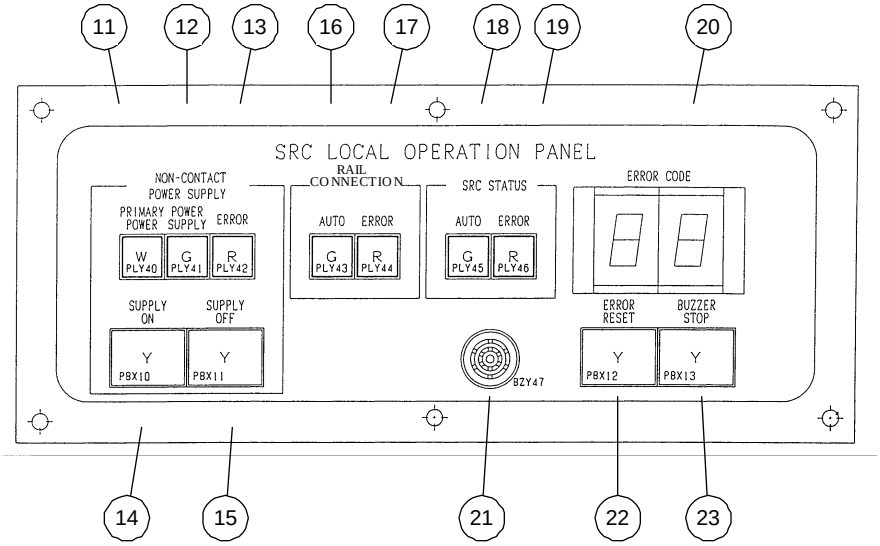
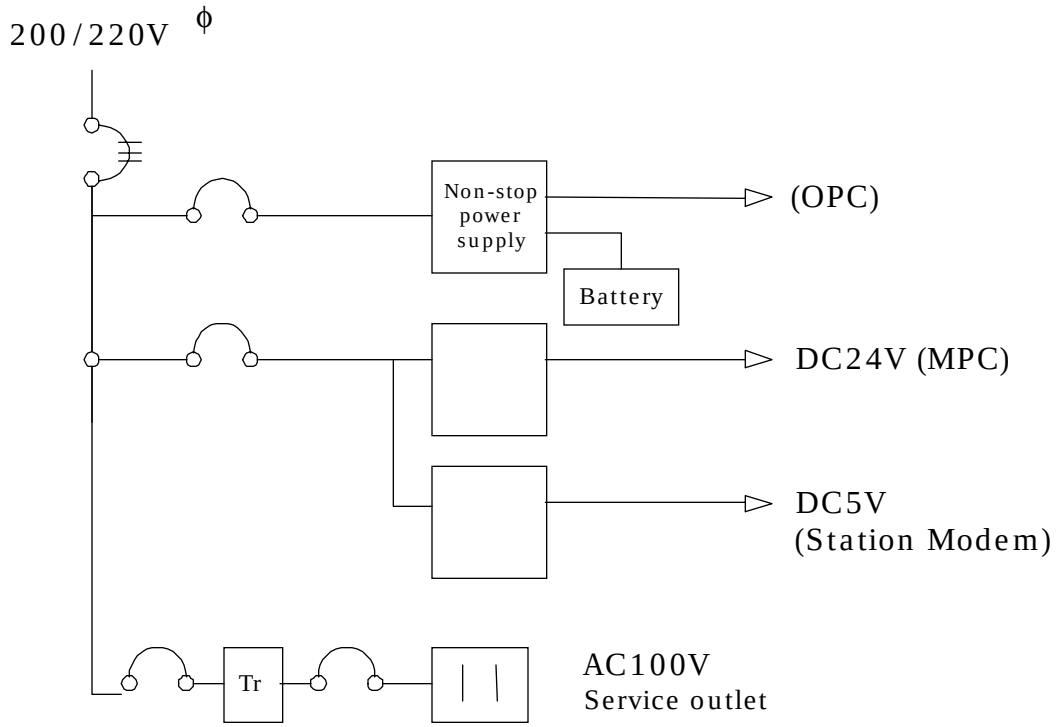
Operation Panel



No.	Name	Color	Function
	<High-frequency power>		
11	PRIMARY POWER	White	Lit when the high-frequency power is being supplied.
12	POWER SUPPLY	Green	Lit while the high-frequency power is being supplied.
13	ERROR	Red	Lit when an error occurs in the high-frequency power supply.
14	SUPPLY ON	Yellow	Press this switch to start supplying the high-frequency power.
15	SUPPLY OFF	Yellow	Press this switch to stop supplying the high-frequency power.
	<Maintenance rail>		
16	RAIL CONNECTION – AUTO	Green	Lit when it is possible for a vehicle to pass through on the maintenance rail.
17	RAIL CONNECTION – ERROR	Red	Lit when it is impossible for a vehicle to pass through on the maintenance rail.
	<SRC>		
18	SRC STATUS – AUTO	Green	Lit while SRC is performing automatic operations.
19	SRC STATUS – ERROR	Red	Ls lit when an error occurs in SRC.
	<Common>		
20	ERROR CODE	Red	Displayed in 2 digits and 7 segments in order to describe an error in SRCC.
21	Buzzer	---	Buzzer sounds when an error occurs.
22	ERROR RESET	Yellow	Press this switch to reset an error after removing the error cause.
23	BUZZER STOP	Yellow	Press this button to stop the buzzer sound.

3.3 Control Panel Control Block

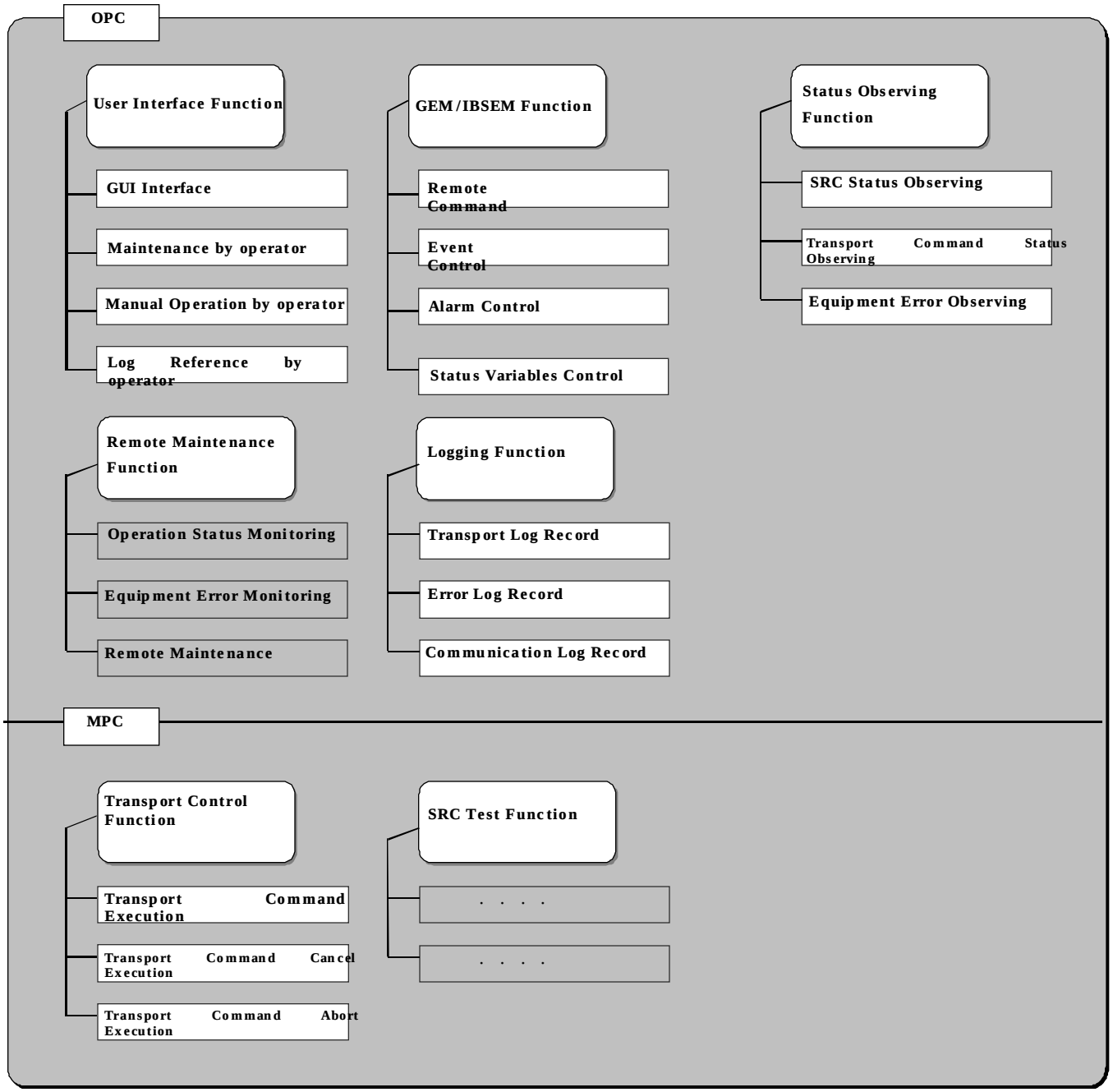


3.4 OPC Electric Specification

Item	Specification
Display panel	10.4 inch, TFT, 800 × 600 dot color
CPU	MMX 223MHz
Memory	64MB
HDD	2GB (Mirror)
Floppy	3.5 inch
OS	Windows NT 4.0
Interface	Touch panel: 1 line
	Keyboard : 1 line
	Mouse : 1 line
	LAN : 1 line (10Base-T)
	Arcnet : 1 line
	BS232C : 4
Power	AC100V ~ 260V
Battery	2.2AH, Backup time: 5 minutes
External size	See another document.
External appearance drawing	

4 Function Description

4.1 Function Configuratioin



4.2 Description of Function

4.2.1 Operator Interface

- GUI Interface
  SRCC functions under Windows NT and provides interface based on GUI for an operator. A touch panel is used for this operation.

