m'X | TELEMATICS
MOBILE INFORMATION EXCHANGE

Version 4: 4 May 2020

MiX Vision

Diagnostic Event Configuration guide

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Introduction

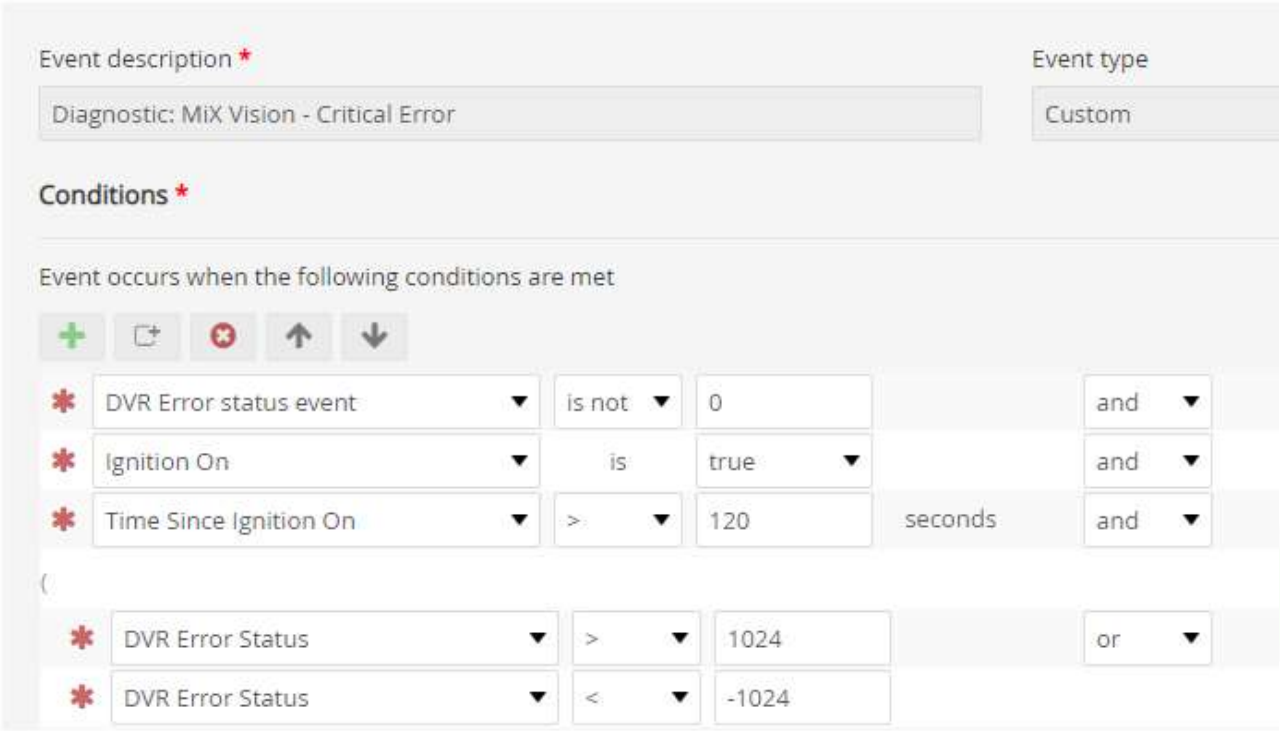
The MiX Vision error codes have evolved over the years and there are now a mechanism where the error codes are binary encoded as well as one where each error is individually logged. This leads to the duplication and excessive logging of the same error multiple times during a trip.

It is recommended that users only create the following two events in their databases and that all the other error events are excluded from the templates in order to make it easier to identify and service a faulty MiX Vision unit.

Note that we will refer to the MiX Vision onboard computer using the generic term OBC in this document, the actual device can be FM3xxx Communicators, MiX 4000 or MiX 6000. FM3xxx Tracers does not support MiX Vision.

Diagnostic: MiX Vision - Critical Error

This new error message will ONLY trigger when the OBC fails to communicate with the MiX Vision Video recorder and all the binary encoded error messages will be excluded.



Return Value	**DVR Error Status**
Value	Maximum
Recording type	Notification

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MVR Critical Error Codes

The output of this error should ONLY return the two values listed below. Note that the two errors below are exceptions, since they are not returned by the **MVR**, but are generated by the serial script when it fails to communicate with the MiX Vision unit.

