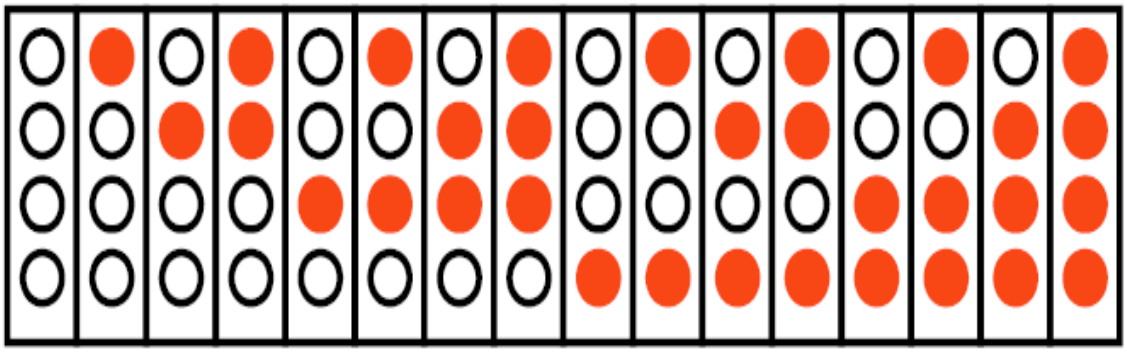
सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

इलेक्ट्रॉनिक इंटरलॉकिंग के त्रुटि निवारण पर हस्तपुस्तिका

Handbook on Troubleshooting of Electronic Interlocking



लक्ष्य समूह: एस.एस.ई./जे.ई. (सिग्नल) एवं सिग्नल अनुरक्षक

Target Group: SSE/JE(Signal) & Signal Maintainers

कैमटेक/एस/प्रोज/2018-19/एसपी7/1.0

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January 2019

Indian Railways
Centre for Advanced Maintenance Technology

Maharajpur, Gwalior (M.P.) - 474005

इलेक्ट्रॉनिक इंटरलॉकिंग के त्रुटि निवारण पर हस्तपुस्तिका

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कैमटेक/एस/प्रोज/2018-19/एसपी7/1.0

जनवरी 2019

CAMTECH/S/PROJ/2018-19/SP7/1.0

January 2019

प्राक्कथन

इलेक्ट्रॉनिक्स एवं संचार में तकनीकी उन्नति के साथ रेल्वे सिग्नलिंग के क्षेत्र में क्रांतिकारी परिवर्तन आए हैं। भारतीय रेल्वे के कई स्टेशनों पर विभिन्न अनुमोदित फ़र्मों के इलेक्ट्रॉनिक इंटरलॉकिंग संस्थापनों को प्रारम्भ किया जा चुका है।

कैमटेक में यह हस्तपुस्तिका, संकेत कार्मिकों को विभिन्न इलेक्ट्रॉनिक इंटरलॉकिंग प्रणालियों के त्रुटिनिवारण से अवगत कराने हेतु तैयार की है। मुझे विश्वास है कि यह हस्तपुस्तिका न सिर्फ उनके ज्ञान को बढ़ाने में सहायक होगी अपितु उन्हें उनके अधिकार क्षेत्र में स्थित प्रणाली के अनुरक्षण में भी सहायक होगी ।

कैमटेक, **ग्वालियर**
दि. 29.01.2019

दिनेश कुमार यादव
कृते कार्यकारी निदेशक/कैमटेक

FOREWORD

With the technological advancement in electronics and communications, there have been revolutionary changes in the field of railway signalling. Electronic Interlocking installations of different approved manufactures have been commissioned on a large number of stations on Indian Railways.

CAMTECH has prepared this handbook for Signal personnel to get them acquainted in troubleshooting procedures for different Electronic Interlocking systems. I am confident that this handbook apart from updating their knowledge will also help them in maintenance of the system under their jurisdiction.

CAMTECH Gwalior **D.K.M. Yadav**
Date: 29.01.2019 **For Executive Director/CAMTECH**

भूमिका

रेल्वे सिग्नलिंग प्रणाली गाड़ियों के संचालन में महत्वपूर्ण भूमिका निभाती है। इलेक्ट्रॉनिक इंटरलॉकिंग एक उन्नत संकेत प्रणाली है जो कि पूरे विश्व में उपयोग की जा रही है तथा भारतीय रेल्वे में भी लगाई गई है। वर्तमान में भारतीय रेल्वे पर कार्य करने वाली इलेक्ट्रॉनिक इंटरलॉकिंग प्रणाली त्रुटिहीन प्रदर्शन अपेक्षित है, परंतु प्रणाली का संरक्षा कारणों से बंद होना अथवा किसी अन्य कारण से त्रुटि होने से गाड़ियों का संचालन बाधित हो सकता है।

कैमटेक ने यह हस्तपुस्तिका संकेत कार्मिकों को इलेक्ट्रॉनिक इंटरलॉकिंग प्रणाली के त्रुटिनिवारण हेतु तैयार की है। इस हस्तपुस्तिका में माइक्रोलॉक II तथा वेस्टरेस वीएलएम 6 ईआई प्रणालियों जिनकी संख्या भारतीय रेल्वे में अधिक है के त्रुटिनिवारण को सम्मिलित किया गया है।

हम सिग्नल निदेशालय, आरडीएसओ, लखनऊ, मै. अंसाल्डों एस टी एस ट्रांसपोर्टेशन सिस्टम्स इंडिया प्रा. लि. बैंगलोर, मै. सीमेंस रेल ऑटोमेशन प्रा. लि. बैंगलोर एवं भारतीय रेलवे के सभी संकेत कार्मिकों के अत्यधिक आभारी हैं जिन्होने इस हस्तपुस्तिका को बनाने में हमारी सहायता की है |

चूंकि तकनीकी उन्नयन एवं शिक्षण एक क्रमिक प्रक्रिया है, अतः इस हस्तपुस्तिका में आप कुछ जोड़ने या सुधारने की आवश्यकता महसूस कर सकते हैं | यदि ऐसा है तो कृपया अपने सुझाव हमें ईमेल dirsntcamtech@gmail.com पर भेजें अथवा इस पते पर लिख भेजें : भारतीय रेल, उच्च अनुरक्षण प्रोद्योगिकी केंद्र, होटल आदित्याज़ के सामने, एयरपोर्ट मार्ग, महाराजपुर, ग्वालियर (म. प्र.) 474005

कैमटेक, ग्वालियर
दि.: 29.01.2019

दिनेश कुमार यादव
निदेशक (संकेत एवं दूरसंचार)

PREFACE

Railway Signalling system plays a vital role in the movement of trains. Electronic Interlocking, an advanced signalling system used worldwide has been introduced on Indian Railways. At present the working installations of this system on Indian Railways are of different approved manufactures. Although Electronic Interlocking system is supposed to give flawless performance, failure of this due to its safe shut down feature or any other reason may paralyze train movements. For ensuring the efficiency and reliability of the system, the staff installing or maintaining this should have fair knowledge about its troubleshooting procedures.

CAMTECH has prepared this handbook to help Signal personnel in troubleshooting the Electronic Interlocking system. This handbook covers troubleshooting of MICROLOK II and WESTRACE VLM6 EI systems which have large population on Indian Railways.

We are sincerely thankful to Signal Directorate RDSO Lucknow, M/s Ansaldo STS Transportation Systems India Pvt. Ltd. Bangalore and M/s Siemens rail Automation Pvt. Ltd, Bangalore and Signal personnel of Indian Railways who helped us in preparing this handbook.

Since technological upgradation and learning is a continuous process, you may feel the need for some addition/modification in this handbook. If so, please give your comments on email address dirsntcamtech@gmail.com or write to us at Indian Railways Centre for Advanced Maintenance Technology, In front of Adityaz Hotel, Airport Road, Maharajpur, Gwalior (M.P.) 474005.

CAMTECH Gwalior **D.K.M.Yadav**
Date: 29.01.2019 **Director (S&T)**

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सुधार पर्चियों को जारी करना

ISSUE OF CORRECTION SLIPS

इस हस्तपुस्तिका के लिए भविष्य में जारी की जाने वाली सुधार पर्चियों के क्रमांक इस प्रकार से रहेंगे:

The correction slips to be issued in future for this handbook will be numbered as follows:

केमटेक/एस/प्रोज/2018-19/एसपी7/1.0 # XX दि .....

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जहां "XX" सम्बंधित सुधार पर्ची की क्रम संख्या है (01 से शुरू होकर)

Where "XX" is the serial number of the concerned correction slip (starting from 01 onwards).

सुधार पर्चीयाँ जारी की गयीं
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सुधार पर्ची की क्रम संख्या Sr. No. of Correction Slip	जारी करने की तारीख Date of issue	संशोधित पृष्ठ क्रमांक एवं मद संख्या Page no. and Item No. modified	टिप्पणियाँ Remarks

डिस्क्लेमर

यह स्पष्ट किया जाता है कि इस हस्तपुस्तिका में दी गयी जानकारी सिग्नल इंजीनियरिंग मैन्युअल, रेलवे बोर्ड प्रकाशनों तथा आर डी एस ओ प्रकाशनों के किसी भी वर्तमान आलेखों को विस्थापित नहीं करतीं है | यह दस्तावेज वैधानिक नहीं है वरन इसमें दिए गए निर्देश केवल मार्ग दर्शन हेतु हैं | यदि किसी बिन्दु पर विरोधाभास दृष्टीगोचर होता है, तब सिग्नल इंजीनियरिंग मैन्युअल, रेलवे बोर्ड प्रकाशनों, आर डी एस ओ मार्गदर्शन अथवा जोनल रेलवे के निर्देशों का पालन करें |

DISCLAIMER

It is clarified that the information given in this handbook does not supersede any existing provisions laid down in the Signal Engineering Manual, Railway Board and RDSO publications. This document is not statuary and instructions given are for the purpose of guidance only. If at any point contradiction is observed, then Signal Engineering Manual, Railway Board/RDSO guidelines may be referred or prevalent Zonal Railways instructions may be followed.

हमारा उद्देश्य

अनुरक्षण प्रौद्योगिकी और कार्यप्रणाली का उन्नयन करना तथा उत्पादकता और रेलवे की परिसम्पत्ति एवं जनशक्ति के निष्पादन में सुधार करना जिससे अंतर्विषयों में विश्वसनीयता, उपयोगिता और दक्षता प्राप्त की जा सके |

OUR OBJECTIVE

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महाराजपुर, ग्वालियर (म. प्र.) पिन कोड 474005
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ई-मेल : dirsntcamtech@gmail.com

If you have any suggestion & any specific comments, please write to us:
Contact person : Director (Signal & Telecommunication)
Postal Address : Centre for Advanced Maintenance Technology, Maharajpur,
Gwalior (M.P.) Pin Code – 474 005
Phone : 0751 - 2470185
Fax : 0751 – 2470841
Email : dirsntcamtech@gmail.com

कैमटेक प्रकाशन CAMTECH Publications

CAMTECH is continuing its efforts in the documentation and up-gradation of information on maintenance practices of Signalling & Telecom assets. Over the years a large number of publications on Signalling & Telecom subjects have been prepared in the form of handbooks, pocket books, pamphlets and video films. These publications have been uploaded on the internet as well as railnet.

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SSE/Signal - 7024141046 (CUG)

Or

Email at dirsntcamtech@gmail.com

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FAX to 0751-2470841 (BSNL)

Or

Write at
Director (S&T)
Indian Railways Centre for Advanced Maintenance Technology,
In front of Hotel Adityaz, Airport Road, Maharajpur,
Gwalior (M.P.) 474005

इलेक्ट्रॉनिक इंटरलॉकिंग का त्रुटि निवारण
Troubleshooting of Electronic Interlocking

1. परिचय Introduction

The working installations of Electronic Interlocking system on Indian Railways are of different approved manufacturers. Although Electronic Interlocking system is supposed to give flawless performance, failure of this due to its safe shut down feature or any other reason may paralyze train movements. For ensuring the efficiency and reliability of the system, the staff installing or maintaining this should have fair knowledge about its components and working. Troubleshooting of Electronic Interlocking at first instance can be done with the help of indications available on various cards at the time of failure. The faults which cannot be diagnosed fully by indications can be analyzed through error logs with the help of diagnostic software of that particular installation. An effort has been made to cover troubleshooting procedures of MICROLOK II and WESTRACE VLM6 Electronic Interlocking installations in the following sections.

2. माइक्रोलॉक II ई आई प्रणाली का त्रुटिनिवारण Troubleshooting of MICROLOK II EI system

(1) For troubleshooting the Microlok II, the system indications might lead to a quick diagnosis of the problem.
Check the following:
   (i) The Power Supply board 5V ON indicator LED should be on.
   (ii) The Power Supply board VCOR LED should be illuminated.
   (iii) The CPU board ON-LINE LED should be on.
   (iv) The CPU board VPP LED should be off.
   (v) The RESET LED should be off.
   (vi) The CPU upper 4-character display should be scrolling the phrase US&S MICROLOK II.
   (vii) The CPU lower 4-character display should be scrolling the application program name.

(2) In addition to the system-related indications listed in step 1, observe the indications on all I/O boards.

(3) Attempt to reset the Microlok II system by pressing the reset push button on the front panel of the CPU board. This will, in many cases, clear software related malfunctions.

(4) If the problem still persists after the system reset, check the system error log and event log for information related to the fault.

(5) If the error and event logs provide no assistance in identifying the problem, try replacing the affected Microlok II printed circuit board (PCB) and recheck the operation of the affected circuit. If this does not restore the system to normal operation, check the field wiring and any related interface panels for defects.

(6) Replace the Microlok II CPU board if the actions in step 4 provide no results. Recheck the operation of the affected circuit.

(7) Once all of the hardware associated with the malfunctioning circuit has been ruled out as the cause, check the application program for possible errors.

Following are the indications on front panel of various types of PCBs of MICROLOK II:

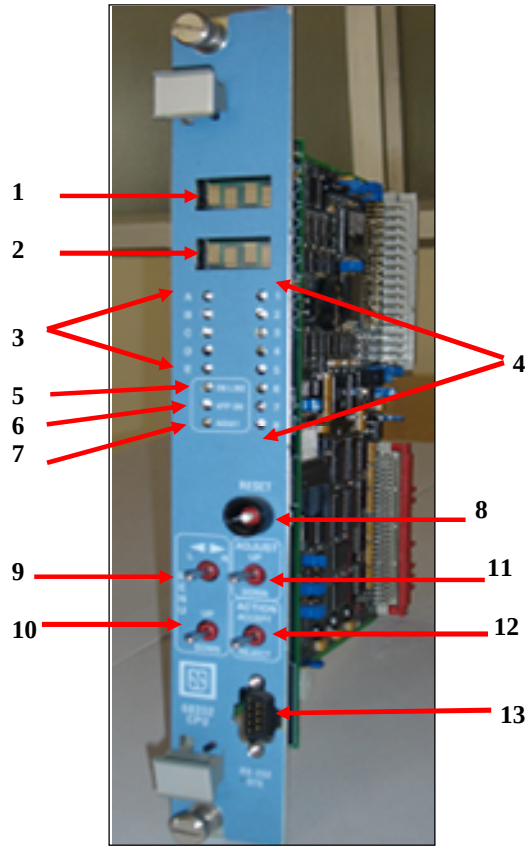


Fig 2.1.: Controls & indications of CPU PCB

Fig. Ref	Label	Device	Purpose
1,2	(None)	4-character alphanumeric displays	On-site configuration programming menus and options.
3	A,B,C,D,E	Yellow LEDs	Reserved for serial link status.
4	1,2,3,4,5,6,7,8	Red LEDs	User-defined in application software
5	ON LINE	Green LED	When lit, indicates normal system operation (successful diagnostics).
6	VPP ON	Yellow LED	When lit, indicates FLASH +5V or +12V programming voltage enabled (via board jumper).
7	RESET	Green LED	When lit, indicates that the system is in reset mode.
8	RESET	Momentary pushbutton	When pressed, resets the CPU. Also used to place the CPU in the reset mode.
9	MENU L-R	3-position (return-to-center) toggle switch	Used to search main program menu items shown on displays.
10	MENU UP-DOWN	3-position (return-to-center) toggle switch	Used to select main program menu items shown on displays.
11	ADJUST UP-DOWN	3-position (return-to center) toggle switch	Used to cycle through configuration values to be selected with **"ACTION"** switch.
12	ACTION ACCEPT-REJECT	3-position (return-tocenter) toggle switch	Executes or cancels configuration value selected with **"ADJUST"** switch.
13	RS-232 DTE Diagnostic Link Connector	DB9, RS-232 Connector (DTE)	Used for connection to Maintenance PC for System monitoring diagnosis.

