Chapter 11
Statistics

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FEATURE DESCRIPTION

The statistics function is the measuring of data created during operation of the switching system using the software of the DCS Gateway System.
The statistics function provided by the DCS Gateway System is used to collect, arrange and display data, measured upon the request of the occasionally or periodically, to use directly or indirectly for operation & maintenance, switching facilities and network management.
Output data of the measurement and statistics function can be used for diagnosis of system operation, analysis of traffic distribution and improvement of call quality and service.

The data measurement process is divided largely into collection of measurement data, data storing and processing, and display of the measured data.

Statistics function consists of Occasional Report inquiry and Periodic Report inquiry. Occasional Report inquiry can report on user's demand while Periodic Report inquiry can automatically report every hour as well as report on user's demand.

Occasional Report Statistics

Occasional statistics reports collect, analyse and process measurement data as requested of the operator and displays the result.

The occasional statistics report collects statistics in a cycle of 15, 20, 30 and 60 minutes. The processing time can be set by the operator.

The data collection cycle can be set up to 16 times a week. Also, the data collection cycle can be executed for once or every week.

The data collection result is saved in hard disk and may be output to the printer.
The occasional statistics reports are divided into 7 types.

Statistics Type	Function
Trunk Group Statistics	Provides statistics information such as the trunk-specific equip status and total seizure time, the total seizure count and the average seizure time.
Extension Group Statistics	Provides statistics information such as the equip status and the originating/ terminating seizure count, the originating/terminating seizure traffic(erlang) and the average seizure time for each extension group(Distribution, Hunt, Equality group).
Function Code Use Statistics	Measures the usage count of each function. It is elated with the count of function attempt or registration, not with the count of function service.
Signaling Device Statistics	Provides statistics information such as the equip status, seizure count, seizure time and the average seizure time for common resources of each node.
ATC Statistics	Provides in-service time, seizure time and answering times, average call duration, etc for specified ATC.
ISDN Subscriber Statistics	Provides statistics information such as the equip status and the originating/ terminating seizure count, the originating/terminating seizure traffic and the average seizure time for each ISDN subscriber group.

Inter-node Statistics	Provides statistics information such as the connection status of inter-connected nodes, the maximum number of seized channels, the average seizure count, and the count of call failure because all channels are busy.

Periodic Report Statistics

Periodic Report can automatically save Statistics collected in every hour into hard disk and print it. Also, user can inquire Statistics of last cycles or print inquired information using MAP.
System can save up to one week's Statistics data. Statistics data stored in hard disk is overwritten in every week.

The Periodic statistics report is divided into 8 types.

Statistics Type	Function
Extension Group Statistics	Provides statistics information on the call progress status related to extension subscribers. Collects events occurring in groups (Distribution, Hunt, Equality group) of the originating party. Provides statistics information such as off-hook count, extension subscriber call count, and trunk seizure count for each extension group unit.
Trunk Group Statistics	Provides statistics information on the progress status of trunk terminating calls. Provides statistics information such as call termination count, count of extensions originating to trunks, and the tandem call count.
Attendant Desk Statistics	Provides information as follows by classifying calls terminated to the attendant desk by type. Total termination count Call termination count from other extension subscribers Call termination count from other trunk subscribers Count of call failure due to all loops seized
System Status Statistics	Provides statistics information such as the count of diagnosis for each item on the system status, count of fault block generation, recovery count, or count of diagnosis stopped.
System Load Statistics	Provides statistics information such as the average load rate and the maximum load rate of the processor in CPM node in each node.
Trunk Originating Call Statistics	Provides statistics information such as trunk port allocation count, trunk call origination count, tandem call origination count, and call count for each trunk originating call
ISDN Supplementary Service Statistics	Provides statistics information such as attempt count of ISDN supplementary service, success count, failure count for each ISDN group.

Major Statistics Features

- The random statistics report starts or ends depending on the system DB, which can be performed up to 16 times per item for a week. Also it can be repeated weekly.
- The cyclic report statistics can specify the start time and the end time.
- All statistics data is stored in hard disk, and all information in hard disk can be output via MAP or the system statistics printer.
- Collected statistics data is stored in hard disk for a week. After a week, the content in hard disk can be replaced by new data.