- Maintanance by operator
  Transfer command cancellation and aborting are possible while an operator is checking on transfer command status and SRC status with a monitor.
  Status display and setting changes on IBSEM/GEM functions are also provided

- Manual Operation by operator
  Operation orders such as transfer and traveling are provided for SRC by an operator.
  Initialization intructions in starting up of the system are also provided for SRC by an operator.

- Log Reference by operator
  The Log data reference is possible by an operator. The log search function can also provide a display of a disired log data by specifying date and a log type.

4.2.2 GEM/IBSEM Function

- Remote Command

  SRCC receives commands shown below from the Host computer and processes them.

Remote Command Name	Description	Main Data
TRANSFER	Transfer Command	Command ID Cassette ID Priority From To
CANCEL	Transfer Command Cancellation before execution	Command ID Cassette ID
ABORT	Transfer Command Aborting in Execution	Command ID Cassette ID
PAUSE	Pause of TSC Status	Command ID
RESUME	Resume of TSC Status	Command ID

- Event Control

  "Event Report"

  SRCC makes event reports on every detected item to the Host Computer. Each event report has its own reporting type, and it can be changed by the Host Computer and an operator.

  "Active Event Setting"

  SRCC make a report when it receives an event list request from the Host Computer. It also corresponds to active event setting requests.

- Alarm Control

  "Alarm Report"

  SRCC make an alarm report to the Host Computer when it judges a detected error as an alarm. Each alarm report has its own alarm ID. SRCC also makes an event report on causes of an alarm when it occurs.

- Status Variables Control
  SRCC controls the below status variables requested by IBSEM. It makes an event report on changes of each status variable.

Status Variables	Description	Status
TSC Status	Execution Status of Controller	INIT PAUSED AUTO
Transfer Command Status	Transfer Command Status	QUEUED WAITING TRANSFERRING PAUSED CANCELING ABORTING
Vehicle Status	Vehicle (SRC) Status	ENROUTE PARKED ACQUIRING DEPOSITING ASSIGNED NOT ASSIGNED INSTALLED REMOVED
Carrier Status	Load Status	INSTALLED REMOVED
Host Control Status	Host Control Status	EQUIPMENT OFFLINE ATTEMPT ONLINE HOST OFFLINE ONLINE LOCAL ONLINE REMOTE
Communication Status	Communication Status	ENABLE DISABLE

4.2.3 Transfer Control Function

- Transfer Command Execution
  SRCC send an order to SRC on the basis of TRANSFER Command from the Host Computer and execute cassette transfer. It also observes SRC and transfer status and make event reports to the Host Computer.

- Transfer Command Cancel Execution
  SRCC executes a cancellation of TRANSFER Command with CANCEL Command from the Host Computer. However, the cancellation is possible only before the TRANSFER Command is executed (before SRC starts loading).

- Transfer Command Abort Execution
  SRCC executes TRANFER Command Aborting with ABORT Command from the Host Computer. However, the command aborting is possible only while the transfer command is being executed.

4.2.4 Status Observing Function

- SRC Status Observing
  SRCC observes SRC status by communicating with SRC through a wireless communication protocol and executing a polling constantly. This operation makes it possible to detect events and alarms.
  Also, an operator can check SRC status through a monitor.

- Transfer Command Status Observing
  SRCC observes transfer command status by communicating with SRC through a wireless communication protocol and executing a polling constantly. This operation makes it possible to detect events and alarms.
  Also, an operator can check transfer command status through a monitor.

- Equipment Error Observing Function (PLC)
  SRCC captures IO from PLC and detects power supply shutting in a diversion table and opening/closing of a fire-proof shutter, and it reports to the Host Computer and an operator immediately. (Event, Alarm, Messages, etc.)

4.2.5 Logging Function

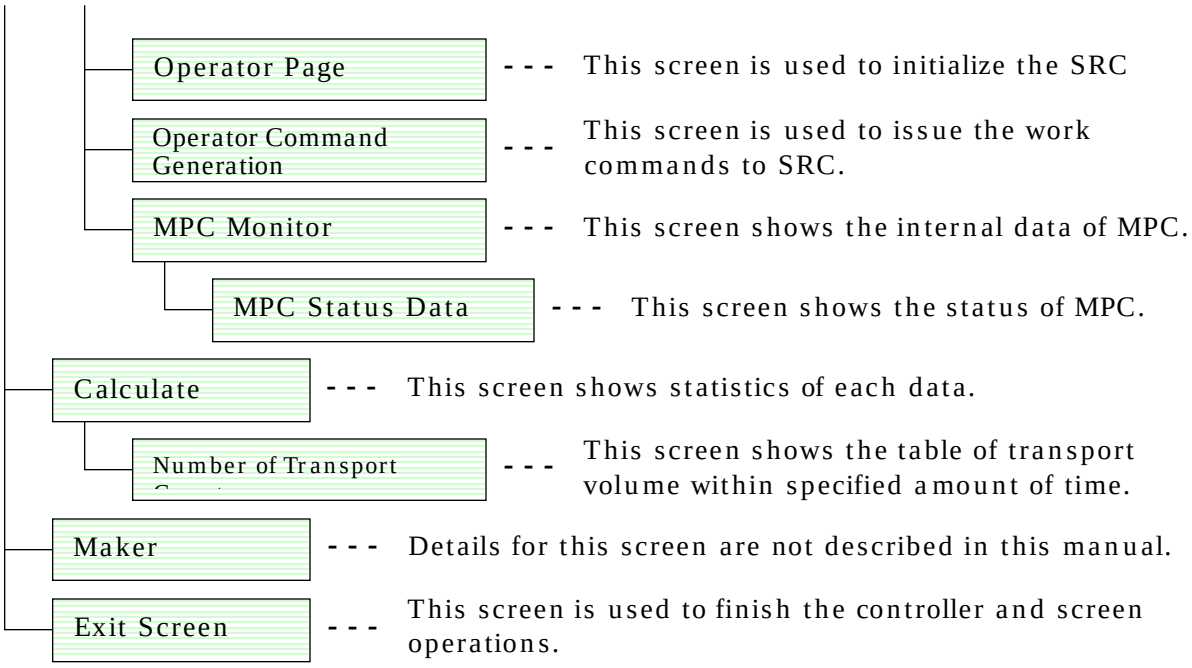
- Transfer Log Function
  SRCC records log data about transfer executed by SRC. Transfer Log records results of each vehicle and station, and it also records completions of transfer commands (completions of loading and unloading).

- Error Log Function
  SRCC records log data about all the detected error. An error log records occurrence and recovery logs, and it consists of time, classification, occurrence point and error code, etc.

- Communication Log
  SRCC records a log in communication between the Host Computer and HSMS, OPC and MPC, and MPC and SRC. However, a recording level of the communication log can be set because the communication log generates a lot of load.

4.3 Screens

- Startup Screen --- This screen will be displayed if the SRCC is started
- Main Monitor --- This screen shows the SRC status and the Station
- SRC Status --- This screen shows the SRC
- Transport --- These screens show the information of
  - Transport Command List --- This screen shows the status of current Transport Commands.
  - Vehicle Status List --- This screen shows the status of Transport Commands that the vehicle is holding.
  - Transport History --- This screen shows the record of previous transport operations.
- Alarm --- These screens show the information of
  - Alarm List --- This screen shows the list of errors that have occurred currently.
  - Alarm Log --- This screen shows the list of errors that had occurred in the past.
  - Alarm Event Log --- This screen shows the transition between SET and RESET for errors that had occurred in the
- Maintenance --- These screens are used to set the time and check the information of each log.
  - Set Time --- This screen is used to set the current time. This is not used usually.
  - Log Menu --- This screen shows the information of each
    - Operation Log --- This screen shows the logs of
    - Host Communication Log --- This screen shows the logs of Host communication.
    - MPC Communication Log --- This screen shows the logs of communication with MPC panel.
    - System Log --- This screen shows the logs of program messages.

