

Faulting Procedure

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Amendment Record

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10	21/03/2003	Railtrack amended to Network Rail. Section 1 amended to refer to fault finding on the PSM. Section 4.2 renamed and amended to include use of PSM logger facility in addition to magnetic tape logger. Section 5.6.3 amended in accordance with SAO-IEC-D33. Section 8.5 text referring to the LED display on MVME101 boards and the processor id for the system controller MVME172 board deleted in accordance with SAO-IEC-D42. New section 10 added for fault finding on the PSM.
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Author	Approved	Date	Authorised	Date
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I Introduction

This document is intended for use by ISM terminal users. It describes how to use the ISM facilities, and is in a reference format. It is not written for training purposes, and it is expected that the users will have had some form of ISM training.

IECCs can be configured to the requirements of individual sites, and it is not possible for a general guide such as this one to detail the responses given at specific installations. It may be necessary to refer to the site-specific engineering drawings, IECC 5000, for details of one particular IECC.

General guidelines for faulting with ISM are given, but due to the various situations that may occur, it is not possible to give definitive symptoms of all likely faults. The user must use all the information available (both ISM and non-ISM) to locate the fault and to diagnose the probable cause.

Two types of ISM terminal are available. One uses a Lynwood J500 terminal. The other runs on a PC. This document covers the use of both types of terminal. Where there is a difference in operation they are referred to as the J500 terminal or the PC terminal as necessary.

Sections 5 and 6 relate specifically to the use of the J500 terminal, and are only of interest if this type of terminal is being used.

Sections 7 and 8 relate specifically to the use of the PC terminal, and are only of interest if this type of terminal is being used.

Information on fault finding on the PC SPAD Monitor (PSM) and IECC PC Logger (IPL) is also included.

2 Faulting

ISM has the facilities to enable both software and hardware errors to be identified and for any faulty board to be located. This section provides details of how a fault is identified and the functions used within the ISM command structure. The faulting procedures that follow are provided as a quick guide to locating faults which have been reported by ISM.

2.1 FAULTING PROCEDURES

Note all reports and alarms on ISM. This should be continued throughout the investigation. Also note the overview network status blocks as displayed on the status line of the ISM screen. A single red block indicates a fault that is probably network related. Two red blocks, indicating a fault on both networks, is probably due to a subsystem problem. The information from the alarms and reports should also indicate whether the problem is network or subsystem related.

2.1.1 Subsystem Faults

- a) Check overview display for both Signalling and Information networks. Note the identities of any computer units which are displayed as red (fault recognised) or magenta (out of contact).
- b) Obtain the detailed display (using “SHOW” command) for the subsystem identified in a). Look through the details to see in which area the fault lies - computer unit status, communications channel status, board status, and the status of ancillary equipment.

WARNING - any computer unit which is out of contact is likely to have out of date status information displayed.

- c) A computer unit that is out of contact may have a problem with its node(s). Obtain the network detail display to check the state of the nodes.
- d) Examine the computer hardware to see what visual information may be obtained from the boards and status panel.

2.1.2 Network Faults

- a) Check the network and node status blocks on both the Information and Signalling overviews. Note the area where the problem has occurred.
- b) Check the network status display for network and node status. Note any missing node names (a string of asterisks) and any “extra nodes” that have appeared.

2.1.3 Channel Fluctuations

- a) From the alarms and reports note the computer units of the affected subsystems.
- b) Obtain the subsystem detail displays. From this the communications link status can be checked. If all links go “up” and “down” then this may be due to a faulty node.

2.2 FAULT LOCATING

Several types of errors may arise on subsystems, which will cause different responses on the ISM terminal. The amount of information reported will also depend on the type of error, and how ISM has detected it.

The first indication of a problem, whether it be with a subsystem or a network, will be in the form of a report or alarm. Examining the report details will identify the area in which the fault has occurred, and the type of error. An indication of a serious error may also be seen on the overview screen, which can be accessed without logging in. The graphical network status indicator, as displayed in the ISM Status Area window, will show that a serious error has occurred on one of the networks.

ISM cannot differentiate between hardware and software errors, this can only be established by examination of the actual hardware. Looking at the graphical overview display in the main status area will indicate the subsystem or network on which the fault has occurred, and in what form it has been detected. The two indications that a fault has occurred are:

a) Subsystem Faulty - Status indicator is **red**.

