



ERTMS CORE

TRAINBORNE SUB-SYSTEM DIAGNOSE GUIDE

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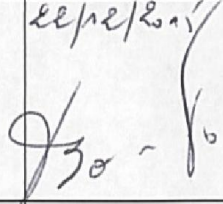
Trainborne

Maintenance

TRB release 6.4.0 or later



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	Written by	Checked by	Validated by	Approved by
Date & Signat.	22/12/2015 	22/12/15 	22/12/15 	22/12/2015 
Name	M. DEMEURE	A. ASSAMET	S. BAILLEUX	A. BONVISSUTO
Position	ERTMS TRB System Engineer	Services Representative	ERTMS TRB Quality Manager	System Engineering Manager



1. DOCUMENT INFORMATION

1.1. Amendment Record

Table 1 : Amendment Record

Version Date	Author Name	Sections	Modifications
1.0 draft A 10/01/06	Nicolas Boverie	-	First issue of the document
1.0 18/01/06	Nicolas Boverie	All	Review comments from E. Denayer Review comments from JJ. Demeutre Review comments from G. Antoons Review comments from F. Goblet
1.1 24/03/06	Nicolas Boverie		- §7.1.4.6 : CR12174 "Maintenance manager : management of an EVC channel element failure"
1.2 draft A 14/12/07	Nicolas Boverie		- §3.3 : removal of the associated documents GATC/BSI/GUID/0126 to 0130 - Creation of dynamic appendix 01 to 05 - §8.1.6.3.3 : refer to the appendixes instead of separate documents
1.2 16/01/08	Nicolas Boverie	See comment sheets	According to the following comment sheets: - GATC_CRL_DL_COMT_07_0323 - GATC_BSI_EM_COMT_07_0325 - GATC_BSI_TM_COMT_08_0002
1.3 27/05/2008	Olivier Brotcorne	§9	Updated documentation for the inclusion of safety related application conditions from Hazard Log Report (GATC_BSI_RAMs_0040_V10.0).
1.4 26/05/09	Olivier Houyou	7.1.4	ALPHA00131202 (Allow to tag each STM independantly on the MMGR screen)
1.5 30/06/2010	Olivier Houyou	7.1.4.2.	ALPHA00188363 : Update document to indicate that the LRU is no more the EVC rack.
1.6 08/04/2011	Olivier Houyou	7.1.4.5	ALPHA00226350 : remove the transition from OK to Warning in the MMgr
1.7 draft A 16/01/2012	Vincent Gondry	Template, Cover page, 1.4, 2.1, 2.2, 3.1, 3.2, 3.4.1, 4.5, 4.6, 4.7, 6.1, 6.2, 6.3, 6.4, 7.1.1.1, 7.1.1.2, 7.1.2.1,	ALPHA00263329 : Missing information/description of some enhancements in the document


Table 1 : Amendment Record

Version Date	Author Name	Sections	Modifications
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		7.1.4.4.4, Figure 7	ALPHA00253473 : indicate that the MMgr flag can be resetted via the DMI (technical Screen)


Table 1 : Amendment Record

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1.7 23/01/12	Vincent Gondry	None	Official release
2.0 draft A 19/07/12	Vincent Gondry	Appendix 01 to 07	Updated for TRB 6.0.0
2.0 draft B 07/08/2012	Vincent Gondry	See comments sheet opposite	GATC_BSI_GUID_0125_2.0 draft A_COMT_DL
2.0 07/08/2012	Vincent Gondry	None	Official release
2.1 draft A 27/05/2014	Michel Demeure	See revision marks	CR atvcm00497385: Cold Movement Detector for Denmark.
2.1 draft B 20/06/2014	Michel Demeure	See revision marks	Review comments: GATC_BSI_GUID_0125_V2.1_draftA_COMT_GG.doc GATC_BSI_GUID_0125_V2.1_draftA_COMT_AL.doc
2.1 02/07/2014	Michel Demeure	None	No more comments, official release of the document.
2.2 draft A 02/07/2014	Michel Demeure	None	New working version
2.2 draft A 08/08/2014	Michel Demeure	See revision marks	CR atvcm00560823: add new TRU "IntTRU" (COMET embedded TRU).
2.2 draft A 11/08/2014	Michel Demeure	See revision marks	Review comments: GATC_BSI_GUID_0125_V2.1_draftA_COMT_AA.doc
2.2 29/08/2014	Michel Demeure	None	No further review comment, even with reminder to the reviewers. Official release of the document.
2.3 draft A 19/06/2015	Michel Demeure	See revision marks	CR atvcm00618360: DMI Centralp/ERSA DRU diagnostic codes. The major part of the modification is the addition of appendix 09.
2.3 29/06/2015	Michel Demeure	None	Review comment without impact on the document: GATC_BSI_GUID_0125_V2.3_draftA_COMT_AQ GATC_BSI_GUID_0125_V2.3_draftA_COMT_GG Official release of the document.


Table 1 : Amendment Record

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2.4 draft A 07/07/2015	Michel Demeure	None	New working document.
		8.1.6.3.3	Review comments: GATC_BSI_GUID_0125_V2.3_draftA_COMT_DL.docx
2.4 24/08/2015	Michel Demeure	None	No more comments, official release of the document.
2.5 draft A 23/10/2015	Michel Demeure	8.1.1.2; 8.2; Appendix 10; Appendix 11	New working document. Added appendix 10: LLU list Added appendix 11: Failure CountersIncluded comments from D. Lambert.
2.5 draft B 14/12/2015	Michel Demeure	Appendix 12	Added new appendix with events codes for sub-system COMET.
2.5 22/12/2015	Michel Demeure	None	No more comments, official release of the document.

1.2. Confidentiality Clause

- 1.2.1. This "TRAINBORNE SUB-SYSTEM DIAGNOSE GUIDE" shall not be reproduced, in whole or in part, or disclosed to any Party other than Alstom and the Client, or those officially designated by them to evaluate documents, without the written permission of Alstom.

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1.5. List of Tables

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2. INTRODUCTION

2.1. Subject

- 2.1.1. The aim of this document is to provide an overall guide for diagnosing a failure of one or several components of the Alstom generic trainborne sub-system.
- 2.1.2. Components/Elements not included in [Ref. 1] are out of the scope of this document. This is particularly relevant for the non-Alstom Components/Elements even though for these entities, some maintenance information could be detected from their interface with the Alstom generic trainborne sub-system solution and may still be diagnosed.

2.2. Field of Application

- 2.2.1. The field of application of this document corresponds to the field of application of the Alstom generic trainborne sub-system solution supported by [Ref. 1].

2.3. Document Description

- 2.3.1. The relevant maintenance instructions are given in chapters 4 to 8.



3. DOCUMENTS & TERMINOLOGY

* : For applicable versions, please refer to BSI_Sr_GATC_sys_plan_0014_app4.xls.

3.1. Reference Documents

{Definition of a reference document: External document elaborated outside the project or even outside the site, and that this working document cannot contribute to modify e.g. standards, ALSTOM Transport instructions. }

Table 2 : Table of Reference Documents

Ref.N°	Title	Reference	Issue
[Ref. 1]	ERTMS CORE Release Note Trainborne Subsystem Passport	GATC/BSI/DESG/0421	*
[Ref. 2]			
[Ref. 3]			

3.2. Applicable Documents

{Definition of an applicable document: Higher level document which must be taken into account for the elaboration of this working document}

Table 3 : Table of Applicable Documents

Ref.N°	Title	Reference	Issue
[Applic 1]	ERTMS Trainborne maintenance plan	GATC/BSI/GUID/0051	*
[Applic 2]			
[Applic 3]			

3.3. Associated Documents

{Definition of an associated document: Document at the same level as this working document and dealing with the same subject or a subject related to it and interfacing it. }

Table 4 : Table of Associated Documents

Ref.N°	Title	Reference	Issue
[ASSOC 1]			



Table 4 : Table of Associated Documents

Ref.N°	Title	Reference	Issue
[ASSOC 2]			
[ASSOC 3]			
[ASSOC 4]			
[ASSOC 5]			

3.4. Definitions/abbreviations

3.4.1. The following definitions are necessary to understand the document:

TRB	Trainborne
TRB Sub-systems	A part of the Trainborne as defined in document [Applic 1] : EVC, DMI, TRU, ...
Element/component	A part of the TRB sub-system. The sub-systems EVC, DMI, TRU, ... but also each board of the EVC. An element is not necessarily an LRU ("LRU" is a different definition).
LRU	Line Replacement Unit. Refer to ref [Applic 1] for the definition.
TRB maintenance graphic status screen	The graphic representation on the DMI of the status of each TRB elements (TRB sub-systems or boards). This screen is elaborated by the EVC.
COMET	Communication board Enhanced with TRU
DMI technical menu	DMI menu accessed by pushing of the "maintenance key" giving access e.g. to the DRU menu, the parameters menu, ...
DRU_sub-systems	Sub-systems of the TRB as defined in the DRU (for each DRU_sub-system, the DRU will compute itself a status)
DRU_LRUs	Components of the DRU_Sub-systems as defined in the DRU.
DRU_sub-system status	Status of the sub-systems as defined and elaborated by the DRU.
TRB Status menu	Display on the DMI by the DRU of the status of the DRU_sub-systems elaborated by the DRU.
TRB LOG menu	Display on the DMI by the DRU of the diagnostic codes recorded by the DRU.



4. INTRODUCTION

- 4.1. The aim of this document is to provide an overall guide for diagnosing a failure of one or several components of the Alstom generic Trainborne sub-system.
- 4.2. The diagnose of a Trainborne sub-system failure will be achieved through different means and tools classified into 3 intervention levels (see definition here-after).
- 4.3. Some of the diagnose means and tools provide a maintenance information about the overall components of the TRB sub-system. The present document is focussed on these.
- 4.4. Some of the diagnose means and tools provide maintenance information about a single component of the TRB sub-system. For these, the present document will refer to a specific maintenance guide (separate document for each service tool dedicated to a single equipment – see [Applic 1]).
- 4.5. This document is a child of the global “ERTMS TRAINBORNE MAINTENANCE PLAN” ([Applic 1]) which (as well as its various references to the maintenance instructions, manuals, guides ...) remains fully applicable and are to be used when considering maintenance interventions on the TRB sub-system components.
- 4.6. In the following chapters, when a maintenance intervention/action is advised, a dedicated project related procedure must be used. This one must be written by the project team and supported by the ERTMS CORE maintenance documentation (starting from document [Applic 1]).
- 4.7. General remark: the DMI images included in this guide are provided for information: real images may be slightly different. DMI operation (buttons ...) could also be slightly configured at “project level” (data preparation).