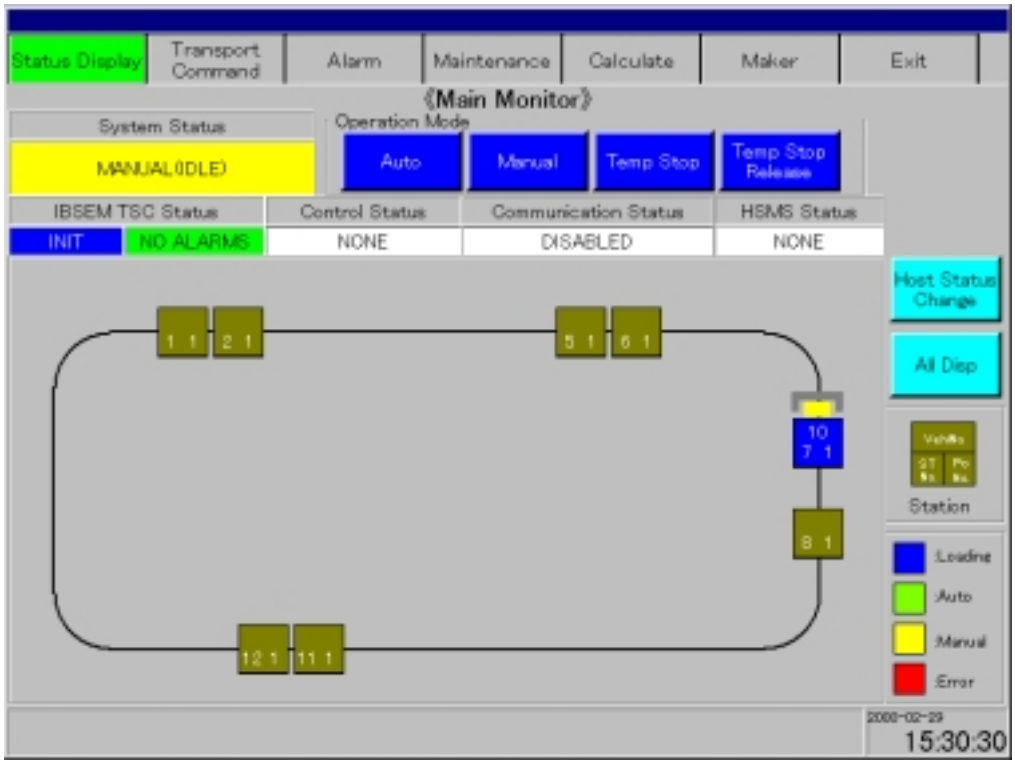

Operator Page
- - - This screen is used to initialize the SRC
Operator Command Generation
- - - This screen is used to issue the work commands to SRC.
MPC Monitor
- - - This screen shows the internal data of MPC.
MPC Status Data
- - - This screen shows the status of MPC.
Calculate
- - - This screen shows statistics of each data.
Number of Transport
- - - This screen shows the table of transport volume within specified amount of time.
Maker
- - - Details for this screen are not described in this manual.
Exit Screen
- - - This screen is used to finish the controller and screen operations.

4.4 Startup Screen

The below screen will be displayed every time SRCC is started up. Go to Control Screen by pressing the “OK” button at the left side of the bottom. When starting operation, make sure to follow the instructions explained in this screen.

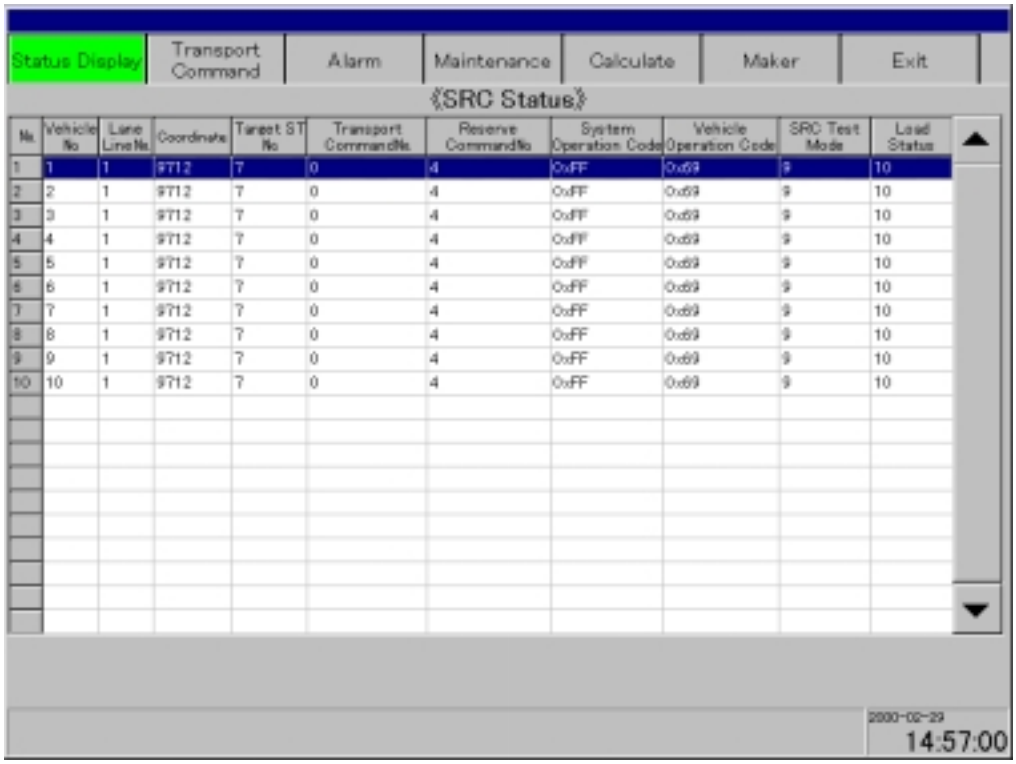
4.5 Main Monitor Screen

Main Monitor Screen is configured to be able to grasp the status of SRC and Station.



4.6 SRC Status Screen

Detailed information in the state of SRC is displayed.



No.	Vehicle No	Lane LineNo	Coordinate	Target ST No	Transport CommandNo	Reserve CommandNo	System Operation Code	Vehicle Operation Code	SRC Test Mode	Load Status
1	1	1	9712	7	0	4	0xFF	0x69	9	10
2	2	1	9712	7	0	4	0xFF	0x69	9	10
3	3	1	9712	7	0	4	0xFF	0x69	9	10
4	4	1	9712	7	0	4	0xFF	0x69	9	10
5	5	1	9712	7	0	4	0xFF	0x69	9	10
6	6	1	9712	7	0	4	0xFF	0x69	9	10
7	7	1	9712	7	0	4	0xFF	0x69	9	10
8	8	1	9712	7	0	4	0xFF	0x69	9	10
9	9	1	9712	7	0	4	0xFF	0x69	9	10
10	10	1	9712	7	0	4	0xFF	0x69	9	10

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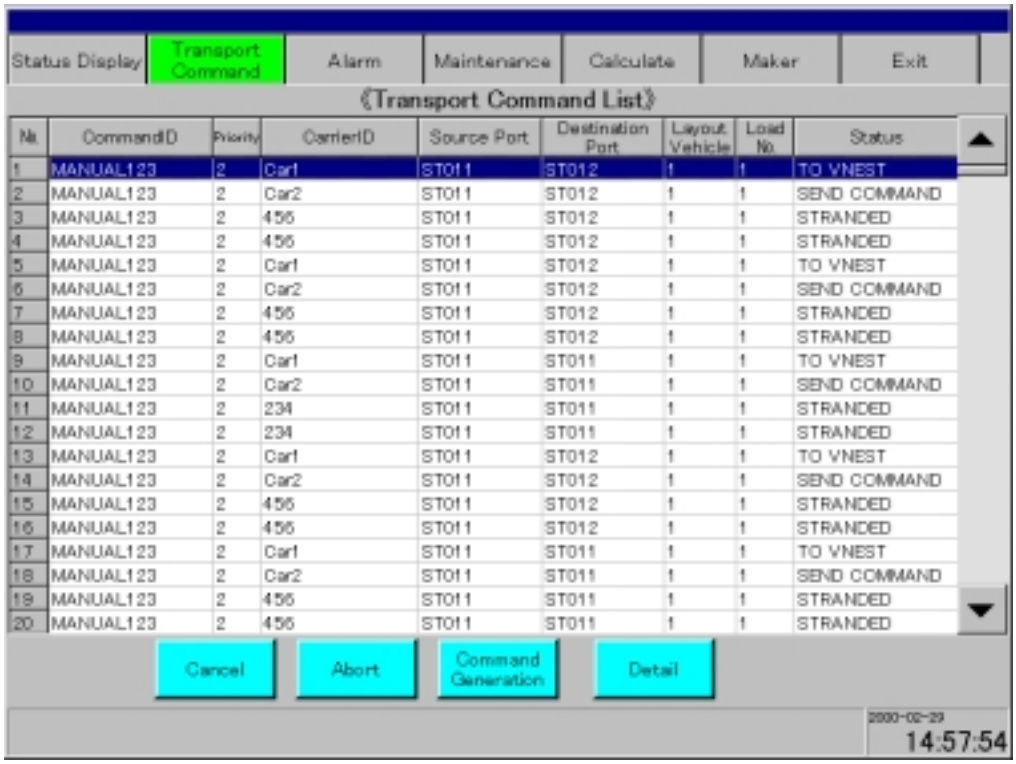
4.7 Transfer Command List Screen

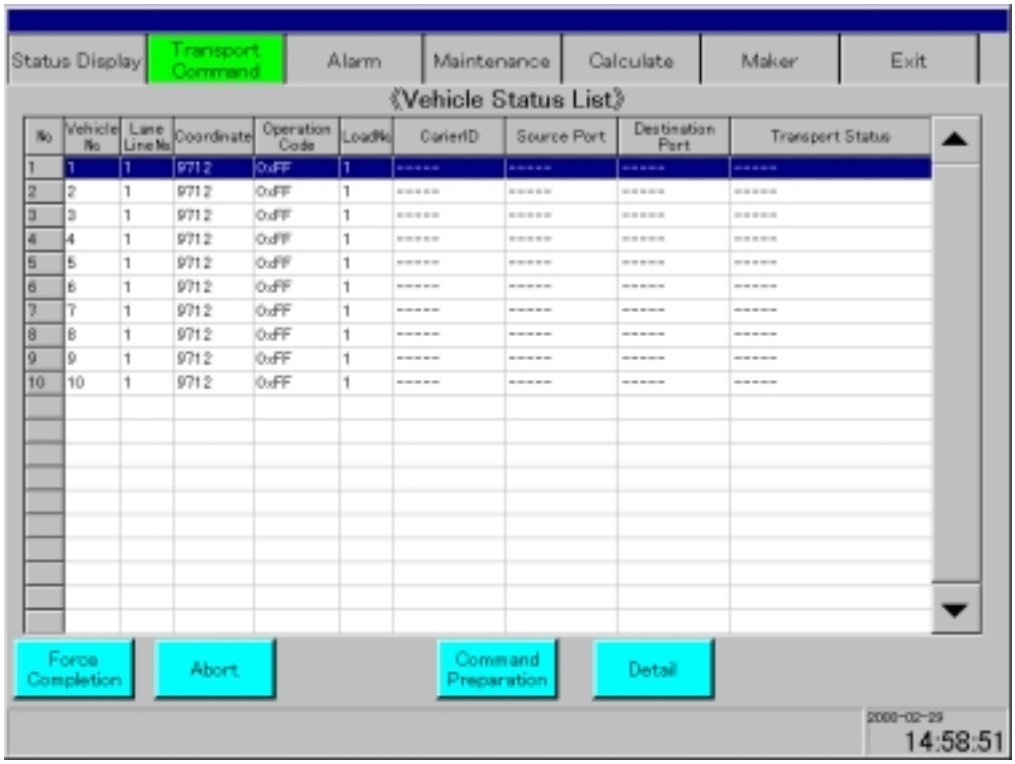
This screen displays the list of transport command status that SRCC is currently holding.