Boot Error **1 073 741 824** **(4000 0000 0000 0000)**	This error will typically be logged for any event that triggers during the first minute after the **MVR** was powered-up (e.g. "Ignition ON" as a Video event). During this time the **MVR** is still booting up and cannot record any video or respond back to the OBC with any of the error messages. The condition "Time Since Ignition ON > 120s" will prevent any false events and when you see this message it means the **MVR** does not boot correctly.
MiX Vision "NOT responding" error message **-2 147 483 648** **(8000 0000 0000 0000)**	When the **OBC** serial script fails to communicate for more than 5 minutes with the **MVR**, an error message will be logged with the following value: 8000 0000 0000 0000 = -2147483648 (Note on some Insight reports this value is too big and will appear as a string of dashes).

MVR Critical Error – Recommended Actions

This is a critical error and will require a technician to visit the vehicle.

Cause	Effect	Action
The serial cable between the **OBC** and **MVR** is not connected or damaged.	**MVR** will flash power LED every 10s and camera LEDs will remain off.	Check serial cable Check that installed port matches configuration.
The **MVR** is not powered.	All the LED's on the MVR will be off.	Check red/black wire and ensure it is connected to 12/24V.
The **MVR** fails to boot.	The power LED will flash every 5-10s and the camera LEDs will also flash.	Remove power (White connector) and re-apply power and switch Ignition ON. If the unit still fails to boot, replace with another. If unit does boot, log call with Help Desk so that unit SD card can be repaired over-the-air.
The **MVR** is not switched ON by the **OBC** when Ignition is ON.	**MVR** will flash power LED every 10s and camera LEDs will remain off.	Check that the script is correctly configured on the **OBC**. Check that positive Drive wire is correctly connected and pulled high (12V/24V).
The **OBC** is fitted with a backup battery and the equipment is installed behind an isolator switch.	The **OBC** will re-surface with power from the backup battery and try and communicate with **MVR**. The **MVR** is still off and the **OBC** will log a critical error.	The "Time Since Ignition ON > 120s" condition should prevent this, so check that the event is correctly configured.

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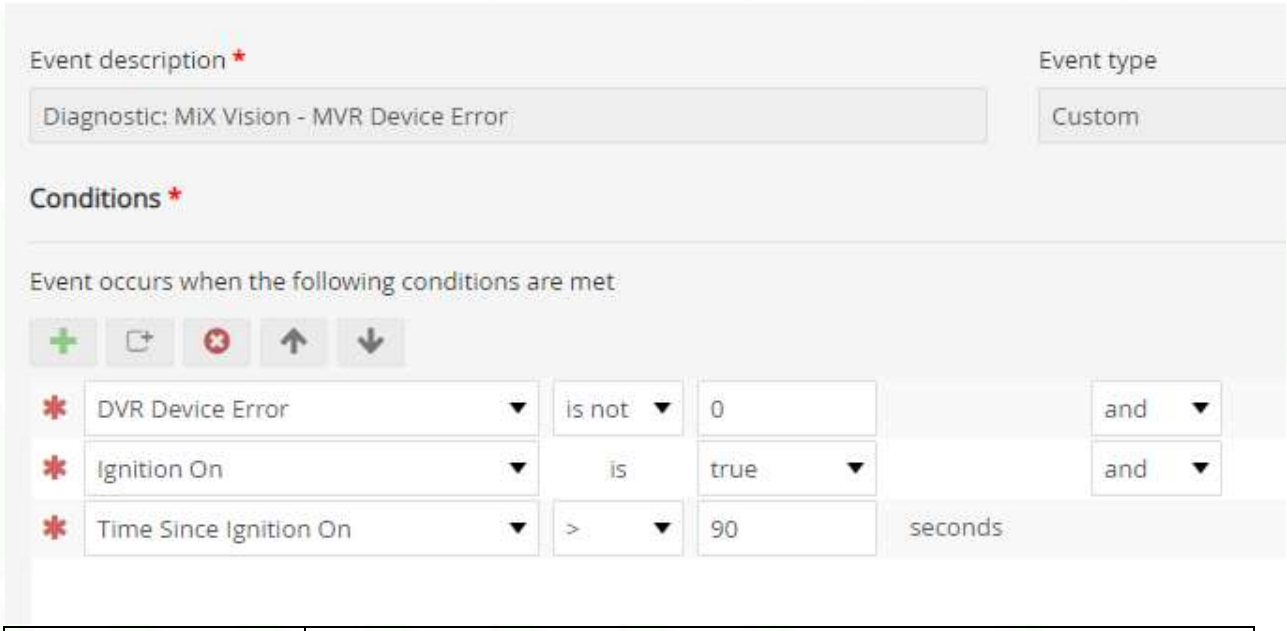
Diagnostic: MiX Vision – MVR Device Error