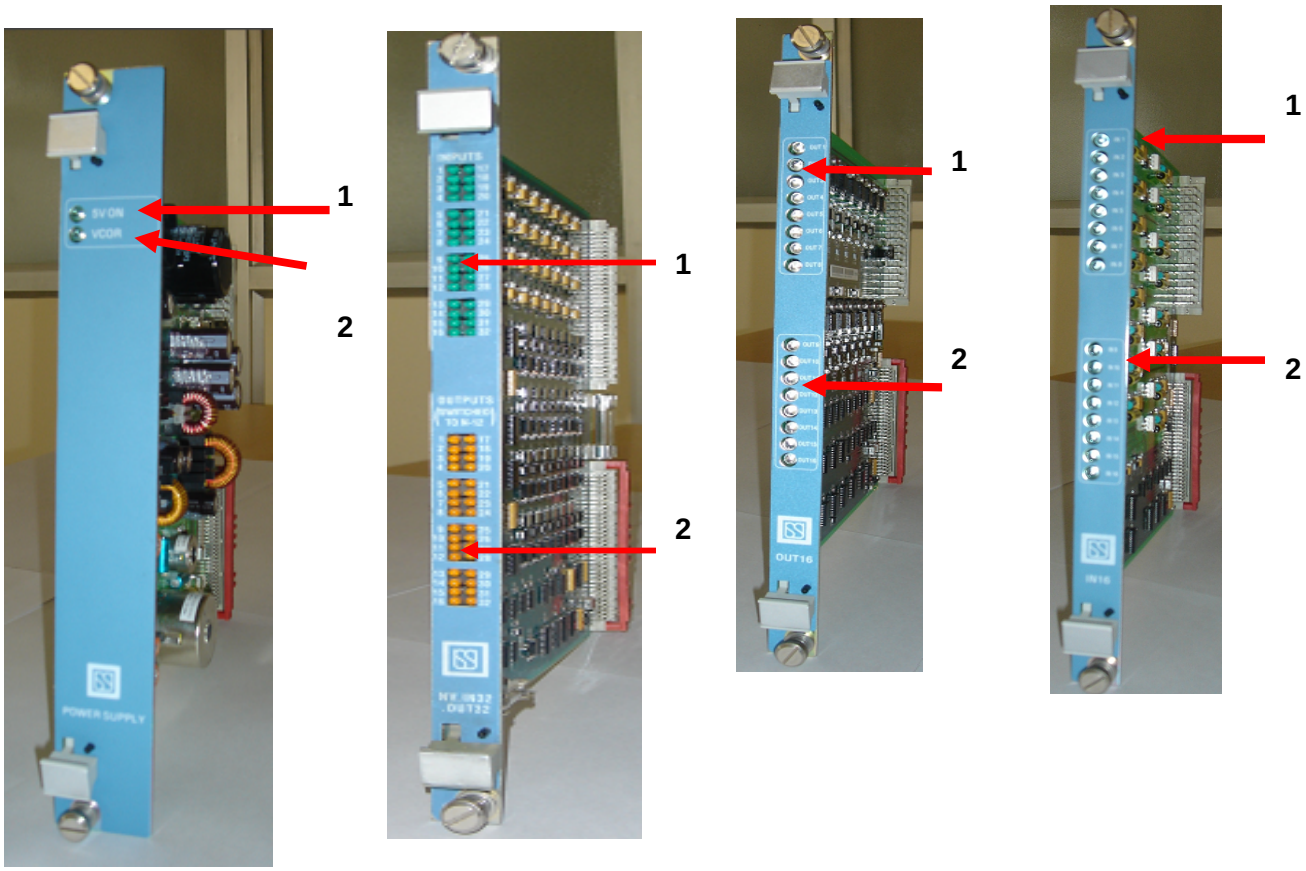


Fig.2.2: (i) Power Supply Board (ii) Non-Vital I/O Board (iii) Vital Output Board (iv)Vital Input Board

	Fig. Ref	Label	Device	Purpose
Fig. 2.2 (i)	1	**5V ON**	LED (green)	When lit, indicates 5V-operating power on to other cardfile PCBs (If not lit refer to Fig. 2.3)
	2	**VCOR**	LED (green)	When lit, indicates conditional power on to VCOR relay (CPU diagnostics normal). (If not lit refer "CPS CLEAR FUNCTION" details on page no.4)
Fig. 2.2 (ii)	**Fig. Ref**	**Label**	**Device**	**Purpose**
	1	**INPUTS 1-32**	Green LEDs	Monitors states of non-vital inputs 1-32. When LED is lit, respective input is on.
	2	**OUTPUTS 1-32**	Yellow LEDs	Monitors states of non-vital outputs 1-32.When LED is lit, respective output is on.
Fig. 2.2 (iii)	**Fig. Ref.**	**Label**	**Device**	**Purpose**
	1	**OUT1-OUT8**	Yellow LEDs	Monitor state of vital outputs 1 through 8. When lit, indicates respective output is turned on.
	2	**OUT9-OUT16**	Yellow LEDs	Monitor state of vital outputs 9 through 16. When lit, indicates respective output is turned on.
Fig. 2.2 (iv)	**Fig. Ref.**	**Label**	**Device**	**Purpose**
	1	**IN1 -IN8**	Green LEDs	Monitor state of vital inputs 1 through 8. When lit, indicates respective input is turned on.
	2	**IN9 -IN16**	Green LEDs	Monitor state of vital inputs 9 through 16. When lit, indicates respective input is turned on.

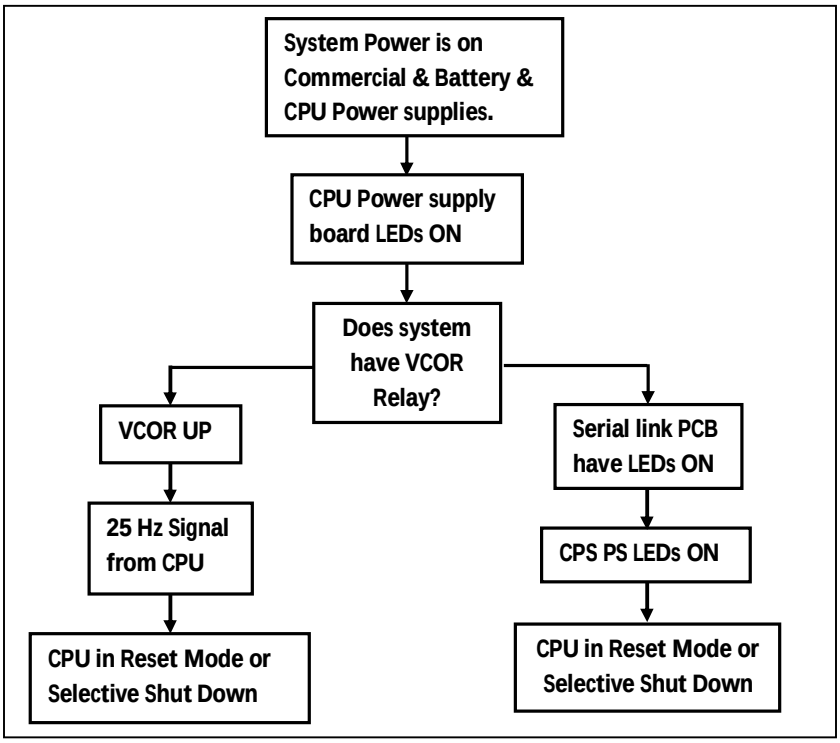


Fig.2.3: Flowchart for System Power Troubleshooting

***CPS CLEAR FUNCTION**

OPTION 1:- CPS clear through Maintenance Tool

1. Click on the "Reset MICROLOK II" button on the Maintenance Tools main menu.
2. The system displays "MICROLOK II Maintenance Tools" confirmation screen.
3. Click on the "Yes" button in the confirmation screen to reset the MICROLOK II unit.
4. At this point, if the CPS is down the System displays "MICROLOK II Maintenance Tools" dialogue box.
5. Click on the "Yes" button in the "MICROLOK II Maintenance Tools" dialogue box to switch the unit to CPS Up mode.

OPTION 2:- CPS clear through CPU front panel

To enter the Reset mode from CPU front panel

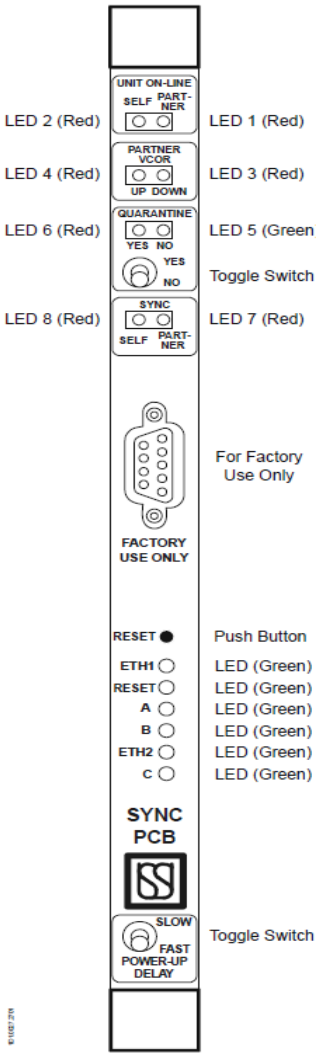
1. Press and release the "RESET" push button on the CPU board front panel.
2. Quickly operate any one of the four front panel toggle switches. Hold the switch in the toggled position.
3. Release the toggle switch that was operated in step 2 after the CPU board 4-character displays shows RES/MENU

To access this function

1. Toggle the MENU UP-DOWN switch to the "DOWN" position.
2. Toggle the MENU L-R switch to the "Right" position.
3. Toggle the MENU L-R switch to the "Right" position with CLR / CPS shown on the CPU board displays, Toggle the Action ACCEPT-REJECT switch to the "ACCEPT" position. This action resets the CPU software & VCOR relay and returns the CPU to the on-line mode.

Synchronization PCB

- The Synchronization PCB allows two Microlok II units to connect to each other in-order to form a synchronized pair for a seamless redundant application (HOT-STANDBY).
- Each Microlok II Cardfile contains a Synchronization PCB. The Microlok II cardfiles are linked through an Ethernet interface,receive the same physical inputs,deliver the same physical outputs and have the same hardware and software architecture and same physical I/O.
- One unit of each synchronized pair is identified as the on-line unit & the other unit is identified as Off-line unit.
- The Synchronization PCB contains its own microprocessor, has four vital Isolated inputs, two vital isolated outputs and other I/O Circuitry in-order to interface with two independent Microlok II UNITS.
- The LEDs provide the following indications when lit:



- **LED 1 Unit On-Line Partner** – (Input) lights red when the partner Microlok ii system is on-line.
- **LED 2 Unit On-Line Self** – (Output) lights red when this MICROLOK II system is on-line.
- **LED 3 Partner VCOR Down** – (Input) lights red when the partner MICROLOK II's VCOR is de energized.
- **LED 4 Partner VCOR UP** – (Input) lights red when the partner MICROLOK II's VCOR is energized.
- **LED 5 Quarantine No** - lights green when this MICROLOK II is not quarantined.
- **LED 6 Quarantine Yes** - lights red when this Microlok ii is quarantined. Flashes when attempting to establish synchronization with partner unit.
- **LED 7 Sync Partner** – (Input) lights red when the partner Microlok ii is synchronized with this unit.
- **LED 8 Sync Self** – (Output) lights red when this Microlok ii is synchronized with the partner unit.

Fig.2.4: Indications of Synchronization PCB

Communication PCB

- The communication PCB allows a Microlok II System to connect directly to an Ethernet network by means of two Ethernet ports.
- The Ethernet Ports may be used individually for different communication links or may be paired on the same link for use as a redundant network.
- The Communication PCB plugs into a Microlok II Cardfile linking the Microlok II CPU board to external equipment via two Ethernet ports.
- The Communication PCB contains its own microprocessor.

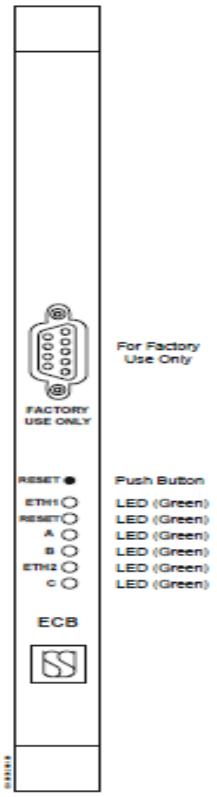


Fig.2.5: Indications of Communication PCB

2.1 प्रणाली के सामान्य संचालन को बहाल करना Restoring the system to normal operation

The system error log and system event log contain historical information regarding the performance of a Microlok II unit. Information placed in these logs falls into three general categories, as described below.

(i) **Critical errors** - The Microlok II executive continuously tests the Microlok II hardware and executive software to ensure proper operation. Failure of any test causes logging of a critical error and either restart or shutdown of the unit (depending on the recent error history and the type of error detected).

(ii) **Warnings** - Warnings usually result from the malfunction of equipment external to the Microlok II unit, or from minor, recoverable internal malfunctions.

(iii) **Events** - Typically, event messages are information and require no corrective action. They are logged on the occurrence of significant but routine events that occur during operation of the unit.

2.2 प्रणाली की त्रुटियों तथा दर्ज घटनाओं का विश्लेषण करना Analyzing the System Error and Event Logs

Whenever the Microlok II unit is operating in normal mode, information can be recovered from the system error log and the system event log using the Microlok II Maintenance Tools. There are four tools available in the Historical data option which enables the user to review the logged system information in several ways.

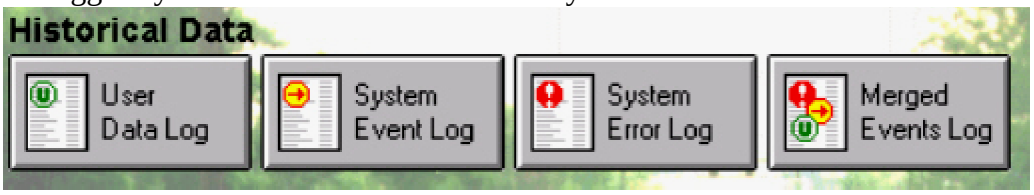


Fig.2.6: Icons for tools in Historical Data option

"User Data Log" records only those events that the user specifies.
"System Event Log" records up to 5000 of the most recent critical errors, warnings and events.
"System Error Log" records up to 50 of the most recent critical system errors.
"Merge Events Log" enables to view errors, warnings and events as in the system log.
This log also provides graphical displays of parameters and events as specified in the user data log.