The subsystem has detected an error within itself and has reported the information back to ISM. By logging in to ISM and obtaining subsystem details, the user may be able to obtain more information as to the location of the error within the subsystem. These details may locate the exact board on which the fault has occurred

b) Subsystem out of contact - Status indicator is **magenta**.

A fault has occurred resulting in no subsystem status information being received by ISM. This is most likely due to a fault with the communications link although other possible faults may also cause the error, such as NDS failing.

Network faults can also be investigated using the overview screen. The status of both the duplicated networks is shown, giving indications of the status of nodes, networks, and extra nodes. The user can investigate the state of a network further by logging on and displaying details for a particular network, or for a particular subsystem. The network details include the overall status and statistics for the duplicated subsystems. The subsystem details include the current communications status with other subsystems

2.2.1 Subsystem Information

Those subsystems which are fully responding are capable of returning status information back to ISM when requested. These details may be viewed on the ISM terminal where information is given in a text and graphical format. The information may go to board level, where an indication of the status of each board will be given.

The boards are listed in the order in which they are positioned in the sub-rack, with an indication of the watchdog status. Information will be displayed alongside the relevant board(s) giving details of the cause of any error. Boards with an error should be noted for further investigation.

The first detail to be noted is whether the computer units are in contact. This will indicate whether the rest of the information is up to date. A computer unit which is not in contact will display old information which was obtained just before contact was lost.

2.2.2 Network Information

Information on the state of the networks can be obtained from ISM by using the top level “SHOW” or “NODE ID” command (see sections 6.3 and 6.4). The details displayed for the specified network includes all node names recognised and the associated subsystems. A subsystem which does not have an associated node is designated by a string of asterisks. Any nodes which ISM does not recognise are reported as “Extra”.

Statistical information for nodes is obtained by paging or scrolling down the details screen for a particular subsystem. This allows the user to monitor the efficiency and condition of each node.

2.3 SUBSYSTEM BOARD CHECKS

The status control panel on each subsystem, will indicate which of the computer units the problem has occurred on. The watchdog light flashes during normal operation, and stays on when a failure has occurred.

NOTE - When the watchdog light stays on, the master or standby lights for that subsystem are irrelevant.

The description of the computer unit boards that make up the subsystems is given in IECC 4000. The information available from ISM and visual checks of the boards should be logged, as this information will be of use should further diagnostics at a higher level be necessary. The information available depends on the type of board and also the configuration. The types of board together with any visible status indicators are given below:

- | | |
|---------|--|
| MVME025 | Bus Arbitration Board
The front edge of the board has two red LEDs, these are labelled “FAIL” and “BERR”. Failure of the board results in the “FAIL” LED being illuminated. Any bus errors cause the “BERR” LED to become illuminated. |
| MVME101 | Processor Board
The front edge of the board has an LED display window, which indicates the current status of the board. The possible displays are described in Table 6000-2A, which also includes the interpretations. |
| MVME123 | Processor Board
The front edge of the board has two red LEDs and one green LED. The “FAIL” and “HALT” indicators are the two red LEDs, and the “RUN” indicator is the green LED. During normal operation the green LED is on permanently, with only the occasional glimmer occurring from the “FAIL” and “HALT” LEDs. If the boards fails the “FAIL” LED is illuminated. |
| MVME162 | Processor Board
Two variants of this board are used, either the MVME162-001 (1M bytes DRAM) or the MVME162-010 (4M bytes DRAM). The front edge of the board has one red LED, one yellow LED and six green LEDs. The red LED is the “FAIL” indicator which will be fully illuminated if the board fails, otherwise it will glimmer occasionally. The yellow LED is the “STAT” (status) indicator which will be fully |

illuminated if the processor enters the “halt” state, otherwise it will glimmer occasionally.

The green LEDs are the “RUN”, “SCON”, “LAN”, “FUSE”, “SCSI” and “VME” indicators. The “RUN” indicator is illuminated during normal running. The “SCON” indicator will glimmer occasionally to indicate one of the on-board chips is in use. The “LAN” and “SCSI” indicators should not be illuminated during normal running. The “VME” indicator will be illuminated whenever the VMEbus is being utilised. It should be noted that if the subsystem’s code and data is resident in on-board Flash Memory (EEPROM), only when the code is being copied from the MVME211 boards during the initialisation phase will this indicator be illuminated.

