

## Q9.99 List of known issues

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for the development of an STM ATB

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Compiled by: AXO  Signature/E-sign: 546014 ,STMA-79810	Date: 2020/07/24 08:20
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# 1 Introduction

## 1.1 Purpose of this document

**Text, STMA-76296** - Through out the project issues have been reported in a JIRA online database tool to keep track of these issues and to track resolving the issues. At the end of the project there will be some issues left that could not be resolved within the project for various reasons. This document has been created to capture these known issues and keep the issues as part of the active record of the STM ATB through out its life span.

**Text, STMA-76346** - It is recognised by the current STM ATBEG project team that the STM ATBEG will be updated during its life span and during these updates these known issues might be resolved.

**Text, STMA-76347** - There are a number of criteria an issue needs to fulfill to be added to this document, these criteria are:

- The issue may never be a safety related issue. These always need to be resolved.
- The issue may never be a reliability issue that has impact on day to day use of the STM ATBEG. These issues need to be resolved.
- The issue must be reproducible, meaning that with the correct circumstances the issue needs to occur.



## 1.2 References

### Text, STMA-14296 - Reference documents



All the documents references used in this document can be found in the document  [P6.1](#)

[Bibliography](#) available in the Polarion folder  [Processes](#)

### Abbreviations, definitions and terminology


An overview of the abbreviations, definitions and terminology used in this document can be found in document  [P6.2 List of abbreviations, definitions and terms](#) available in the Polarion folder  [Processes](#)








### Requirement identification

The STM ATB project makes use of an automated requirement management system. In this system each requirement has been identified as a work item. Each work item has been automatically assigned with a unique ID, with the format "STMA-<number>". As a result requirement ID's are not in logical order. An overview of all the used STMA-numbers is given in document  [P6.3 Requirement Overview](#) available in the Polarion folder  [Processes](#)



## 2 Known issues






### Known Issue, STMA-76536 - Vmax\_ATB may be set to "unknown"


If STML\_V\_MAX\_TRAIN is set to "unknown", then Vmax\_ATB would be set to "unknown" by  **STMA-3004**, which is not correct because this value is used as a "number" in other requirements. In practise, this situation will never occur. The issue has been partially resolved by rewriting the requirement. However, it could not be implemented in source code anymore.

Severity	 Nice to Have
RAMS Impact	 Maintainability
Resolution	 Partially resolved
Jira DEV issue(s)	DEV-3392
Linked Work Items	<p>has parent:  <b>STMA-76306</b> - Known issues ,</p> <p>relates to:  <b>STMA-2972</b> - state transition 14 If the STM internal state is CS and the input "STM state ord... ,</p> <p>relates to:  <b>STMA-3004</b> - If the following variables are different from "unknown": * STML_V_MAXTRAIN (maxi... ,</p> <p>relates to:  <b>STMA-3008</b> - CALCULATE the "LIMITED ATBEG CODE SPEEDS": If the following variables are differ...</p>


### Known Issue, STMA-76546 - Magnitude difference between left and right 145 Hz test signals







 **STMA-37856** requires that an event flag is set when the magnitudes of the left and right 145 Hz test signals differ more than 20%. The actual implementation (see  **STMA-37856-mCheckConfigurationSignal** ) implements a check on a magnitude difference of more than 100% - which is stated by DES&IMP to be the correct value.

Severity	 Nice to Have
RAMS Impact	 Reliability
Resolution	 Partially resolved
Jira DEV issue(s)	DEV-3411
Linked Work	<p>has parent:  <b>STMA-76306</b> - Known issues ,</p> <p>relates to:  <b>STMA-37856</b> - If suppress test signal check ( ) is not set then If the magnitude of the last 1... ,</p>




Items	relates to:  STMA-37856-mCheckConfigurationSignal - mCheckConfigurationSignal implements STMA-37856
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### Known Issue, STMA-76564 - Not all source code fragments linked to requirements

Some high-level requirements like for example  STMA-28278 in D5.2 have been copied to a limited set of module requirements only - instead of having been copied to all relevant sets of module requirements. This causes a problem that not all source code fragments have been linked to "source" implementation workitems. For example, STMA-28278 describes initialisation of module variables. Each software module has a function for doing thing. However, only the initialisation functions of the FP\_HW and IH modules have been linked to the requirement. Therefore, care must be taken when doing code reviews on the source code when "copied in" requirements are used.




Severity	 Should Have
RAMS Impact	 Maintainability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3412
Linked Work Items	has parent:  STMA-76306 - Known issues , refines:  STMA-28144 - The initialisation of variables needs to have successfully taken place before th... , relates to:  STMA-28278 - Initial values have to be set according to the default values as given in the co...