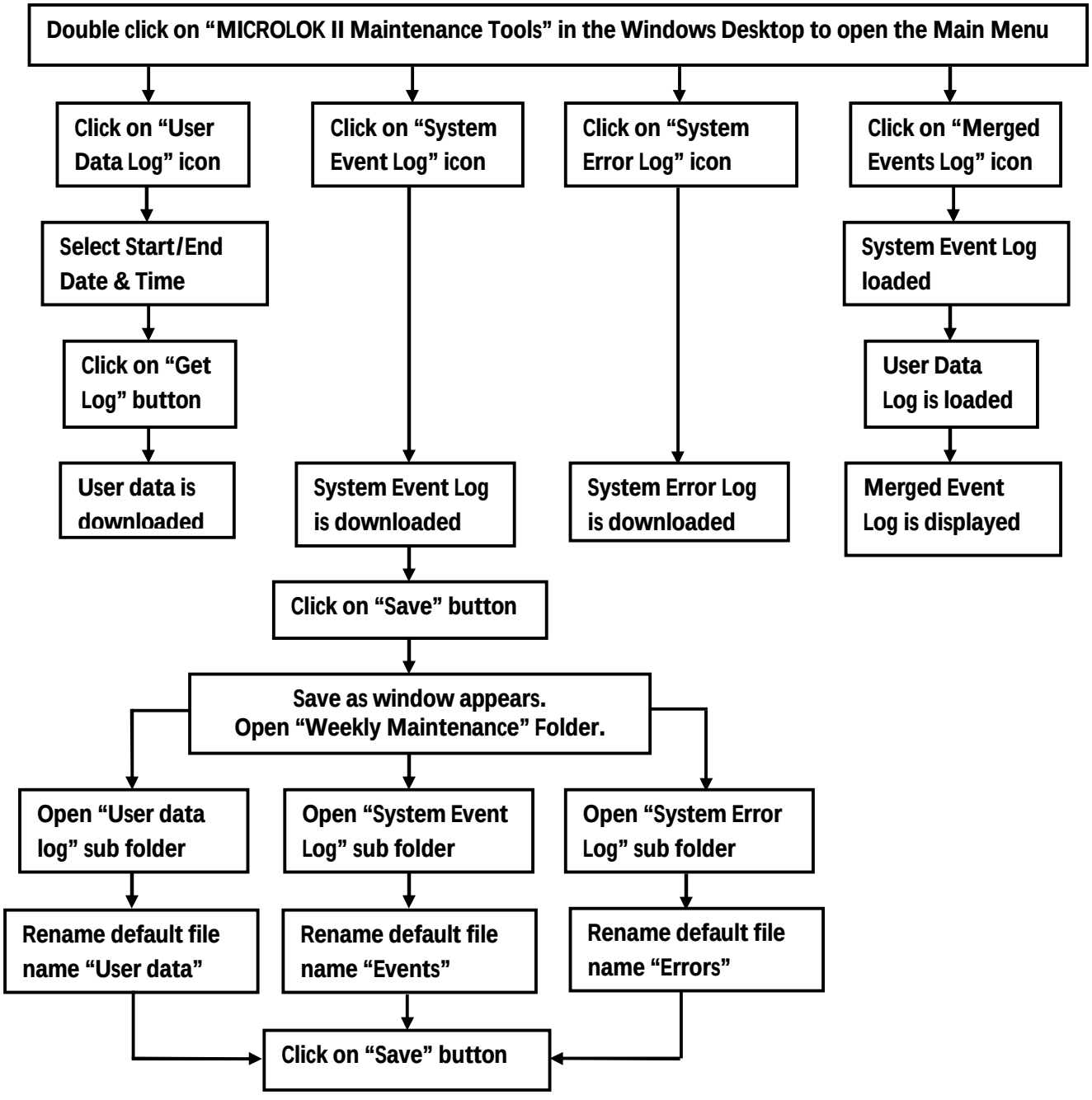


Fig.2.6: Flowchart for viewing/downloading User Data Log, System Event Log, System Error Log and Merged Event Log

The errors which are normally encountered, their possible causes and remedies are summarized in following tables:

2.3 सिस्टम रीसेट की स्थिति का त्रुटि निवारण MICROLOK II Troubleshooting guide

For troubleshooting, first turn ON the Failure System in Diagnostic/Quarantine mode and check error log for cause of failure in Maintenance Tool – if power supply is found OK.

2.3.1 Failure type : SYSTEM RESET

Sr. No.	Failure message/type	Possible Cause/Analysis	Remedy/Action
1	**OUTPUT BOARD** OUT16 Hardware error, Board J "x", Monitor "y" (or) OUT16 output error, Board J "x", Output "y".	Note :- "x" indicates board number & "y" indicates bit number	
	OUT16 Read failure	False feed before the diode terminal in bit "y" of the output board "x".	Isolate false feed at the identified bit.
2	i. Output Monitor OFF Failure ii. Output Monitor ON Failure iii. Output read failure	Noise in the Microlok II I/O 24V DC Supply which may be due to sudden trip of 24V DC	1. Check/Replace the 24V DC fuse of the identified board. 2. Check/Replace 24V DC-DC CONVERTER module. 3. Check/Replace the 48 pin connector cable. 4. Replace the faulty board.
3	Output Flip Failure	Noise in the Microlok II Cardfile 12V DC Supply which may be due to variation in the 12V DC	Check/Replace 12V DC-DC Converter module
		Noise in the Microlok II I/O 24V DC Supply.	1. Check/Replace 24V DC-DC Converter module. 2. Check/Replace the 24V DC fuse of the identified board. 3. Isolate output from the Relay. 4. Check/Replace the diode terminal of the identified bit. 5. Check/Replace the transzorb across the Left & Right coils in the twin relay of the identified bit. 6. Check/Replace the 48 pin connector cable. 7. Replace the faulty output board.
4	i. Output Monitor OFF Failure	24V circuit is shorted in the output board.	1. Disable the identified board. 2. Switch ON the system.

Sr. No.	Failure message/type	Possible Cause/Analysis	Remedy/Action
	ii. Output Flip Failure		3. If the error shifts to the next board, disable all the output boards in the Cardfile and remove them from the slot. 4. If VCOR picks up, then 5. Switch OFF the system. 6. Label the removed output boards. 7. Insert the first labelled output board in the first slot. 8. Enable the first output board slot and Switch ON the system. (i) If the VCOR is NOT picking up, separate that output board with proper tags. (ii) If the VCOR picks up, insert the next labelled output board in the first slot and repeat this cycle till isolating the faulty output board/s. 9. Enable all the output board slots after replacing the faulty output board/s. 10. If the problem persist Contact Ansaldo STS staff.
5	**OUTPUT BOARD** OUT 16 Type error, Board J "x" (or) OUT 16 Echo error, Board J "x"	1. Motherboard address failure. 2. Corruption failures in data bus,	Identify the faulty board in the event/error log information using Maintenance Tool. Disable the identified board. 1. After identifying the faulty board, ensure correct Jumper settings in the Address select PCB. 2. Ensure locking of all crimps in the Address select PCB. 3. Check/Replace the Address select PCB.
6	**INPUT BOARD** IN16 Type error, Board J "x"(or) IN16 Echo error, Board J "x"		
7	**NON-VITAL I/O BOARD** NVIN32OUT32 Type error, Board J "x" (or) NVIN32OUT32 Echo error, Board J "x"		
8	**SYNCHRONIZATION BOARD** **i.**Output Monitor OFF Failure **ii.**Output Monitor ON Failure	Noise in the Microlok II I/O 24V DC Supply which may be due to sudden trip of 24V DC	1. Check/Replace the 24V DC-DC Converter module. 2. Check/Replace 48 pin connector cable. 3. Replace the faulty board.

Sr. No.	Failure message/type	Possible Cause/Analysis	Remedy/Action
	Sync change failed. VCOR contact read failure Offline system mode changed to Quarantine mode.	Disconnection in CPU 48 pin connector assembly. Disconnection in Microlok II rack serial communication terminals. Ethernet port failure.	1. Ensure correct Jumper settings in the Address select PCB. 2. Ensure locking of all crimps in the Address select PCB. 3. Check/Replace the Address select PCB. 4. Check for any wire cut in Ethernet cable.
	COMMUNICATION BOARD i. Echo error **ii.** Internal vector error	Internal glitch or Communication PCB error.	Replace Communication PCB

2.3.2 Failure type: RESET BIT SET BY APPLICATION LOGIC

Sr. No.	Message	Possible cause/Analysis	Remedy/Action
1	Vital serial link failed (i.e. VSL COM OK bit clear)	Disconnection in CPU 48 pin connector assembly. .	Ensure all crimps are locked.
		Disconnection in Microlok II rack serial communication terminals.	(i) Check Ethernet cable. (ii) Check RJ45 connectors at communication equipments. (iii) Check supply for Communication equipments. (iv) Tighten the terminals.
		Serial port failure	Replace the CPU board
9	FCOR (False Feed Cut-off Relay) bit set by application logic	False feed at output relay coil.	Isolate the false feed at the identified bit.
10	System RESET without any event/error log information	System power 12 V DC is Low power.	Increase Microlok II Cardfile source voltage as specified.
		NO power at Power Supply board.	(i) Check/Replace the fuse of the MLK II 12V DC. (ii) Ensure locking of all crimps in the Power Supply board 48 pin connector assembly and the terminals between power source and Power Supply board. (iii)Replace Power Supply board. (iv)Replace 12V DC module.
11	VCOR (Vital Cut-off Relay) failed	System reset or failed.	(i) Ensure proper connection at VCOR relay coil.

Sr. No.	Message	Possible cause/Analysis	Remedy/Action
			(ii) Ensure locking of all crimps in the 48 pin connector at CPU board and Power Supply board including CPU to Power Supply board 250Hz wire connection. (iii) Ensure VCOR contacts at sync board inputs. (iv) Ensure that the diagnostic switch is in "OFF" position, if used.
12	CPS (Conditional Power Supply) down mode (or) NO VCOR LED indication in the Power Supply board	Microlok II in sleep mode, attempted a minimum of five times to pick up VCOR and failed.	Ensure locking of all crimps in the 48 pin connector at CPU board and power supply board including power supply board 250 Hz wire connection. Refer "CPS CLEAR FUNCTION" details on page no.4.
14	RAM error	CPU Data is Corrupted.	i. Reload MLK II Executive version. ii. Replace CPU board.
	RAM Diagnostic error	Fluctuations in the 12 V MLK Card-file supply.	1. Identify the defective 12V DC-DC converter by measuring output voltage. 2. Replace the 12 V DC-DC Converter.
		CPU Data is Corrupted.	i. Reload MLK II Executive version. ii. Replace CPU board.
15	Logic queue overflow error	Trigger list overflow (Either the MAKE or BREAK trigger is full and another equation cannot be queued) as this error will occur when too many statements are triggered for execution at once.	(i) Increase the logic timeout (maximum upto 5 seconds) using system configuration mode in the maintenance tool (ii) Correction required in the application logic program, Contact Ansaldo STS staff.
16	System Timer Watchdog Timeout-Idle Loop	Continuous processing of one particular statement or program settings are NOT sufficient to complete the logic processing.	Correction required in the application logic program, Contact Ansaldo STS staff.
17	System Timer Watchdog Timeout-Logic Processing	Program settings are not sufficient to complete the logic processing.	Contact Ansaldo STS staff.

2.3.3 Failure type: SYSTEM KILL

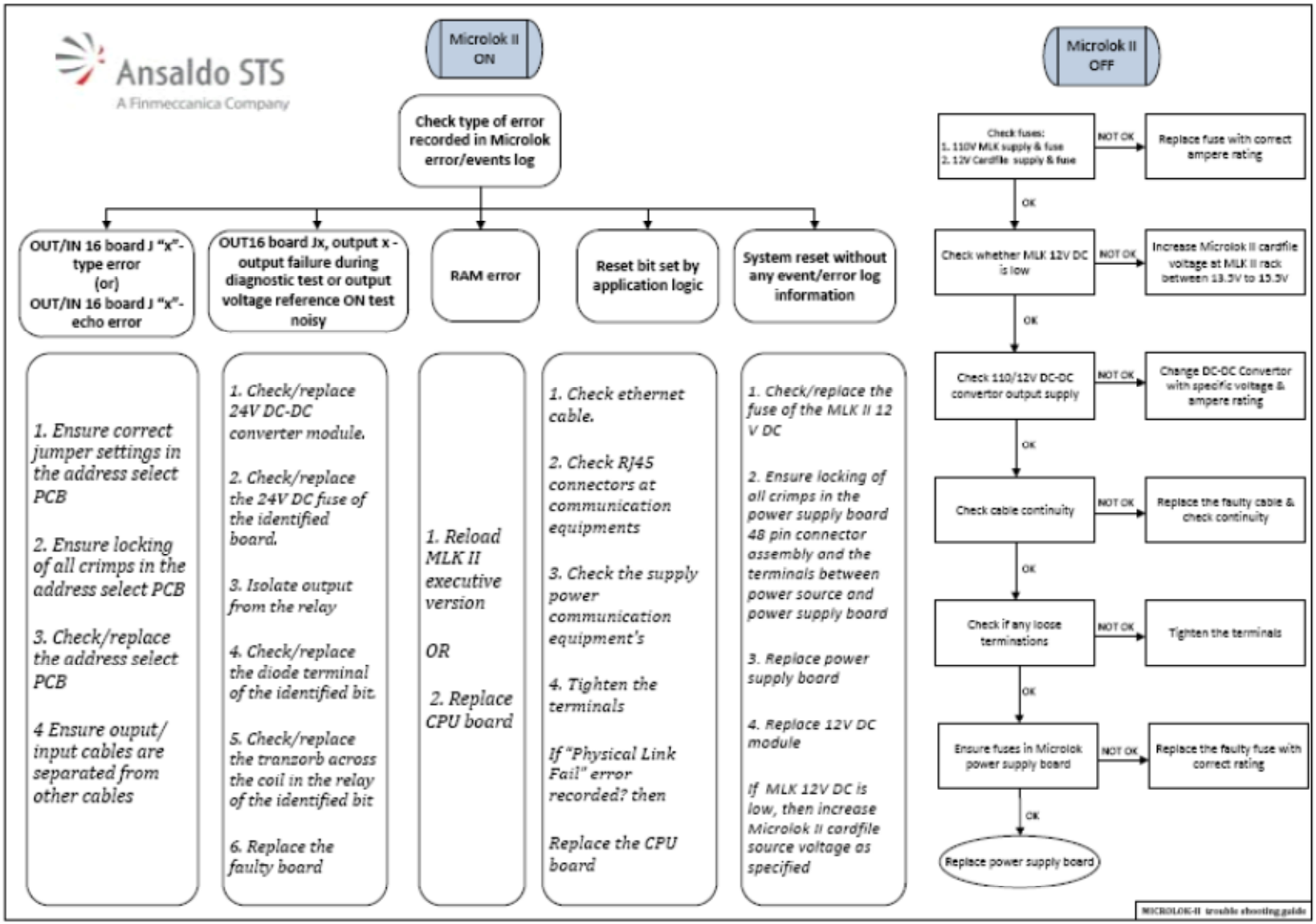
Sr. No.	Failure message/type	Possible Cause/Analysis	Remedy/Action
1	Kill Bit set by application logic	Uploading of New application program in the CPU	Refer "CLEAR KILL CONDITION" details

2.3.4 GENERAL FAULTS

Sr. No.	Failure message/type	Possible Cause/Analysis	Remedy/Action
1	System configuration mode failed	System settings could not be changed through Maintenance Tool.	1. Ensure locking of all crimps in the EEPROM PCB. 2. Replace EEPROM PCB. 3. Maintenance Tool is to be re-installed.
2	LINK 1920(0)	System Reset or failed	Establish communication between Microlok II and Maintenance Tool application in Maintenance PC for Event/Error log information.
3	Diagnostic link failed	BAD LINK seen between Microlok II and Maintenance Tool application in Maintenance PC.	1. Ensure Maintenance VDU is closed before open Maintenance Tool application. 2. Check Port address and Baud rate settings in the Maintenance Tool. 3. Remove and Reconnect 9-pin connector at both Microlok II and Maintenance PC ends. 4. Close & Restart Maintenance Tool program afresh.
5	Non-vital serial link failed (i.e. NVLOP/NVLMP COM OK bit clear)	Disconnection in CPU 48 pin connector assembly	Ensure all the crimps are locked
		Disconnection in Microlok II rack serial communication terminals	Tighten the terminals
		Disconnection in isolator/convertor terminals between Microlok II and Operator VDU PC/Microlok II and Maintenance VDU PC.	i. Tighten the connections ii. Check isolator 12V DC iii. Check/Replace isolator and converter
		Structure error due to noise in the communication.	Check 12V DC converter supply at the operator VDU PC end.
		Microlok II CPU board serial port failure.	Replace the Microlok II CPU board.
		Operator/Maintenance PC communication port failure.	Replace the Operator/Maintenance PC CPU.