MVME172 Embedded Controller Board

The front edge of the board has one red LED, two green LEDs, and one green or amber LED. The “FAIL” indicator is the red LED, the “SCON” and “FUSES” indicators are the green LEDs, and the “RUN” indicator is the green or amber LED. During normal operation the “FUSES” LED is on permanently, the “RUN” LED is on or dim with perhaps an occasional visible flicker, and the “FAIL” LED is off. The “SCON” LED in the left-hand MVME172 board in each rack is on, and in all other MVME172 boards in the rack the “SCON” LED is off. During the period following download of data from CD-ROM facility, if the flash memory was reprogrammed then the “FAIL” LED flashes until the “RESET” button is pushed. Otherwise if the flash memory was not reprogrammed because no change was made, then the program runs and the “FAIL” LED is off. If the board fails the “FAIL” LED is fully illuminated.

MVME211 Memory Board

This board has no visual indicators. Failures can only be established through the information available from ISM, or directly from the MVME123 board.

MVME215-3 Battery Backed RAM Board

There is one LED on the front panel. This green LED is for “SELECT” and indicates when the board is being accessed.

MVME216 Battery Backed and EPROM Memory Board

This board has two green LEDs on the front panel. One indicates that the battery backed RAM is being accessed. The other indicates that the EPROM is being accessed.

MVME236-1 RAM memory board

There is one LED on the front panel. This green LED labelled “VME” indicates when the board is accessing the VMEbus.

MVME333-2 Intelligent Communication Controller Board

The front edge of the board has a red “FAIL” LED. If the board fails the LED is illuminated.

- MVME705A Serial Transceiver Module Board
This board has no visual indicators. Failures can only be established through the information available from ISM.
- MVME705B Serial Transceiver Module Board
This board has no visual indicators. Failures can only be established through the information available from ISM.
- MVME705-1 Serial Transceiver Module Board
This board has no visual indicators. Failures can only be established through the information available from ISM.

Table 6000-2A - MVME101 LED Interpretation

LED Display	Interpretation
"1" to "9", "A"	This is an identifying board number only, and does not necessarily indicate the position of the board in the sub-rack, or the priority. The brightness of the number indicates how busy the board is.
"B" to "E"	In the Simulator (SIM) and the Remote Interlocking Interface (RII) subsystems these are also identifying board numbers and the special meanings given below do not apply under normal running when the LED should flicker.
"0"	This indicates processing of off-board messages is taking place (displayed fleetingly).
"F"	This appears when the board is starting up. If it appears after start up it indicates a board failure.
"E"	This indicates another board has failed and is displaying "F". The board displaying "E" is also brought down into a failed state.
"D"	This means the board is delaying until the MVME123 or MVME162 board has started up.
"C"	This is displayed for a short time, and shows the local memory is being cleared before D is displayed.
"B"	Minibug is in use. This is displayed after the abort switch has been pressed for at least 4 seconds.

LED Display	Interpretation
"F"(flash)	<p>Interpretation depends on the duration of the flashing:</p> <p>(i) every half second - MVME123 or MVME162 board has locked up due to invalid address;</p> <p>(ii) every quarter second - a double failure has occurred while trying to report a previous failure.</p>

The start sequence is "C", "D", "F" then board number.

2.4 OBTAINING DIAGNOSTIC INFORMATION

Following a computer unit failure there is certain information that is useful in diagnosing the fault. This information is particularly relevant if the problem is software related. Certain diagnostic information may be passed to ISM following a board crash. This information is displayed as four dump messages. These details can only be sent by the subsystem if the NDS and RCM boards are unaffected by the fault.

Should communications between ISM and the subsystem be unavailable then the crash data can be obtained by connecting a terminal to the MVME123 board, the MVME333-2 via the MVME705B board (remote workstation only) or the MVME162 board of the failed computer unit. These diagnostics should be handed over to the appropriate authority, who may request additional diagnostics to be performed. The following sections 2.4.1, 2.4.2, and 2.4.3 apply to systems without MVME172 boards. Section 2.4.4 applies to systems with MVME172 boards. Section 2.4.5 applies to all systems.

2.4.1 ISM Dump Information

Obtain the subsystem low level prompt for the faulty unit. Enter the dump facility, specifying the MVME123, MVME333-2 or MVME162 processor id, and dump the data areas for the following start addresses:

601D4, 601F4, 60214, 60234, 60254.

The resultant dump reports should preferably be listed on the printer or stored on magnetic tape. If not then the reports on the screen must be carefully copied.