### Known Issue, STMA-76568 - STMA-28144 and STMA-28278 can be combined

Requirements  STMA-28144 and  STMA-28278 overlap. One states that module variables must be initialised before use and the other states that module variables must be initialised to the specified default values. Since this applies to all modules, it would be more efficient to combine these requirements into a single requirement. See also:  STMA-76564.




Severity	 Nice to Have
RAMS Impact	 Maintainability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3413
Linked Work Items	has parent:  STMA-76306 - Known issues

**Known Issue, STMA-76748** - STMA-72592 does not test the disconnect reason



Severity	 Nice to Have
RAMS Impact	
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3417
Linked Work Items	has parent:  <a href="#">STMA-76306</a> - Known issues








**Known Issue, STMA-76752** - STMA-1469 is not tested completely

Unit tests can be added to test the behaviour for SL0, see STMA-58586.

Severity	 Nice to Have
RAMS Impact	
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3418
Linked Work Items	has parent:  <a href="#">STMA-76306</a> - Known issues

**Known Issue, STMA-76754** - Braking percentage table not documented correctly.

The braking percentage table listed in  [STMA-17205](#) lists voltage levels in addition to resistance levels. The requirement lists positive-only voltage levels. The table used in the implementation (source code) uses some negative voltage levels as well. The corrected table in spreadsheet format can be found [here](#) and in  [STMA-77964](#) - [Configuration resistor](#): .

Severity	 Should Have
RAMS Impact	 Maintainability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3419
Linked Work Items	has parent:  <a href="#">STMA-76306</a> - Known issues , relates to:  <a href="#">STMA-17205</a> - Table: ConfiguredBrakingPercentage as a function of U_config_filtered. R [kΩ] (E... , relates to:  <a href="#">STMA-17204</a> - Determine the braking percentage If * is false and * U_config_filtered(n) () is... , relates to:  <a href="#">STMA-17204-mCalculateBrakingPercentage</a> - mCalculateBrakingPercentage implements STMA-17204






**Text, STMA-77964** - Configuration resistor:

Resistor [kOhm] E96 series	Minimum voltage [V]	Maximum voltage [V]	Braking percentage
4,53	1,25	1,37	36
3,01	0,97	1,09	46
2	0,62	0,74	54
1,5	0,35	0,47	55
1,13	0,06	0,18	65
0,845	-0,23	-0,11	72
0,634	-0,52	-0,40	91
0,464	-0,81	-0,69	113
0,332	-1,09	-0,97	119
0,221	-1,37	-1,25	160

84% and 100% are not supported.  
These values are only relevant for trains > 500m which always drive above 100km/h. These locomotive shall either be allowed to drive 130km/h, When driving alone (113%) or reduce speed when hauling long trains.

**Known Issue, STMA-77039** - The diagram in  **STMA-40815** contains a typo.

GAIN ADJ R label on the left channel should be named GAIN ADJ L. Also, A1 and B2 or B1 and A2 are connected to a single cabin. The labels are wrong.

Severity	 Nice to Have
RAMS Impact	 Maintainability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3420
Linked Work Items	has parent:  <b>STMA-76306</b> - Known issues , relates to:  <b>STMA-40815</b> - Fig 2. The block schematic diagram of the analogue input signals, incl. test sig...

**Known Issue, STMA-77980** - Backplane connector







One of the backplane connectors was implemented as the wire-wrap version during the prototype design stage, as the elongated pins are helpful for debugging purposes. As the elongated connector is not compatible with the enclosure, the production version of the backplane should have all standard type connectors.  
The corrected TPD can be found below.


PDF









The corrected BOM can be found below.

<a href="#">XLS</a>
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Severity	 Must Have
RAMS Impact	 Maintainability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3421
Linked Work Items	has parent:  STMA-76306 - Known issues , relates to:  STMA-64076 - Schematics including board layout (Gerbers): Board TPD SAP ZIP AIN PDF DIO+PS PD... , relates to:  STMA-64088 - The list of components can be found in the Bill Of Materials, these are generate...

**Known Issue, STMA-78079** - Part numbers shall added in  [STMA-69310 - Connector parts code type number description Manufacturer \(example\) Order code \(... and !\[\]\(c468cde8f04e2e2a6ba3c2a373e05c45\_img.jpg\) STMA-74734 - The STM ATB module consists of the following parts: \\* DIO+PS board; 100 x 160mm... Inotec part number SubD bolts is DV-B2/2M3](#)

Severity	 Nice to Have
RAMS Impact	 Maintainability
Resolution	 Resolved
Jira DEV issue(s)	DEV-3422
Linked Work Items	has parent:  STMA-76306 - Known issues , relates to:  STMA-74734 - The STM ATB module consists of the following parts: * DIO+PS board; 100 x 160mm... , relates to:  STMA-69310 - Connector parts code type number description Manufacturer (example) Order code (...