In case of DCS Gatway without hard disk, how long you can save Statistics data is related to flash memory, the number of fields to measure Statistics and the number of Groups. In case of measuring all items and as many statistics as those of a maximum Group, you can save Statistics data at least of one day.

Statistics data generated on a trunk port without any trunk group is not collected..

A Trunk Port that does not belong to any Trunk Group is not included in Statistics for each Trunk Group but included in total sum.

- Start and end of the random report statistics is set to 15, 20, 30 and 60 minutes while the cyclic report statistics can be only set to 60 minutes.
- Statistics can be processed on up to 64 groups for extension and trunk data group and 64 subscribers for attendant console. In case of Statistics for ISDN users, measure Statistics for 16 Groups.

In case of MII, you can measure each Statistics for maximum 16 user Groups TrunkGro and Trunk groups. Number of ATC is limited to 16.

- Events should occur to collect call processing statistics.
- There is only one MAP that can request for statistics data to be printed out at a specific point.
- When MAP is using the statistics print, the cyclic report statistics result may not be printed even if the print option is set up. Also, if MAP requests a print of statistics data while the cyclic report statistics data is being printed, an error message may appear on MAP.
- Even though you have registered to obtain operator statistics on Data Base, you can’t process statistics if no event occurs to the operator within the statistics period. In other words, Statistics you can access in MAP or print out with a Statistics printer are not the Statistics being measured in the current cycle but a Statistics measured in previous cycle to be saved in hard disc.
- If any one of the nodes does not answer while statistics data from each node is output to MAP or the printer, it is processed as an error. In other words, only when there are answers from all nodes, can data be sent to MAP or the printer.

SETTING THE MAP

Configuration Tasks for Using Statistics Features

1. Connecting the statistics printer

Statistics printer is connected on RS232C or LAN port of IOCB3 board located on the side of the basic shelf.

2. Connecting MAP PC

The DCS Gateway System is accompanied with software called MAP (Maintenance & Administration PC) used for system maintenance. MAP is installed in a PC connected to the system to perform system tasks.
MAP-installed PC transmits/receives data through RS232C or LAN of IOCB3 board located on the side of the basic shelf.

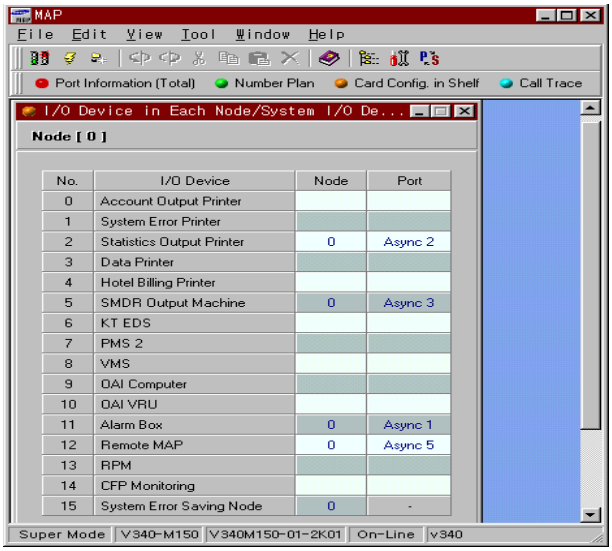
3. MAP Setting

Configuring I/O device of each node

Displays the port number where an Input/Output device in each node will be installed. It is possible to designate the connection of each device to the desired nodes or ports using this function.

1. Selecting Menu

   System Management ⇒ System I/O Device Management ⇒ I/O Device in Each Node



2. Input a node number and press the [Rx] button to view the I/O device and port information.
   - Statistics output printer must be connected to the Nodes must be SET and Statistics print Nodes and Ports for each Node must be the same.
   - If a device is designated with multiple nodes and ports, an error will occur in a system.
   - The port type which I/O device installed is as follows.