2.4.2 MVME123, MVME333-2 and MVME162 Diagnostics

A terminal can be attached, via a serial link cable, to the single 25 pin connector on the front end panel of the MVME123 board, the top 25-pin connector on the MVME705B (for the MVME333-2 board on a remote workstation) or the bottom 25 pin connector on the front end panel of the MVME162 board. This allows diagnostic data to be obtained directly from the board if the computer unit has stopped. Connect the terminal to the MVME123 board, the MVME705B board (for the MVME333-2 board) or MVME162 board and hit the return key several times.

The terminal should respond with:

MVME120BUGA 1.1 > (MVME123 board)

or

MVME333BUG > (MVME333-2 board)

or

162-Bug> (MVME162 board)

To this prompt reply with:

.sr 2700 (MVME123 and MVME333-2 boards)

or

rs sr 2700. (MVME162 board)

terminating the character string by pressing the “Return” or “Enter” key.

Follow this by typing:

gd 0 (MVME123, MVME333-2 and MVME162 boards)

terminating the string as before.

The terminal responds with:

CRASH RE-ENTRY - INTERRUPTS DISABLED
Passwords as is when CRASH occurred
#

To this prompt reply with:

F G (MVME123, MVME333-2 and MVME162 boards)

(note space in between F and G), followed by the “Return” or “Enter” key. The terminal will now display diagnostic details. The details on the screen must be copied, either using any terminal printer facilities, or by hand.

2.4.3 MVME101 Diagnostics

There is a facility available on this board to perform a limited amount of diagnostic investigation. The use and scope of these instructions are not covered in this manual.

2.4.4 MVME172 Diagnostics

In systems with MVME172 boards, and for a limited number of failure conditions, information on board failures can be obtained from the failed MVME172 board. The failed MVME172 board is identified by its red LED 'FAIL' indicator being on. Connect a terminal via a serial link cable to the top RJ-45 connector (Port 1) on the front panel of the failed MVME172 board, and hit the return key on the terminal several times.

The terminal should respond with:

172-Bug>

To this prompt reply with:

g

and press the “Return” or “Enter” key.

The terminal will now display diagnostic details. The details on the screen may be copied, either using any terminal printer facilities, or by hand. Entering **g** again will cause the display of diagnostic details to be repeated.

If a terminal is connected to a working MVME172 board and the above procedure is carried out, then entering **g** will cause the message “Sysfail Detected” to be displayed on the terminal.

2.4.5 Subsystem Restart

The subsystem must only be restarted once sufficient diagnostics have been performed and the relevant details logged.

Restart the subsystem by pressing the reset button on the MVME025 board or MVME172 board located in the first slot furthest to the left in the sub-rack. If this is successful then the subsystem may be left in an operational state. Should the same error occur repeatedly, then replacement of the appropriate faulty item (node or board) may be necessary (see below).

WARNING - Do not attempt to start the subsystem using the reset or abort buttons on any of the other boards. This can leave the subsystem in an undefined state.

Replace the board following the procedures detailed in section 2.5. The board can then undergo further checks to establish the cause of the failure.

A board may fail because of either a hardware or a software fault. It is probable that the subsystem will fail to restart should the fault be due to hardware problems. If the fault lies within the software then a restart is likely to succeed. A board which persistently fails but restarts successfully, may be replaced to help indicate whether the fault is indeed due to the software.

Restarting a computer unit back to standby status does not guarantee that the unit is fully functional (software and hardware). Only when the unit has successfully become master can it be assumed that the unit is functioning properly.

2.5 REMOVAL AND INSERTION OF MVME CIRCUIT BOARDS

The MVME Circuit boards used in the IECC system must be handled with care. Damage to the circuit boards may occur due to mishandling and this may be permanent. Each IECC subsystem cabinet including the workstations should provide an earthed stud to which an anti-static armband may be connected using a flexible cord. This section gives guidelines on how to remove and insert boards so as to minimise the risk of damage.

2.5.1 General Handling

Circuit boards can suffer both mechanical and electrical damage. The main risk of electrical damage is by removing or inserting a board whilst the power to the sub-rack is still on.

Therefore **ALWAYS** power down the sub-rack before changing boards. To prevent mechanical damage always handle the boards carefully, holding the board by the front plate with both hands. Do not handle the printed circuit board or touch any components as this may cause irreparable damage.