Sr. No.	Failure message/type	Possible Cause/Analysis	Remedy/Action
6	Bit FAIL in Vital Output board Vital Input board Non-vital I/O board		i. Ensure that the board is fully finger tightened ii. Check the terminals in the entire path iii. Ensure locking of all crimps in the 48/96 pin connector iv. Replace the faulty board
7	Application logic loading failed through maintenance tool.	Check CPS jumper settings.	Ensure jumper 20 through 24 & 30 are in 2-3 position (Enable).

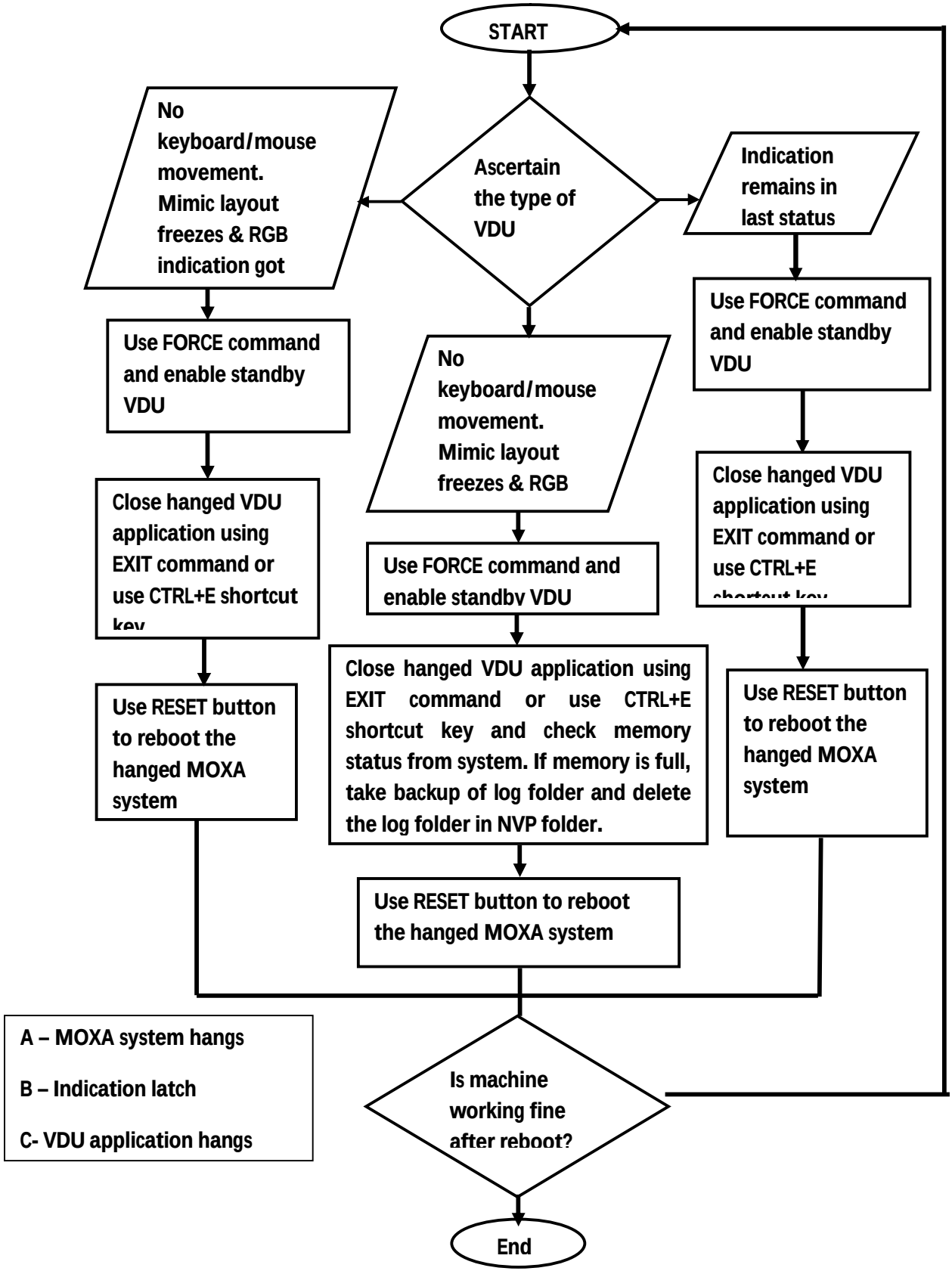
MICROLOK II Troubleshooting Flowchart



2.4 नॉन वाईटल पैनल (एनवीपी) अथवा ऑपरेटर वीडीयू का त्रुटि निवारण Troubleshooting of Non-Vital Panel (NVP) or Operator VDU

Sr. No.	Nature of failure	Symptoms	Steps for corrective action
1.	Hanging of VDU application	• No Mouse movement. • RGB flashing indication get stuck. • No Keyboard response.	• Use **Force** option from **Control** menu command (CTRL + F) to enable stand by VDU become online and ensure it's updating correct in response with EI system. • Close Hanged VDU application using **exit (CTRL + E)** option from Control menu. • Check memory status from the system if it's full then take backup of log and then delete log folder from NVP. • Re boot the hanged moxa system from front panel Reset push button. • After Re booting system wait for few minutes ASTS Panel will automatically open from start-ups and it will become standby mode.
2.	VDU Moxa system is not responding to commands	• No Mouse movement. • RGB flashing indication get stuck. • No Keyboard response.	• Use Force option from Control menu command (CTRL + F) to enable stand by VDU become online. and ensure it's updating correct in response with EI system. • Close Hanged VDU application using exit (CTRL + E) option from Control menu. • Re boot the hanged moxa system from front panel Reset push button. • After Re booting system wait for few minutes ASTS Panel will automatically open from start-ups and it will become standby mode.
3.	VDU is not updating to indication and commands	• VDU layout is not updating • to indications and the • commands and remained • in its last updated state. • Mouse movement OK. • Keyboard response OK.	• Use Force option from Control menu command (CTRL + F) to enable stand by VDU become online. • and ensure it's updating correct in response with EI system. • Close the VDU application using exit (CTRL + E) option from Control menu which is not updating and Restart ASTS Panel exe shortcut from the VDU desktop • Its recommended Re boot the moxa system from front panel Reset push button which give fresh start up to VDU application. • After Re booting system wait for few minutes ASTS Panel will automatically open from start-ups and it will become standby mode.

Flowchart for troubleshooting of Non-Vital Panel (NVP) or Operator VDU



(i) Important instructions for Station Master/Panel operator in station provided with dual VDU

I. Normal Condition: Actions

1. Don't turn off the Local Control Panel (LCP) systems unless there is a failure.
2. Always remember to operate the LCP systems using **Key Board Menus** when mouse becomes inoperative.

II. Failure Condition: LCP communication failure



Fig.2.7: Dual VDU

Action:

1. Shutdown any one LCP
2. Press **"Power off"** button in the embedded computer to turn off the failed LCP system.

III. Failure condition: Monitor/Keyboard/Mouse/system hangs

Action:

1. Press **"Force"** command in **Tools menu** in the **OFFLINE** LCP.
2. Ensure that, after the successful authorization, OFFLINE LCP becomes "**ONLINE"**.
3. **Turn OFF** the defective LCP

IV. Failure condition: When both LCP systems are in standby



Fig.2.8: Both VDU in standby mode

Action:

1. Close any one LCP application.

V. Any failure in the Dual VDU system should be reported to S&T staff immediately.

(ii) Do's & Don'ts for dual VDUs

Do's

- ✓ Ensure that one VDu is in working mode and other VDU is in standby mode.
- ✓ Ensure that SM's room is clean and dust free.
- ✓ Download the backup of VDU logs at regular intervals (weekly basis).
- ✓ Ensure that at least one successful changeover of online system to standby system is done on bi-weekly basis.
- ✓ Provide USB access lock software in both the systems to protect against virus.
- ✓ Keep master copy of Ansaldo STS Panel setup (VDU setup) and Specific configuration file on both VDU desktops and a master CD(R).
- ✓ Ensure SM's Key is out while leaving VDU operation. This will prevent unauthorized person to issue command in absence of the person authorized to perform operation.

Don'ts

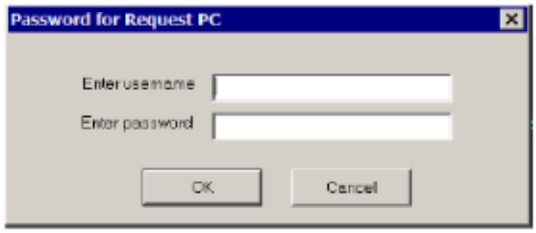
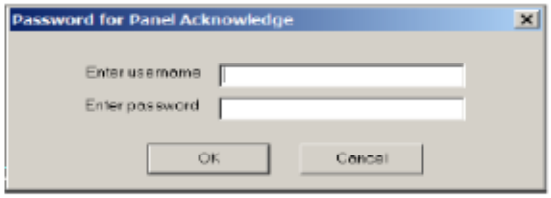
- × Shutdown both VDU systems together.
- × Remove any cables connected to VDUs.
- × Place any objects/container/eatables in and around embedded computer or monitors. Keep liquid or fire prone items close to VDU system.
- × Delete any file and log from NVP folder without authorization.
- × Insert pen drive/USB without authorization.
- × Install and keep antivirus software or unnecessary software and files in both VDUs.
- × Leave the VDU unattended while SM Key is IN.

2.5 सिस्टम ऑपरेटिंग पावर System Operating Power

Power Input to System Cardfile				
Voltage Range	Nominal Voltage	Min. Sys. Start-Up	Maximum Ripple	Current Draw
9.5 to 16.5 Vdc	12 Vdc	11.5 Vdc	0.5 V P-P	Determined by installation (number of signal lamps, cab carrier frequency, etc.)

Cardfile Power Supply Printed Circuit Board Outputs*		
For System Cardfile PCB 5V Internal Circuits	For System Cardfile PCB 12V Internal Circuits	To VCOR Relay
+5V @ 3A	+12V @ 1A, -12V @ 1A	+12V into 400 ohm coil
*Not used to power vital or non-vital external devices or circuits		

2.6 पैनल और पीसी चेंजओवर की प्रक्रिया Procedure for Panel - PC Changeover

PANEL TO PC	PC TO PANEL
1. CLICK ON *PANEL / PC SWITCH* KEY ON LCP & CLICK ON ***REQUEST PC***. 	1. FIRST TURN *PANEL / PC SWITCH* ON PANEL TO PANEL. 
2. ENTER USERNAME & PASSWORD, THEN PRESS ***OK***. 	2. OBSERVE FLASHING OF PANEL & PC INDICATIONS AT PANEL/PC SWITCH IN LCP & PANEL, THEN
3. OBSERVE FLASHING OF PANEL & PC INDICATIONS AT *PANEL/PC SWITCH* IN LCP & PANEL, THEN	3. CLICK ON *PANEL / PC SWITCH KEY* ON LCP & CLICK ON ***PANEL ACKNOWLEDGE***. 
4. TURN *PANEL / PC SWITCH* ON PANEL TO PC, TO CHANGE TO PC MODE. 	4. ENTER ***USERNAME*** & ***PASSWORD***. PRESS ***OK***, TO CHANGE TO PANEL MODE. 
5. OBSERVE STEADY INDICATION OF PC AT *PANEL/PC SWITCH* IN LCP & PANEL.	5. OBSERVE STEADY INDICATION OF PANEL AT *PANEL/PC SWITCH* IN LCP & PANEL.
6. IF *PANEL/PC SWITCH* INDICATION AT PC STILL FLASHING, CHECK *PANEL/PC SWITCH* WIRING	6. IF *PANEL/PC SWITCH* INDICATION AT PANEL STILL FLASHING, CHECK *PANEL/PC SWITCH* WIRING

3. वेस्टरेस वी एल एम 6 ई आई प्रणाली का त्रुटि निवारण Troubleshooting of WESTRACE VLM6 EI system

WESTRACE generates and logs a fault for every test and check that fails.

Faults within WESTRACE system generate fault codes. Most fault error codes are displayed on the Diagnostic LEDs or alphanumeric display on the modules, but only one fault can be displayed by each module

To read all the logged faults, help of MoviolaW Diagnostic Tool has to be taken.

Fault codes and their applicable meaning for individual WESTRACE modules can be referred from Annexure I to IV of this handbook or Appendix A of WESTRACE First Line Maintenance (FLM) manual. Usually the faulty module displays its error code before the rest of the module display their codes. The timing is very quick and may be difficult to observe in a large WESTRACE system.

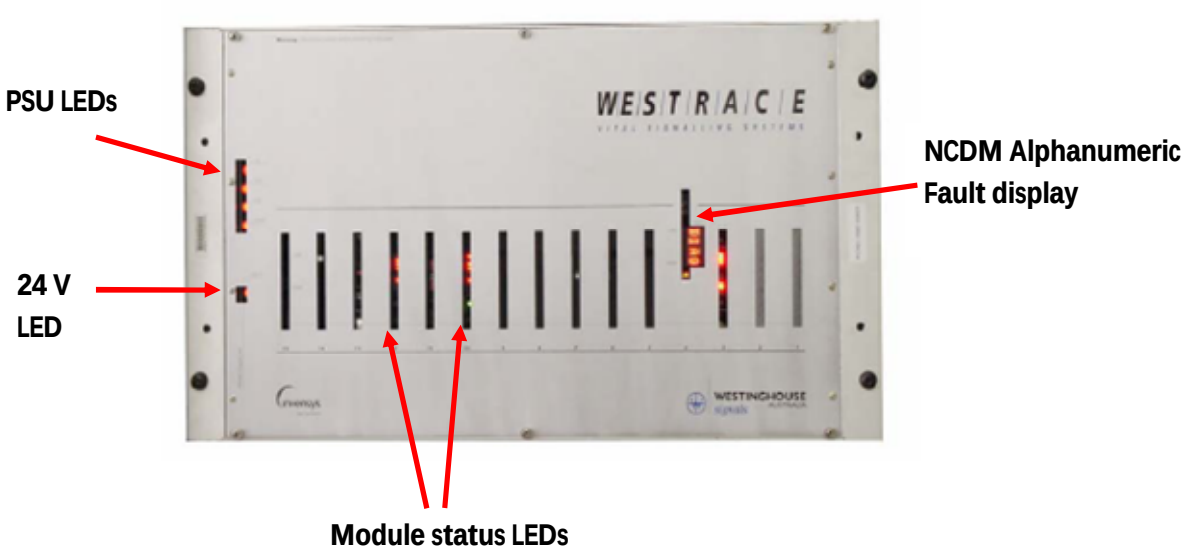


Fig.3.1: WESTRACE housing front view

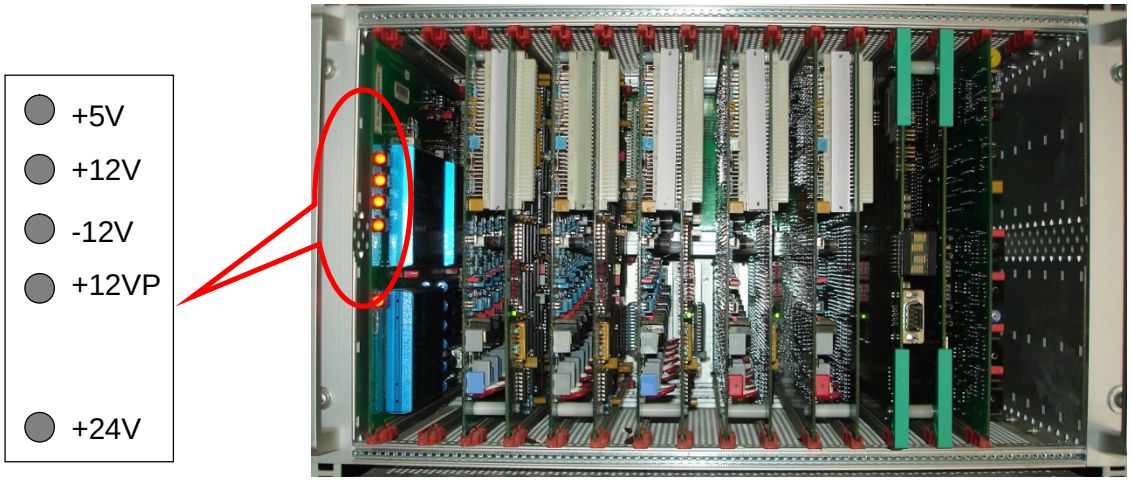


Fig.3.2: PSU LEDs

3.1 फॉल्ट कोड को पढ़ना Reading Fault Codes

A fault code indicated by the fault Diagnostic LEDs or alphanumeric display on the front of a module is applicable to that particular module.