No.	CommandID	Priority	CarrierID	Source Port	Destination Port	Layout Vehicle	Load No.	Status
1	MANUAL123	2	Car1	ST011	ST012	1	1	TO VNEST
2	MANUAL123	2	Car2	ST011	ST012	1	1	SEND COMMAND
3	MANUAL123	2	456	ST011	ST012	1	1	STRANDED
4	MANUAL123	2	456	ST011	ST012	1	1	STRANDED
5	MANUAL123	2	Car1	ST011	ST012	1	1	TO VNEST
6	MANUAL123	2	Car2	ST011	ST012	1	1	SEND COMMAND
7	MANUAL123	2	456	ST011	ST012	1	1	STRANDED
8	MANUAL123	2	456	ST011	ST012	1	1	STRANDED
9	MANUAL123	2	Car1	ST011	ST011	1	1	TO VNEST
10	MANUAL123	2	Car2	ST011	ST011	1	1	SEND COMMAND
11	MANUAL123	2	234	ST011	ST011	1	1	STRANDED
12	MANUAL123	2	234	ST011	ST011	1	1	STRANDED
13	MANUAL123	2	Car1	ST011	ST012	1	1	TO VNEST
14	MANUAL123	2	Car2	ST011	ST012	1	1	SEND COMMAND
15	MANUAL123	2	456	ST011	ST012	1	1	STRANDED
16	MANUAL123	2	456	ST011	ST012	1	1	STRANDED
17	MANUAL123	2	Car1	ST011	ST011	1	1	TO VNEST
18	MANUAL123	2	Car2	ST011	ST011	1	1	SEND COMMAND
19	MANUAL123	2	456	ST011	ST011	1	1	STRANDED
20	MANUAL123	2	456	ST011	ST011	1	1	STRANDED

4.8 Vehicle Status List Screen

This screen displays the list of transport command status that a vehicle is

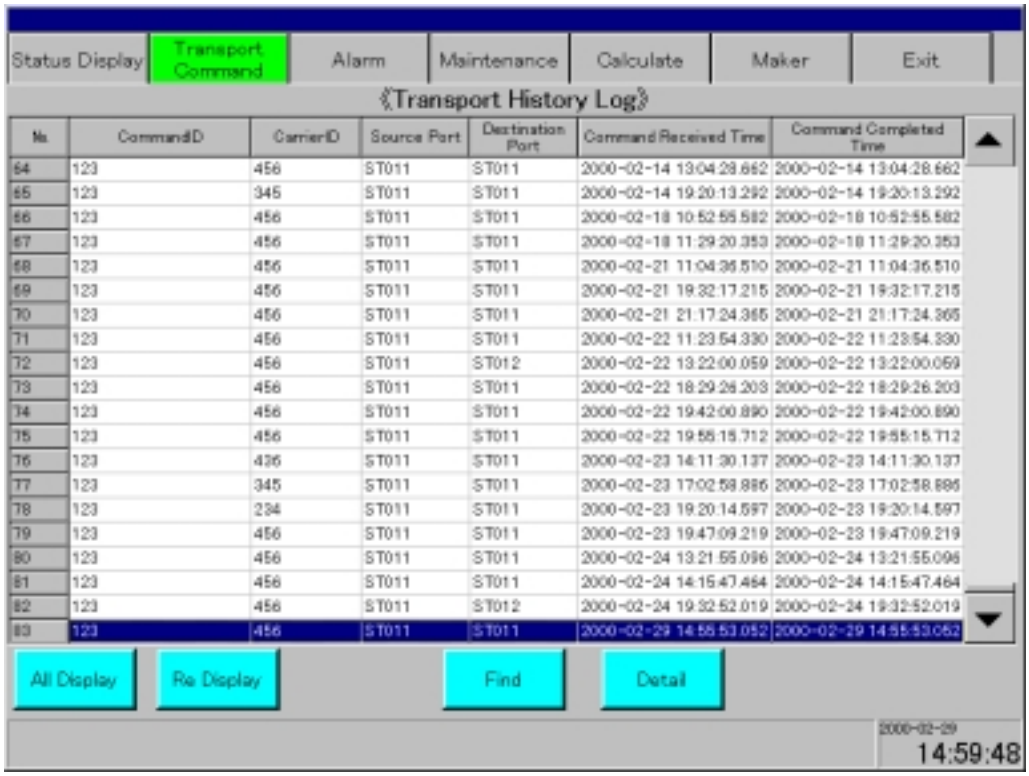


No	Vehicle No	Lane Line No	Coordinate	Operation Code	LoadNo	CarrierID	Source Port	Destination Port	Transport Status
1	1	1	9712	0xFF	1	-----	-----	-----	-----
2	2	1	9712	0xFF	1	-----	-----	-----	-----
3	3	1	9712	0xFF	1	-----	-----	-----	-----
4	4	1	9712	0xFF	1	-----	-----	-----	-----
5	5	1	9712	0xFF	1	-----	-----	-----	-----
6	6	1	9712	0xFF	1	-----	-----	-----	-----
7	7	1	9712	0xFF	1	-----	-----	-----	-----
8	8	1	9712	0xFF	1	-----	-----	-----	-----
9	9	1	9712	0xFF	1	-----	-----	-----	-----
10	10	1	9712	0xFF	1	-----	-----	-----	-----

holding.

4.9 Transport History Log Screen

This screen displays the record of previous transport operations.



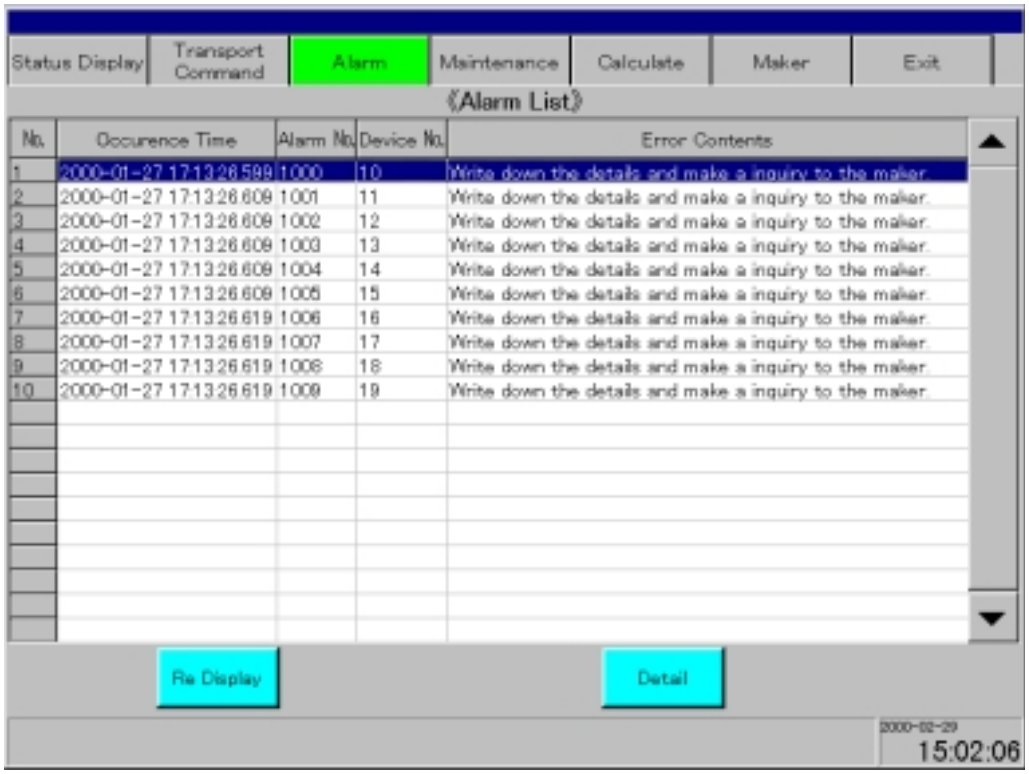
No.	CommandID	CarrierID	Source Port	Destination Port	Command Received Time	Command Completed Time
64	123	456	ST011	ST011	2000-02-14 13:04:28.662	2000-02-14 13:04:28.662
65	123	345	ST011	ST011	2000-02-14 19:20:13.292	2000-02-14 19:20:13.292
66	123	456	ST011	ST011	2000-02-18 10:52:55.582	2000-02-18 10:52:55.582
67	123	456	ST011	ST011	2000-02-18 11:29:20.353	2000-02-18 11:29:20.353
68	123	456	ST011	ST011	2000-02-21 11:04:36.510	2000-02-21 11:04:36.510
69	123	456	ST011	ST011	2000-02-21 19:32:17.215	2000-02-21 19:32:17.215
70	123	456	ST011	ST011	2000-02-21 21:17:24.365	2000-02-21 21:17:24.365
71	123	456	ST011	ST011	2000-02-22 11:23:54.330	2000-02-22 11:23:54.330
72	123	456	ST011	ST012	2000-02-22 13:22:00.059	2000-02-22 13:22:00.059
73	123	456	ST011	ST011	2000-02-22 18:29:26.203	2000-02-22 18:29:26.203
74	123	456	ST011	ST011	2000-02-22 19:42:00.890	2000-02-22 19:42:00.890
75	123	456	ST011	ST011	2000-02-22 19:55:15.712	2000-02-22 19:55:15.712
76	123	436	ST011	ST011	2000-02-23 14:11:30.137	2000-02-23 14:11:30.137
77	123	345	ST011	ST011	2000-02-23 17:02:58.886	2000-02-23 17:02:58.886
78	123	234	ST011	ST011	2000-02-23 19:20:14.597	2000-02-23 19:20:14.597
79	123	456	ST011	ST011	2000-02-23 19:47:09.219	2000-02-23 19:47:09.219
80	123	456	ST011	ST011	2000-02-24 13:21:55.096	2000-02-24 13:21:55.096
81	123	456	ST011	ST011	2000-02-24 14:15:47.464	2000-02-24 14:15:47.464
82	123	456	ST011	ST012	2000-02-24 19:32:52.019	2000-02-24 19:32:52.019
83	123	456	ST011	ST011	2000-02-29 14:55:53.052	2000-02-29 14:55:53.052