Electrical damage to boards may also be caused by electrostatic discharges. These discharges can occur at different potentials, and are usually only noticed when the potential is high enough to cause a spark and a shock ! Any discharge onto a board could cause deterioration of the components, or could totally destroy them. The risk of this form of damage occurring can be minimised by following the procedures as detailed below.

2.5.2 Extraction of Boards

Before attempting to insert or extract a board from a sub-rack ensure that the sub-rack is powered off. Prior to moving a board it is essential to discharge any electrostatic charge that may be present in your body. This is done by touching an earthed surface such as the exposed metal surfaces on the sub-rack or equipment cabinet. Attach the armband provided on each subsystem cabinet to wrist. The board can now be removed from the sub-rack.

For all boards except the MVME705 series (MVME705A, MVME705B, MVME705-1) the extraction procedure is as follows. The two screws attaching the board front plate to the sub-rack are unscrewed. The board is then released by pressing the two catches, at the top and bottom of the board front plate, away from the centre. The board will now be disconnected from the back-plane, and can be carefully pulled back along the guide rails until it is completely removed from the sub-rack.

The procedure is different for an MVME705 series board. An MVME705 series board is not connected to the back-plane so it does not have any catches. However it is connected at the rear to its accompanying MVME333-2 board via a cable. The two screws attaching the board front plate to the sub-rack are removed. The board can now be carefully pulled forward until it is removed from the sub-rack. When the board is free of the sub-rack the cable at the rear of the board is disconnected.

The board must be placed in an electrostatic bag before removing the armband.

2.5.3 Movement of Boards

If a board is to be moved, either away from the sub-rack, or from storage, then the board must be enclosed in an electrostatic bag. These are either black conductive plastic bags with an electrostatic sensitive device warning sign, or translucent metal coated bags. This precaution prevents the build up of harmful potentials on the board whilst in transit and must be adhered to even if the board is only being carried a short distance.

2.5.4 Insertion of Boards

As for extraction, ensure that electrostatic precautions are taken before handling the board, and that it is moved within an electrostatic bag. Attach the armband connected to the subsystem cabinet before removing the board from the electrostatic bag. The board must be inserted into the correct slot of the sub-rack. If there is any uncertainty as to exact location, then reference to the site drawings (IECC 5000) must be made.

The boards are normally arranged with a gap between each one to allow for optimum ventilation. The backplane connectors in the gaps must have a jumper connecting BG3 in and out. Backplane connectors where a board is to be inserted must not have this jumper present, as the board will not function properly.

For all boards except the MVME705 series the insertion procedure is as follows. Line the back edge up with the guide rails. Once the top and bottom edges are correctly in place, the board can be slid back carefully, making sure that all pins connected to the back-plane are inserted correctly. To seat the board correctly into the back-plane, the board should be pressed back until the front panel is touching the sub-rack at the top and bottom. The installation is completed by screwing the two screws attached to the board front plate into the sub-rack.

The procedure is different for an MVME705 series board. The accompanying MVME333-2 board is installed (as described above) before the MVME705 series board is installed. The cable, which attaches the MVME333-2 board to the MVME705 series board, is attached to connector P2 on the back-plane of the MVME333-2 board and to connector P2 at the rear of the MVME705 series board. The MVME705 series board is inserted in the guide rails in the sub-rack and pushed into place. The installation is completed by screwing the two screws attached to the MVME705 series board front-plate into the sub-rack.

2.6 NODE FAULTS

A node failure may be indicated on ISM, either as a fault on the network, or as a subsystem that is out of contact. A report or alarm message will indicate the area in which the error has occurred. The relevant subsystem screen can then be obtained to give details as to the state of links, and the statistics for the node.

If a node is thought to be faulty, the first action is to re-initialise the node. This is achieved by powering off and on the node via the appropriate switch on the power distribution box for a stand alone node or by the switch on the front of the node card for rack mounted nodes.

If the node has been configured with a name different to that which the node was running with, then the node will not operate as normal. By looking at the "Extra Nodes" as detailed on the ISM network detail screen, the configured name will be seen, and can be renamed (via "NODE ID" command) to be the expected id. If the node fails during configuration, or no response can be obtained, then a replacement must be made.

Once the new node has been connected, and powered up, then configuration of the node is necessary. During configuration the node identity is entered which must be entered as previously set up in ISM.

With regard to rack mounted nodes, they can be removed and inserted without powering off the rack, although it is advisable to switch the power off to the node card first by using the switch as described above.

WARNING - The user must ensure that nodes are not assigned names that have already been allocated to other nodes on the network.