The alphanumeric display shows the error code whereas the pattern of lit Fault Diagnostic LEDs has to be interpreted to determine the error code. All Fault Diagnostic LEDs are read in the same manner.

All the modules have one Green Watchdog LED which flashes once per cycle in normal condition. VLM6 card have additional yellow flashing LED.

Each module has two groups of four Red LEDs to indicate a fault code comprising two bytes (binary digits – a combination of 0s & 1s). The upper byte is the first (left) character of a Hexadecimal fault code and the lower byte is the second character. An LED represents 1 when illuminated and 0 when not illuminated.

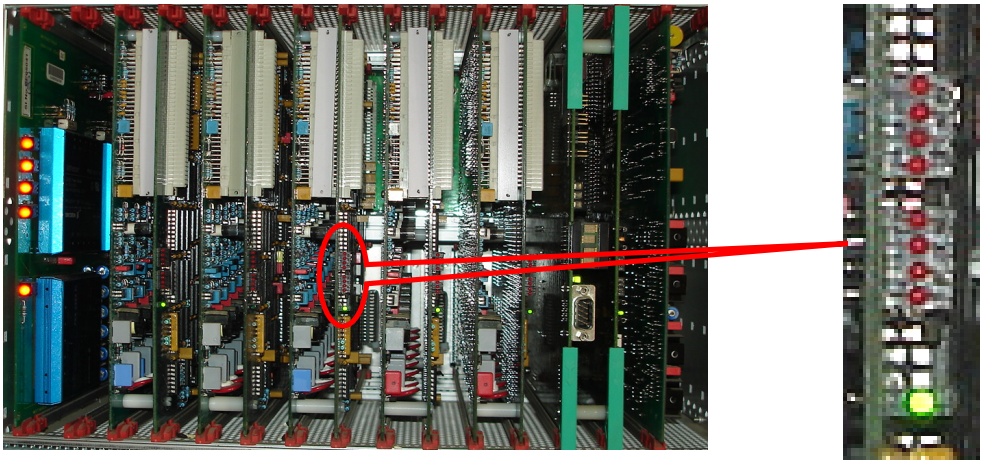


Fig. 3.3: Fault Diagnostic LEDs in a module

The example in Fig. 3.4 below is displaying 1111 1000 (reading bottom to top) which represents F8H (where H means hexadecimal) meaning ***Time Stamp Error*** and action to be taken is ***Replace VLM6.***

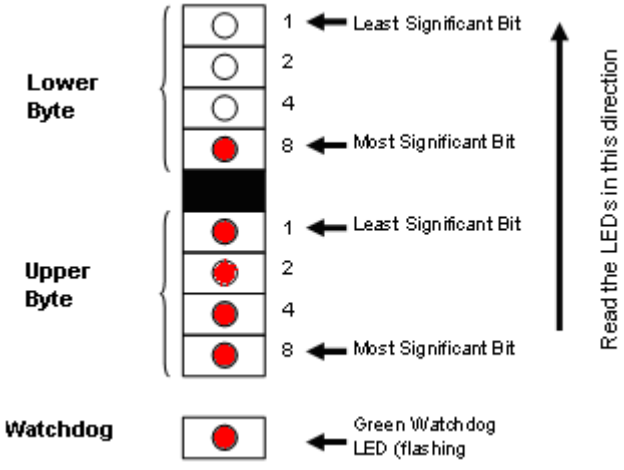


Fig.3.4: Method of reading Fault code through Fault Diagnostic LEDs

Fig. 2.22 shows the patterns of a group of four vertical LEDs. Each pattern represents a particular character and these are shown below the pattern.

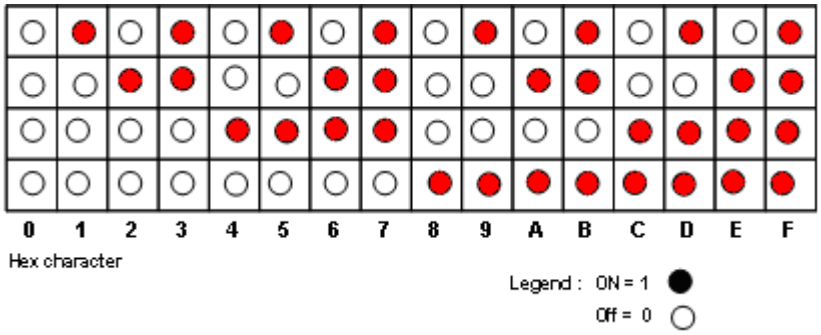


Fig. 3.5: Reading Fault diagnostic LEDs

Use the information in fig.2.22 or Table A to read the fault code displayed by Fault Diagnostic LEDs on the front of a module. Remember, the lower four LEDs represent the first (left) character and the upper four the second character in the Hexadecimal error code.

Fault codes and their applicable meaning for individual modules can be referred from fault code list from respective section of FLM or from respective Annexure pf this handbook.

Table A: LED indications patterns and their Hex codes

Legend ○ OFF, ● - ON

LED indication				Binary digits	Hexadecimal character		LED indication				Binary digits	Hexadecimal character
○	○	○	○	0 0 0 0	0		●	○	○	○	1 0 0 0	8
○	○	○	●	0 0 0 1	1		●	○	○	●	1 0 0 1	9
○	○	●	○	0 0 1 0	2		●	○	●	○	1 0 1 0	A
○	○	●	●	0 0 1 1	3		●	○	●	●	1 0 1 1	B
○	●	○	○	0 1 0 0	4		●	●	○	○	1 1 0 0	C
○	●	○	●	0 1 0 1	5		●	●	○	●	1 1 0 1	D
○	●	●	○	0 1 1 0	6		●	●	●	○	1 1 1 0	E
○	●	●	●	0 1 1 1	7		●	●	●	●	1 1 1 1	F

Record fault codes on WESTRACE fault equipment return form

3.2 मॉड्यूल के स्टार्ट अप तथा ऑपरेशन्स के संकेत
Start Up and Operations indications of modules

3.2.1 VLM6 Vital Logic Card (VLC6) Indications

Start Up Indications
Diagnostic LEDs first display the module type code, and then firmware version code. Firmware version is displayed for approximately 8 seconds, after which all diagnostic LEDs extinguish.

Operation Indications
A single green Watchdog LED and a single yellow Watchdog LED are provided to indicate the module is operating correctly and to indicate the mode of operation:

- In On-line mode, the VLC6 flashes the green LED once per cycle, and the yellow LED to indicate IMB communications.
- In Standby mode, the VLC6 flashes the yellow LED once per cycle.

3.2.2 Vital Relay Output Module (VROM) Indications

Start Up Indications
Diagnostics LEDs display the module type code, shortly followed by a firmware version code (reflecting the firmware version installed in the module). The firmware version is displayed for approximately 8 seconds, after which all diagnostic LEDs will extinguish.

Operation Indications
The module will commence flashing the green watchdog LED to indicate the module is operational and working correctly.

3.2.3 Vital Parallel Input Module (VPIM) Indications

Start Up Indications
Diagnostics LEDs display the module type code, shortly followed by a firmware version code (reflecting the firmware version installed in the module). The firmware version is displayed for approximately 8 seconds, after which all diagnostic LEDs will extinguish.

Operation Indications
The module will commence flashing the green watchdog LED to indicate the module is operational and working correctly.

3.2.4 VLM6, VPIM and VROM Fault Codes

The VLM6, VPIM and VROM fault codes are given in FLM. Some fault codes have different meanings during power-on initialization and these have been explicitly declared.

3.2.5 NCDM LED Indications

The NCDM comprises LEDs and a four digit alphanumeric display which can help in the diagnostics in the event of fault.

(i) NCDC LEDs

The NCDC has two front panel LEDs

Internal Fault LED (*Red*) – Illuminated whenever there is a non-fatal internal NCDM fault.

Watchdog LED

Flashes *Green* at regular interval if all is well with the NCDM.

Flashes *Orange* when the NCDM is in the Standby Installation of a Hot Standby System.

Flashes *Red* when the NCDM is in Maintenance mode.

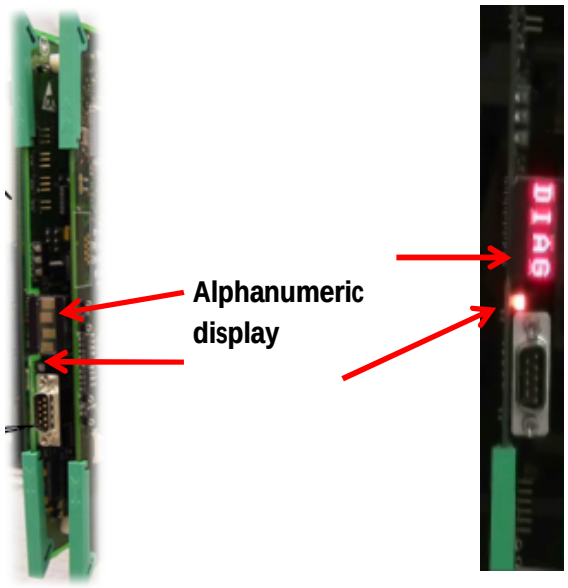


Fig.3.6: Alphanumeric display and Watchdog LED on front panel of NCDC

(ii) NCD PFM LEDs

The NCD PFM has 7 LEDs namely:

- Serial LED (D6 & D7) – for each of the 2 serial ports. Flashing *Red* when data is transmitted and flashing *Green* when data is received.
- Network LED (D5) – for the network port. Flashing *Red* when data is transmitted and flashing *Green* when data is received.
- Power Indicator LED (D10 & D11) – Steady *Green* for each of the serial ports. Indicates the +24 V power supply is present.
- Power Indicator LED (D9) – Steady *Green* indicates the +5 V power supply is present.
- Installation status LED (D8) – Steady *Green* indicates the NCDM is in the online installation.

(iii) Alphanumeric display

The alphanumeric display can only show one fault at any time.

All faults are logged by NCDM which can be examined using external diagnostic equipment.

(a) Shutdown Mode

The alphanumeric display will show the applicable fault code if the NCDM shuts down because of the internal fault. (See Annexure II NCDM fault codes- fatal). Watchdog LED not flashing.

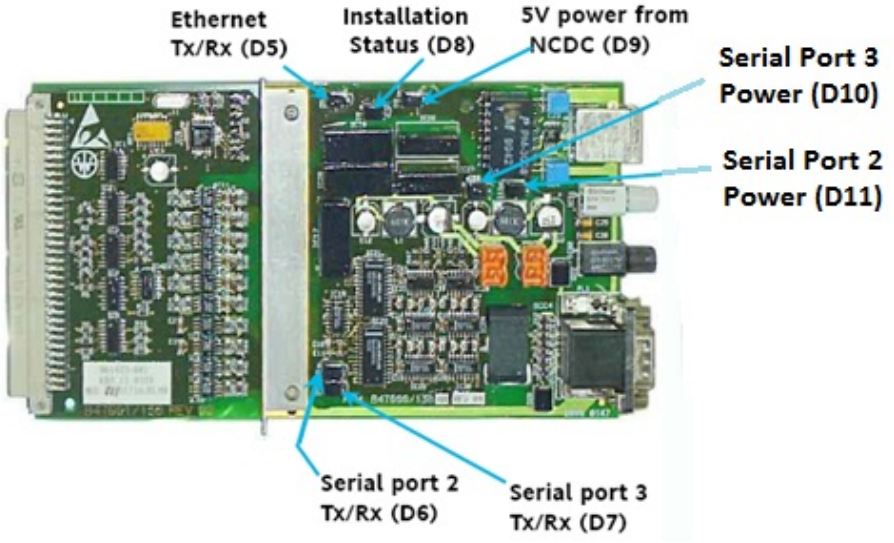


Fig.3.7: NCD PFM LEDs

(b) Normal Mode

Within first 12 seconds of operation the alphanumeric display will show start-up information and then it will be blank unless a fault is detected.

Watchdog LED flashes – GREEN for stand-alone or on-line operation; ORANGE for standby operation.

During operation, a non-fatal fault may occur which will cause the NCDM to display a fault code but continue to operate. When there are multiple faults present simultaneously, the NCDM will display code for the first of the following that applies:

"TIME" if the NCDM real time clock has not been set.

A non-fatal NCDM fault code (see table)

"FLT" when more than one non-fatal fault code has occurred.

"DIAG" when one or more WESTRACE system faults have not been uploaded by the external diagnostic equipment.

"BAT" if the NCDM battery voltage is low.

(c) Maintenance Mode

The alphanumeric display will show "MNT" when ready to download a new non-vital configuration. Watchdog LED flashes RED.

Thus the correctly operating NCDM will show the following:

- Internal fault LEDs – OFF
- Alphanumeric display – Blank
- NCDC LEDs – As per details given in clause
- NCD PFM LEDs - As per details given in clause

(d) Production Mode

In Production mode the watchdog LED is OFF and display shows 'Prd'.

(iv) NCDM Faults

In the event of an internal NCDM fault, the NCDM will either:

Display a code on the alphanumeric display, log fault and continue operating. This action is taken for "non-fatal" faults (such as comms port failure, low battery or date/time not set), which do not compromise safe operation of the NCDM.

Or

Shutdown the NCDM and display a code on the alphanumeric display. This action is taken for a "fatal" fault (such as software or hardware malfunctioning). A fault will be logged when the system is restarted.

When an internal fault is the cause of an NCDM shutdown:

(a) The NCDM will lose communications with the VLM.

(b) The VLM will display a fault code (typically 34th) but will keep running

To clear the fault code, restart the WESTRACE system.

At this point all NCDM ports are disabled and will stay that way until WESTRACE is restarted.

(a) NCDM Fault codes

The alphanumeric display comprises four digits D1,D2, D3 & D4 reading from top to bottom (see fig.)

D1
D2
D3
D4

The digit D1 identifies the port, the other three digits (D2-D4) display

- The fault code
- Module address or
- Network session number

(b) Port faults

Digit D1 identifies the faulty port. Digits D2 and D3 are set to zero and digit D4 is the fault code.

p
0
0
f

Port no. (2-B hex)

Fault code (0,1 hex)

The port numbers used are

2 = Serial port 2

3 = Serial port3 8 = IMB port

9 = INCL port

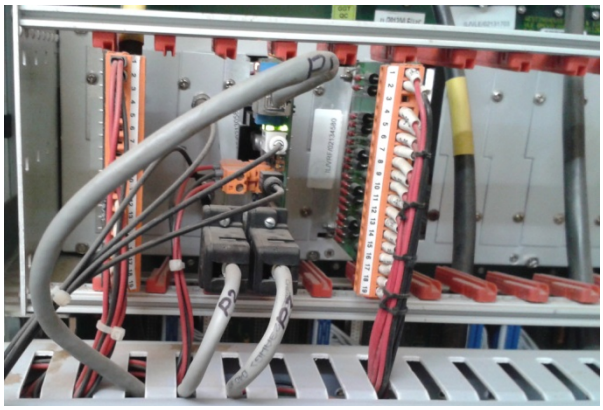


Fig.3.8: Cable connections at the rear of NCDPFM

A = VLM6 port
B = Network port
e.g. A001 indicates a fault code 1 on port A (the VLM6 port)

Whenever a port fault is identified, NCDM PFM has to be replaced.
On replacement of PFM the fault still persists then it may be a communications failure.
Check that the pins and the ports are properly connected with the connectors and cables. There should be no loose connection. If still communication fault exists then replace the communication cable.
If after replacing the cable fault still persists then it may be problem with the software. In that case help of designer has to be taken..