     ⊙ LAN
     ⊙ Async

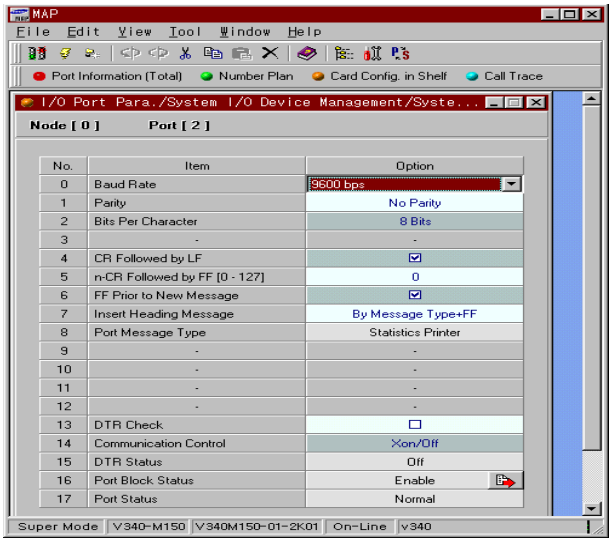
3. Press **[Tx]** button to send the values to the system.

Configuring asynchronizing ports

Inputs Input/Output option parameters (baud rate, parity type, Bit/Char, Line speed, etc.) for installed input/output device in each node.

1. Selecting Menu

   System Management ⇒ System I/O Device Management ⇒ I/O Port Parameter



2. Input the node number and port number and press the [Rx] button. You can view or set up I/O option parameters as follows.

   - **Baud Rate :** Data transfer rates to/from external devices such as printers are normally set to ‘9600’bps. The baud rate of an INFOLINK computer is set to ‘19200’bps.
   - **Parity** : Designates parity bit type of asynchronized ports. The default value is ‘No Parity’.
   - **Bits per Character** : Sets the number of bits to compose a character.
   - **CR Followed by LF** : Sets if Line Feed is inserted after each carriage return printers or terminal emulators usually has been set to be followed LF after CR automatically. If no automatic set up is chosen, LF is applied by this set up option.
   - **N-CR followed by FF** : Inserts form feed after a number of carriage returns by setting the number of carriage returns.
   - **FF prior to new message** : Inserts form feed to break a page to distinguish the type of information when printing billing info or statistical data.
   - **Insert Heading message** : Sets the type of heading messages which will be used so the user can browse billing information or statistical data more easily by inserting heading messages for each item. The types are displayed/printed for each message, displayed/ printed by the type of message, displayed/printed when Form feed is inserted, and displayed/printed when Form Feed is inserted by the type of message.
   - **Port Message Type** : Displays ports connection status off the INFOLINK, printer, etc. only browsing option is allowed.
   - **DTR Check :** There is a pin called ‘DTR’ that checks the status of a connected device (active/inactive) by sending power signals when an outside device is connected to an I/o port with a RS-232c cable. If DTR is selected and checked, the system sends data to any outside device only when an active signal is received. If a printer which is not able to send DTR signal is used, set this option to not be checked to send data to the printer.

- **Communication control** : Initiates the communication control option.
  - ✓ No control : Sends data without communication control.
  - ✓ XON/OFF : If too much data is sent to a printer at once, the printer cannot operate because its buffer becomes full. This option stops the transmission of data to the printer with a 'XOFF' signal when the buffer of the printer becomes full. When the data in the buffer of printer has been sent, the 'XON' signal will start the transmission of data again.
  - ✓ Binary : Sends binary data created in a PABX. (not ASCII DATA)
  - ✓ BINARY+XON/OFF : Sends BINARY DATA and applies 'XON/OFF' signal at the same time.
  - ✓ ENQ/ACK1 : Sends an ENQ signal prior to transmission of billing information. When an ACK signal is received, the data will be released so it can be sent.
  - ✓ Even if the DTR signal is received, if the software of the outside device is not working properly, the data will not be transmitted and the ACK signal will not show the status of the software of the outside device as active.
  - ✓ ENQ/ACK2 : This is a new control method improved for ENQ/ACK1 the speed off signal of this method is faster than that of ENQ/ACK1. By using this method, up to 4 messages are able to be sent simultaneously when the 'ACK' signal is received for the 'ENQ' signal.
- **DTR Status** : Displays the status of an opposite DTR. This is a read-only item.
- **Port block status** : This is a read-only item. If the user wants to change the value of a parameter of a port, the user must set the port to disable to send the changed information to the system. Even though the value of a parameter of a port was set, the value will not be input to the system if a port has been enabled.
- **Port Status** : Displays the status of ports. This is a browsing only item.