This error will return individual error codes from the table below if the **MVR** is on and functioning. If you have received the Diagnostic: MiX Vision - Critical Error then none of the errors mentioned below will be logged. To ensure that you do not get any false error events, we recommend that the condition "Time since Ignition ON > 90s" is also added to this event.



Return Value	**DVR Device Error**
Value	Maximum
Recording type	Notification

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MVR Device Error Codes

The following list of error codes can be returned by this event. Note that only the error codes with green shaded cells with a Y in the Incl. column should be reported by current versions of the script and firmware.

The error codes in red; 9, 11-19 are reserved for future use.

Error code	Error Description	Explanation	Incl.
0	No Error	This code is transmitted when no errors are detected.	Y
1	Watchdog Reboot	When the **MVR** Internal watchdog had to restart the processor, this code will be transmitted.	Y
2	Video Processor Error	When the Video Processing chip reports an error, this error code will be transmitted.	Y
3	Audio Processor Error	When an audio error is detected, this error code will be transmitted.	Y
4	Tampering detected on CAM1	When camera 1 is tilted or obscured this error code will be transmitted.	Y
5	Tampering detected on CAM2	When camera 2 is tilted or obscured this error code will be transmitted.	Y
6	Tampering detected on CAM3	When camera 3 is tilted or obscured this error code will be transmitted.	Y
7	Tampering detected on CAM4	When camera 4 is tilted or obscured this error code will be transmitted.	Y
8	SD Card Failure	When an error is detected on the SD card or the card is removed, this error code will be transmitted.	Y
9	NAND memory failure	When the memory fails, this error code will be transmitted.	N
10	PSU (Power) failure	If one of the power rails measure too low or the external power drops below 10V then this error code will be transmitted.	Y
11	Temperature Failure	When the unit has to shutdown / reboot due to temperature this error code will be transmitted.	N
12	SIM PIN Error	When a SIM PIN error is reported, this error code will be transmitted.	N
13	SIM failure error	When the unit cannot read the SIM card, this error code will be transmitted.	N
14	APN UN & PW Error	When an incorrect username or password for the APN is entered, this error code will be transmitted.	N
15	Invalid APN	When an invalid APN is entered, this error code will be transmitted.	N
16	GSM connection failed > xx times	When the GSM connection fails more than a configured time within a set period, this error code will be transmitted	N
17	GSM connection timeout	When a GSM connection times out, this error code will be transmitted	N
18	GSM jamming detected	When GSM jamming is detected, this error code will be transmitted.	N
19	GSM modem failure	If the MVR no longer communicates with the modem, this error code will be transmitted.	N
20	Not recording 72 hours	If the unit cannot maintain 72 hours of continuous video, this error code will be transmitted	Y
21	Video Server comms error	If the unit can connect to the server or data uploads failed, this error code will be transmitted.	Y
22	Camera 1 Error	When an error is detected on camera 1, this error code will be transmitted.	Y
23	Camera 2 Error	When an error is detected on camera 2, this error code will be transmitted.	Y
24	Camera 3 Error	When an error is detected on camera 3, this error code will be transmitted.	Y
25	Camera 4 Error	When an error is detected on camera 4, this error code will be transmitted.	Y
26	Cannot process command	When the MVR gets a command from the **OBC** that cannot be processed or contains multiple errors (e.g. when the system is still booting up), this error code will be transmitted.	Y
27	Unit booted because of a power failure	This will happen if the unit experiences a power failure (i.e. the **MVR** is wired to an isolator or it is disconnected from power).	Y
28	SD card - Corrupt file(s)	There is a corrupt file(s) on the SD card (possibly caused a bad SD card sector). It means there could be some video loss. This error should clear after the data is wrapped.	Y
29	SD Card - MMC error	MMC errors • The causes of these errors are varied and deciding what to do with an SD card that reports such errors is complicated.	Y