(c) Module or session faults

Digit D1 identifies the port to which the module network session is connected. Digits D2 and D3 identify the module address or session number, and digit D4 is the fault code.

p	Port number (2 – B hex.)
m	} Module address or session number (00 – FF hex.)*
m	Fault code (8, 9 hex.)
f	*Modules or session faults are in the range: 00 – 7F are reported by the NCDM in an online WESTRACE 80 – FF are reported by the NCDM in a standby WESTRACE

e.g. a fault code of 32A9 on an NCDM indicates a fault code 9 on the module with address 2A (Serial port 3).

(d) Internal Faults

Digit D1 is blank and digits D2 to D4 display the fault code (000 – FFF)

0	The first action should be to restart WESTARCE. Next, find the displayed fault code in the table of fault codes and take the recommended action
f	
f	
f	

3.3 स्टार्ट अप के समय खराबियां Faults during Start-Up

There are faults that may prevent completion of the start-up sequence described in para. Some of the common faults of this type are given in the following paragraphs:

(i) No LEDs are illuminated

(a) Verify that B24 power is available at the external PSU PFM connector.
(b) Replace the PSU if 24 V power is available.

(ii) 24 V Power is present but power rail LEDs are not illuminated

(a) Remove all modules from the system housing and determine whether the fault lies on PSU, or a system module.
(b) Replace the offending module.

(iii) All modules display all LEDs
All the modules are displaying the fault code FFH:
(a) Ensure the PSU is fitted correctly.
(b) Replace the PSU if the fault persists.

(iv) Module Faults
One module fails to flash its watchdog as other modules start up, and subsequently an error code is displayed by the Fault Diagnostic LEDs.
(a) Switch system power off (B24) and wait 40 seconds before re-applying the power.
(b) Replace the offending module with a known working spare and repeat step (a).

Usually, the module that first displays an error code is the faulty one.
For fault localization and rectification of particular modules, WESTRACE First-line Maintenance Manual may be referred.

3.4 सामान्य कार्य के समय खराबियां Faults during normal working

Faults may arise during normal working of a system. They may be minor system faults, or faults leading to system negation.
Determine the status of suspected faults or other conditions by interrogating the diagnostic module. For doing this, MoviolaW Diagnostic tool has to be used. (Refer sections 2.15 for details).
Clear the fault log after fixing a fault.
Some of the faults during normal working are given below:

Module shuts down
One module shuts down (fails to flash its watchdog) and displays an error code on the Fault Diagnostic LEDs. Other modules also stop functioning and display an error code. OPCR is de-energized.
Follow the procedure described in section 2.13

OPCR de-energises and no error codes are displayed on modules
Power down and replace the VLC and OPC cards (one at a time). Restart and check operation. A re-occurrence of the fault is likely to be a backplane problem and replacement may be necessary.

3.5 खराब मॉड्यूल को बदलना Replacement of faulty modules

Identify the faulty module by seeing the fault codes.
Decode the fault code by checking from FLM.
If the action to be taken is given as ‘Replace the module’, then only the module should be replaced.

3.5.1 Replacement of VPIM or VROM

Replacement of a faulty VPIM or VROM should be done only by switching off the power to the WESTRACE.
Switching off can be done by removing fuse provided at the bottom.
Once the power is switched off, the module can be taken out with the help of an extraction tool supplied with the WESTRACE.
First engage the extraction tool at the bottom of module as shown in Fig.2.27 (i) & (ii).
Push the tool downwards and the module will come out.
For inserting the new module, the module is to be simply inserted and pressed.
Switch on the power after a minimum period of 40 sec. after power off.

3.5.2 Replacement of VLM

Switch off the power as above
VLM and NCD cards are connected by a centre pin.
Hence whenever VLM or NCD cards or both are to be changed, the two cards will have to be pulled together.
These are then physically separated and the cards with new combination are joined by centre pin and are re-inserted together.

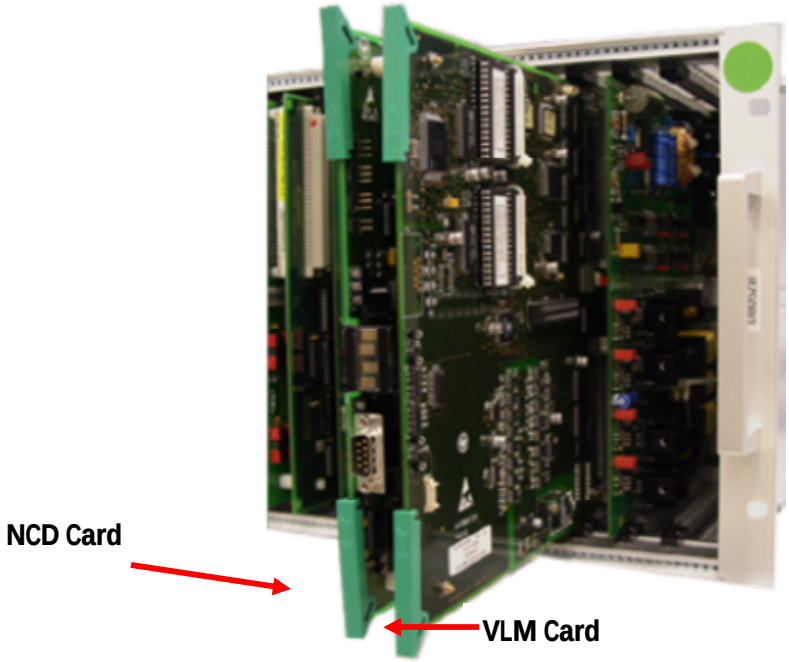


Fig.3.9: NCD and VLM Cards come out together

If the VLM card (i.e. VLC) is faulty, then only card is to be replaced and not the EEPROMs, as there is no fault in the logic. The existing EEPROMs are to be fixed on new card and then new card is inserted.
8 pins on the DIP switch (version switch) are to be set in the new VLM card matching position (On/Off pattern) that on the old card.

In case VLM card is not replaced and only EEPROMs are to be replaced then there is no need to change the card. The procedure is as follows:

- Pull out VLM and NCD cards together.

- Physically separate the VLM and NCD cards.
- Remove the EEPROMs from VLM card.
- Fix the newly supplied EEPROMs supplied from design office on VLM card.
- Join the VLM and NCD cards together.
- Re-insert the cards.

3.5.3 Replacement of NCD card

Switch off the power.
Pull out old NCD card along with VLM card.
Separate the VLM and NCD cards.
Join the new NCD card to VLM card, and re-insert the module.
New NCD card does not contain logic. Non-vital logic has to be loaded using computer and ICS software.
Observe the anti-static precautions while replacing as given in FLM

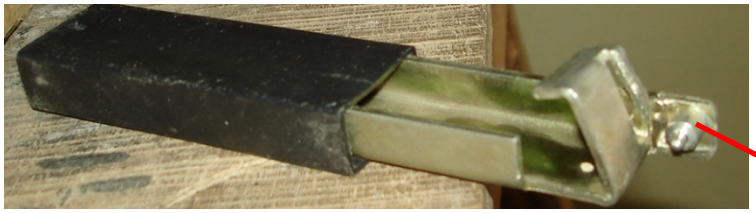
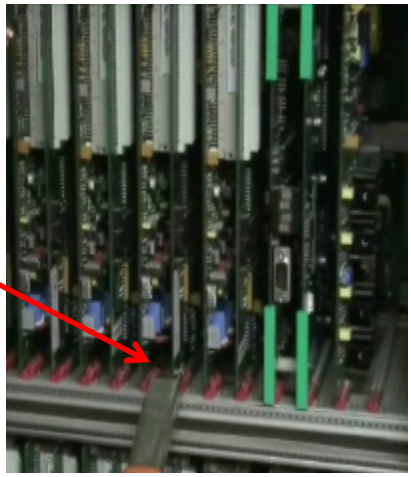


Fig.3.10: (i) WESTRACE module ejection tool

Pin of Extraction tool engages hole on card. Heel of Extraction tool bears on frame



(ii) Removing a Card from WESTRACE housing

3.6 मरम्मत हेतु मॉड्यूल को वापस करना Returning a module for repairs

Before returning a faulty module to the firm for repair or replacement, a 'Faulty equipment return form' is to be filled (see Fig.2.33 on page38) Whatever fault codes the module was showing should be indicated on the form by shading the circles corresponding to the LED indications (for VPIM, VROM or VLM and alphanumeric codes for NCDM). This will help testing personnel to track the fault in minimum time and repair the module.

3.7 मोवीआलॉ MoviolaW

MoviolaW works as the maintenance terminal and data logger for the WESTRACE. It helps in easy identification of faults and diagnosis of any failure in WETRACE. It also helps in monitoring the interlocking. The purpose of MoviolaW is to:

- Monitor WESTRACE events and other railway signal logic in near real time;
- Collect the data from WESTRACE and then play it back at the user's convenience.

MoviolaW collects and displays events it receives from the diagnostic module(s) in a WESTRACE system. An event is generated every time something changes state in the monitored system. MoviolaW adds events to an event log in the order they are received from WESTRACE.

3.7.1 Faults and Failures

Failures are problems with equipment external to WESTRACE and will only be indicated if allowed by the local application configuration.
MoviolaW detects failures by associating them with defined combinations of its inputs;
Conversely, MoviolaW cannot detect failures that are not defined, therefore some failures may not be observed;
Other mnemonics may provide limited information on failures.
Faults-are problems with the WESTRACE equipment that have been logged by the diagnostic module.
Use the Faults or Failures windows to identify equipment problems;
Remember that each WESTRACE module will produce a fault code when the system shuts down. You must analyse the logged data to find the faulty module that triggered the shut-down.
Use the Replay mode to replay events leading up to shut down time.

3.7.2 Track Diagram

The track diagram is a graphical representation of the section of railway (yard layout) connected to the WESTRACE system. Physical features such as track, points and signals are represented by graphical elements and the diagram in its entirety provides a convenient overview of the railway. The diagram is often useful for picking when there has been an operational problem.

3.7.3 User Logon

User has to log on to the MoviolaW PC by selecting user name from user name dialog box and typing password. Users can be added, removed or modified by Supervisor or Administrator users.

3.7.4 Status Bar

Status of MoviolaW is indicated by status bar at the bottom of the screen. Status bar can show any of the four colours – Green, Red, Yellow or Blue. The meaning of colour is as follows:

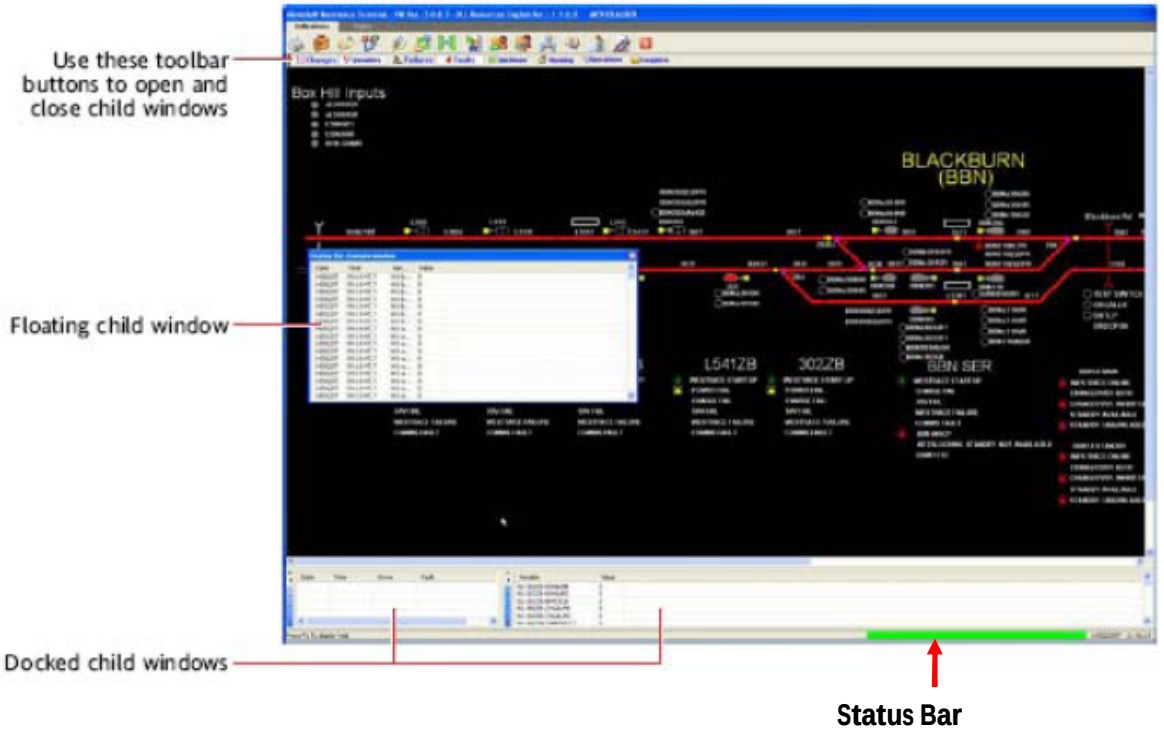


Fig.3.11: Track diagram showing toolbar buttons and child windows

GREEN – WESTRACE A (Online system) and WESTRACE B (standby system) are connected and the entire WESTRACE system is being monitored. (W_A, W_B and storing module are shown at the bottom of window. The information obtained from WESTRACE is stored in Storing module).
RED – MoviolaW is not being able to connect with the WESTRACE system and log any events in the system. User is unable to monitor any of the interlocking events.
YELLOW – One of the systems (A or B) is not connected but it is able to get information or log events.
BLUE – WESTRACE system when in hot standby is changing over from the online system to the standby system.
MoviolaW has a number of features which help in diagnosis of the faults. These are called as 'Child Windows'. A few of them are as given below:

Events Window
This window displays the 100(can be altered) most recent changes of state of the interlocking's mnemonics (variables), in historical order. It can operate in either 'Indications' or 'Replay' mode.
The state of a mnemonic is represented thus:
0 represents de-energised
1 represents energised.

Use the window to:
Monitor change of state of inputs, outputs and internal states as they occur (indicator mode);
Step through cycle by cycle to observe what has happened (replay mode);
Isolate variables with a changed state by eliminating all that remain steady.

3.7.5 Child windows

MoviolaW track diagram contain child windows that display specific sets of data. Child windows can be accessed through tool bar buttons at the top of track diagram. Following are the details of some child windows:

(a) Changes window– Change of status window.
Click on Changes tab at the top of the screen. It will display recent change of states in variables in WESTRACE interlocking.

e.g	Date	Time	Variable	Value
	10/05/2012	11:22:03:4	N1- 21NWKE_FL	0

Indicates that N1- 21NWKE_FL has changed its previous value 1 to current value 0 on date and time shown.

(b) Variables window
This window displays all of the Interlocking's mnemonics (variables) in alphanumeric order together with the variable's current state. It can operate in either 'Indications' or 'Replay' mode.
The state of a mnemonic is represented thus:
0 represents de-energised
1 represents energised.
Use the window to:
Check the current state of any variable;
Determine if there is a short cut to finding the cause of a problem.

It shows only two columns. It gives the current state of all the mnemonics available in WESTRACE with its current value e.g.

Variable	Value
N1-C1ALSR	-1

(c) Faults window

It gives list of all faults logged by the WESTRACE, critical, non-critical or others. Critical faults are those which can cause the VLM to shut down.
Non-critical faults are those intermediate faults which may not affect the normal working of the system.
This window displays the last 50 faults that occurred in the interlocking. Any significant fault (that results in WESTRACE shutting down) is marked with a red arrow.
Use the window to see:
The time and date of a fault;
The affected driver;
A description of the fault and the associated fault code.
e.g. One of the faults in the list is shown below

Date	Time	Driver	Fault
10/05/2012	11:18:23:4	W_A	(964) Fault.Module NCDM Rack:1 Slot:4 Code:8216 (2018)

The fault was registered in WESTRACE system A
The fault is in NCDM module.
Fault code is 8216 (2018) for which the description and action to be taken can be referred from NCDM Fault code table given in First Line Maintenance manual.

(d) Failures window

This window displays faults in the interlocking as they occur. Faults are shown in chronological order and they disappear from the window as they are resolved. It lists problems in external equipment.Use the window to see:
The time and date of a failure;
A description of the failure.