5. INTERVENTION LEVELS

5.1. The diagnose means and tools will be classified in 3 "Intervention levels" according to the conditions of use: duration of the maintenance operation, need to use additional tools,... :



- Intervention level 1: Quickest way to get visual synthetic current status of the equipment's. No need of extra tool. Cause minimal disturbance to the service. Request minimal maintenance skills to observe the data.
- Intervention level 2: intermediate level, more detailed information, could request extra tools to extract and analyse the diagnose data.
- Intervention level 3: in case the 2 previous steps did not provide enough information for repair. This level concern the test and investigation tools that are specific to each single equipment, that can provide much deeper diagnose information, but requesting also skilled maintenance staff and causing more disturbance to the service (additional tools needed, duration of intervention, removal of equipment, ...)



6. DIAGNOSE MEANS AND TOOLS OVERVIEW

6.1. The following diagram provides a global overview of the different diagnose means and tools supporting the Alstom generic trainborne sub-system solution (functional view):

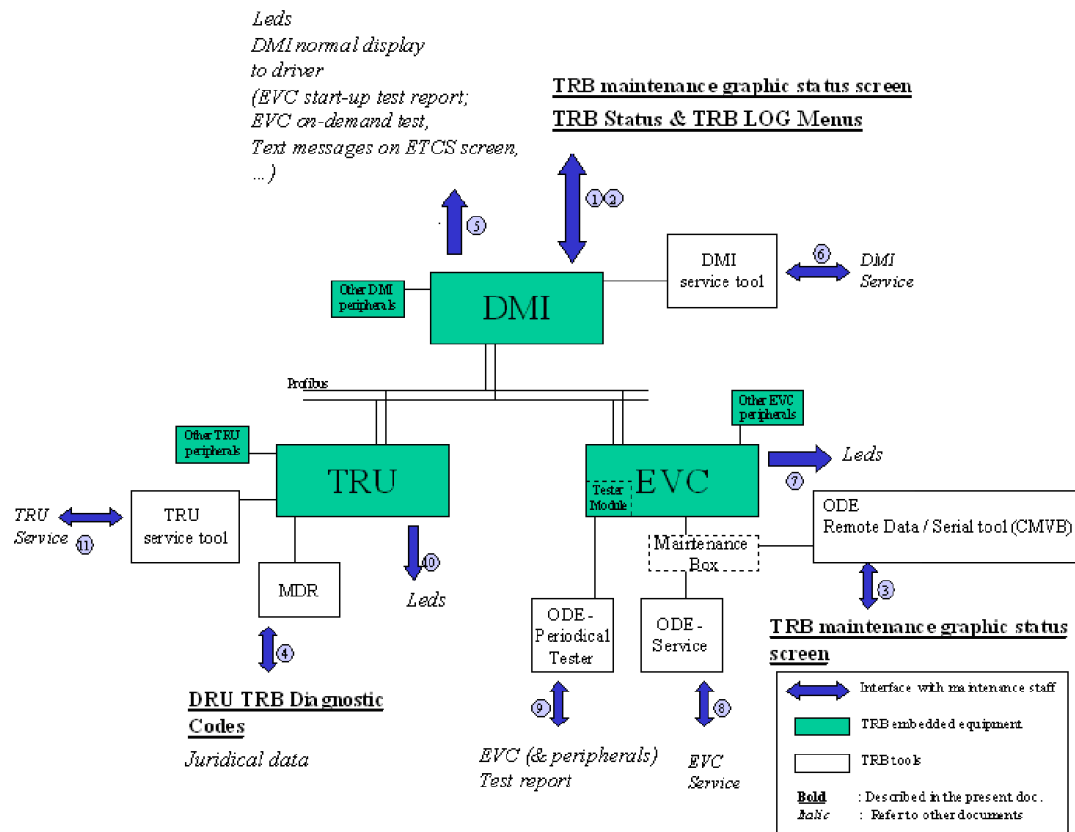


Figure 1 : Overview of the existing diagnose means and tools

6.2. The diagnose means and tools numbered from 1 to 11 are:

Nbr	Name	tool/equipment	Level of intervention
①	TRB maintenance graphic status screen	DMI	1
②	TRB Status & TRB LOG Menus	DMI	2
③	TRB maintenance graphic status screen	ODE Remote data – Serial Tool (CMVB) / EVC	3
④	DRU TRB Diagnostic Codes & Juridical data	MDR / DRU	2
⑤	DMI Leds and normal display to driver	DMI	1
⑥	DMI service tool	DMI service tool / DMI	3



⑦	EVC Leds	EVC	2
⑧	ODE service	ODE Service tool / EVC	3
⑨	EVC Periodical tester	ODE Periodical tester / EVC	3
⑩	TRU Leds	TRU	3
⑪	TRU Service tool	TRU Service tool / TRU	3

Table 5 : Levels of intervention of the different diagnose means and tools

- 6.3. The present document concerns the items 1, 2, 3 (same item as 1 accessed with ODE) and 4 (see appendixes) listed above.
- 6.4. The items 5 to 11 listed above are not in the scope of the present document and are described in the relevant corresponding product/tool documentation.




7.DESCRPTION – INTERVENTION LEVEL 1

7.1.TRB maintenance graphic status screen

7.1.1.Summary

- 7.1.1.1. This screen display is available on the DMI (only Alstom ones) when the TRB is operating in normal mode.
- 7.1.1.2. On this screen, a visual current status for each TRB element is provided. The scope of this maintenance help feature is the full Alstom generic trainborne sub-system as defined by [Ref. 1]; it is not restricted to a unique product.
- 7.1.1.3. This is the fastest way to get a simple and synthetic diagnose information. No extra tool is requested.

7.1.2.How to access to the display

- 7.1.2.1. The TRB sub-system must be powered-on and in the ETCS Stand-By mode meaning, for example, that:
 - the train is stopped
 - the Cabin is open
 - the EVC and the DMI must be operational and connectedRemark: the TRU is not involved in this maintenance feature.
- 7.1.2.2. Open the "technical menu" with the  key on the top of the DMI.

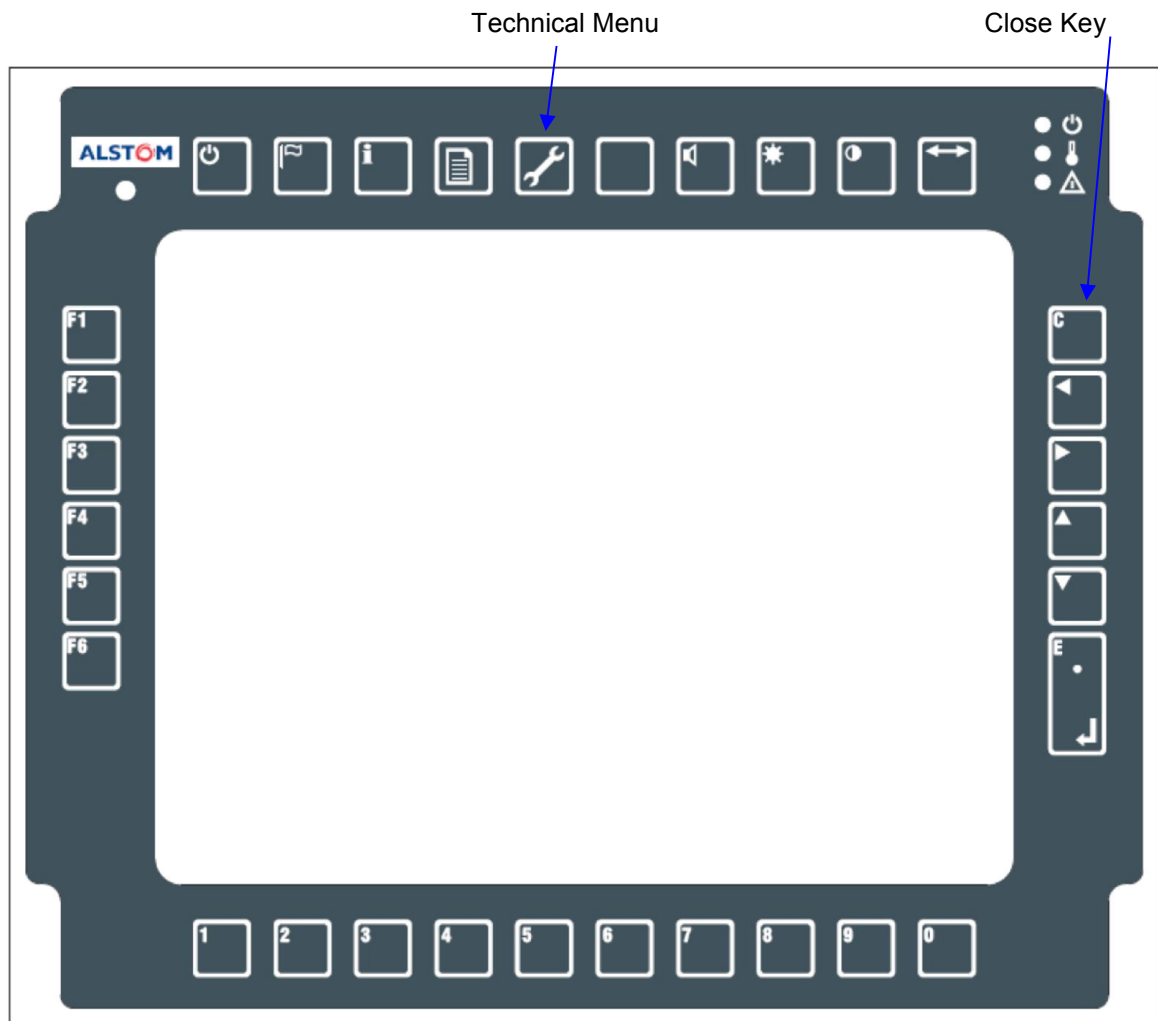


Figure 2 : Technical menu accessibility on DMI 300 type

- 7.1.2.3. Select the Maintenance Menu ("Maint. Diag" on the Figure 3) on the bottom of the DMI.