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		• These errors are caused when the SD card returns an error or fails to respond appropriately or fast enough, during a write or read operation. • These errors can be categorized into 2 basic types (1) Spurious and (2) Frequent **1. <u>Spurious</u>** • In some cases, the error is spurious, in that, it may occur once for a single read/write operation and may not occur again for many days/weeks afterwards. • This means that only a small portion of data may be lost. • In the instances that we have seen, when the error appears once, it always re-occurs some time later. • This could be hours/days or even weeks. When it re-appears, it is not necessarily at the same sector. ***In these cases, the SD card is probably okay but it is probably a very early indicator of the card deteriorating.*** • We have been able to source cards internally that behave in a similar fashion and our analysis has shown that while these cards appear to operate correctly for long periods of time, they have invariably always had the MMC error reappear at some point later. • For the most part, they will probably continue to operate (albeit with the occasional small loss of data) for a long time. • The sample SD cards that we have been able to access continue to operate with the very occasional spurious MMC error. ***These card should probably be replaced at some point in the future but at a low priority.*** **2. <u>Frequent</u>** • In other cases, the MMC errors occur very frequently. • These errors may happen continuously or it may be that the card accepts read/write operations for a short while (1-2hrs) before generating the error. • This is probably the same card that occurred in the spurious case above, but the card has been working for some time longer. ***In these cases, the SD card is likely damaged and should be replaced as soon as possible.***	
30	SD Card - Max write cycles	The maximum write cycles of the SD card has been reached so the card is no longer retaining data. ***The SD card should be replaced asap.***	Y

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MVR Device Error - Recommended Actions

The following table contains a description and actions that should be taken when each of these errors occur.

Error Name	Description / Details	Actions
Watchdog reboot (1)	This error happens when the firmware running on the unit reboots the unit. If there is a high frequency of camera failures, the watchdog may reset the unit. If the unit cannot access the modem, the unit may reset the modem. If the input voltage falls below the specified operating voltage (a brown out) - a watchdog reboot may result. A watchdog is an attempt to put the unit into a known operating state (for example after a brown out)	If there is a watchdog and it is not clear what the cause of this might be (for example low power), then this error should be reported to Cathexis for remote support
Video Processor Error (2) Audio Processor Error (3)	The system fails to record video or audio.	If these errors happens more than once during a trip it should be reported to Cathexis for remote support
Tamper errors (4,5,6,7)	1) The tamper events will only happen if the Video frames (image) has not changed for more than 20 seconds WHILE the vehicle is driving (Speed > moving Speed) 2) The confidence level must be > 40% before a tamper event will be raised i.e. even if tampering is detected, but the confidence level is lower than 40%, the MVR will not raise a tampering event. 3) If tampering happens out of trip (When the vehicle is NOT moving) or when the MVR is switched off – the event will only be raised when the vehicle is starting to move (in trip). 4) Once a tamper event is raised for a specific camera, it will continue to raise the alarm every hour until the condition is cleared/corrected. 5) If the event is configured to record Video and to send an active event and SMS, then the unit will upload a video and send an SMS once every hour until the Camera view is cleared or the camera orientation is corrected. If the cable is cut, it will raise a "CAMERA ERROR" and not a Tampering Event	Expect some false events, but they should be less than 5% of all incidents. If it is a valid tamper event perform following actions: - Ensure the camera view is cleared - The camera orientation is corrected. - The lens is cleaned. - LEDs are working and sufficient night time illumination is visible in the scene. If more than 5% false events are triggered Contact Cathexis support to investigate remotely
SD Card failure (8)	This happens when the SDCARD has permanently failed or if there is no SDCARD inserted. This error will repeat every minute until the SDCARD is detected	• Contact Cathexis support to investigate remotely • Will probably need to replace SDCARD
PSU Failure (10)	When the input voltage (supplied by the vehicle) drops below 10V the MVR will send this error to the **OBC** • If the input power source is consistently below 10V this error will be generated every 60 seconds so it can result in a very high count • This voltage is below the operating specification of the unit. • This is called a brown out, and reliable operation of the unit cannot be guaranteed.	• Resolve the problem with the input power • Is the unit powered directly from the vehicle battery? • Check wiring • Check battery • This may require a technician to investigate
Not recording 72hrs (20)	This error is generated if the unit determined that the continuous database did not have at least 72hrs of footage	This is depends on the settings that were configured for continuous video recordings. *If the default configuration is used then this error should not occur.* If the unit's video configuration has changed then this error should probably be ignored. *If this error is frequent (more than once a day) then contact Cathexis Support for assistance*