(e) Housing window

This window graphically display all of the hardware modules fitted to WESTRACE housings installed at the monitored site. This window can be used for the same purposes as the Hardware Window Housing window gives the arrangement of all the modules as in the WESTRACE rack. Number shown below each of the modules is the firmware version.

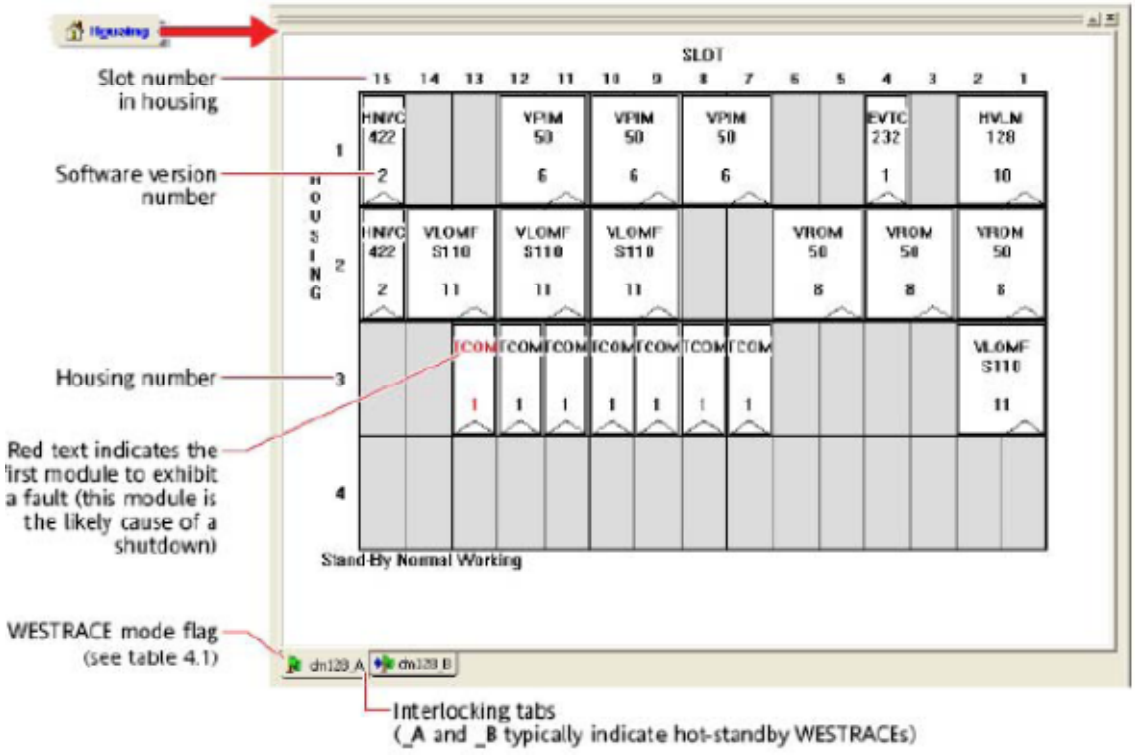


Fig.3.12: Display of Housing window

Two tabs are displayed at the bottom to see the arrangement of both W-A (Online system) and W_B (Standby system).
There are flags on the tab which indicate:
Green Flag – Modules are healthy
Blue Flag – W_A is the online system
The Table explains the flag symbols that appear on the tabs. Blue arrow shows which WESTRACE is online.

Table B

Communication with WESTARCE	**Stand-alone WESTRACE**	**Hot Standby WESTRACE**	
		Online WESTRACE	**Standby WESTRACE**
Satisfactory (Green Flag)			
Unsatisfactory (Red Flag)			
Synchronizing and Satisfactory (Yellow Flag)	--		

f) Hardware window

List all the WESTRACE hardware modules in the current installation. For Multi-WESTRACE modules select appropriate tabs.

(g) Diagnosis of faults

Whenever there is a fault in the system, a pop-up message window appears to alert the user. e.g.

10/5/12 11:48:00:4
FAULT in ECOR-KMX:(48)
Fault Module VROM 50
Rack:3 Slot:3 Code:160 (a 0)

Check the housing window.
Red flag on tab W_B is shown indicating that system B is not healthy.
VLM and VROM 50 are shown in RED in the housing window of W_B with fault codes 160 and 58 respectively.

Go to Faults window
Critical faults are shown in RED, with an arrow to immediately alert the user.
e.g.

10/05/2012 11:45:40:6 W_B (37) Fault Module VLM6 Rack:1 Slot:3 Code 58 (3a)

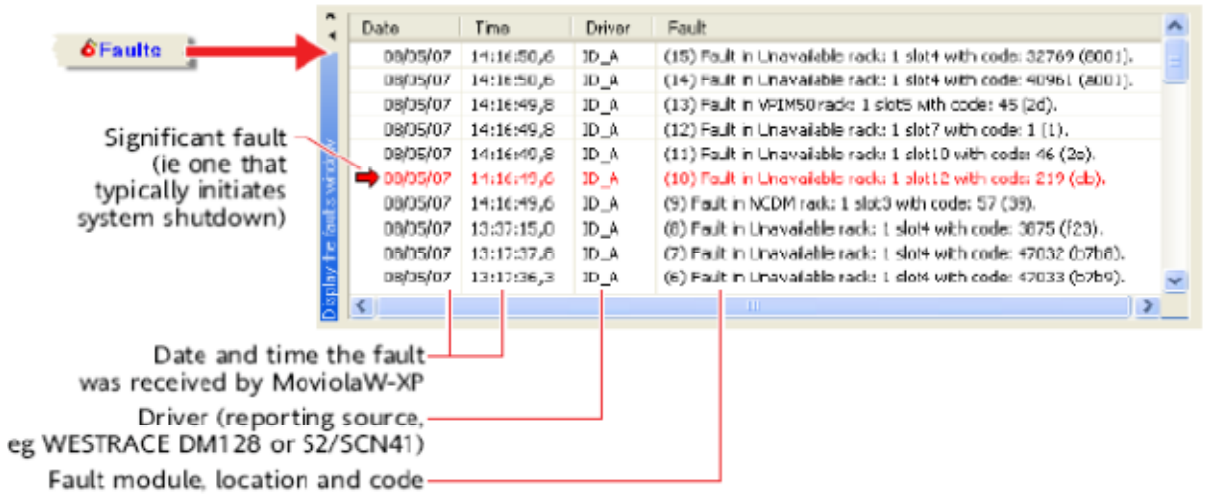


Fig.3.13: Display of Housing window

(h) Replay feature

The MoviolaW PC replays all the events from the date and time selected.

Click on the Replay tab

Provision to select Date and Time is available at the bottom of window of track diagram window.

Set the date and time.

Set the speed and click on play button.

This will give replay of the status of all the signaling gears at that point and time.



Fig.3.14: Window showing list of available reports

(i) Export to jpeg

This option will take a screenshot of whatever is seen on the screen, and save it into a location.

(j) Reports window

This window can display different reports chosen from a dialog box Click on the Reports tab.
Get the list of all the reports that are available (See Fig.2.27) e.g.

- Change of state
- Operations
- Faults
- Failures
- Event Counters
- Time counters
- System log
- SSI Faults

Check on any type of report and click OK.
Another window is opened.
Select W_A or W_B or both from available modules.
Select the interval i.e. initial date and time to final date and time.
Click on OK
Get the report.

Report can also be printed if connected to a printer.
Alternatively it can be saved to a text file.

Examples are
Variables Report-provides details of selected variables during a selectable time interval. A choice from three types of Variables.

Report is available:

- Show initial status and changes;
- Count changes to one;
- Count changes to zero;

Fault Report-provides details of faults that occurred during a selectable time interval;
Failure Report-provides details of failures during a selectable time interval. A choice from two types of

Failure Report is available:

- Faults that happened;
- Faults repaired.
- Commands Report-provides details of commands sent from the Control Centre during a selectable time interval;

Operations Report-provides details of operations executed in a WESTRACE that contains an NVC/DM or NCDM during a selectable time period;
Reports can be useful for determining how many times a variable changed state or whether a variable indicates a possible failure.
For example:

- Loss of point detection;
- Track circuit bobbing;
- Control lever operated.

3.8 त्रुटि निवारण Troubleshooting

Some common failures and their troubleshooting methods are given in Table C below:
Table C

Sr. No.	Symptom	Observation and action	Inference	Remedy
1.	Any of the LEDs on the PSU Card is not lit.	PSU Input 24 V DC available.	There is a fault in PSU module.	Replace the PSU module.
2.	Signal is not clearing.	There is no fault in wiring upto VROM output connecting pins and outgoing terminals on CT rack. Check HR relay in relay rack. If HR is not energized – Check output 50 V DC of HR on connecting pins of VROM		
		(i) If the voltage is available then 50 V DC is not reaching the HR	There is no fault in	Fault to be traced in HR

		Relay coils.	VROM	circuit
		(ii) If voltage is not available at the connecting pins then check whether it is PFM fault which is not giving voltage. Check through MoviolaW if PIOFLT = 1	Front side of VROM card is working properly but backside i.e. VROM PFM is faulty.	Replace VROM PFM.
		(iii) If the voltage is available at HR relay coil but relay is not picked up	There is no fault at VROM PFM.	The fault is to be traced in HR circuit separately outside VROM PFM.
3.	Signal is cleared from RED to YELLOW. Indication is not appearing on panel.	HECR is energized Supply to VPIM PFM is given through HECR front contacts. Check the voltage at HECR input pins of VPIM PFM say 1 & 13.		
		(i) If 50 V DC is available then there is no external fault. Check if there is internal fault of WESTRACE. Check through MoviolaW whether PIOFLT = 1 or 0 If PIOFLT = 1,	Front side of VPIM module is properly working and the fault lies in VPIM PFM.	Replace VPIM PFM.
		(ii) If 50 V DC is going through HECR front contacts but not reaching at HECR input pins of VPIM PFM,	VPIM PFM is not faulty. There is wiring fault	Fault is to be traced separately in wiring outside VPIM PFM.
4.	Port Failures	For troubleshooting of port failures see section 2.10.5 (iv) (b) under port faults.		

3.9 फॉल्ट कोड Fault codes

FAULT CODES & ACTION - WESTRACE - VLM6	
Fault Code	**Recommended Action**
03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22 23 2F 31 32 33 AB DA 36 37 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56 57 58 59 5A 5B 5C 5D 5E 5F 60 61 62 63 64 65 66 67 68 69 6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 7B 7C 7D 7E 7F	Replace VLM6
82 83 & 98	Check Installation address and UHVBC linking
84 & B1	Check data version switch settings
80 81 85 86 87 88 89 8A 8B 8C 90 91 92 93 94 95 96 97 99 9A 9B A6 AC AD C6 C7 C8 D9 DB E6 EF F0 F1 FC	Replace CED PROM
8D 8E 8F 9C 9D 9E 9F A1 A3 A7 A9 AF B0 B5 B6 BD C9 CA D2 D3 D4 D5 D6 D7 DD E1 E2 E3 E4 E7 E8 E9 F3 F4 F6 F8 FA FD FE FF	Replace VLM6
A0 A2 A4 A5 A8 AE C1 C4 C5 2D 2E 01	Indicates Fault on VROM & VPIM
B8 & C0	Indicates Fault on DPRAM
DC	Check supply to OPC.Power off system and restart after 40 seconds. Replace the OPC or OPC PFM when the fault persists.
34 35	Replace VLM6 if shutdown occurred. Replace NCDM if shutdown did not occur

FAULT CODES & ACTION - WESTRACE - VROM	
Fault Code	**Recommended Action**
01, 2D & 2E	Indicates a fault on VPIM & VLM6
02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22 23 24 25 26 2B 2C 2F 30 31 32 33 34 8C 8D 8E 8F 90 91 92 93 94 95 96 97 98 99 9A 9B 9C 9D 9E 9F A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB AC AD AE AF B0 B1 B2 B3 B4 B5 B6 B7 B8 B9 BA BB BC BD BE BF C0 C1 C2 C3 C4 C5 C6 C7 C8 C9 CA CB CC CD CE CF D0	Replace VROM

FAULT CODES & ACTION - WESTRACE - VPIM	
Fault Code	**Recommended Action**
01, 2D & 2E	Indicates a fault on VROM & VLM6
02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2F 30 31 32 33 34 B4 BE C8 D2 DC	Replace VPIM

FAULT CODES & ACTION - WESTRACE - NCDM	
Fault Code	**Recommended Action**
003 004 005 009 101 102 103 104 105 107 109 F21 F22 F23 F24	Replace NCDM
080 & 108	Download new Non Vital configuration
10A & 10B	Restart WESTRACE

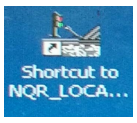
800 801 802 803 804 805 806	Could be due to old or fault battery. Replace the battery when the error occurs on start-up, otherwise replace the NCDC.Note: NVRAM is always cleared when the NCDM is configured or re-configured; such an error is logged upon first start up.
084	Confirm that the version switches are correctly set. Download new Non-vital Configuration if the switches are correctly set.
100	A. Check the NCDM Configuration parameters for their range and correct any those are out of range. B. Ensure that all WSA/S2 protocol sessions over the network port have unique housing addresses for client and server sessions. C. Ensure that parameters for the vital communication ports (configured for the VLM6) are matched by the NCDM configuration. D. Re-build the NCDM configuration and load it onto an NCDM.
108	Download new Non Vital configuration
10C & F11	Check the NCDM and VLM Non-vital Configuration versions
10D	Check the NCDM Non-vital Configuration and WESTRACE installation details
10F	Move NCDM to the correct backplane slot
10E & 111	No Action required
112	A. Check the NCDM Non-vital configuration for correct IP address. B. Check other equipment connected to the network for a duplicate address. In a Stand-by system: Ensure the secondary IP address configuration switch is set correctly.
113	A. Ensure that the Application Session Id is unique for all sessions over the network port B. Ensure that each diagnostic port addresses is unique and different from any Application Session Id. C. Correct the NCDM configuration where necessary, then re-builds it and loads it onto an NCDM.

810	Check that all cards are in place and if the error is still persists,replace the NCDM
900	Check configuration of vital sessions on the network port
904	Check INCL hardware. Ensure that both NCDMs have the same configuration.
90C	Ensure the same Session ID is used for connecting installations.
90D 90E & 911	Check network hardware
90F	Check for unexpected equipment on the network. Ensure that only one remote installation is connected at any time
BAT	Replace battery
TIME	Set correct time through MoviolaW, CTC or Getlog.It is possible to set the time via the S2 protocols.
DIAG	Connect or check and restart an external diagnostic system and request the fault codes from the Fault Buffer.
8001	Try the following if this code is on display and the VLM is still running A. Restart WESTRACE B. Check to ensure the VLM and NCDM, Non vital configurations are consistent with respect to transfer states passed between them. Normally GCSS ensures that this is the case. C. Check to ensure that only one NCDM and no DM installed. D. Replace the NCDM
9001	An NCDM in an On Line installation displays this code if it does not receive an INCL acknowledgement message from the NCDM in the standby Installation. A. Check the INCL Rx link to the NCDM in the Online installation. B. Check the INCL Tx link to the NCDM in the standby installation. C. Replace the NCD PFM in the Online installation. D. Check the INCL Rx link to the NCDM in the Standby installation. E. Check the INCL Tx link to the NCDM in the Online installation. F. Replace the NCD PFM in the Standby installation.

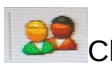
3.10 अनुलग्नक Annexures

SIEMENS WESTRACE EVENT LOG DOWNLOADING PROCEDURE

Double click on Moviolaw shortcut icon on Desktop to start Maintenance tool application.



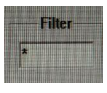
Open Moviolaw software,


Click on this Icon & Enter user name and password then the entire tool Tab options gets enabled. Before entering the password none of the tool tab options in enable condition.

Left click on Brief case , then main menu appears, in that menu click on Change of state. And click on OK

Give preferred date & time from which period you want to take log under Initial Date & time column in DD/MM/YYY format and time in HH:MM:SS AM\PM

If you want particular bit data then you can filter those particular bits by using the following Icon

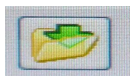


or else you can select all relays by selecting the following Icon 

Select End date & time in a same format as mentioned in Initial date & time format.