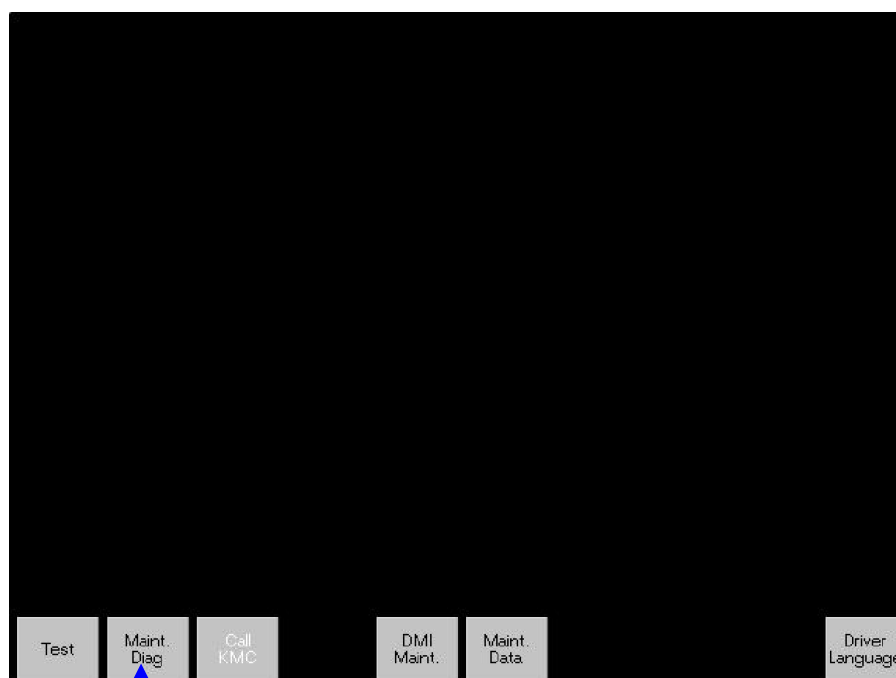




Figure 3 : Technical menu

Maintenance Menu

- 7.1.2.4. Keep the button « maintenance screen » pushed for at least 5 seconds until the button stops flashing (this delay is a parameter that can be different on your equipment) and then release it to enter into the TRB maintenance graphic status screen.

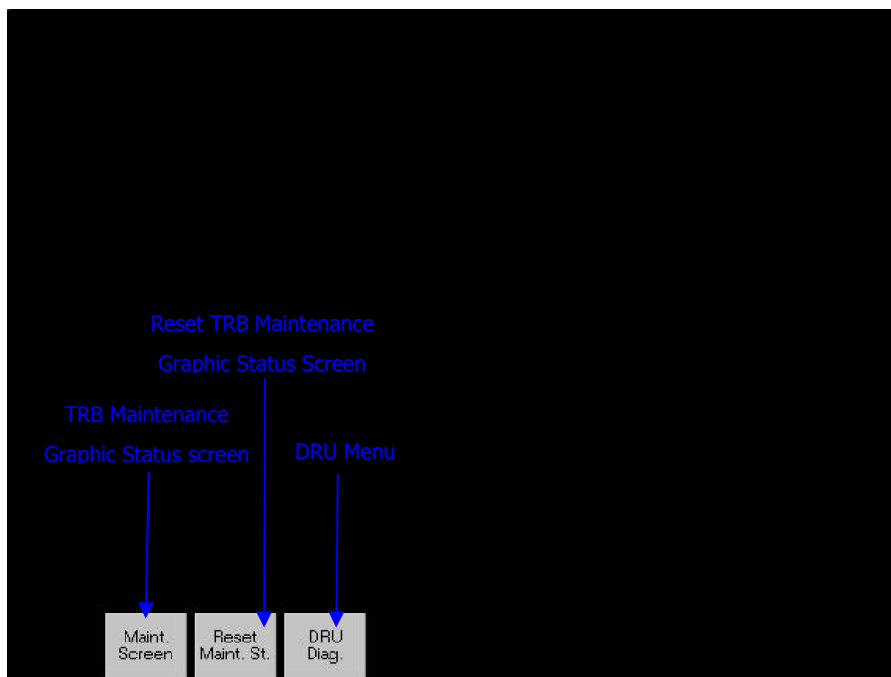


Figure 4 : Maintenance Menu

7.1.3.How to exit this display

- 7.1.3.1. Using the “close key” (see Figure 2), the user will return to the main screen (ETCS screen).
- 7.1.3.2. Remark: if the connection between the EVC and the DMI is cut (either because of an EVC failure, either because of a DMI failure; either because of Profibus failure), then the DMI display will switch automatically in “Error mode” (blind mode).
- 7.1.3.3. Remark 2: if the train speed exceeds a speed threshold (configurable), the DMI display is set back the Default ETCS screen (the one with the Speedometer).

7.1.4.Description of TRB maintenance graphic status screen

7.1.4.1.Screen

- 7.1.4.1.1. The following images are some illustrations of what could be found, depending of the software version used.

These status indicators have to be taken into account together with the others.

CAN bus
status
indicator

Train devices connected to EVC via :
- digital I/O
- Train bus
- EB1, EB2, EB SW CMD