**Text, STMA-78085** -

Connector parts					
co de	type	num ber	description	Manufact urer (example)	Order code (example)

<b>X1</b>	Connector	1	DIN 41612 Type F female	Harting	09 06 248 3201 222
	Hood	1	DIN-Power shell housing D 20 metall emv	Harting	09 06 848 0551
	Cable entries (cable type dependant)	2	Crimp flange, 9 mm	Harting	61 03 000 0072
		2	Crimp ferrule, 14 mm	Harting	61 03 000 0061
		1	Crimp flange, 5 mm	Harting	61 03 000 0066
		1	Crimp ferrule, 8 mm	Harting	61 03 000 0051
		4	Crimp flange insert	Harting	09 06 800 9952
		5	Blanking piece	Harting	61 03 000 0042
	Connector female crimp FC contacts	34	Copper alloy, conductor: 0.5...1.5 for FC 3	Harting	09 06 000 7482
	Alternative screw cable entries	?	DIN-Power cable clamp D20 zinc die cast	Harting	09 06 800 9955
		?	Blinding piece D20 zinc die cast	Harting	09 06 800 9951
<b>X2</b>	Pin connector	1	SubD-15 crimp pin	Inotec	DC15P-G
	hood	1	D-Sub full metal hood with screw locking, M3 screw	Inotec	DG15 MSB-91
	Cable entries	2	Cable clamp	Inotec	DKS100
		2	Crimp ferrule	Inotec	CH-x/x (*)
	Crimp contacts	15	Crimp contacts, pin, AWG 24-20	Inotec	DCC2P4
<b>X3</b>	Socket connector	1	SubD-15 crimp socket	Inotec	DC15S-G
	hood	1	D-Sub full metal hood with screw locking, M3 screw	Inotec	DG15 MSB-91
	Cable entries	2	Cable clamp	Inotec	DKS100

		?	ferrule	tbd	tbd
	Crimp contacts	15	Crimp contacts, socket, AWG 24-21	Inotec	DCC2S4
<b>X4</b>	Pin connector	1	SubD-09 crimp pin	Inotec	DC09P-G
	hood	1	D-Sub full metal hood with screw locking, M3 screw	Inotec	DG09 MSX-91
	Cable entries	?	Cable clamp	Inotec	DKS100
		?	ferrule	tbd	tbd
	Crimp contacts	?	Crimp contacts, pin, AWG 24-20	Inotec	DCC2P4
<b>X5</b>	Socket connector	1	SubD-09 crimp socket	Inotec	DC09S-G
	hood	1	D-Sub full metal hood with screw locking, M3 screw	Inotec	DG09 MSX-91
	Cable entries	?	Cable clamp	Inotec	DKS100
		?	ferrule	tbd	tbd
	Crimp contacts	?	Crimp contacts, socket, AWG 24-21	Inotec	DCC2S4

(\*) x/x indicates D1/D2 (inner/outer diameter in mm)




#### Known Issue, STMA-78288 - Software fault:





##### The EB counters are not reset in case of an ATBEG state transition

In STMA-15680, STMA-15667, 15672 and 15673 the state (Constant, Braking and Braking) should have been included as a condition, as in the RIS it is required that all timers are reset in case of a state transition (except the code75 timer).

The absence of this condition causes a problem in the transition from braking to constant in case the speed margin for constant is lower than the speed margin for braking (i.e. for freight trains), and the speed at the time of the transition is above the speed margin for constant.

In such a case when the transition is made (20s after the speed came below the speed margin for braking) an immediate EB intervention will be commanded without prior warning.

Severity	 Should Have
RAMS Impact	 Availability
Resolution	 Unresolved
Jira DEV	





issue(s)	DEV-3416
Linked Work Items	<p>has parent:  STMA-76306 - Known issues ,</p> <p>relates to:  STMA-15667 - N_InterventionConditionsConstant If * V_current &lt; Guarded_Speed_Constant or * Dr... ,</p> <p>relates to:  STMA-15672 - N_InterventionConditionsBrakingY If * V_current &lt; Guarded_Speed_Braking or * Dri... ,</p> <p>relates to:  STMA-15673 - N_InterventionConditionsBraking If * V_current &lt; Guarded_Speed_Braking or * Driv...</p>

#### Known Issue, STMA-78289 - Software fault:

##### The ATBVv signals are also used if the selected driving direction is different from forward.

If the driving direction is different from forward, then not only the ATBEG code shall be set to noCode by the Scheduler, but also the ATBVv signal shall be set to noSignal.

In addition the track signals may also be stored independent from the selected driving direction and the STM ATB state; the ATB decoder can remain active by suppressing the result if the conditions for using code are not met (thus if the driving direction is not forward or the STM ATB state is not active).