3. Press **[Tx]** button to send the values to the system.

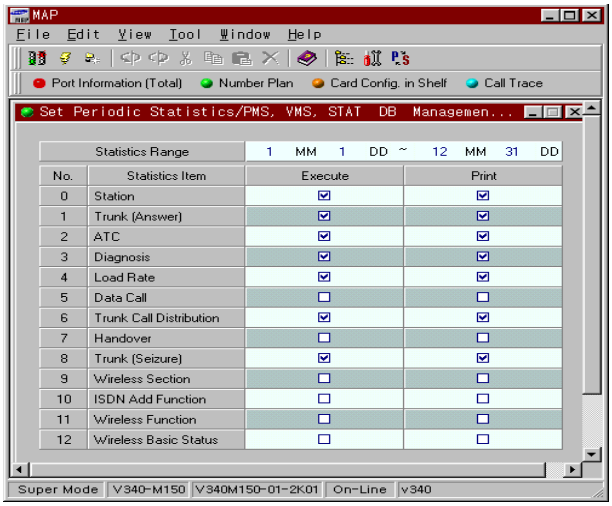
Setting Statistics Period Report

To decide whether to run the Statistics program per type of data and to print the data via the Statistics data printer.

NOTE When you select whether you will print out a Periodic Report, you should also select whether you will execute it. If you have selected only whether to print out the Periodic Report, you can not have it operated.

1. Selecting Menu

   Database Management ⇒ PMS, VMS, STAT DB Management ⇒ Set Periodic Statistics



2. Set values of each item as follows and then press the [Tx] button.
   - **Statistics Range :** Input the start date and finish date for the Statistics reporting period.
   - **Station :** Choose whether to calculate the statistical data for the station group regularly and to print the data via the printer.
   - **Trunk :** Choose whether to calculate the statistical data for the trunk group regularly and to print the data via the printer.
   - **ATC :** Choose whether to calculate the statistical data for the ATC station group regularly and to print the data via the printer.
   - **Diagnosis :** Choose whether to calculate the statistical data as per item regularly and to print the data via the printer.
   - **Load Rate** : Choose whether to regularly calculate the statistical data regarding the MPM board processor installed into each Node and to print the data via the printer.
   - **Data Call** : Choose whether to calculate the statistical data regarding data calls regularly and to print the data via the printer.
   - **Trunk Call Distribution** : Choose whether to calculate the statistical data regarding the trunk call time per trunk group regularly and to print the data via the printer.
   - **Hand-Over** : Choose whether to regularly calculate the statistical data regarding the success and failure rates of each wireless group's requests for the handing over of calls and to print the data via the printer.
   - **Trunk [Seizure]** : Choose whether to regularly calculate the statistical data regarding outgoing trunk calls and to print the data via the printer.
   - **Wireless Section** : Choose whether to reset the link between wireless sectors, to regularly calculate statistical data regarding the reset of the hand over function and to print the data via a printer.

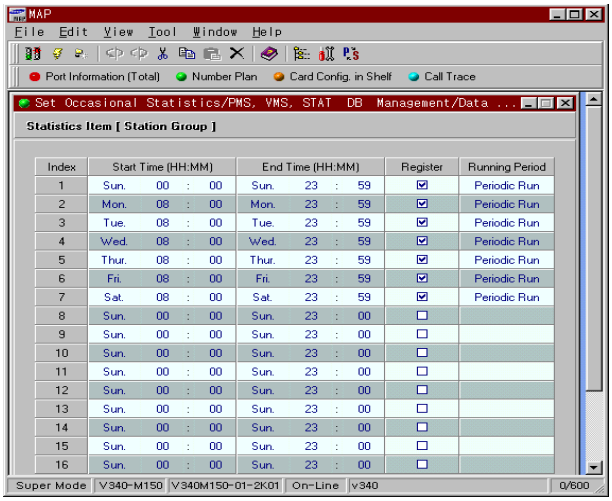
- **ISDN Added Function** : Choose whether to regularly calculate statistical data regarding the number of ISDN services required, success and failure rates for the service per ISDN group and to print the data via a printer.
- **Wireless Function** : Choose whether to regularly calculate statistical data regarding the number of requests for the wireless function provided by the system and to print the data via a printer.
- **Wireless Basic Status** : Choose whether to regularly calculate statistical data regarding the status of the wireless system and to print the data via a printer.