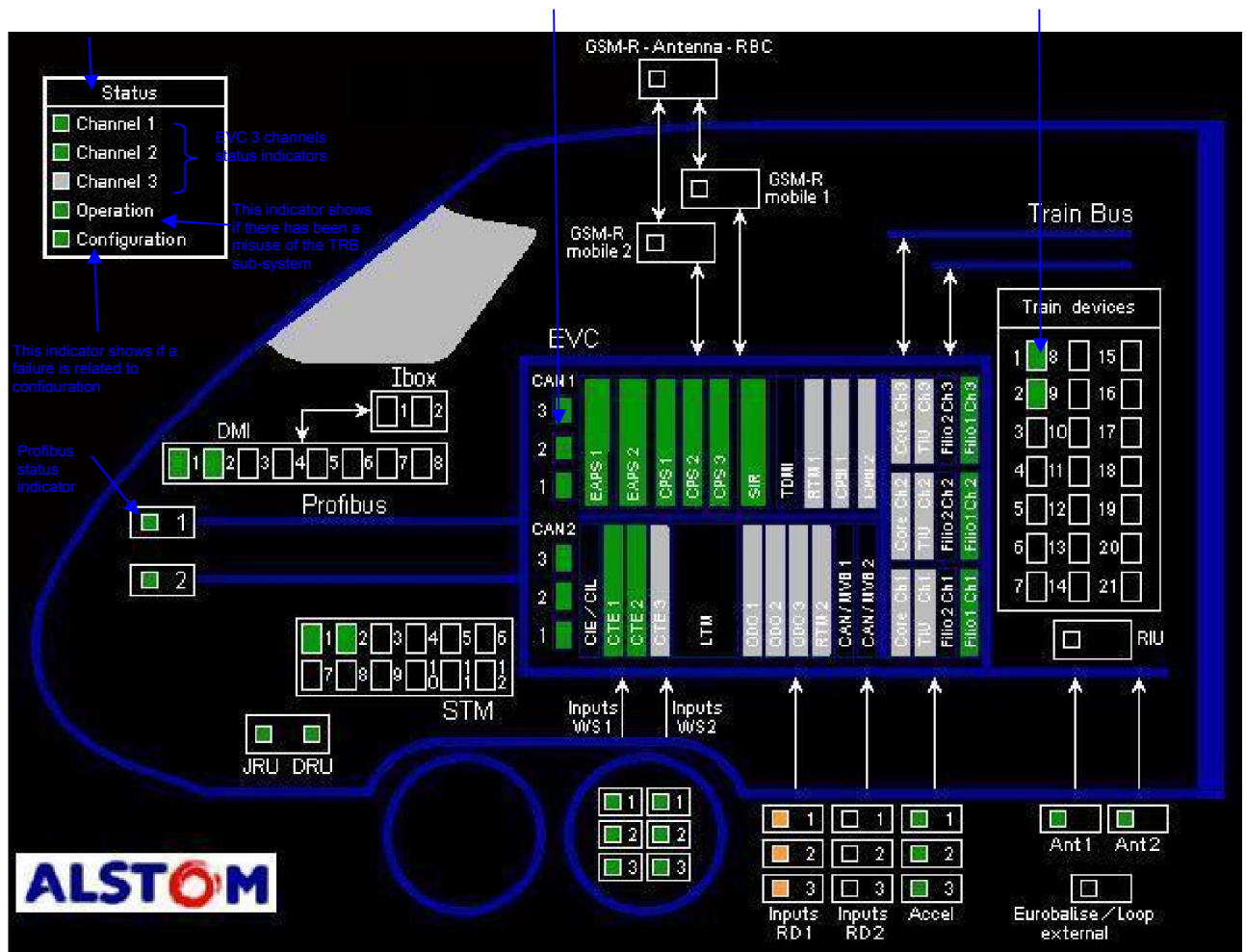


Figure 5 : TRB maintenance graphic status screen for EVC1

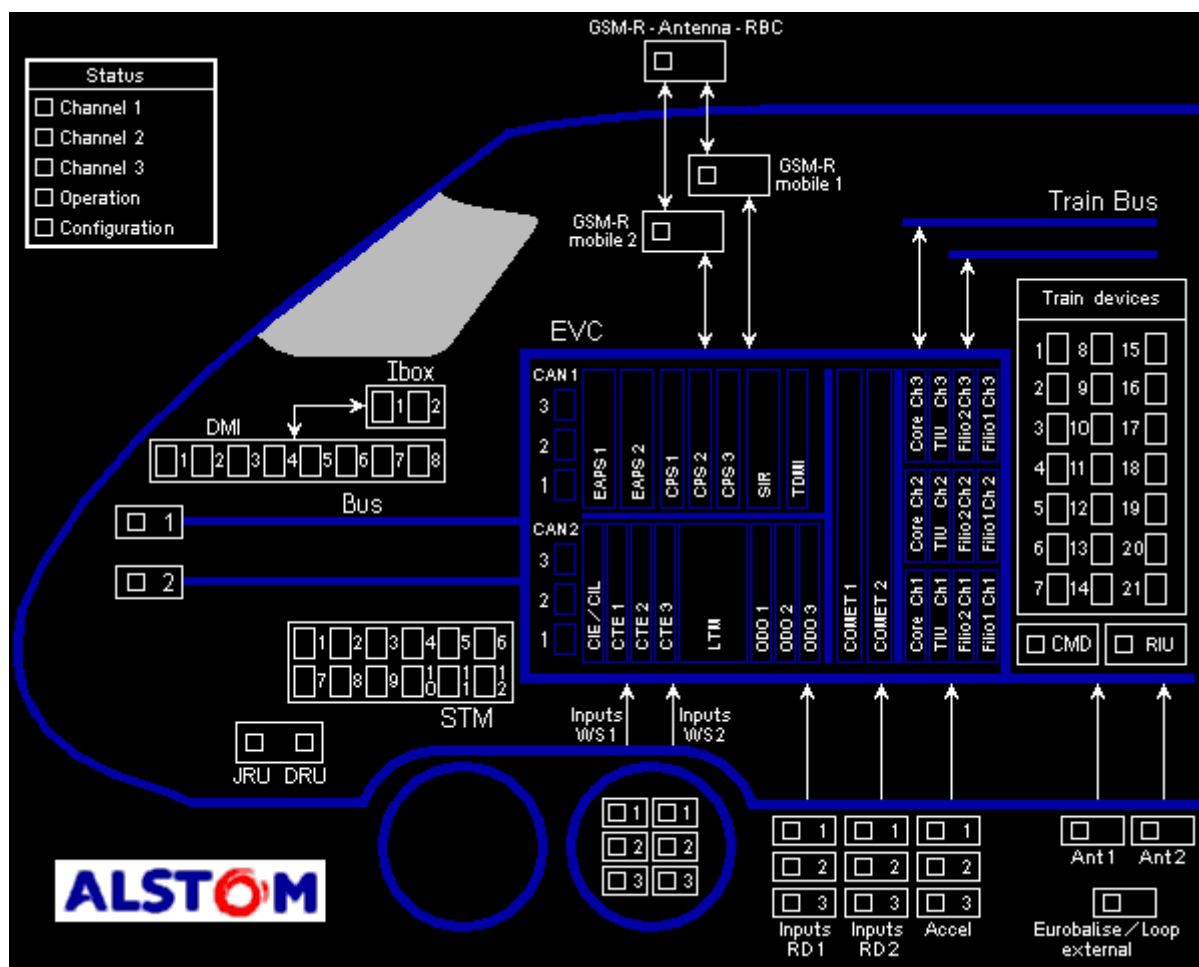


Figure 6 : TRB maintenance graphic status screen for EVC2

7.1.4.1.2. Intentionally deleted.

7.1.4.1.3. If a failure occurs while this is displayed, then the indicators are updated in "real time" (only delayed by the processing delay) when the failure is detected by the TRB sub-system.

7.1.4.2. List of represented elements

7.1.4.2.1. Global status indicators

Indicator Name	LRU	Description	Remark
Channel 1, Channel 2, Channel 3	EVC	Overall status of the 3 channels	1 indicator per channel In this case, it is very likely that another element is responsible of the failure and replacing only the corresponding LRU may be sufficient
CAN 1 : indicators 1, 2, 3	EVC	CAN network 1	1 indicator per channel In this case, it is very likely that another element is responsible of the failure and replacing only the corresponding LRU may be sufficient. This indicator is located in the EVC box and not in the upper left box.
CAN 2 :	EVC	CAN network 2	1 indicator per channel In this case, it is very likely



Indicator Name	LRU	Description	Remark
indicators 1, 2, 3			that another element is responsible of the failure and replacing only the corresponding LRU may be sufficient. This indicator is located in the EVC box and not in the upper left box.
Operation	Not Relevant	Indicate if an operational problem has been encountered	No more used
Configuration	Plug(s)	Status of the data preparation	This indicator only concerns configuration outside the TRB sub-system. As example, this indicator is used for incorrect balise telegrams.

7.1.4.2.2. TRB sub-system indicators

Indicator Name	LRU	Description	Remark
Core Ch 1, Core Ch2, Core Ch 3	CORE	CORE board unit of the 3 channels	1 indicator per channel
TIU Ch 1, TIU Ch2, Core Ch 3	TIU	Train Interface Unit (TIU) board of the 3 channels	1 indicator per channel
CAN 1 : indicators 1, 2, 3	EVC_kernel	CAN network 1	1 indicator per channel
CAN 2 : indicators 1, 2, 3	EVC_kernel	CAN network 2	1 indicator per channel
SIR	SIR	Safety integrity relay module	1 indicator
Filio 1 ch1, Filio 1 ch2, Filio 1 ch3	Filio_IO	Filtered Input Output Interface board (FILIO)	1 indicator per channel
Filio 2 ch1, Filio 2 ch2, Filio 2 ch3	Filio_IO	Filtered Input Output Interface board (FILIO)	1 indicator per channel
CTE 1, CTE 2, CTE 3	CTE	Carte transmission Eurobalise (CTE) board	1 indicator per channel
CIE / CIL	CIE/CIL	Eurobalise & Euroloop antenna interface board (CIE / CIL board)	1 indicator
EAPS 1	EAPS	Eurobalise Antenna power supply 1	1 indicator
EAPS 2	EAPS	Eurobalise Antenna power supply 2	1 indicator
ODO 1, ODO 2, ODO 3	Odometry	ODO boards of the 3 channels	1 indicator per channel
Inputs WS1 : indicators 1, 2, 3	WSS	Input from ODO wheel sensor 1 on the ODO board of the 3 channels	1 indicator per channel
Inputs WS2 : indicators 1, 2, 3	WSS	Input from ODO wheel sensor 2 on the ODO board of the 3 channels	1 indicator per channel
Inputs RD1 : indicators 1, 2, 3	RADAR	Input from ODO radar 1 on the ODO board of the 3 channels	1 indicator per channel
Inputs RD2 : indicators 1, 2, 3	RADAR	Input from ODO radar 2 on the ODO board of the 3 channels	1 indicator per channel



Indicator Name	LRU	Description	Remark
Accel : indicators 1, 2, 3	ACC	Input from ODO accelerometer on the ODO board of the 3 channels	1 indicator per channel
TDMI(CKI)	TDMI(CKI)	Test Diagnose Maintenance Interface or CAN KER Interface board	1 indicator
CAN/MVB 1	MVB_IO	Can/MVB Interface board 1	1 indicator
CAN/MVB 2	MVB_IO	Can/MVB Interface board 2	1 indicator
CPBI 1	Profibus	Can/Profibus Interface board 1	1 indicator
CPBI 2	Profibus	Can/Profibus Interface board 2	1 indicator
RTM 1	RTM	Radio Transmission Module 1 (RTM board)	1 indicator
RTM 2	RTM	Radio Transmission Module 2 (RTM board)	1 indicator
COMET 1	COMET	COMET board 1	1 indicator
COMET 2	COMET	COMET board 2	1 indicator
LTM	LTM	Loop Transmission Module	1 indicator
CPS 1, CPS 2, CPS 3	CPS	Power supply of the 3 channels	1 indicator per channel
DMI 1	DMI	Driver Machine Interface 1 of CAB A Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
DMI 2	DMI	Driver Machine Interface 2 of CAB A Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
DMI 3	DMI	Driver Machine Interface 3 of CAB A Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
DMI 4	DMI	Driver Machine Interface 4 of CAB A Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
DMI 5	DMI	Driver Machine Interface 5 of CAB B Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
DMI 6	DMI	Driver Machine Interface 6 of CAB B Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator



Indicator Name	LRU	Description	Remark
DMI 7	DMI	Driver Machine Interface 7 of CAB B Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
DMI 8	DMI	Driver Machine Interface 8 of CAB B Please refer to relevant Project documentation that shall define which DMI is this DMI (configurable).	1 indicator
iBox 1	iBox	Interface Box (optional part of DMI sub-system)	1 indicator
iBox 2	iBox	Interface Box (optional part of DMI sub-system)	1 indicator
Train device : indicator 1	Out of Alstom generic TRB sub-system	Emergency brake 1 (please refer to the "project level" configuration)	1 indicator
Train device : indicator 2	Out of Alstom generic TRB sub-system	Emergency brake 2 (please refer to the "project level" configuration)	1 indicator
Train device : indicator 3 to 6	Not used	N/A	N/A
Train device : indicator 7	Out of Alstom generic TRB sub-system	Emergency brake Software command (please refer to the "project level" configuration)	1 indicator
Train device : Indicator 8 to 9	Not used	N/A	N/A
Train device : indicator 10	Out of Alstom generic TRB sub-system	Desk state train device (please refer to the "project level" configuration)	1 indicator
Train device : indicator 11	Out of Alstom generic TRB sub-system	Driver direction train device (please refer to the "project level" configuration)	1 indicator
Train device : indicator 12 to 16	Not used	N/A	N/A
Train device : indicator 17	Out of Alstom generic TRB sub-system	Vehicle Control Unit 1 (please refer to the "project level" configuration)	1 indicator
Train device : indicator 18	Out of Alstom generic TRB sub-system	Vehicle Control Unit 2 (please refer to the "project level" configuration)	1 indicator
Train device : indicator 19 to 21	Not used	N/A	N/A



Indicator Name	LRU	Description	Remark
Ant 1	Euro Balise Antenna	Euro Balise and Euro Loop Antenna 1	1 indicator
Ant 2	Euro Balise Antenna	Euro Balise and Euro Loop Antenna 2	1 indicator
JRU	TRU	Juridical Recording Unit (JRU)	1 indicator
DRU	TRU	Diagnostic Recording Unit (DRU)	1 indicator
STM : indicator 1	STM	Specific Transmission Module 1 (STM). Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 2	STM	Specific Transmission Module 2 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 3	STM	Specific Transmission Module 3 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 4	STM	Specific Transmission Module 4 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 5	STM	Specific Transmission Module 5 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 6	STM	Specific Transmission Module 6 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 7	STM	Specific Transmission Module 7 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 8	STM	Specific Transmission Module 8 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator



Indicator Name	LRU	Description	Remark
STM : indicator 9	STM	Specific Transmission Module 9 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 10	STM	Specific Transmission Module 10 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 11	STM	Specific Transmission Module 11 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
STM : indicator 12	STM	Specific Transmission Module 12 (STM) Please refer to relevant Project documentation that shall define which STM is this STM (configurable).	1 indicator
GSM-R Mobile 1	MOBILE	GSM-R mobile 1	1 indicator
GSM-R Mobile 2	MOBILE	GSM-R mobile 2	1 indicator
GSM-R – Antenna – RBC	Out of Alstom generic TRB sub-system	Any device related to GSM-R communication that is external to the Alstom TRB sub-system: GSM-R network, RBC (e.g)	1 indicator
Eurobalise & Euroloop external	Out of Alstom generic TRB sub-system	Any device related to Eurobalise & Euroloop communication that is external to the Alstom TRB sub-system : Balise & Loop coding errors, Balise & Loop linking errors, other balises & Loop issues, air gap (e.g.)	1 indicator
Profibus : indicator 1	Profibus	Profibus network 1	1 indicator
Profibus : indicator 2	Profibus	Profibus network 2	1 indicator
RIU	RIU	Relay interface unit	1 indicator
CMD	CMD	Cold Movement Detector	1 indicator

7.1.4.2.2.1. Remark: the elements which are represented with 3 indicators (1 per channel) are to be considered as part of an EVC channel (exception: the SIR board is also considered as part of each EVC channels)