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Video Server comms error (21)	This happens when the unit cannot connect to the upload server at any point. The MVR connects to the server to upload video and statistics on a daily basis. This could simply be: • Intermittent network outage (out of range) • Or could point to a problematic modem or SIM or cell network. • or out of data error • or the APN data is incorrectly configured • or the server was incorrectly configured This error can be generated every hour.	If the unit is reporting this error more than 6 or 7 times a day • Check that the SIM still has data • Check the SIM is enabled. • Check if the vehicle has not entered a different country (ie check if Roaming is enabled for SIM) • Check the routing to the servers for the APN is still valid • If the above checks are successful then a technician will probably be required to diagnose • As this relates to network comms, remote support is likely to be impossible
Camera error (22, 23, 24, 25).	This reports a camera synchronization failure (most often this is transient). The cameras on the MVR are monitored and an error generated every time the camera synchronization fails. A genuine camera failure - where it ceases to work, or works intermittently will result in thousands of camera synchronization failures. Possible causes for synchronization failures. • On boot up it is possible that a camera does not synchronize during camera power supply initialization, so the odd camera error count is expected. • If there is a video compression failure for any reason (perhaps a very large, complex image that needs to be recompressed) - the camera power is switched on and off, and a camera error will be generated with the loss of camera synchronization. • This is possible sometimes, in normal operation with old cameras. • A faulty camera will result in hundreds or thousands of camera errors as the camera synchronization may constantly go up and down. The count is dependent on the up time of the MVR. Units where the camera error count is high should be investigated for possible faulty cameras. This will also be evident in the video. The cameras are designed to work above 10VDC. If the input power is below 10VDC it is likely that the camera synchronization will periodically fail	• Check and ensure the input voltage to the device is always >=10VDC (Can be done remotely) • Check the videos from the camera to see if there are signs of failure in the video (can be done remotely) • Check camera cables for signs of tamper • If the camera failure rate is <10 times a day, the error can probably be ignored • Contact Cathexis support for further assistance
Cannot process command (26)	This is an error reported by the MVR when it is unable to process a command from the **OBC**. These errors will happen when: 1. One or more cameras are down at the time of an event request (and the camera was part of the request). 2. When an event is requested for a camera that is not configured or disconnected 3. When a command is sent from the **OBC** before the MVR has properly initialized. The **OBC** instructs the MVR to boot, but must give the MVR time to boot. This happens if a command is sent before the **MVR** has completed initialization.	• Check that the latest **OBC** script version is running. • If the unit is experiencing camera synchronization failures then this error is likely to happen as well • If the frequency of this error is high (happening after every **OBC** event request) then Cathexis Support may remotely be able to help
Unit booted because of power failure (27)	The error occurs when a unit had its input power removed without the requisite instruction from the **OBC** unit (i.e. power was previously cut to the device). If the **MVR** is powered via an isolator and the ignition line was not asserted and the **MVR** given time to shut down correctly, then this error will occur in normal operation. If the **MVR** is powered directly to the battery with its ignition connected to **OBC** positive drive and the **OBC** has instructed the **MVR** to shut down, then this error is abnormal	• This is a little more difficult to interpret as it requires contextual knowledge of the wiring. • It can be ignored in low volumes but if it occurs more than 30 times in a day, then further investigation is warranted

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SD card (28)	There is a corrupt file(s) on the SD card (possibly caused a bad SD card sector). It means there could be some video loss. This error should clear after the data is wrapped.	• This error should clear automatically after the data is wrapped. • No user intervention is required except to take note of this error if certain data could not be retrieved, since it can be due to the corrupt file.
SD Card (29)	MMC errors • The causes of these errors are varied and deciding what to do with an SD card that reports such errors is complicated. • These errors are caused when the SD card returns an error or fails to respond appropriately, or quick enough, during a write or read operation. • These errors can be categorized into 2 basic types (1) Spurious and (2) Frequent	• For spurious errors the SD card should probably be replaced at some point in the future but at a low priority. • For frequent errors replace the SD card as soon as possible.
SD card (30)	The maximum write cycles of the SD card has been reached so the card is no longer retaining data.	• **The SD card should be replaced ASAP.**