Setting Statistics Occasion Report

Select one of the 10 different types of Occasion Report Statistics item output time.

1. Selecting Menu

   Database Management ⇒ PMS, VMS, STAT DB Management ⇒ Set Occasional Statistics



2. Input the Statistics Item and press the [Rx] button. The Statistics Items are as follows :
   - **Trunk Group** : Statistical data for trunk groups
   - **Station Group** : Statistical data for station groups
   - **Feature** : Statistical data regarding the number of user's requests to use functions registered with the phone.
   - **Signal Device** : Statistical data regarding the status of the signal device including the time and services which required the device.
   - **ATC** : Statistical data of ATC
   - **Node** : Statistical data regarding the channels of each Node.
   - **CFP Group** : Statistical data regarding the Wireless Groups
   - **HANDOVER** : Statistical data regarding the hand over services per Wireless Group including the success and failure rates of the service.
   - **CFP Feature** : Statistical data regarding the number of requests made to use wireless services provided by the system.
   - **ISDN Group** : Statistical data regarding the number of requests made to use the ISDN services per ISDN group including the success and failure rates of the service.
   - **NO.7 MTP Level** : Collect the Statistics for MTP (Message Transfer Part) Level's Layer 2 and Layer 3 in No.7 Signalling. Measure Signalling Link's capability and availability, Signalling Link's usability, availability for contacting adjacent signalling points and Link Set's availability, Route Set.

- **NO.7 TUP Level** : Collect the Statistics of TUP (Telephone User Part) Level in No.7 Signalling. Measure Outgoing performance ratio, Incoming performance ratio, Line Blocking condition, the number of Call Loss (for each reason).

NOTE You can access Statistics of NO.7 MTP Level and NO.7 TUP Level not in the MAP screen but only with the Statistics printer.

3. Set the reporting period for the applicable Statistics by selecting the 'Start Time' and 'End Time'. Choose whether to register the applicable Statistics item by selecting 'Register' item.

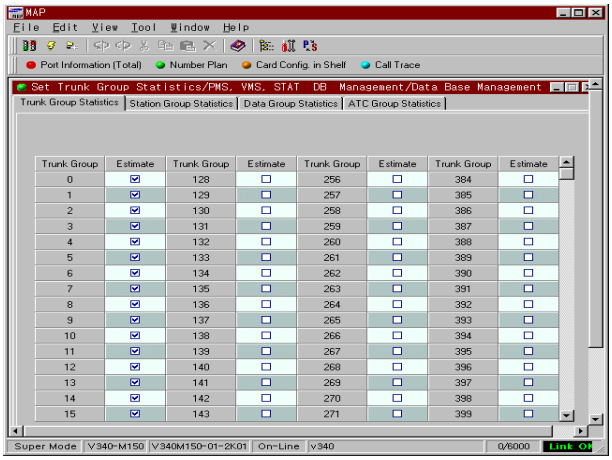
4. Choose whether to initiate the reporting function regularly during the period set in the above-mentioned ‘Start Time’ and the ‘End Time’ or to run this only once by selecting the ‘Running Period’. Mark the ‘Running Period’ item to print the applicable statistical data every week. Repeat the same procedure to run the reporting function for hours outside of the regular time slot.

5. Repeat the same procedure to set the Occasional Report time range for other statistical items. Press the [Tx] button after setting Occasional Report time for all the applicable statistical items.

Registering Statistics measurement for each TrunkGroup

1. Selecting Menu

   Database Management ⇒ PMS, VMS, Statistics DB Management ⇒ Set Trunk Group Statistics

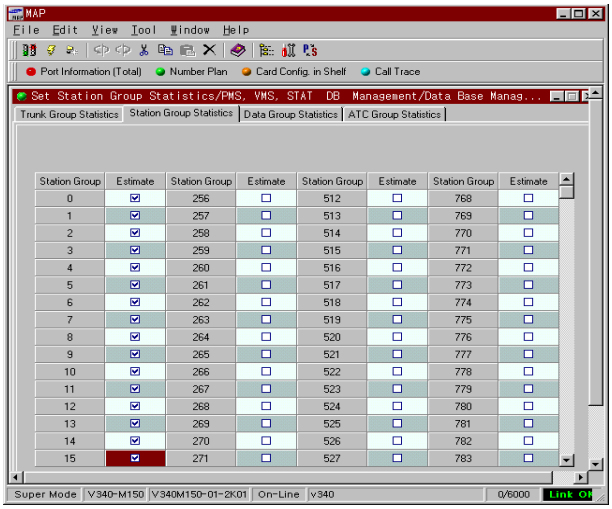


2. Select the Trunk Group to collect Statistics and press the [Tx] button.
   M150/M10 can register 64 Groups maximumly while MII can register 16 Groups maximumly.