7.1.4.3. Status of the elements (colour indicator) - advice


State	Aspect (Colour)	Comment	Operational Impact on TRB sub-system	Advice
OK	Green	The element is currently operational. There is nothing significant to report to the maintenance staff about the element.	None	None.
Warning	Grey	The element is currently operational but the element has been in failure previously (failure memorized from a previous power-on).	None	Another maintenance intervention of level 1 or a maintenance intervention of level, 2 or 3 is advised (but not mandatory) to investigate the warning
Defect (Non-blocking Defect)	Orange	The element is currently not operational. Nevertheless, this is not critical as it is not blocking the operation of the train (from a functional point of view).	The operation of the train is allowed but : <ul style="list-style-type: none"> - there is maybe a functional limitation - in case another element fails during the mission, the TRB sub-system could become fully unavailable. 	Another maintenance intervention of level 1 or a maintenance intervention of level, 2 or 3 is strongly advised and/or a repair action may be needed to fully recover the TRB sub-system. Refer to document [Applic 1] for the repair instructions of each LRUs.
Not operational (Blocking defect)	Red	The element is currently not operational; this is critical as it is blocking the operation of the train (from a functional point of view). This status is not visible on the DMI because of the TRB sub-system crash triggered when an element is set to this status. However, this state may be seen through the ODE Remote data (see diagnose means (3) in Figure 1)	The operation of the train is not allowed. The Emergency brakes are applied by the TRB sub-system.	Another maintenance intervention of level 1 or a maintenance intervention of level, 2 or 3 must be performed and/or a repair action may likely be needed to recover an operational TRB sub-system. Nevertheless, a re-start of the TRB sub-system could be enough to recover some availability. If not, the TRB Sub-system has to be isolated in order to release the Emergency Brakes.
Not Applicable	transparent	The element is not present in the current TRB configuration.	N/A	Not applicable.

Table 6 : Indicators status advised maintenance operations



7.1.4.4. Reset of the indicators

- 7.1.4.4.1. The initial state of each indicator is either "In running order", either "Not applicable".
- 7.1.4.4.2. The transitions between the different LRU states are described in the Figure 7. This figure does not consider the elements that are initially detected as "Not applicable".
- 7.1.4.4.3. If an element recovers from a failure by it-self (usually after a power-down/up of the TRB sub-system); its status will remain "warning" (the defect is memorized for the maintenance staff) until the next EVC NOVRAM reset action. Exception: STM may be fully recovered and may come back to the "In running order" state.
- 7.1.4.4.4. The transition from "Warning" or "Non-blocking Defect" or "Blocking defect" back to "OK" (Green) will only be possible after:



- an **EVC NOVRAM reset** operation to be achieved with the **periodical tester tool from the ODE suite**. (see document[Applic 1])
- having pressed a button on the DMI (transitions achieved after the next power down and up of the EVC) (see Figure 4)

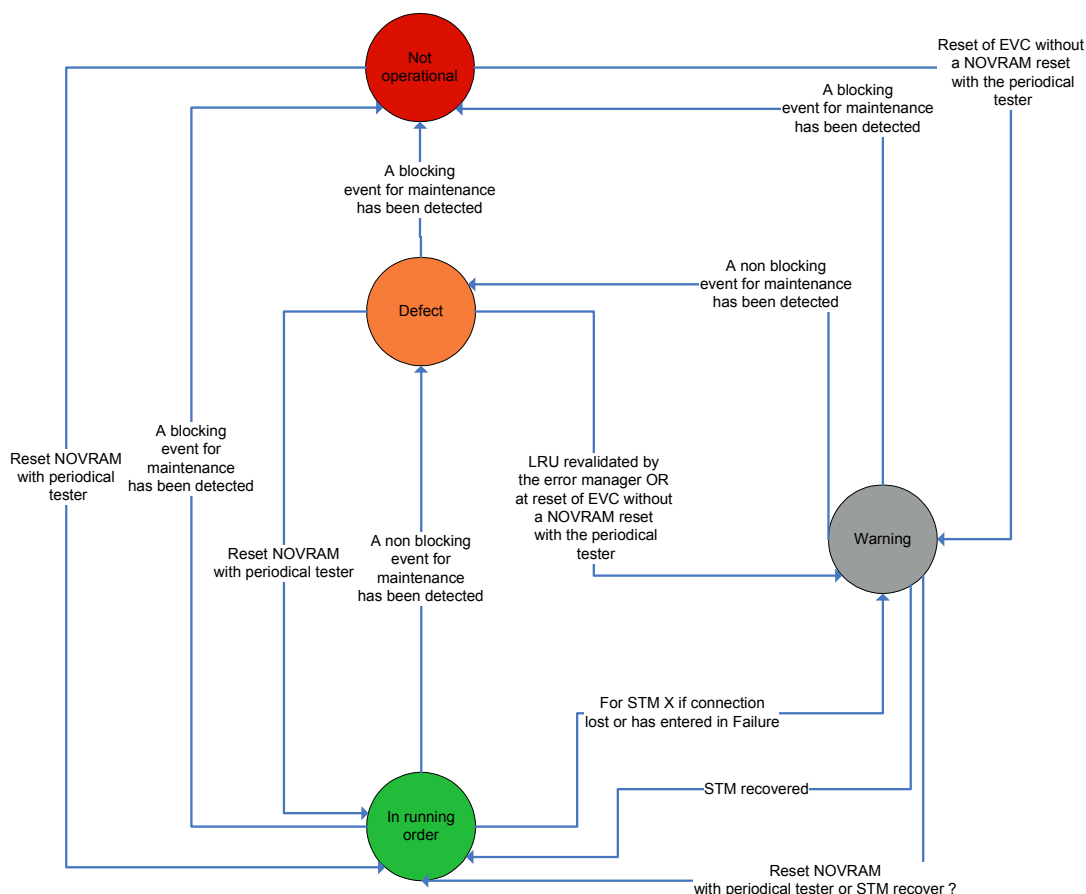


Figure 7 : Indicators status state transition diagram



7.1.4.5. Information about the TRB maintenance graphic status screen

- 7.1.4.5.1. This maintenance help feature is provided by the embedded equipment's themselves (mainly EVC and DMI) running in normal mode and not requesting the use of an additional tool.
- 7.1.4.5.2. It is thus evident that this feature is dependent on some design properties of the embedded equipment's as well as their current health status.
- 7.1.4.5.3. In case the EVC is shutdown, the screen is not available.
- 7.1.4.5.4. In case the DMI is failed, the screen is not available.
- 7.1.4.5.5. It may happen that the TRB equipment's may not by themselves find out precisely which single element has caused a failure.
- 7.1.4.5.6. In case there is no deterministic way to be sure one element is the only responsible of the faulty detected event, several element indicators will be updated.
- 7.1.4.5.7. Even if a single indicator is lit, it is strongly advised to include in the scope of investigation the interfaces of the element.
- 7.1.4.5.8. The consequent maintenance intervention shall then take into account that there is a doubt on the origin of the failure by either:
 - directly replacing one or several elements
 - using other intervention level 1, 2 or 3 features for a better diagnose

7.1.4.6.EVC channels indicators:

- 7.1.4.6.1. This indicator summarizes the status of the elements belonging to the corresponding channel 1, 2 or 3.



Channel 1/ Channel 2 / Channel 3 indicator	Means
In running order – Green	All elements of the related EVC channel are "OK"
Warning - Grey	One (or several) element(s) of the related EVC channel is (are) in "warning" state. The others are "OK"
Defect – Orange	One (or several) element(s) of the related EVC channel is (are) in "Non-blocking defect" state. The others are either in "OK" or "warning" state.
Not operational - Red	One (or several) element(s) of the related EVC channel is (are) in "blocking defect" state. The others are either in "OK" or "warning" or "non-blocking defect" state.



- 7.1.4.6.2. Important: this indicator has to be taken into account together with the indicators of the individual components of each channel.
- 7.1.4.6.3. In case a board of an EVC channel fails:
- The overall EVC channel is isolated
 - The TRB status screen will show the channel isolation through the related "Channel 1 / Channel 2 / Channel 3" indicator (actually changed from Green to Orange)
 - The indicators of the components of the failed EVC channel are all changed to Orange "non-blocking defect". The reason is that it is not always possible for the EVC to find out which precise element of the failed channel is the cause of the channel failure.
- 7.1.4.6.4. At the next power-up:
- if the channel restart: the related "Channel 1 / Channel 2 / Channel 3" indicator will be in Grey; as well as all the components of that EVC channel.
 - if the channel does not restart; the related "Channel 1 / Channel 2 / Channel 3" indicator will be in Orange (non-blocking defect). The indicators of the components of the EVC channel also remain in Orange.

7.1.5. Known limitations of the TRB maintenance graphic status screen

- 7.1.5.1. On the TRB maintenance graphic status screen, some hardware entities are represented as having three different status indicators (because seen on the three channels). However, from a maintenance point of view, there is no need of having three indicators as the corresponding LRU is the whole entity (example: the wheel sensors, the radars ...).
- 7.1.5.2. As already stated in §7.1.4.6.3., in case of a channel lost, the status of all elements on this channel is impacted which does not give any relevant information from a maintenance point of view. Moreover, some states of elements in this case are wrongly modified (Wheel sensor, radar, accelerometer ...).
- 7.1.5.3. A "Not operational" (Red) state on the TRB maintenance graphic status screen is actually never seen by the maintenance operator when this screen is accessed through the DMI. In this case, when one element status is set to this state, the TRB sub-subsystem enters in failure which prevents the maintenance operator to access the TRB maintenance graphic status screen. The only possibilities for the maintenance operator are to:
- access this screen through ODE Remote Data (diagnose mean and tool (3) in Figure 1)
 - power down and up the TRB sub-subsystem but in this case the transition



to the Warning state (Grey) happens

7.1.5.4. There are also two other limitations related to the Eurobalise antenna:

- in case the power supply (EAPS) of the Eurobalise antenna is lost, the information on the Maintenance Manager is not correct (the CIE, CTE states enters in defect and even though the redundant EAPS has taken over the function, its state enters also in defect
- if an Eurobalise antenna is lost while the TRB sub-system is in the ETCS Level 0/STM, this is not indicated before the train has run 300 m (configurable by projects) on the TRB maintenance graphic status screen

7.1.6. TRB maintenance graphic status screen on MVB

7.1.6.1. Please note that there is a configurable function that allows publishing an image of the different current LRU status on the TRB maintenance graphic status screen on MVB.