2.7 REPLACEMENT OF A PC IN A DIS SUBSYSTEM

Each PC within a DIS contains a unique Ethernet address. When replacing a PC, it must be ensured that this unique address is maintained, otherwise, on power up, the replacement PC will fail to function.

This unique address is stored in 3 different locations and each must contain the same address for the PC to function. These are:

- as data in EPROM or Flash Memory on the VME part of DIS;
- on the flash disk within the PC rack; and
- on the lockable floppy disk within the PC rack.

Thus, when replacing a PC, the following procedure must be adhered to.

- a) Unlock the floppy disk on the original PC, remove it and place it in the replacement PC or use a replacement disk FOR THAT COMPUTER UNIT ONLY.
- b) Change the address on the flash disk. A special utility, located on the floppy disk, is used to perform this task.

WARNING - The user must ensure that PCs are not assigned an Ethernet address that has already been allocated to another PC on the same Ethernet communications link.

WARNING - The Ethernet communications link used to transmit information between the Host SDS and PC and vice-versa should only be loaded to a maximum of 20% of the available bandwidth. Typically, DIS loads to a maximum of 5% but checks should be performed periodically to ensure this value is not exceeded.

3 User Input

3.1 PC TERMINAL

The PC terminal uses a mouse and a standard “QWERTY” keyboard for user input. User functions are accessed through tabs, icons, list boxes and other standard windows techniques.

3.2 J500 TERMINAL

The J500 terminal uses a customised keyboard to issue commands to ISM. These may be entered as typed character strings, or as a single function key entry. The layout of the keyboard is shown in Figure 6000-3A. Further details of both types of command/reply entry are given below.

Typing in a character string requires that the information is correct, both in spelling and in structure. Information is typed in via the “QWERTY” keypad, in a series of single characters. Capital letters must be used otherwise the command will be rejected. The string typed in is only acted upon by ISM once the RETURN key has been pressed. This method is mostly used to reply to ISM prompts, and cannot be used to enter ISM commands.

The function keys allow a quicker means of issuing commands to ISM. The function keys are mainly located above the “QWERTY” keypad and are inscribed to indicate the purpose of each key. The table below is a quick guide, giving a short description of the use for each function key. Note that it is not necessary to press the return key after using a function key.

The function keys are laid out so that all keys associated with top level commands are located to the left of the keyboard. To the right of the top level function keys is a blank function key, which performs no ISM commands. The low level function keys are to the right of the blank key.

The keys “SET UP”, “RESET”, “CLEAR”, “ESC” and “CAPS LOCK” are disabled whilst the terminal is connected to ISM.

J500 Terminal Function Key Guide

TOP LEVEL COMMANDS

OVERVIEW	The Overview/default screen is displayed, and the prompt returns to top level.
SHOW	Subsystem screen is displayed for the specified subsystem or network. Prompt is low level for subsystem specific commands.
NODE ID	Changes or effective removal of network nodes.
ALRMS	Alarm & Report screen is displayed, screen commands control the alarm window. Low level prompt follows.
RPRTS	As for “Alarms”, except that screen commands control the report window.
INTERCEPT	Sets up monitoring of messages between two specified subsystems. Details returned as reports.
DUMP	Areas of memory within specified subsystem computer units are obtained as a report.
SET TIME	Allows manual setting of the ISM internal clock.
SET USERS	Addition and deletion of temporary ISM user identities.

J500 Terminal Function Key Guide (continued)

LOW LEVEL COMMANDS

General Options

CANCL	Exit current prompt and return to previous low level or top level prompt, as appropriate.
NEXT PAGE	Display screen details below current page.
PREV PAGE	Display screen details above current page.
SCROLL UP	View line below current screen.
SCROLL DOWN	View line above current screen.

Show Options

SET	Initiate a changeover between computer units in a duplicated subsystem.
TEST	Enables various items on an ARS to be monitored (see “test” options below).
TIMETABLE	Instructs the ARS to obtain timetable information from the timetable processor.
ROUTESET	Requests the route setting status of a specified train from the ARS.

Set Options

MASTR	Changes the status of a subsystem from “Standby” to “Master”.
MODE	Change mode of ARS.

Intercept Options

STOP	Terminate all message monitoring
BEGIN	Start message monitoring between two specified subsystems.