Registering Statistics measurement for each station Group

1. Selecting Menu

   Database Management ⇒ PMS, VMS, Statistics DB Management ⇒ Set Station Group Statistics



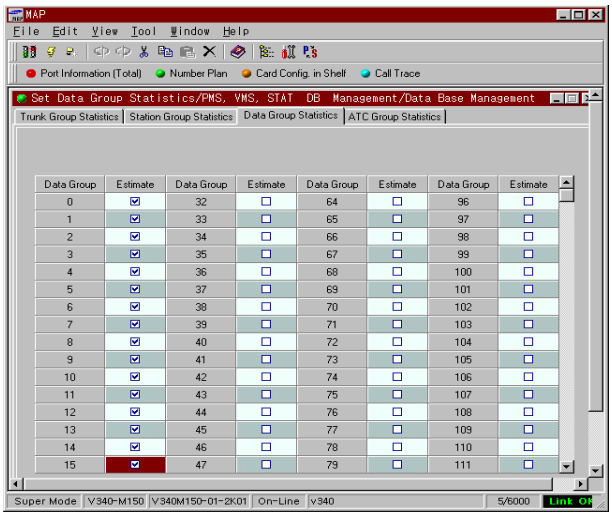
2. Select the StationGroup to collect Statistics and press the [Tx] button.
   M150/M10 can register 64 Groups maximumly while MII can register 16 Groups maximumly.

Note that a station Group is a user Group configurated in “DatabaseManagement/ User DBManagement/ User Group Configuration” and in case of configurating the User Group only to measure Statstics, Station Group service is also provided.

Registering Statistics measurement for each DataGroup

1. Selecting Menu

   Database Management ⇒ PMS, VMS, Statistics DB Management => Set Data Group Statistics

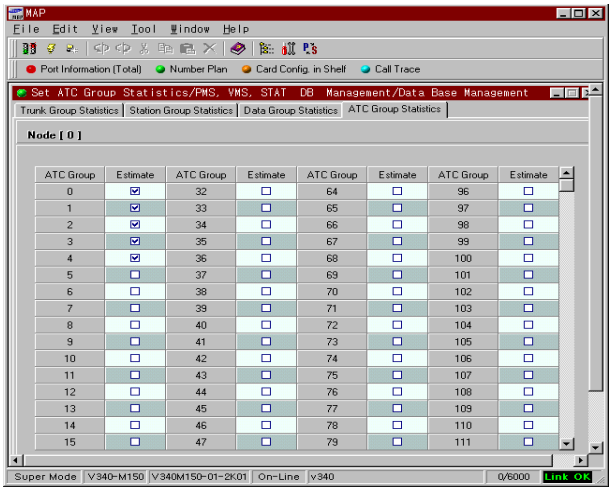


2. Select the Data Group to collect Statistics and press the [Tx] button.
   M150/M10 can register 64 Groups maximumly while MII can register 16 Groups maximumly.

Registering ATC Statistics measurement

1. Selecting Menu

   Database Management ⇒ PMS, VMS, Statistics DB Management ⇒ Set ATC Group Statistics

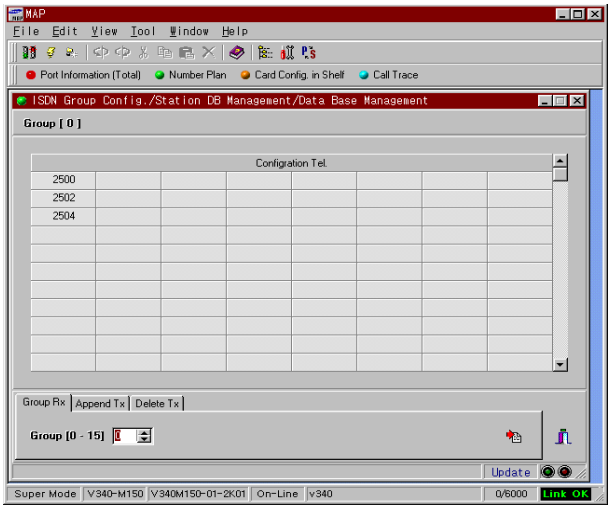


2. Select the ATC to collect Statistics and press the [Tx] button.
   M150/M10 can register maximumly 64 ATCs while MII can maximumly 16 ATCs.