4.10Alarm

Select the Alarm Tab, and the below menu will be displayed. This menu is for checking the information of alarm.

4.10.1 Alarm List Screen

This screen displays the list of current errors.

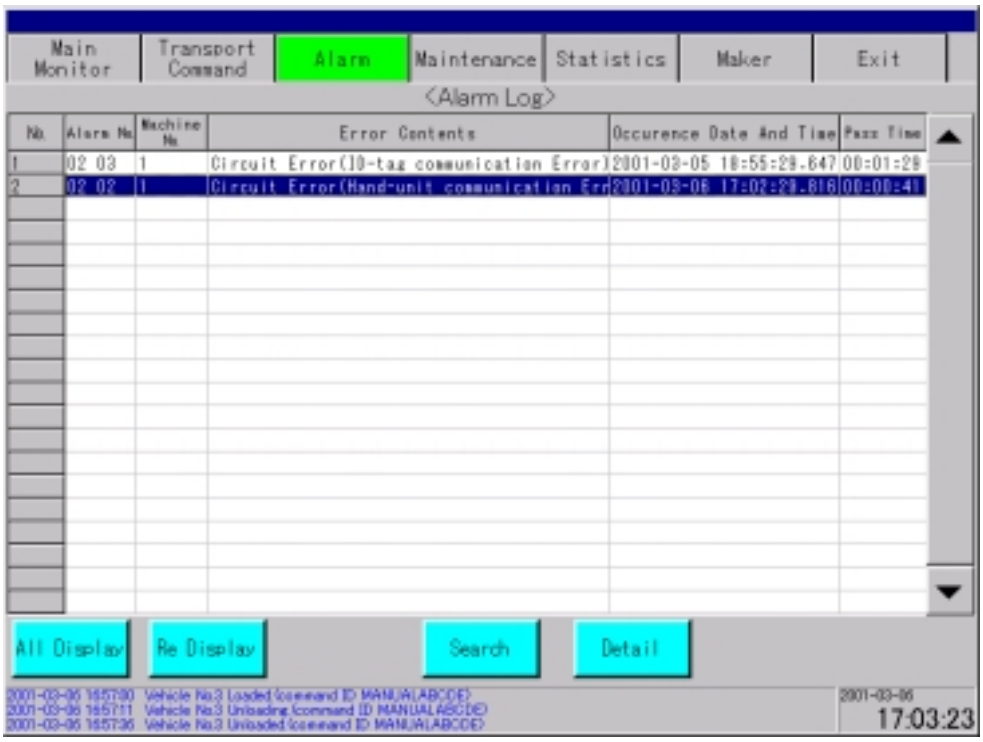


(a) Re Display
Click this button to update and re-display the data displayed on this screen.

(b) Detail
Click this button to open the screen that shows the detail of a selected error.

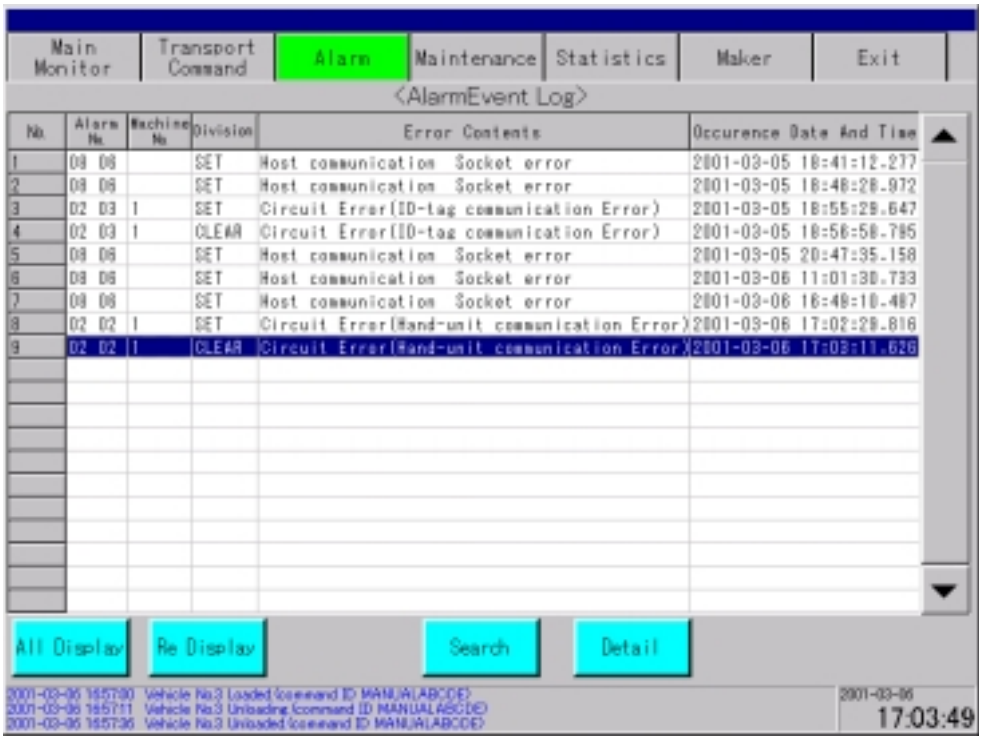
4.11 Alarm Log

This screen displays the list of previous errors.



4.12 Alarm Event Log

This screen displays SET and RESET status of previous errors.



4.13 Maintenance

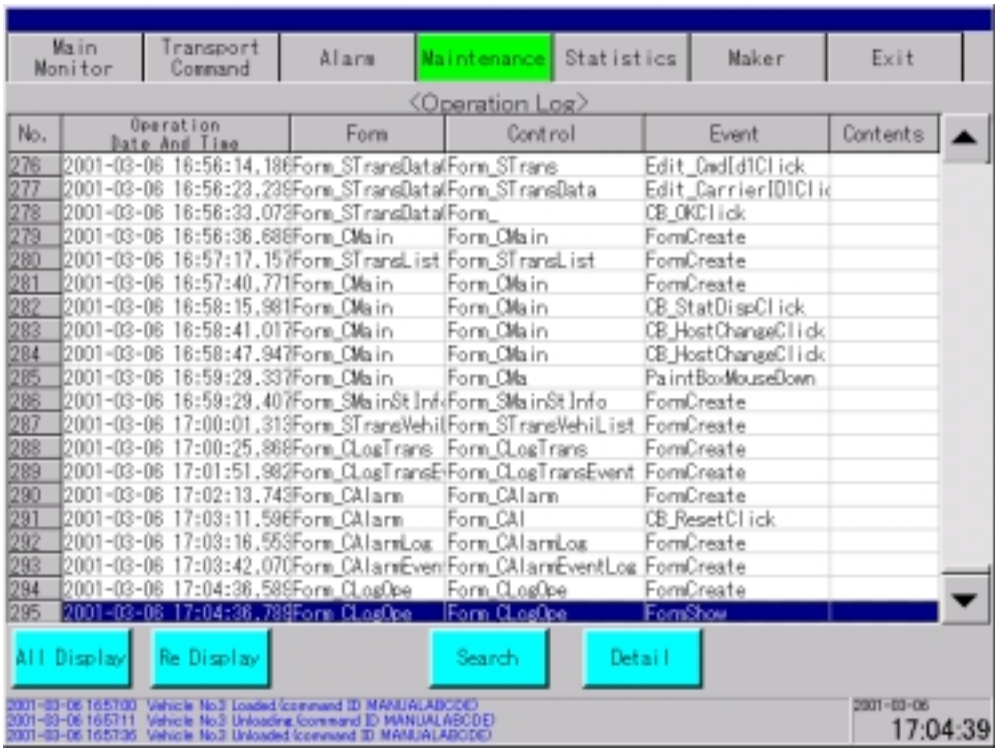
Select the Maintenance Tab, and the below menu will be displayed.