J500 Terminal Function Key Guide (continued)

Test Options

STOP	Terminate all ARS diagnostics.
BEGIN	Start diagnostics for ARS.
END	End ARS diagnostics for a particular data item.
END ALL	End ARS diagnostics for all data items for a particular data type.
SSI ITEM	Define an SSI data item for starting or terminating ARS diagnostics.
PANEL REQ	Define a panel request item for starting or terminating ARS diagnostics.
TRAIN DESCR	Define a train descriptor item for starting or terminating ARS diagnostics.
BERTH	Specifies a berth item for starting or terminating ARS diagnostics.

Set Users Options

ADD USER	Add a temporary user to ISM.
DEL USER	Delete a temporary user from ISM.

Alarms Option

ACCPT	Acknowledge the oldest alarm message buffered by ISM.
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4 Obtaining Information

4.1 LOGGING IN TO ISM

4.1.1 PC Terminal

Logging in to ISM can only be accomplished if the PC is connected, has completed system start-up and is displaying the network diagram. Users with "Set Users" privilege may also log on even if this is not the case, but will only have access to the "Logout", "Change Password" and "Set Users" options until the ISM has connected and system start-up has completed.

A valid login identity and password must be entered, otherwise a message box is displayed indicating incorrect login details. The typed in password is displayed as asterisks on the screen, care must therefore be taken when entering this as any mistakes are not obvious. Following a successful login, the "Login" tab will change its name to "Logout", and the "Logout" and "Change Password" options are displayed. The Network Diagram colours become brighter, indicating that a user has logged in, and any tabs for options which the current user has are displayed.

It is undesirable to leave a user logged in to ISM, and therefore the current user is logged off, either when an ISM changeover occurs, or when a configurable period has passed since the user last moved the mouse or entered text at the keyboard. The user is also logged out if the terminal is powered off, or if the connection to the ISM is broken.

The identity used to log in to ISM may restrict the use of certain ISM facilities. This is because each identity which is configured into the subsystem has a specific set of privileges associated with it which cannot be changed.

A limited amount of information is displayed prior to logging in, more details are contained in section 4 on screen displays.

4.1.2 J500 Terminal

Logging in to ISM can only be accomplished if there is a "**LOGIN:**" prompt in the interactive window of the ISM screen. The absence of this prompt may indicate that logins are disabled or that the terminal is still currently logged into the subsystem. When ISM starts up a message is displayed stating that logins are enabled.

A valid login identity must be entered, otherwise the prompt is repeated and the error message "INVALID LOGIN ATTEMPT" displayed. A correct login identity will result in a prompt for the password. The typed in password is not displayed on the screen, care must therefore be taken when entering this as any mistakes are not obvious. An incorrect reply to the password prompt will result in the same responses as for an invalid login identity, with the subsystem returning to the login prompt. Following a successful login, the ISM command prompt - ">>" - is displayed.

It is undesirable to leave a user logged in to ISM, and therefore the current user is logged off, either when an ISM changeover occurs, or when a fifteen minute period has passed since the last command was entered.

The last command is either the depression of a function key, or the hitting of the return key following a text input. The action of hitting the return key on its own is not accepted as a valid command entry. The user will also be logged out if the terminal is powered off.

The identity used to log in to ISM may restrict the use of certain ISM facilities. This is because each identity which is configured into the subsystem has a specific set of privileges associated with it which cannot be changed.

Temporary login identities can be set up by another user, the login procedure being the same as for permanent login identities. These will be accessible until the subsystem is restarted or a changeover has occurred, following which a permanent login identity must be used to gain access. See the section on User Management (section 6.9) for details of the access rights applicable for temporary login identities.

A limited amount of information is displayed prior to logging in, more details are contained in section 5 on screen displays.

4.2 ISM DATA LOGGER

Alarms and reports generated by ISM are stored on a data logger. This was originally a magnetic tape logger but the logging is now performed by the logging function of the PC SPAD Monitor (PSM) or IECC PC Logger (IPL) (the IPL being a PSM with the SPAD detection and reporting functions removed). All three types of logger are described below for completeness. Whether the log is currently operating is indicated in the ISM status window where the logging device is shown as either being “on-line” (functioning) or “off-line” (non-functioning). For information on how to view the contents of a PSM/IPL log or a magnetic tape, refer to IECC 6004 ‘Reading IECC Logs’.