Registering ISDN Statistics Group

1. Selecting Menu

   Database Management ⇒ Station DB Management ⇒ ISDN Group Config



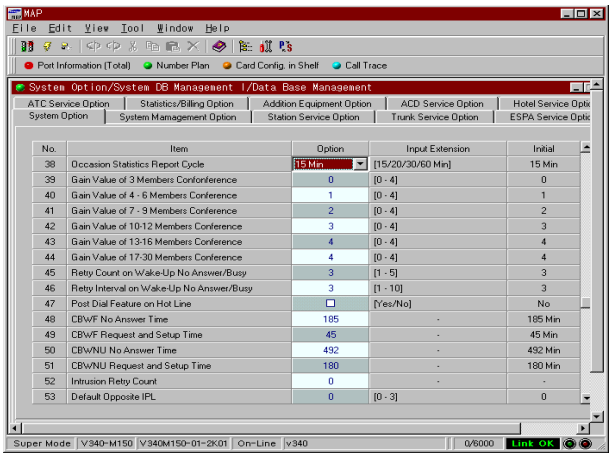
2. Configurate the ISDN Group to collect Statistics and press the [Tx] button.
   One ISDN Group can configurate 16 Groups.

NOTE The ISDN Group is configured only for Statistics, not affecting call processes.

Registering Occasional Report Cycle

1. Selecting Menu

   Database Management ⇒ System DB Management(I) ⇒ System Option



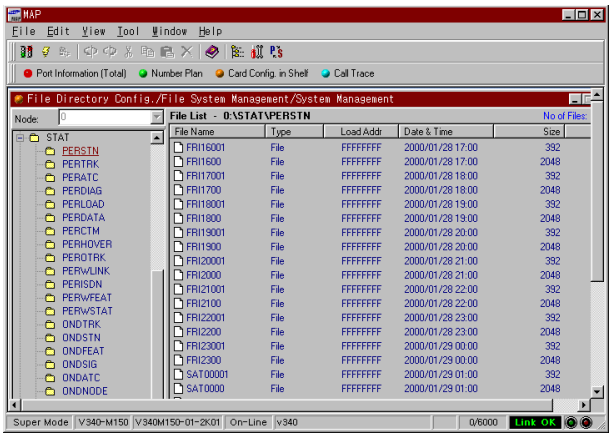
2. Select one cycle you want among 15/ 20/ 30/ 60 minutes in '38. Statistics Occasional Report Cycle'.

NOTE In case ofmodifying Statistics cycle in operating the System, all Occasional Report Statistics of a current cycle is deleted making a new measuremeant from the next cycle. If you change the cycle value into 60 minutes when a current cycle is 15 minutes and it is 09:10 at current time, measure the next Statistics between 10:00 and 11:00 withouht measuring the Statistics between 09:00 and 10:00.

Checking Statistics File

1. Selecting Menu

   System Management ⇒ File System Management ⇒ File Directory Config



2. Slect the Node to access.
   On the left directory, 'STST' is the Statistics directory.

3. At the click of ‘STST’, sub-directory displays where each Statistics field is saved. Below are the descriptions of each sub-directory.
   - PERSTN Periodic Report for each StationGroup
   - PERTRK Periodic Report for each TrunkGroup
   - PERATC ATC Periodic Report
   - PERDIAG Diagonisis Periodic Report
   - PERLOAD Load Ratio Periodic Report
   - PERDATA Data Call Periodic Report
   - PERCTM Trunk Call Distribution Periodic Report
   - PEROTRK Trunk Outgoing Call Periodic Report
   - PERISDN ISDN Additional Service Periodic Report
   - ONDTRK Occasional Report for each Trunkgroup
   - ONDSTN Occasional Report for each StationGroup
   - ONDFEAT Function Occasional Report
   - ONDATC ATC Occasional Report
   - ONDSIG Signalling Equipment Occasional Report
   - ONDNODE INI Occasional Report
   - ONDISDN ISDN User Occasional Report
   - ONDMTP NO.7 MTP Occasional Report
   - ONDTUP NO.7 TUP Occasional Report