4.13.1 Time Setting

This screen is used to set time. While this screen is displayed, current time of the system is displayed.

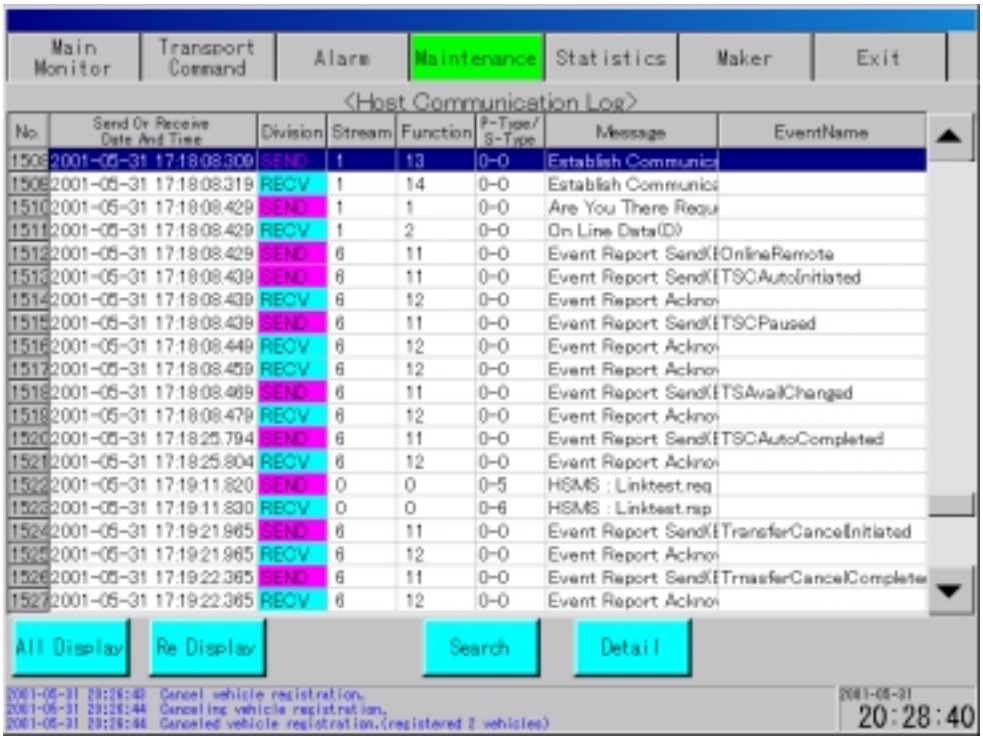
4.14 Operation Log

This screen displays the list of previous screen operations.



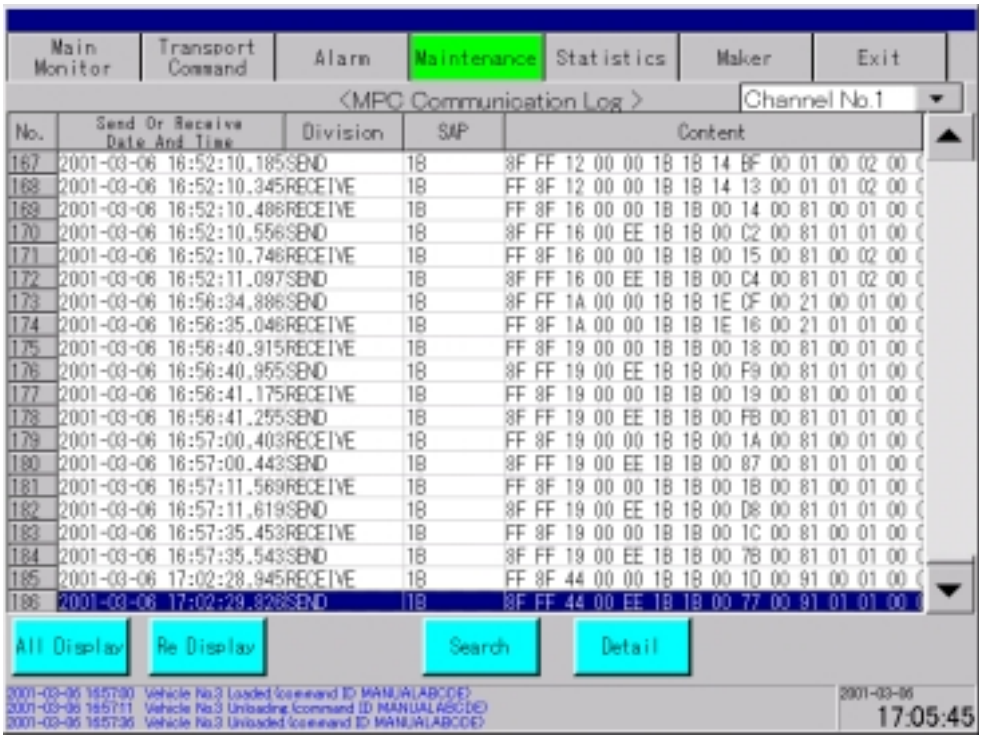
4.15 HOST Communication Log

This screen displays the list of messages exchanged with HOST in the past.



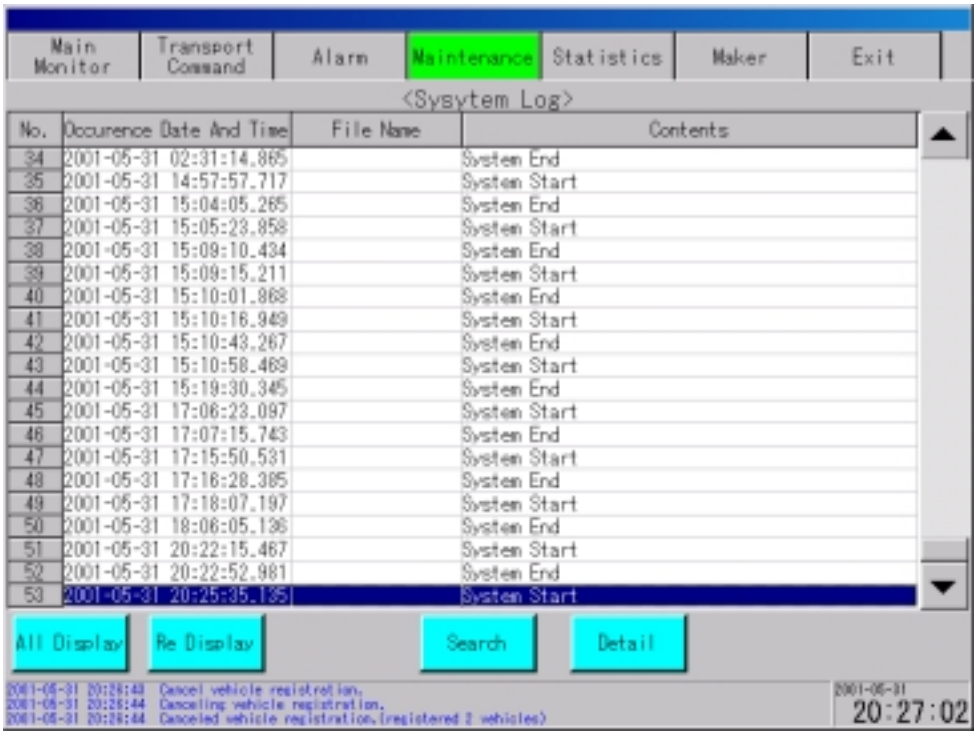
4.16 MPC Communication Log

This screen displays the list of messages exchanged with MPC (Murata Panel Computer) in the past.



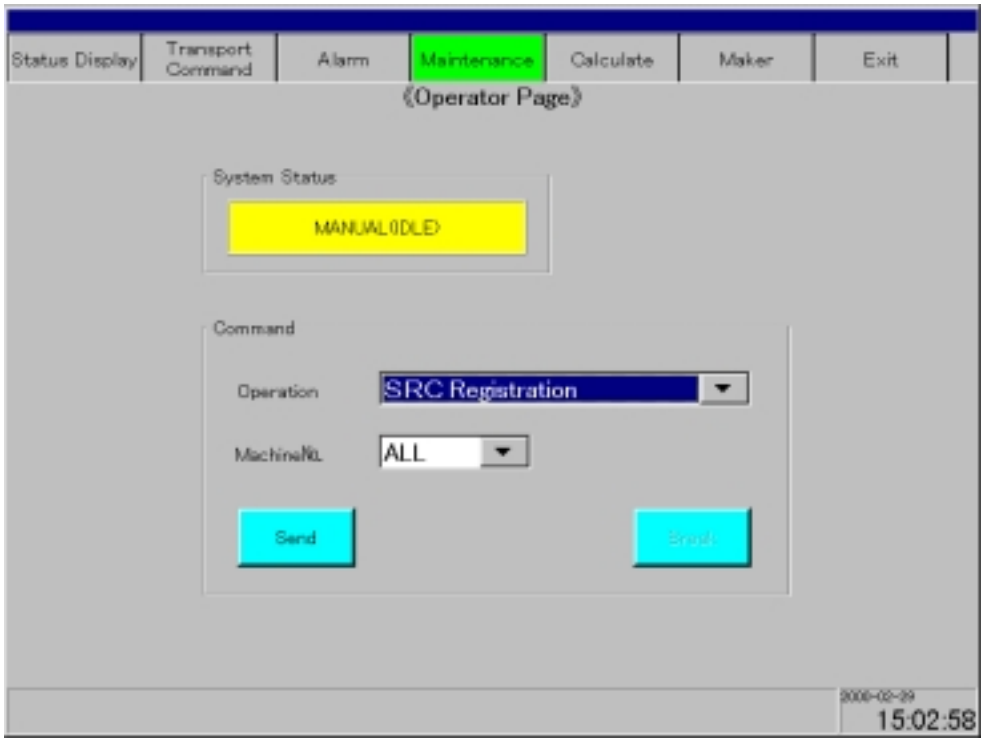
4.17 System Log

This screen displays messages which show the system operation status.