7.1.6.2. However, this function only publishes a merged version of all these LRU status. These information may then be used to recreate a similar "TRB maintenance graphic status screen" if the only DMI available is on the MVB bus.




8.INTERVENTION LEVEL 2

8.1.TRB status & TRB LOG menus on DMI

8.1.1.Summary

- 8.1.1.1. These screen displays are available on the DMI when the TRB is in normal mode.
- 8.1.1.2. These screen displays are available in Baseline 2 versions only (i. e. before Trainborne release ("Baseline") 6.0.0).
- 8.1.1.3. A subset of the diagnose data recorded in the DRU may be displayed on the DMI in the form of a textual description.
- 8.1.1.4. No extra tool is requested.
- 8.1.1.5. This maintenance help feature share several common points with the "TRB maintenance graphic Status screen" of the intervention level 1. For example: the "scope" of this maintenance help feature is the full trainborne sub-system, it is not restricted to a unique product.
- 8.1.1.6. The DRU diagnose data are presented in 2 ways:
 - **TRB LOG menu**: a list of dated diagnose codes related to various events (such as HW failures) raised by TRB sub-systems and recorded in the DRU; this allows the maintenance staff to check the historical sequence of events that caused the trainborne sub-system to be in its current state;
 - **TRB Status menu**: provides the current status of the TRB sub-systems as recorded by the DRU.

8.1.2.How to access these DMI screens

- 8.1.2.1. The TRB sub-system must be powered-on and in Stand-By mode meaning that (not exhaustive):
 - the train is stopped
 - the Cabin is open
 - the EVC, the DMI and the TRU must be operational and connected
- 8.1.2.2. Open the "technical menu" by pushing on the  key on the top right of the DMI (see Figure 2).
- 8.1.2.3. Push on the "DRU Diag" button in order access the **DRU menu** (Figure 4).
- 8.1.2.4. Push on the "TRB Status" button in order to enter in the TRB Status menu or push on the "TRB LOG" button in order to enter in the TRB LOG menu.

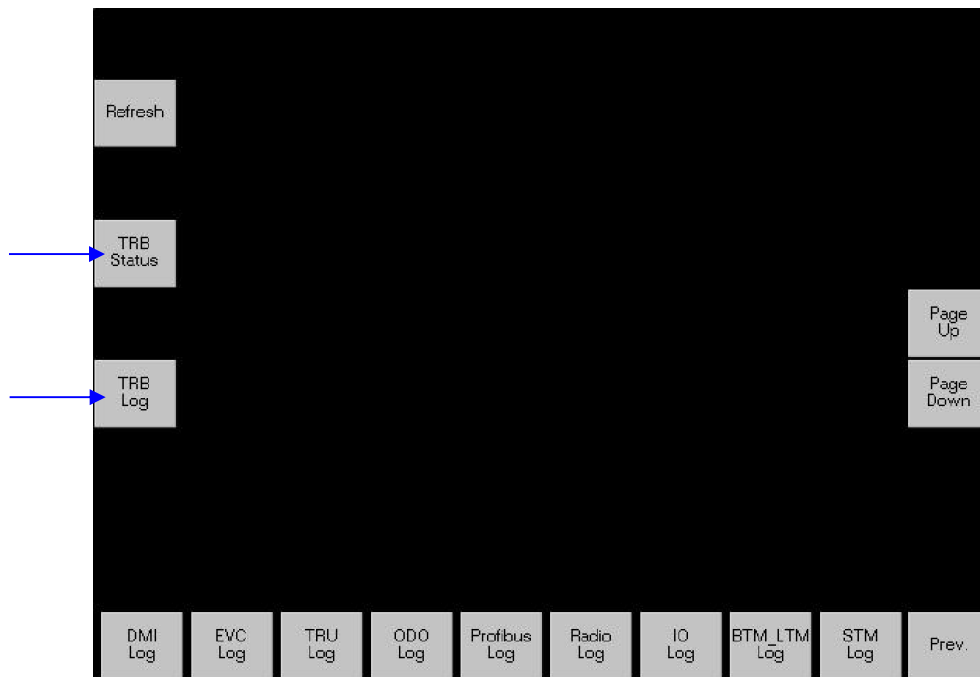


Figure 8 : DRU Menu (TRB log and TRB Status Menus accessibility)

8.1.3.How to exit this display

- 8.1.3.1. Using the “close key” (see Figure 2), the user will return to the main screen (ETCS screen).
- 8.1.3.2. Remark: if the connection between the EVC, the DMI and the TRU is cut (either because of an EVC or DMI or TRU failure, either because of a Profibus failure), then the DMI display will switch automatically in “Error mode” (blind mode).
- 8.1.3.3. Remark 2: if the train speed exceeds a speed threshold (configurable), the DMI display is set back the Default ETCS screen (the one with the Speedometer).

8.1.4.Sources of the diagnose data recorded in the DRU

- 8.1.4.1. The diagnose data recorded in the DRU are from various origins:
 - The EVC
 - The DMI
 - The TRU: the JRU and the DRU it-self
 - The STMs (in option)

8.1.5.DRU_Sub-systems & DRU_LRUs

- 8.1.5.1. The TRB LOG & TRB Status menus will both classify the diagnose data into DRU_Sub-systems and DRU_LRUs according to the TRB element that is supposed to be the cause of the event/failure.
- 8.1.5.2. Important: DRU-LRUs don’t have the same meaning as LRUs defined in the



document [Applic 1] or in the section 7.1.TRB maintenance graphic status screen.

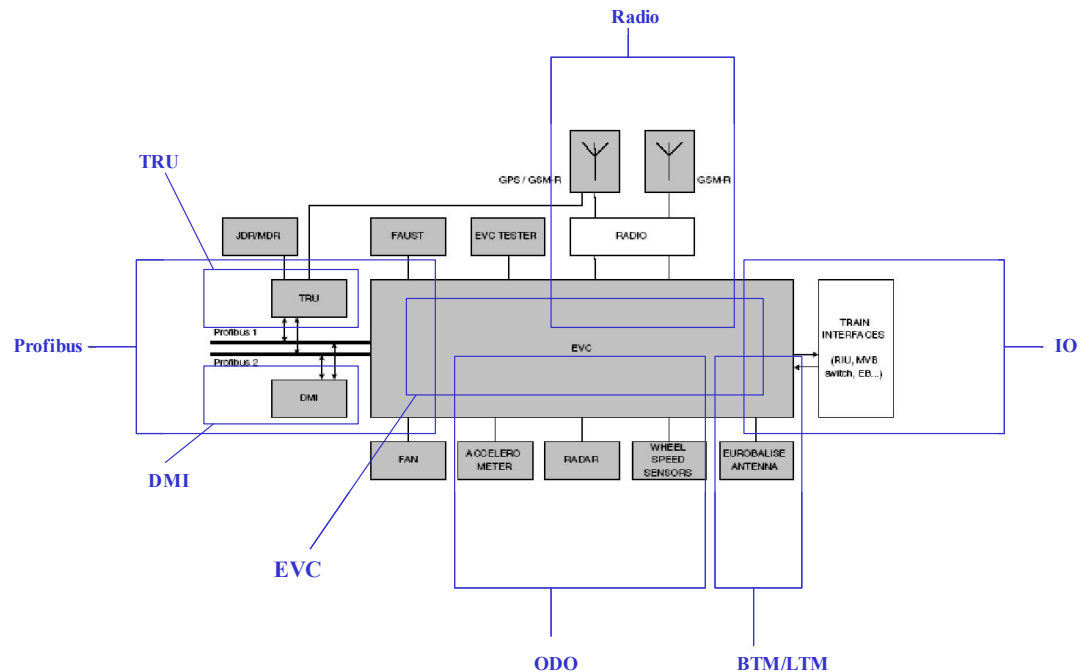


Figure 9 : DRU Sub-systems and DRU-LRUs

8.1.5.3. The following DRU_Sub-systems and DRU_LRUs are defined :

DRU_Sub-System	DRU_LRU	Source	Description
DMI	DMI	DMI	Diagnose data from the DMI
EVC	EVC	EVC	Diagnose data from the EVC concerning the EVC kernel. Most likely the Smart CORE, Smart TIU, Channel Power-supplies and SIR modules.
BTM/LTM	BTM	EVC	Diagnose data from the EVC concerning the EVC and the Eurobalise interface components. Most likely: the Smart CORE, CTE, CIE/CIL, Eurobalise & Euroloop Antenna power supply, the Eurobalise & Euroloop antenna as well as Alstom TRB external elements such as balises, ...
	LTM	EVC	Diagnose data from the EVC concerning the EVC and the Euroloop interface components. Most likely: the Smart CORE, CIE/CIL/CIEL, LTM, Eurobalise & Euroloop Antenna power supply, the Eurobalise & Euroloop antenna as well as Alstom TRB external elements such as loops ...
ODO	ODO	EVC	Diagnose data from the EVC concerning the EVC and the odometry components. Most likely: the Smart CORE, ODO boards, Wheel sensors, Radars and Accelerometer.



DRU_Sub-System	DRU_LRU	Source	Description
Profibus	Profibus	EVC	Diagnose data from the EVC concerning the EVC and the elements linked to the Profibus interface. Most likely: the Smart CORE, the Smart TIU, CPBI boards, Profibus, and if connected to the Profibus, DMI, TRU and STM.
Radio	Radio	EVC	Diagnose data from the EVC concerning the EVC and the elements linked to the radio interface. Most likely: the Smart-CORE, RTM boards, GSM-R mobiles as well as Alstom TRB external elements such the GSM-R network, RBC...
IO	IO	EVC	Diagnose data from the EVC concerning the EVC and the elements linked to the I/O interface: FILIO, MVB or SIR EB (see following lines).
	FILIO	EVC	Diagnose data from the EVC concerning the EVC and the elements linked to the digital I/O interface. Most likely: the Smart TIU, the FILIO board as well as Alstom TRB external elements such as the RIU and train devices.
	MVB	EVC	Diagnose data from the EVC concerning the EVC and the elements linked to the MVB I/O interface. Most likely: the Smart TIU, the CAN/MVB boards as well as Alstom TRB external elements such as the VCUs and Train devices.
	SIR EB	EVC	Diagnose data from the EVC concerning the EVC and the elements linked to the Emergency Brake interface. Most likely: the Smart TIU, the SIR board as well as Alstom TRB external elements such as the Emergency Brake Train devices.
TRU	TRU	TRU	Diagnose data from the TRU.
	TRU_PPIB	TRU	Diagnose data from the TRU. Most likely from the PPIB board of the TRU.
	GPS	TRU	Diagnose data from the TRU. Most likely from the GPS device of the TRU.
STM		STM	Diagnose data from the STMs.