4. At the click of a sub-directory, files saved in the sub-directory display on the right side. File names are organized as follows:
   - WED1300 - Day(WED) + saving start hour(13) + saving start minute(00)
   - “WED1300” file is saved at 13:15 if a cycle is 15 minutes for an Occasional Report and “WED 1300” is saved at 14:00 sharp for a Periodic Report.

Display or Print out the Statistics Results

Statistics information collected per node are stored on the hard disk of each node and can be displayed on MAP screen or printed by the system printer.
In case of multiple node configuration, not only the hard disk of each node but also links between nodes should be operating properly when display or printout is requested. In addition, statistics information collected at every time period requested by MAP shall be stored on all the hard disks of every node.

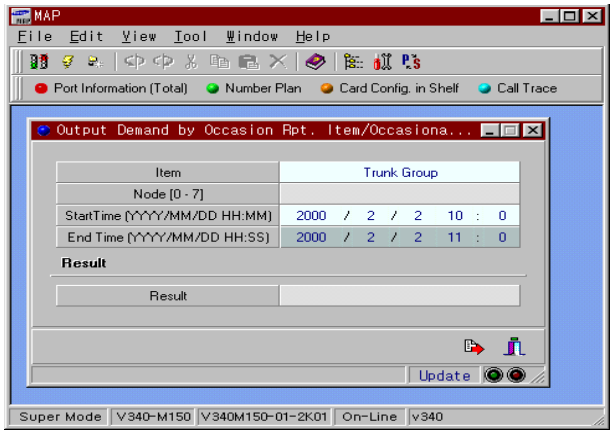
Printing Occasion Report by item

This is a function used to print occasion reports of items from the ‘Occasion Report Inquiry’ menu.

1. Selecting Menu

   Statistics & Billing ⇒ Occasion Report Inquiry ⇒ Output Demand Occasion Report

2. Input the Item, Start Time, End Time of the data to be printed.
   The node number should be input to print any of following items such as ‘Handover’, ‘Wireless’, ‘Wireless Function’, and/or ‘Wireless Basic Status’.



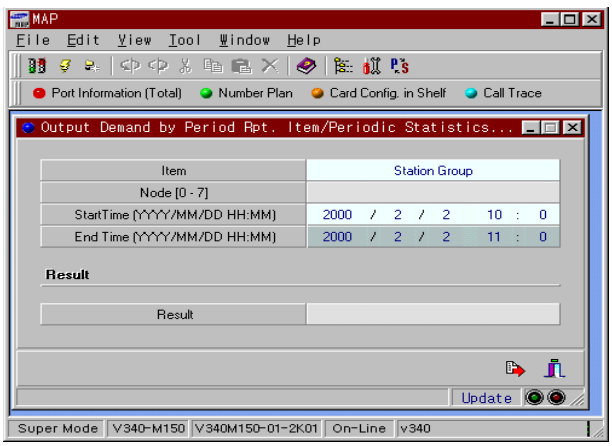
3. Press the [Tx] button to save data. Then the phrase ‘Print Request Completed’ will appear in the ’Result’ window and the report will be printed by the printer connected to the system.

Printing Periodic Reports by items

This is a function used to print periodic reports of items from the 'Period Report Inquiry' menu.

1. Selecting Menu

   Statistics & Billing ⇒ Period Report Inquiry ⇒ Output Demand in Period Report



2. Input the Item, Start Time, End Time and press the [Tx] button.
   Set the item, Start time, and End time of the data to be printed. The node number should be input to print any of following items such as ‘Handover’, ‘Wireless’, ‘Wireless Function’, and/or ‘Wireless Basic Status’.

3. Press the [Tx] button to save data. Then the phrase ‘Print Request Completed’ will appear in the ’Result’ window and the report will be printed by the printer connected to the system

For more information about checking Occasional Report Statistics and Periodic Report Statistics, refer to the MAP User Guide.

RESTRICTIONS

The corresponding files must be included in all the Nodes when you access Statistics in MAP or print them out.