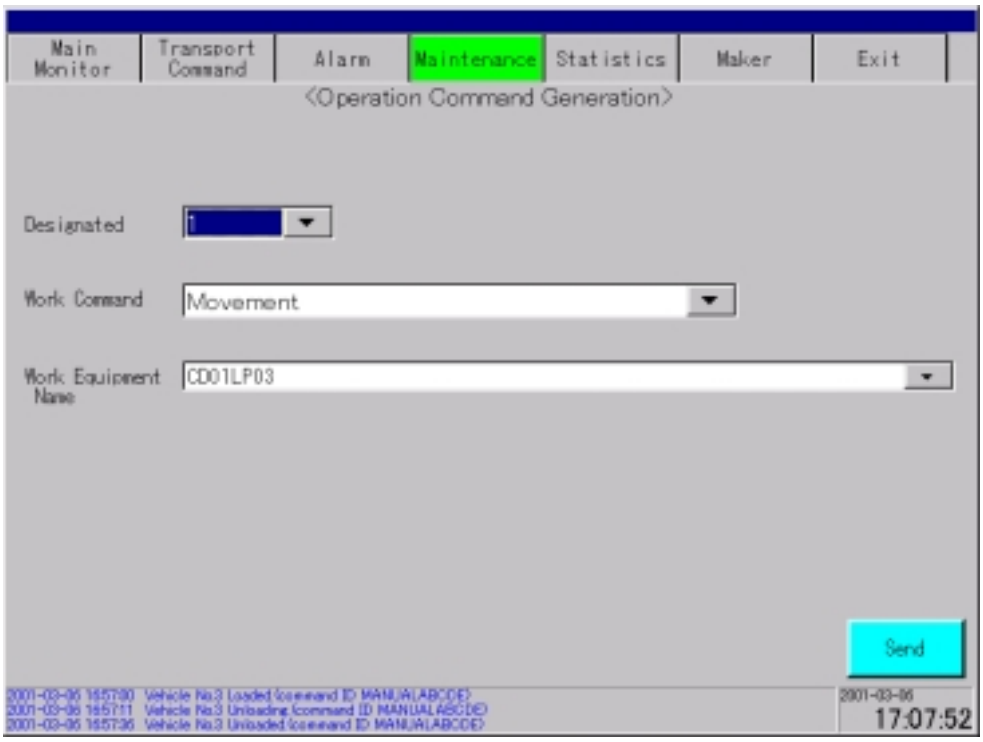
4.18 Operator Screen

This screen is used to issue operation commands for normal initialization of SRC system.


Status Display
Transport Command
Alarm
Maintenance
Calculate
Maker
Exit
《Operator Page》
System Status
MANUAL(IDLE)
Command
Operation
SRC Registration
MachineNo.
ALL
Send
15:02:58

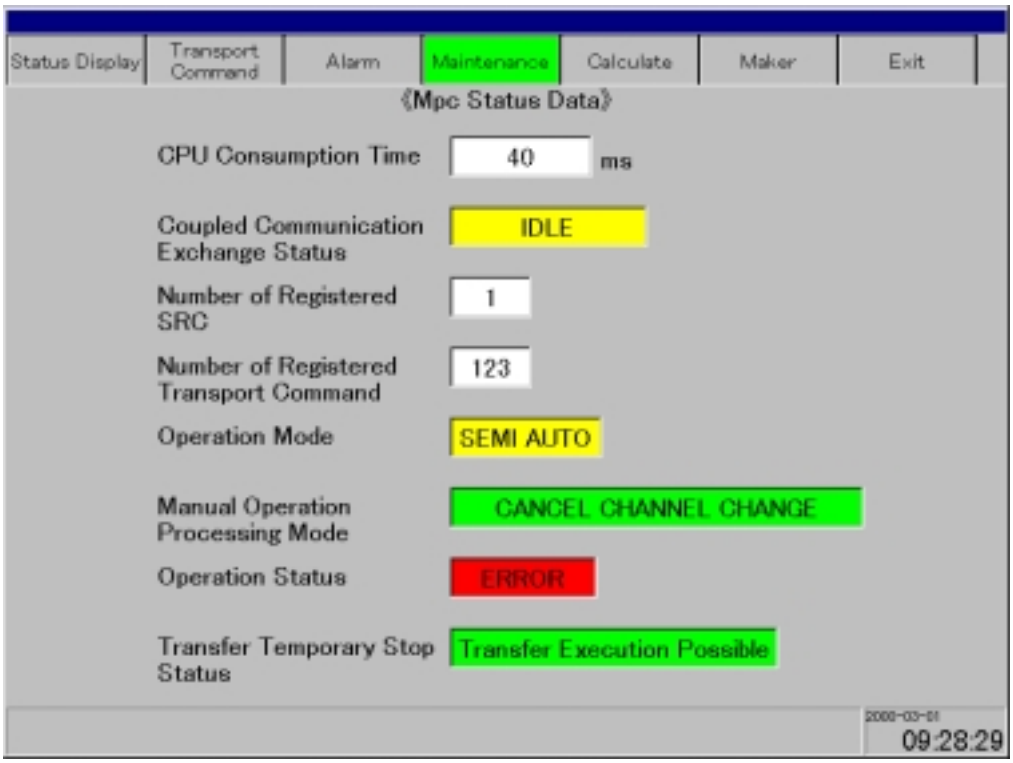
4.19 Work Command Generation Screen

This screen is used to issue normal operation commands of SRC system.



4.20 MPC Status Data Screen

This screen is used to check the status of MPC

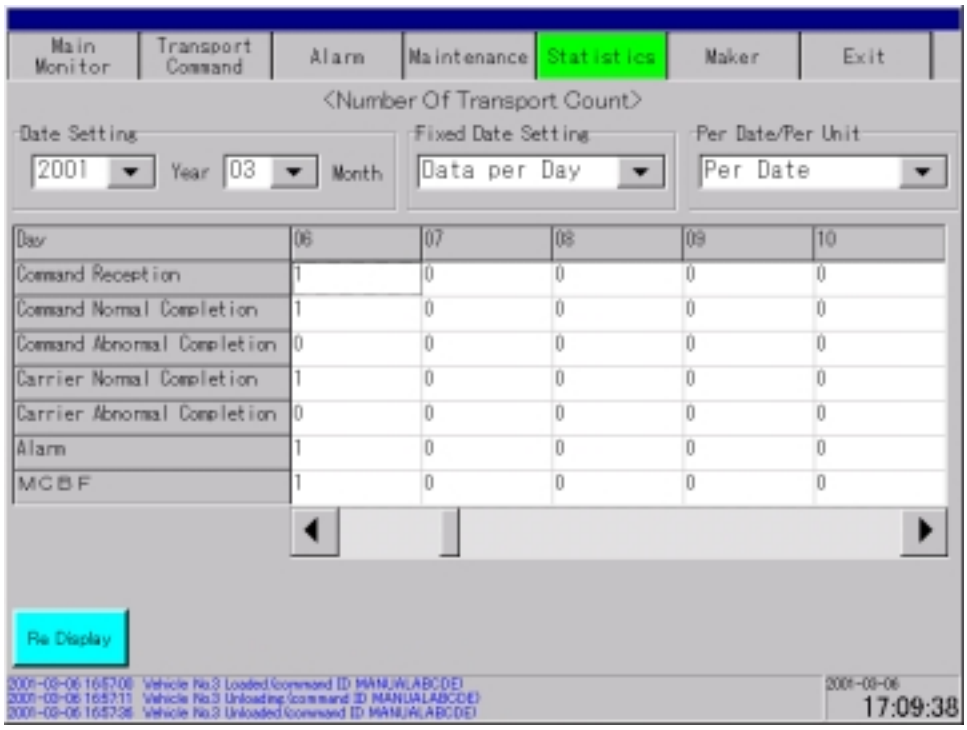


4.21 Statistics Screen

Select the Statistics Tab, and the below menu will be displayed. This menu is used to check statistical information of transfer commands that had been executed in the past.