4.2.1 PSM/IPL Logger

The PSM/IPL will log, on its twin RAID (Redundant Array of Inexpensive Devices) disks, all of the data received from both ARS units, the master ISM unit (selected by the ISM serial line switch) and PSM/IPL events. In the event of an incident, an investigating body may seize the logged data by removal of the disk. A facility to copy logged data to CD-ROM is also provided. For information on how to access and copy PSM/IPL logged data, refer to IECC 6004 ‘Reading IECC Logs’.

The PSM/IPL has facilities to confirm that ARS, ISM and PSM data is being logged. For information on these facilities refer to IECC 6013 ‘PC SPAD Monitor’ for the PSM or IECC 6016 ‘IECC PC Logger’ for the IPL.

Facilities are also provided on the PSM/IPL for internal fault finding, these are described in section 10.

4.2.2 Magnetic Tape Logger

The magnetic tape logger is a Tracker 1700 manufactured by Data Track Technology. A tape logging device that is functioning normally will only have the “WT” and “POWER” LEDs lit

(see Figure 6000-4A). If the current tape is full and the logging device has been configured to run on a “stop-when-full” basis, then the logging device will go to “standby” and the “ET” LED will become lit. If the device has been configured to run on a “continuous” basis then the tape will be overwritten.

To replace a tape, first ensure that the device is in “standby” state. If necessary this state can be achieved by pressing the button marked “STBY”. The tape can then be removed by pulling the cartridge firmly out. The new tape can then be inserted, ensuring that it has the metal side down and the drive capstan facing inwards.

The tape will automatically rewind, with the “RV” and “FWD” LEDs being illuminated. Once complete, the unit will revert to standby, and can be put on line by pressing the “WT” button. ISM is capable of storing messages for the log device for a short period which should enable tape changeover to proceed without loss of data.

For further information regarding the configuration and control of the magnetic tape log refer to the Tracker 1700 Users Manual.

4.3 PC LOGGER

The PC automatically stores all incoming reports and alarms on its local hard disk. If the hard disk has become full, which is very unlikely to happen, the “PC Logger” display on the status bar goes red and displays the text “Offline”. If this happens then you should delete old log files from the hard disk.

4.4 ISM PRINTER

The ISM printer provides a hard copy log of alarms and reports. The status of this device is displayed in the ISM status window, with the printer being either “ON-LINE” or “OFF-LINE”. Printing will only proceed if the device is “ON-LINE”. The printer must be correctly loaded with paper and will normally start operating when it has been powered up. It may be necessary to press the “READY” key, if this LED is not illuminated. Should the fault light be on, check that the device has been correctly loaded with paper. Refer to the printer user manual for more details on loading paper and on faults.

4.5 PC PRINTER

The PC printer (if installed) provides a hard copy of the alarms and reports displayed on the “Alarms” and “Reports” pages. This enables the user to print out a list of reports and alarms as they appear on the PC Terminal. Both filtered and non-filtered reports and alarms may be printed.

5 J500 Screen Display

5.1 GENERAL SCREEN DETAILS

The ISM VDU screen consists of five display areas or windows. Each window contains information relevant to certain parts of the IECC system. This section describes the contents of each window, and how this relates to the system as a whole.

The windows are numbered one to five, as shown in Figure 6000-5A.

5.1.1 ISM Status Area (window 1)

This window gives information relating to the IECC system as a whole. The following details are displayed, the relative positions on the screen being shown in Figure 6000-5B.

IECC identity.

Identifies the IECC system on which the ISM VDU is attached.

User ID.

The user identity used to log in to ISM is displayed. If no user has logged on then this field is blank.

Printer status.

Describes the current status of the printer device as either ON-LINE or OFF-LINE. When on-line the printer is recognised as being ready to print messages, and off-line meaning that the printer is not ready.

Log status.

This refers to the magnetic tape log and as for the printer status, the device can either be ON-LINE or OFF-LINE. Relevant information can only be logged when the device is on-line.

Network status.

Coloured squares give the current overall status of the subsystems and nodes on each of the two duplicated networks. Green indicates that there has been no error detected in that area, and red indicates that an error has occurred. At a glance the overall status of the system can be checked.

Date and time.

Given in the format DD-MM-YY hh:mm, this is the current date and time in ISM and is used to update the time on all other subsystems.

5.1.2 Main Status Display Area (window 2)

This window can contain information at two different levels, an overview screen or a detail screen. The type of screen shown is under the control of the user, with the default being the overview screen. In some cases not all the information can be displayed, and the user must scroll or page the display to obtain all of it.

The detail screen contains information relevant to particular subsystems or networks.