8.1.6.The TRB LOG menu

8.1.6.1.“General” TRB LOG menu and “selective” TRB LOG menus

- 8.1.6.1.1. There is one “general” TRB LOG menu that displays the diagnose data for all the DRU sub-systems.
- 8.1.6.1.2. There is also one “selective” TRB LOG menu per DRU_Sub-system that displays diagnose data related only to the corresponding sub-system.

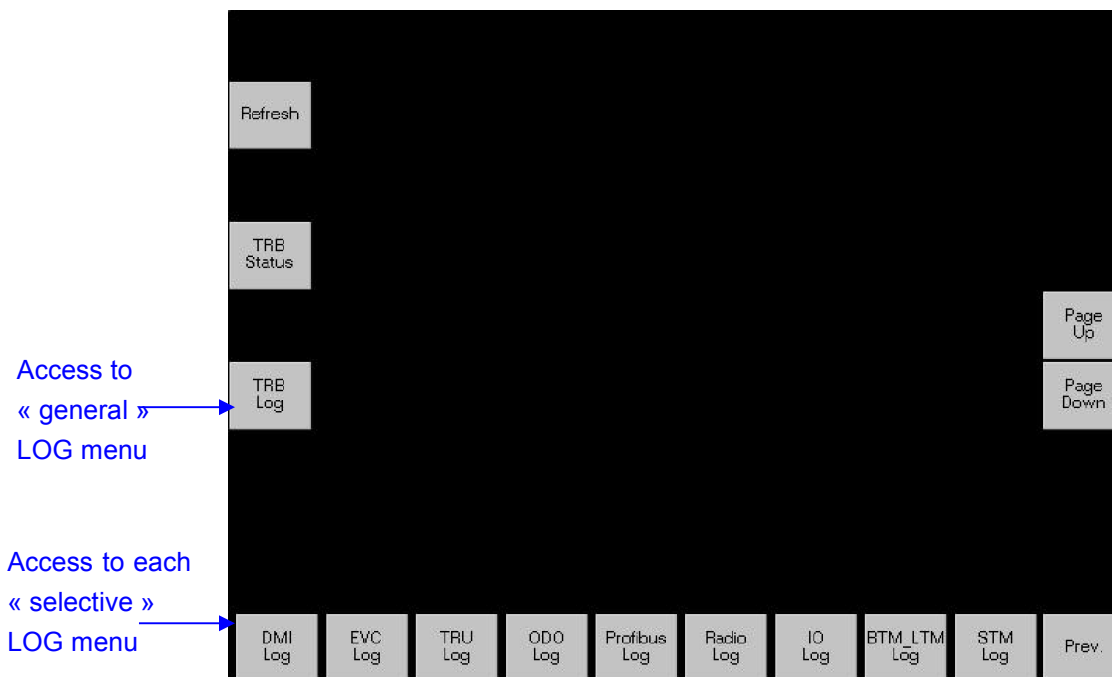


Figure 10 : General TRB LOG menu and selective TRB LOG menus accessibility

8.1.6.2.What is displayed:

- 8.1.6.2.1. The TRB diagnostic codes recorded in the DRU are displayed in a chronological order according to the date corresponding to the detection of the event by the source (EVC, DMI, TRU or STMs).
- 8.1.6.2.2. Although the recording capacity of the DRU is huge, the display on the DMI is limited to the 8 last pages of recorded diagnose codes.
- 8.1.6.2.3. For reading all the pages of TRB diagnostic codes recorded, please refer to the use of the MDR tool (see document [Applic 1]).

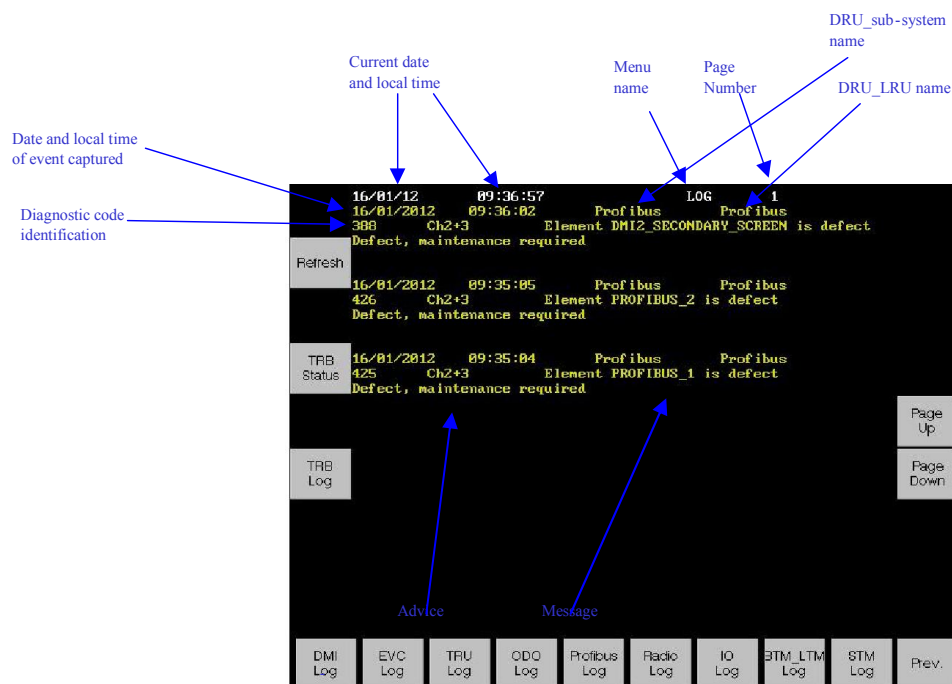


Figure 11 : Example of a General TRB LOG menu

8.1.6.2.4. The title on the top of the screen mentions:

- the current date and time (UTC)
- the menu name:
 - o "LOG" for the "general" LOG menu
 - o "EVC" or "DMI" or "TRU" or "STM" or ... for one of the "selective" LOG menus according to the chosen DRU_Sub-system (see §8.1.5.3)
- the current displayed page number (maximum 8 pages)

8.1.6.2.5. For each DRU record event, the following information is displayed:

Name	Explanation
Date and time	Date and time corresponding to the detection of the event by the source (EVC, TRU, DMI or STMs) in UTC reference time.
Sub-system name	Localisation of the sub-system concerned by the event (or error detection): see DRU_Sub-system list at §8.1.5.3.
LRU name	Localisation of the LRU concerned by the event (or error detection) : see DRU_LRU list at §8.1.5.3.
Diagnostic Code identification	The reference of the event recorded
Message	Description of the recorded event. The exact meaning of this field depends on the source of the diagnose data. See §8.1.6.3..
Advice	Some advice for handling the diagnose data. The exact meaning of this field depends on the source of the diagnose data. See



Name	Explanation
	§8.1.6.3..
Free-text	Additional description of the recorded event (normally under the Advice but Free-text are actually not used in the generic data prep, this is the reason why this does not appear on the Figure 11). The exact meaning of this field depends on the source of the diagnose data. See §8.1.6.3..
Channel	The data is only relevant for the DMI product LRU : CH1 id is for the DMI of Cabin A; CH2 id is for the DMI of Cabin B.

8.1.6.2.6. The colour of the text means:

Colour of the Diagnose data text	Explanation
Green	This is a normal event: "OK".
White	This event is minor; it does not cause any limitation in operation of the TRB sub-system.
Yellow	This event is significant. The operation of the train is probably possible but : <ul style="list-style-type: none"> - there is maybe a functional limitation (in this case, a complementary text message is or has been displayed to the driver in the ETCS screen) - in case another element fails during the mission, the TRB sub-system may become fully unavailable A maintenance intervention of level 1, 2 or 3 and/or a repair action is advised.
Red	Major defect. The TRB sub-system is probably not operational any-more. A maintenance intervention of level 1, 2 or 3 and/or a repair action is probably needed.

8.1.6.3. Interpretation of the diagnose data (TRB LOG menu)

8.1.6.3.1. The interpretation depends on the source of the diagnose data: EVC, DMI, TRU and STMs (optional).

8.1.6.3.2. In the case of the EVC, 2 different categories of diagnose data exist:

- EVC HW status-codes: those are directly related to the health status of the HW element of the whole TRB sub-system (not only EVC HW elements). The list of HW elements is the same as for the "TRB maintenance graphic status screen" maintenance feature: please refer to §7.1.4.2.
- EVC application events: this diagnose data is made of special events triggered by the EVC ETCS application usually not related to the health status of TRB sub-system HW elements: (e.g.) Wheel diameter parameter changed, ref. of balise crossed, bad balise linking, etc...

8.1.6.3.3. The interpretation of the diagnose data will be found in separate guide annexes:

Source	Document
EVC – HW status codes	see appendix 01
EVC – System events	see appendix 02



Source	Document
EVC – COMET Sub-system events	see appendix 12
DMI	see appendix 03
TRU Logi+	see appendix 04
TRU Hasler Sécheron Teloc 1550/2550	see appendix 05
TRU Atess	see appendix 06
TRU IntTRU (COMET embedded TRU)	see appendix 08
DMI eVision (Centralp)	see appendix 09
STMs	optional

Remark: those separate documents are generic and are issued by ERTMS CORE. Those documents could be upgraded by the projects according to project specific TRU data preparation. Please be sure that you are using the latest diagnostic data description document applicable to your current TRB sub-system release.