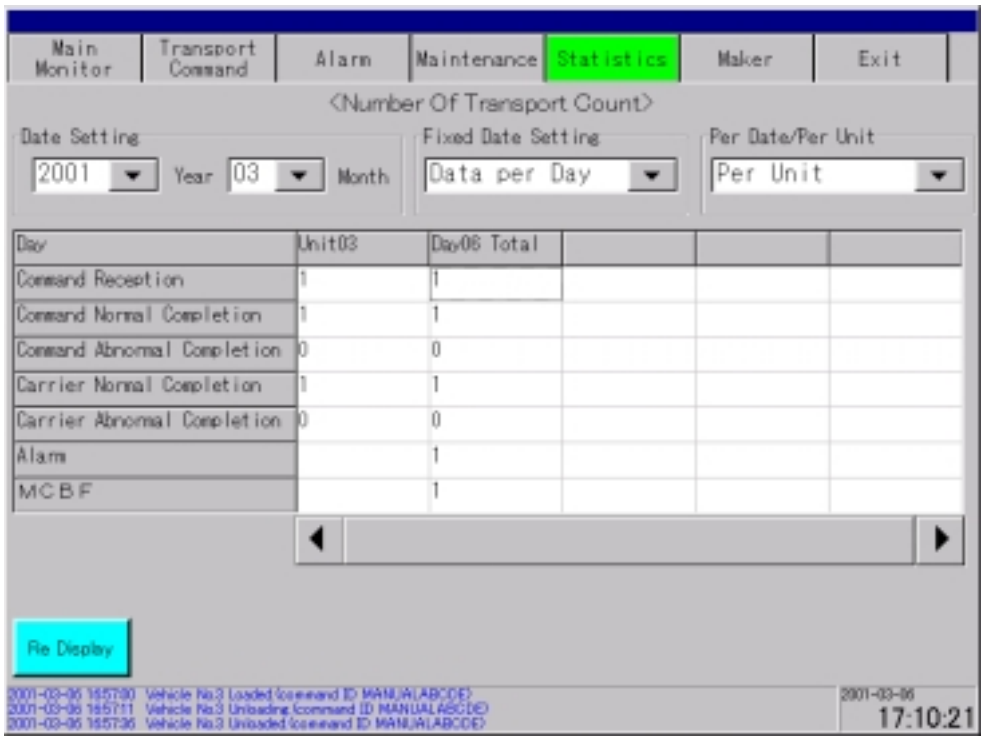
4.21.1 Transport Count Table Screen (Per day – Per fixed date)

This screen displays the table of the transport volume per day in a month set in “Date Setting”.



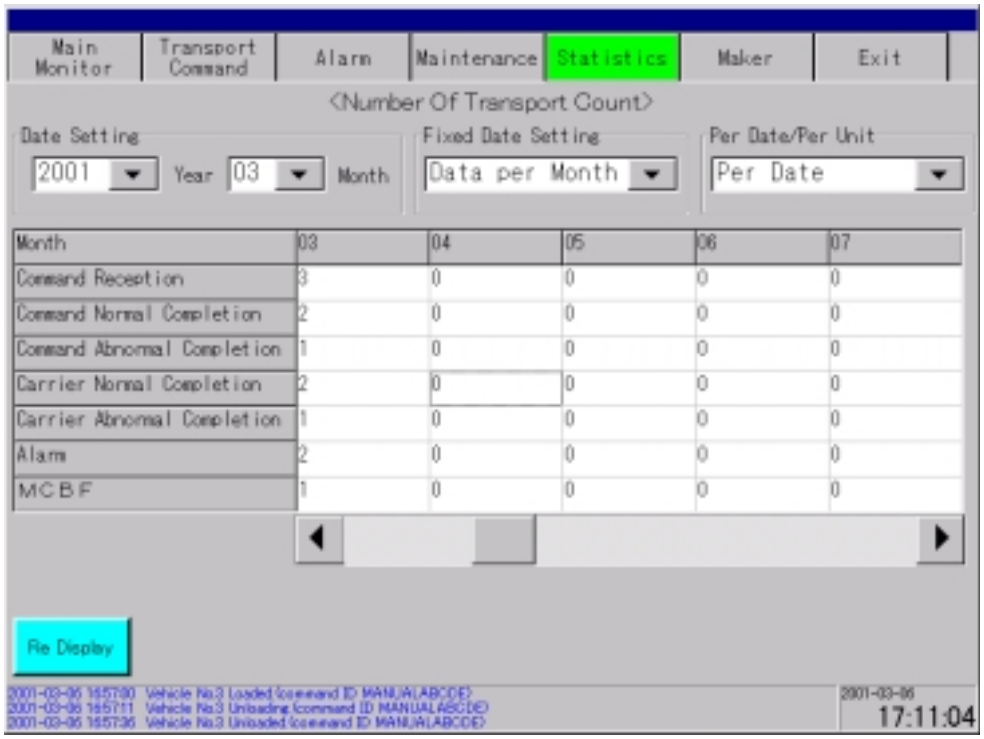
4.21.2 Transport Count Table Screen (Per day – Per unit)

This screen displays the table of the transport volume per unit No. in a certain day.



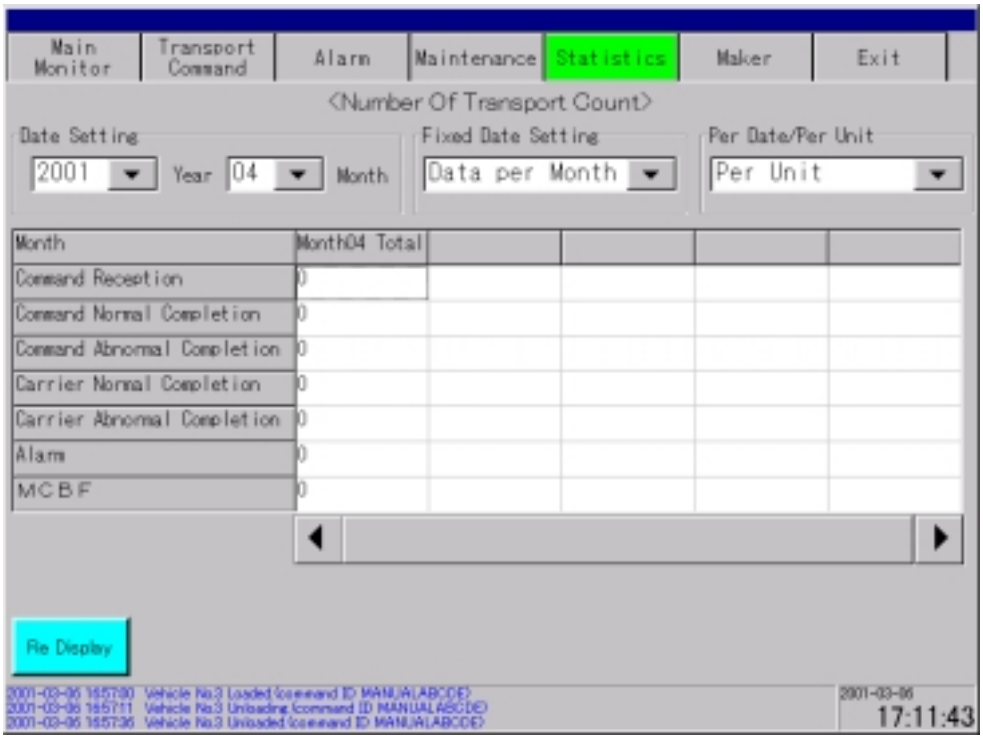
4.21.3 Transport Count Table Screen (Per month – Per fixed date)

This screen displays the table of the transport volume per month in data specified in “Date Setting”.



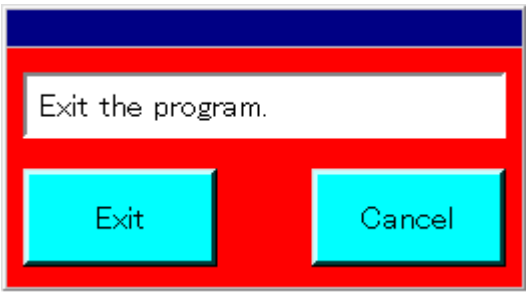
4.21.4 Transport Count Table Screen (Per month – Per specified unit)

This screen displays the table of the transport volume per unit No. in a month specified in “Date Setting”.



4.22 Exit

Select the Exit Tab, and the below menu will be displayed. Exit operation must be executed from this screen.



4.23 SRCC operation procedure

Operation start

(1) Turn the main breaker on.

=> The Startup screen appears on OPC.
Confirm the message and click the “OK” button.

=> The Main Monitor screen appears.

=> The operation panel of MPC is started up and manual operations become possible.

(2) Start up the local equipment.

(For more information, see the operation procedures for the local equipment.)

- High-frequency power supply
  - Turn the main breaker on.
    - => The power supply indicator is lit.
  - Press the standby switch.
    - => The power supply indicator on the MPC operation panel is lit.
- Shunting device
  - Turn the main breaker on.
  - Perform a home position recovery operation.
  - Turn the operation mode to the Automatic mode.
    - => The Automatic mode lamp on the MPC operation panel is lit.
- MPC operation panel
  - Press the high-frequency power supply start switch.
    - => The high-frequency power supply indicator is lit.
    - => The power is supplied to the vehicle and the startup status is displayed.

(3) Start up the vehicle.

With the remote controller for SRC, perform a home position recovery operation. After completing the home position recovery operation, select the Automatic mode and make the vehicle wait for automatic operations.

(4) Perform the procedure to register SRC.

Select the vehicle registration operation on the operation screen of OPC.

=> The vehicles whose registrations are completed are scrolled and displayed.

Select the interruption after completing the registration of all the vehicles in the system.

Return to the Main Monitor screen and select the Automatic operation mode.

=> The system status switches from “Manual” to “Automatic” mode.

(5) Connect SRCC with the Host in the on-line status.

(SRCC is automatically connected to the Host when it starts up.)

(6) The Host sends transport commands to SRCC.

=> SRC starts transport operations.

Operation stop

(1) Stop SRC temporarily.

Select the temporary stop mode on the Main Monitor screen.

=> SRC makes a cycle stop after completing all transport commands that it holds.

(2) Stop the local equipment.

(For more information, see the operation procedures for the local equipment.)

- MPC operation panel

  Press the high-frequency power OFF switch.

  => The high-frequency power supply indicator goes out.

  => The power of the vehicle is shut down and the indicator goes out.

- High-frequency power supply

  Turn the main breaker off.

  => The power supply indicator goes out.

- Shunting device

  Turn the main breaker off.

(3) Turn the main breaker off.

5 Appendix

1. External appearance of SRCC

OUTLINE DRAWING	CY0-BC004-10M
CIRCUIT DRAWING	CY0-BC004-10E
PARTS LAYOUT DRAWING	CY0-BC004-10D

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