Severity	 Should Have
RAMS Impact	 Availability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3415
Linked Work Items	has parent:  STMA-76306 - Known issues

#### Known Issue, STMA-78042 - Software fault:

##### The resolution of the distance measurement for ATBVv functions is insufficient.

The distance to measure the ATBVv distances (overridden distance and the distance to the signal at danger) is calculated from the speed value (in cm/s) received from the ETCS on-board. Every 10ms this distance is calculated in cm, which causes a loss in resolution. With a speed available in cm/s, the distance driven per 10m could have been calculated with a resolution of 0.1mm.

This has consequences for the measurement of the overridden distance and the distance to the signal at danger:





- overridden distance: After operating the override button, the ATBVv function shall not command the EB for the override distance of 200m. The maximum relative fault in this distance is  $1/v$ . Unless the train is driving below 1m/s the distance can never be big enough to reach the beacons of the next signal in the overridden state, and normally the overridden

state will be switched of by the beacon3 stop signal

- distance to the signal: After passing the 120m beacon the distance to the signal is continuously corrected according to the distance driven. The deviation between the 120m beacon and 30m beacon depends on the speed driven (relative fault  $1/v$ ). This is a problem if the 30m beacon is reached at a speed which is too high to stop in rear of the signal at danger.





For a passenger train the worst case speed is app. 8m/s leading to over-passing the signal with 90/8 is app. 11m.

This will in normal cases be in rear of the danger point.

Severity	 Should Have
RAMS Impact	 Reliabiliy
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3414
Linked Work Items	has parent:  <a href="#">STMA-76306</a> - Known issues

#### Known Issue, **STMA-78994** - DIO+PS connector fit

The DIO+PS connector tightening bolts cannot be fully tightened, since the bolts are too long or the front plate nuts are placed too high. As a consequence, an installed DIO+PS connector has a significant amount of play. The system integrator shall use shorter bolts.

Severity	 Should Have
RAMS Impact	 Reliabiliy
Resolution	 Unresolved
Jira DEV issue(s)	DEV-2542
Linked Work Items	has parent:  <a href="#">STMA-76306</a> - Known issues

#### Known Issue, **STMA-78999** - Functional Processor Hardware Interface







The state machine on the functional processor that monitors the FPGA state has overlap in two transitions.

1. Transition 3 (STMA-37745) should occur from the state READY to the state LOADING when:
  - a. The event flag "Under- Over- Voltage Detected" is false AND
  - b. The FPGA signals "a bitstream load is busy".
2. Transition 5 (STMA-40035) should occur from the state READY to the state OFF when:

- a. The FPGA is in the state POWERDOWN OR
- b. The event flag "Under- Over- Voltage Detected" is true.

The state POWERDOWN is determined with the same signal "a bitstream load is busy" used by transition 3. When transition 3 should occur, so should transition 5, (but transition 5 can be true when transition 3 is not). Because condition 3 is checked before condition 5, the first condition of transition 5 is effectively not used and should be removed from the requirement.

Note that this does not effect the functionality of the STM ATB. Transition 3 will reset the FPGA and directly order the FPGA to load the bitstream. Transition 5 on the other hand will reset the FPGA, but order the FPGA to withhold loading the bitstream. However it will transition to state OFF from which transition 1 will order the FPGA to load the bitstream eventually.

Severity	 Nice to Have
RAMS Impact	 Maintainability
Resolution	 Unresolved
Jira DEV issue(s)	DEV-3325
Linked Work Items	<p>has parent:  <a href="#">STMA-76306</a> - Known issues ,</p> <p>relates to:  <a href="#">STMA-37745</a> - FPGA State Transition 3 If the current FPGA_State is "READY" and is false and th... ,</p> <p>relates to:  <a href="#">STMA-40035</a> - FPGA State Transition 5 If the current FPGA_State is "READY" and ( the FPGA is i...</p>




**Known Issue, STMA-79004** - The FPGA clock is connected to the EMCCLK pin, this pin is not clock capable. Topic reported it might be an issue to route this signal to the global clock buffer in the FPGA.


A solution was found where the clock is routed to a regional clock buffer of the diagnostic channel which is routed to the global clock tree.

Another solution is to route the clock signal (in the FPGA) to another pin and then on the board connect this new pin to a clock capable pin.

As no problems or warnings were found with the first solution, this solution is implemented.

If board changes have to be made, rerouting the clock should be considered. In case of a board update, the FPGA firmware should be aligned to the board update.

Severity	 Nice to Have
RAMS Impact	 Reliability
Resolution	 Partially resolved

Jira DEV issue(s)	DEV-1012
Linked Work Items	has parent:  <a href="#">STMA-76306</a> - Known issues