Then click on OK, then it loads data from DB Viewer & it shows all relays status in between the specified time interval.

Now this log is stored in DB Viewer now you need to save this data in a text format to save this data press the following button in left bottom corner.



If you press at folder Icon which shown in above, you will get a pop up Window which is to give path, to save that text file. Give the Drive name where you want to save & file name extension must be ".txt" and Click on OK.

After Clicking on OK you will get pop up window "The report has been Exported Successfully" then click on OK.

Now required data is saved in specified path, if you double click on that file then it will open in text format.

END

SIEMENS WESTRACE NGETLOG DOWNLOADING PROCEDURE

Downloading Event log using Ngetlog

Open Ngetlog folder located in C: drive.

Double click on "Main System Event Report.bat" located in C:\Ngetlog folder for generating Event report for Main system. In case of Multiple WESTRACE prefix XX will be added before "Main System Event Report.bat"

After opening command prompt it will ask "Press any key to continue" Press any key in keyboard.

It will start downloading of event log from WESTRACE.

After downloading the event log till Current date and time , then press "Ctrl+C" to exit.

It will store log report in C: Ngetlog folder in the Name of "MainSystemEventReport.txt". In case of Multiple Westrace prefix XX will be added before "MainSystemEventReport.txt"

Repeat the procedure for other Main system using other "XX System Event Report.bat" files.

Repeat the procedure for standby systems Using "Standby System Event Report.bat" .Reports will be saved in the Name of "XX Standby stem Event report .txt "

END

Downloading Fault log using Ngetlog

Open Ngetlog folder located in C: drive.

Double click on "Main System Fault Report.bat" located in C:\Ngetlog folder for generating Event report for Main system. In case of Multiple Westrace prefix XX will be added before "Main System Fault Report.bat"

After opening command prompt it will ask "Press any key to continue" Press any key in keyboard.

It will start downloading of Fault log from WESTRACE.

After downloading the fault log till current date and time, then press "Ctrl+C" to exit.

It will store log report in C: Ngetlog folder in the Name of "MainSystemFaultReport.txt". In case of Multiple Westrace prefix XX will be added before "MainSystemFaultReport.txt"

Repeat the procedure for other Main system using other "XX System Fault Report.bat" files.

Repeat the procedure for standby systems Using "Standby System Fault Report.bat" .Reports will be saved in the Name of "XX Standby stem Fault report .txt"

END

Downloading Operation log using Ngetlog

Open Ngetlog folder located in C: drive.

Double click on "Main System Operation Report.bat" located in C:\Ngetlog folder for generating Event report for Main system. In case of Multiple Westrace prefix XX will be added before "Main System OperationReport.bat"

After opening command prompt it will ask "Press any key to continue" Press any key in keyboard.

It will start downloading operation log from WESTRACE

After downloading the operation log till current date and time , then press "Ctrl+C" to exit.

It will store log report in C: Ngetlog folder in the Name of "MainSystemOperationReport.txt". In case of Multiple Westrace prefix XX will be added before "MainSystemOperationReport.txt"

Repeat the procedure for other Main system using other "XX System Operation Report.bat" files.

Repeat the procedure for standby systems Using "Standby System Operation Report.bat" .Reports will be saved in the Name of "XX Standby stem Operation report .txt "

END

Note: - XX refers to Prefix of WESTRACE Systems i.e., A1, A2, A3, B1, B2, B3 etc.

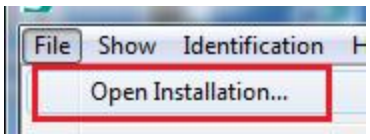
SIEMENS WESTRACE RUNG PROCESSING VIEW USING DELFOS

Double click on Delfos.exe shortcut icon on Desktop.



Open Delfos software,

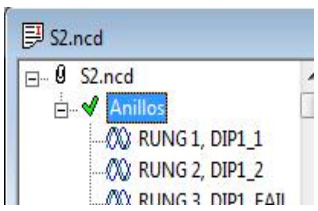
Click on "**File**" and Select "**Open Installation**"



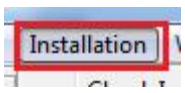
Select "**.ins**" for Vital logic Circuit or "**.ncd**" for Non-Vital logic circuit
And select "**Open**" button



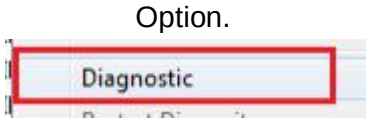
It will show Rung Names in Left side.



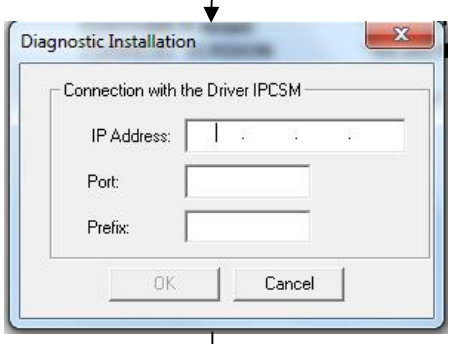
Select Installation Menu.



And Select Diagnostic Option.



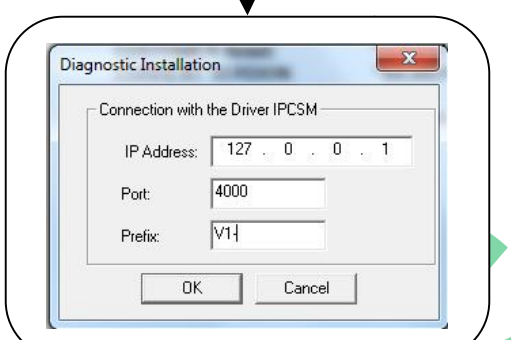
It will prompt for "**IP Address, Port Address: And Prefix:**"



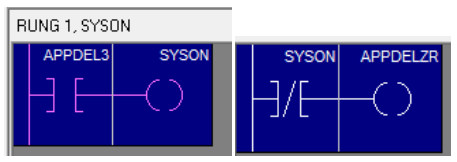
Enter "**IP Address: 127.0.0.1**
Port: 4000
Prefix: V1- "

(Depends on MoviolaW Configuration")

''V-'' Vital
''N-'' Non Vital
1, 2, 3 –WESTRACE's



Select on First Rung and Check the status of Rung.
i.e., ''PINK'' color indicates "Available Pick up or Drop contacts".
White Color indicates " Not Available Pick up or Drop contacts".
"



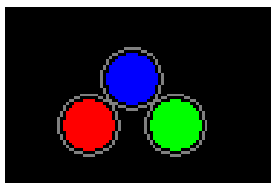
Select the Required Rung and Check the Status of Rung.

END

SIEMENS

Rev: 2.0

INSTRUCTIONS TO STATION MASTER /SIGNAL MAINTAINER ON FAILURE OF EI SYSTEMS

OBSERVATIONS	ACTION BY STATION MASTER/ESM
Healthy – Hot standby System Indications: **ONLINE system - ''GREEN'' or ''Yellow'' indication steady.** **STANDBY system – ''RED'' Indication Steady.** 	This information's suits for all the WESTRACE E.I installations.
Healthy – WESTCAD System Indications: The functioning of the WESTCAD is shown by three flashing indications as shown in the figure at the top right corner of the track layout window. 	This information's suits for all the WESTRACE E.I installations with Operator VDU [WESTCAD] configuration.
During System Failure condition of Online or Standby systems: System ''ON '' Green indication disappears, subsequently System ''OFF'' indication Red flashing & System Fail buzzer also triggered by the system.	Acknowledge System Fail buzzer by pressing System Failure acknowledgement block which provided in the Alarms window.
WESTCAD PC1 operational condition: ''PC1 ONLINE" green steady indication displayed in the WESTCAD PC1. 	Control Operations can be performed through WESTCAD PC1 only. However yard status indications updated in the both WESTCAD PC terminals.
WESTCAD PC2 operational condition: ''PC2 ONLINE" green steady indication displayed in the WESTCAD PC2. 	Control Operations can be performed through WESTCAD PC2 only. However yard status indications updated in the both WESTCAD PC terminals.
Operator PC [WESTCAD] to WESTRACE Communication failures in Main and Standby systems : Network Communication /OFC communication failure No indications are displayed in the WESTCAD yard layout	Only Yard layout appears on the screen (Yard indications Blank). & WESTCAD healthy indication status –RGB stops Flashing.
If Complete E.I System failures & Restored : If route locked indications are present in WESTCAD yard layout. If reminder collar enabled indications are present in WESTCAD yard layout.	Carry out Emergency Route Cancellation/Sub sectional/Super emergency cancellation, with respect to the conditions to release the locked route section. Ensure NO train in the route locked section. Carry out Reminder collar operation, with respect to the locked conditions to release the Reminder collar functions.
PC1 – PC2 Switch Over Process : 1. Manual Request changeover Process 2. Override changeover process	**Recommendations:** It is highly recommended to perform this activity on daily basis to ensure the healthiness of operator VDU operation.

INSTRUCTIONS TO STATION MASTER /SIGNAL MAINTAINER ON FAILURE OF EI SYSTEMS

OBSERVATIONS	ACTION BY STATION MASTER/ESM
Healthy – Hot standby System Indications: **ONLINE system - ''GREEN'' or ''Yellow'' indication steady.** **STANDBY system – ''RED'' Indication Steady.**	This information's suits for all the cabins E.I systems.
During System Boot Up - ''GREEN'' or ''Yellow'' Flashing indication. **During System Shut Down Mode & Non Availability of INCL Communication – ''RED'' flashing Indication.**	This information's suits for all the cabins E.I systems.
During System Failure condition: System ON indication disappears, subsequently System OFF indication & System Fail buzzer triggered by the system.	Acknowledge System Fail buzzer by pressing System Failure acknowledgement push button provided in the control Panel.
Panel Mode in operational condition: Ensure that Panel_PC key/switch" is in Panel mode & "PANEL" control steady indication displayed in the Panel/WESTCAD.	Control Operations can be performed through Control Cum indication Panel.
Operator PC in operational condition : Ensure that Panel_PC key/switch" is in PC mode & "PC" control steady indication displayed in the Panel/WESTCAD.	Control Operations can be performed through operator VDU
During WESTRACE Startup : If "Panel_PC key/switch" is in PC mode, both "Panel" & "PC" control indications will be flashing.	Put "Panel_PC key/switch" to "Panel" mode position to get the Panel control.
Panel to WESTRACE Communication failure: No Indication is displayed on panel (Blank). If "Panel_PC key/switch" is in Panel mode. PC control Indication flashing appears on WESTCAD	Apply "Request PC" command In WESTCAD to get the PC control.
Operator PC to WESTRACE Communication failure: No indication is displayed on PC (Yard indications Blank). If "Panel_PC key/switch" is in PC mode. PANEL control Indication flashing in the Panel	Put "Panel_PC key/switch" to "Panel" mode position to get the Panel control.
If Complete E.I System failures: If route locked indications are present in Panel / PC If SGE block instrument is in "Line closed " position If SGE block instrument is in "Line Clear" position	Carry out Emergency Route Cancellation, which will release the locked route after 120 seconds Ensure **NO** train in the route locked section Inform the Adjacent Station SM to turn the commutator handle to "TOL" position for a few seconds & to bring it back to "Line closed" position. This is to normalize LSS of the station. Pilot out the first train to normalize LSS of the station.

Changeover of E.I systems :

1. Prior to changeover, No train movements in the yard to be ensured and it is also recommended to avail 10 to 15 minutes disconnection while performing System changeover.
2. Do ensure System Network Connectivity status with respect to MoviolaW [Maintenance VDU] and [WESTCAD] operator VDU.
3. Shortcut method should be avoided for Changeover of system from online to standby systems.
4. WESTRACE housing Power supply may be powered down by removal of B24 fuse Wago terminal in the order of 1,2, 3 which fulfills the condition of WESTRACE Powering down process. [Switch OFF the Top housing First] [Fig 1.00]
5. Once completion of WESTRACE changeover from online to standby system, Wait at least 40 secs before powering up.
6. WESTRACE housing Power supply may be powered up by reconnection of B24 fuse Wago terminal in the order of 3,2, 1 which fulfills the condition of WESTRACE Powering Up process. [Switch ON the Bottom housing First] [Fig 1.00]

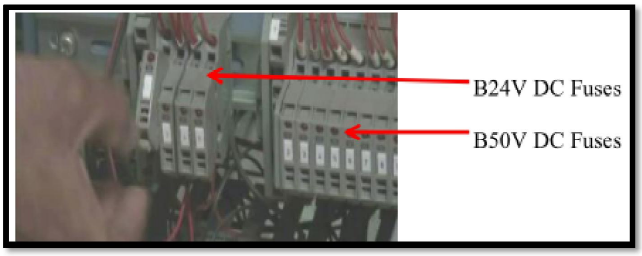


Fig : 1.00

Ensure Correct Sequence of System Booting and System Status Indications as per the healthy status indications for normal system working.

SIEMENS

DO's & DON'Ts of WESTRACE VLM6

✓ DO

- ✓ Keep the WESTRACE – E.I room free from dust & Moisture
- ✓ Ensure all terminations are fully tightened
- ✓ Place the removed faulty Modules with an Identity tag into a anti-static bag
- ✓ Maintain Minimum 24 Volts DC at the WESTRACE power Modules [24 Volts]
- ✓ Maintain Minimum 50V DC at the WESTRACE Input/output Modules [50 Volts]
- ✓ Take back up of MoviolaW- Maintenance terminal user data event/Fault Log files in every 45 days
- ✓ Check Network cables connectivity between WESTRACE to WESTCAD & MoviolaW
- ✓ Use Card Extractor for Removing of WESTRACE modules
- ✓ Read carefully WESTRACE -Fault codes & Fault Description on FLM During Troubleshooting
- ✓ Switch ''OFF'' the top housing first, during WESTRACE Powering down manually.
- ✓ Switch ''ON'' the top housing Last, during WESTRACE Powering Up manually.
- ✓ Wait 40 secs time delay Between Powering Down & Up Process
- ✓ System changeover every fortnight ,but not later a month

✗ DO NOT

- × Attempt WESTRACE trouble shooting if you do not have proper WESTRACE training
- × Remove modules, OPCR relays, Fuses, Links, PFM's & I/O module connectors, When the System is ON
- × Force modules into the slots during insertion
- × Change version Switch settings of VLM 6 & NCDM Modules
- × Change Jumper settings in UHVBC & S2- Scanner card
- × Touch the module components.
- × Repair module on your own
- × Alter WESTRACE settings ,MoviolaW & WESTCAD PC settings without Authorization
- × Delete /modify Application logic programs without Authorization
- × Use any kind of solvents, detergents or abrasive cleaners on the Housing or Internal components
- × Use vacuum cleaner/blower INSIDE the Housing
- × Remove Optic Fiber cable connector when system is ON
- × Installation of Unauthorized software's in WESTCAD /Moviolaw PC's
- × View optical Laser light on Exposed Eyes.
- × Switch "OFF" MoviolaW diagnostic Terminal.
- × Use Mobile Phones & Transceivers within 5 meters of WESTRACE/WESTRONICS [S2] Equipments.

संदर्भ References

UM-6800C MICROLOK II – Startup & Maintenence
UM-6800E MICROLOK II – Troubleshooting & Recovery
WRTOFLMM-WRSI_10.0 –WESTRACE First Line Maintenance Manual

गुणवत्ता नीति

रेलों में यात्री और माल यातायात की बढ़ती मांग को पूरा करने के लिए गुणवत्ता प्रबंध प्रणाली में अनुसंधान, डिजाइनों और मानकों में उत्कृष्टता तथा सतत सुधारों के माध्यम से सांविधिक और नियामक अपेक्षाओं को पूरा करते हुए सुरक्षित, आधुनिक और किफायती रेल प्रौद्योगिकी का विकास करना ।

Quality Policy

To develop safe, modern and cost effective Railway technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs & Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the Railways.



INDIAN RAILWAYS

Centre for Advanced Maintenance Technology

Maharajpur, Gwalior (M.P.) Pin Code – 474 005