8.1.7.The TRB Status menu

8.1.7.1. What is displayed

8.1.7.1.1. This menu displayed on the DMI provides a status computed by the DRU for each of the sub-systems as defined in the DRU (see DRU_Sub-systems list at §8.1.5.3)

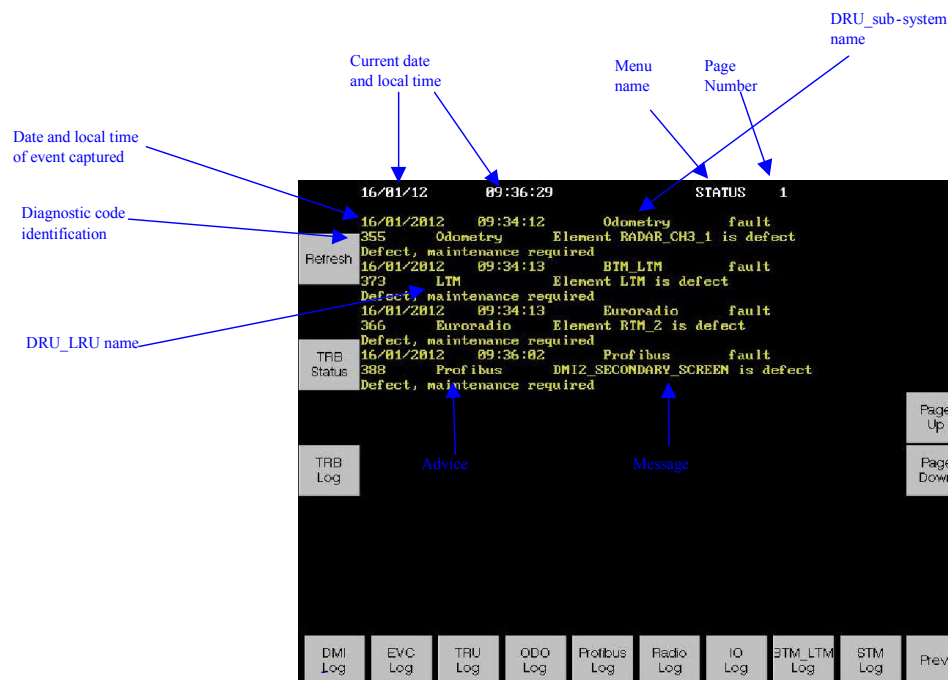


Figure 12 : Example of a TRB Status menu

8.1.7.1.2. The title on the top of the screen mentions:

- the current data and time (UTC)
- the menu name : "STATUS"



- page number (which will always be "1" in this case)

8.1.7.1.3. For each of the DRU_Sub-system, the following information is displayed:



Name	Explanation
Status	Will be one of the following: OK, Fail. The status depends on the events recorded by the DRU. Please refer to the explanations of §8.1.7.2..
Diagnostic Code identification	If existing, the reference of the last event recorded (during the current mission) leading to a fail state of the sub-system. If none, the reference of the last event recorded (during the current mission) leading to a non-fail state of the sub-system.
Date and time	Date and time of the diagnostic code identification displayed. Corresponding to the detection of the event by the source (EVC, TRU, DMI or STMs) in UTC reference time.
Sub-system name	Sub-system name corresponding to the diagnostic code identification displayed. Localisation of the sub-system concerned by the event (or error detection): see DRU_Sub-system list at §8.1.5.3.
LRU name	LRU name corresponding to the diagnostic code identification displayed. Localisation of the LRU concerned by the event (or error detection) : see DRU_LRU list at §8.1.5.3.
Advice	Some advice for handling the diagnose data. The exact meaning of this field depends on the source of the diagnose data. See further §8.1.6.3..
Message	Description of the Diagnostic Code identification displayed. The exact meaning of this field depends on the source of the diagnose data. See § 8.1.6.3..

8.1.7.2. Interpretation of the diagnose data (TRB Status menu)

8.1.7.2.1. The colour of the text is to be related to the Diagnostic Code identification displayed and is to be linked with the status provided.

8.1.7.2.2. It means:

Colour of the Diagnose data text	Status displayed	Explanation
Green	OK	This is a normal event: "OK".
Yellow	FAIL	This event is significant. The operation of the train is probably possible but : <ul style="list-style-type: none"> - there is maybe a functional limitation (in this case, a complementary text message is or has been displayed to the driver in the ETCS screen) - in case another element fails during the mission, the TRB sub-system may become fully unavailable A maintenance intervention of level 1, 2 or 3 and/or a repair action is advised.



Colour of the Diagnose data text	Status displayed	Explanation
Red	FAIL	Major defect. The TRB sub-system is probably not operational any-more. A maintenance intervention of level 1, 2 or 3 and/or a repair action is probably needed.

8.1.7.2.3. For the interpretation of the diagnostic code it-self, please refer to §8.1.6.3 and to dedicated separate documents.

8.1.8. Navigating in TRB Status & TRB LOG menus

8.1.8.1. The navigation from one menu to another and the navigation inside each menu can be achieved in the following way:

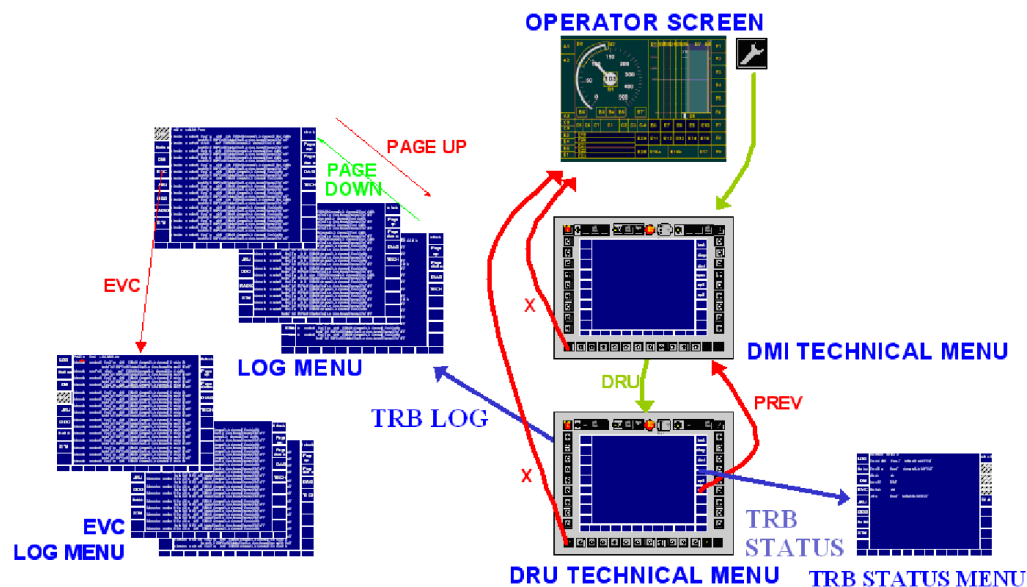


Figure 13 : Navigation between TRB Status menu and TRB Log menus

8.1.9. Known limitations of the TRB Status & TRB LOG menus

8.1.9.1. With the DMI SIL2 hardware architecture (Alstom), in both of these menus a black square hides the display of the relevant information (this is due to the Red Flag displayed when there is an error in the SIL2 speed display management).



8.2.ATBL errors and Failure counters

8.2.1.ATBL errors

- 8.2.1.1. The events called "ATBL error" are internal events of the software. Name of these events 'ATBL' is historical from development team.
- 8.2.1.2. They are all listed in appendix 07. There are more than 3800 codes.
- 8.2.1.3. Most of these are dedicated to software tuning or debugging. (They have been created and defined by the software development team for its internal usage).
- 8.2.1.4. However, sometimes, it could be interesting to analyse these events in order to understand the behaviour of EVC. Therefore the list of these events with their signification is included in this maintenance guide.
- 8.2.1.5. As these events are highly "technical", there is no additional support to what is given in appendix 07. Further analysis will be done by the skilled person.

8.2.2.Failure counters

- 8.2.2.1. Some statistical and/or failure counters can be attached to each event code of "ATBL error" (appendix 07). (It is not mandatory to define a counter for each event code.) This is done by the development team and is not customisable by the projects.
- 8.2.2.2. The statistical counters have absolutely no effect on the EVC behaviour.
- 8.2.2.3. When looking into details, each failure counter contains in fact four independent counters:
 - One counter for internal event detection, called "intra".
 - Three counters for external event detection (one for each EVC channel), called "inter".
- 8.2.2.4. An event "intra" is an event detected by a channel itself when analysing input data from its own channel (e.g. BM or ODO data).
- 8.2.2.5. An event "inter" is an event detected by one channel for another one or itself compared to the others.
- 8.2.2.6. Two thresholds are also associated to each Failure counter: one threshold for the intra counter and one threshold for the three inter counters.
- 8.2.2.7. An action is associated to the threshold of the intra counter: NO_ACTION or REQUEST_ISOLATION. No action is associated to the inter counter.
- 8.2.2.8. The counters are initialised at 0 when one makes a reset of the novrams.
- 8.2.2.9. Each time an event occurs, the corresponding counter is incremented of 10 units.
- 8.2.2.10. At each start of EVC (or at least each 24 hours), the counter s that have not reached their thresholds are decremented of 1 unit.



- 8.2.2.11. The counter never goes back below 1 for keeping track of past event(s).
- 8.2.2.12. At start-up of EVC, if a counter reaches the threshold, the associated action is executed.
- 8.2.2.13. If REQUEST_ISOLATION is configured, the channel (not the EVC) is isolated and remains isolated until next reset of the novrams.
- 8.2.2.14. Note: the thresholds in the data base are encoded in multiples of 10. A value of 6 means a threshold of 60.
- 8.2.2.15. The failure counters are described in appendix 11.



9.SAFETY FACTOR

- 9.1. Each ERTMS Application Project shall define adequate procedure for the maintenance request (necessity to repair or not according to the failed equipment) and the appropriate corrective actions according to the status displayed: Warning, Defect, Not Operational, Not applicable.





APPENDIX 01 – DIAGNOSTIC CODES FOR "EVC – HW STATUS CODES"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP1.

(File name: GATC_BSI_GUID_0125_APP01_yyyymmdd where dd/mm/yyyy is the date of the latest update)

The minimum version of the appendix for this version of the main document is 20140528.

Please be sure you are using the latest diagnostic data description document applicable to your current Trainborne sub-system release.



APPENDIX 02 – DIAGNOSTIC CODES FOR "EVC – SYSTEM EVENTS"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP2.

(File name: GATC_BSI_GUID_0125_APP02_yyyymmdd where dd/mm/yyyy is the date of the latest update)

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APPENDIX 03 - DIAGNOSTIC CODES FOR "DMI"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP3.

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APPENDIX 04 - DIAGNOSTIC CODES FOR "TRU LOGI+"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP4.

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APPENDIX 05 - DIAGNOSTIC CODES FOR "TRU HASLER SÉCHERON TELOC 1550/2550"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP5.

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APPENDIX 06 - DIAGNOSTIC CODES FOR "TRU ATESS"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP6.

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APPENDIX 07 – ATBL ERRORS AND DESCRIPTION

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP7.

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APPENDIX 08 - DIAGNOSTIC CODES FOR COMET EMBEDDED TRU

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP8.

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APPENDIX 09 - DIAGNOSTIC CODES FOR "DMI CENTRALP/ERSA"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP9.

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APPENDIX 10 – LLRU LIST

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP10.

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APPENDIX 11 – FAILURE COUNTERS

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP11.

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APPENDIX 12 – DIAGNOSTIC CODES FOR "COMET – SYSTEM EVENTS"

Please refer to the dynamic appendix GATC/BSI/GUID/0125_APP2.

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