Lantronix AVL FIRMWARE RELEASE

VERSION: avl_3.12.0_rc2
    BIOS version: 3.0.4
    Official release date: 11/17/2020 (M/D/Y)
    List of firmware files: avl_3.12.0_rc2_20201110.frp
                                   avl_3.12.0_rc2-Zfe2d27d5.zip
                                   avl_3.12.0_rc2_20201110.txt

    Hardware compatibility: This firmware applies to the following LANTRONIX products with Cortex processor:

Devices	Hardware Revisions	Supported firmware versions	Notes

FOX3-2G Series	13,15,17,19,20,21	avl_3.x.x (only)	1) Use the PFAL command $PFAL,MSG.Version.HardwareRev to get shown the hardware revision of your AVL device. The device responses with (second line shows the hardware version):
			    $<MSG.Version.HardwareRev>
			    $11-NUCHB
			    $SUCCESS
			2) The hardware revision is also printed on the product label, located on the back panel of the device. In the Serial Number (S/N) field there are 3 digits in parenthesis, for example, 60148(9XX)50600014, and the number "XX" is the hardware revision of the device. If the number is "11", it means that the hardware revision is 11.

FOX3-3G Series	06,11,13,15,17,19,20,21	avl_3.x.x (only)	
FOX3-3G-BID*			
FOX3-4G Series	All	avl_3.x.x (only)	
BOLERO40 Series	All	avl_3.x.x (only)	

                                                                  * On request

IMPORTANT

➢ This firmware version is ONLY for the LANTRONIX products explicitly Mentioned above! Do not try to update other LANTRONIX products with this firmware, otherwise, you will not be able to operate your device anymore.

➢ Before updating the new firmware on your FOX3 or BOLERO40 series, it is strongly recommended to back up the configuration with the command **$PFAL,CNF.Backup**

➢ Before upgrading the firmware on your FOX3 or BOLERO40 series, it is recommended to upload and back up all history data on your server (if needed) and finally delete this data on the device.

NOTE

➢ If FOX3-3G-BLE devices with older firmware versions (e.g. 3.0.0_xx) are upgraded to this new firmware version (3.3.0_xx), please contact LANTRONIX to receive the BLE activation codes and continue to use this feature without additional costs.

➢ The latest FW 3.12.0_rc2 is for FOX3-2G/3G/4G with the CORTEX CPU as well as BOLERO40 series.

➢ Sleep=Ring on BOLERO40 series works only by using SIM-SLOT2 (the upper SLOT) on BOLERO40 series

DOCUMENTATION:

The following document(s) is (are) provided on7https://www.lantronix.com/ as part of the AVL firmware release "avl_3.12.0_rc2".

Filename	Description
PFAL Command Reference	Lists and describes all PFAL commands supported by this firmware release.

Version	Description	Created by	Date (M/D/Y)
3.12.0.0	Firmware release "avl_3.12.0_rc2"	Lantronix	11/17/2020
3.11.0.0	Firmware release "avl_3.11.0_rc4"	Lantronix	10/14/2020
3.9.0.0	Firmware release "avl_3.9.0_rc2"	Lantronix	07/14/2020
3.8.0.0	Firmware release "avl_3.8.0_rc3"	Lantronix	06/03/2020
3.7.0.0	Firmware release "avl_3.7.0_rc2"	Lantronix	04/21/2020
3.6.0.0	Firmware release "avl_3.6.0_rc2"	Lantronix	03/10/2020
3.5.0.0	Firmware release "avl_3.5.0_rc8"	Lantronix	02/05/2020
3.4.0.0	Firmware release "avl_3.4.0_rc8"	Lantronix	12/03/2019
3.3.0.0	Firmware release "avl_3.3.0_rc15"	Lantronix	10/02/2019
3.2.0.3	Firmware release "avl_3.2.0_rc39"	FALCOM	07/04/2019
3.1.0.2	Firmware release "avl_3.1.0_rc33"	FALCOM	11/09/2018
3.1.0.1	Firmware release "avl_3.1.0_rc20"	FALCOM	05/15/2018

1) Preface

This release note describes the new functionalities of the firmware release "*avl_3.12.0_rc2*" and is intended for use as a reference when updating an AVL device to version "*avl_3.12.0_rc2*".

2) Important Notes

The firmware file with extension "***.frp**" is for the update through the **Workbench** and for the update remotely OTA (RUpdate). The firmware file with extension "***.txt**" is for the update through **terminal emulators** (e.g.: Hyperterminal, PComm Pro). The firmware file with extension "***.zip**" is for the WebUpdate. To update the firmware with the extension "***.frp**", please use the **Workbench** version **2.6.2_RC7** or higher. To update the firmare with the extension "***.txt**" you can use any **terminal emulator** (example: Hyper terminal, Pcomm Pro). To initiate a WebUpdate use the command

$PFAL,SYS.WebUpdate.Start,"url",80 on the device. DON'T switch off the AVL device while it reboots after the firmware update. The duration of the reboot after the firmware update may take approx. 45 seconds.

3)   Firmware Installation Notes

The installation package consists of firmware in three different formats *.frp and *.zip. and *.txt. You can choose whether you want to update the firmware via following interfaces:

Interfaces	File	Description	References
RS-232 PORT	*.frp	This is primarily intended for updating one device first, to ensure the process completes properly before rolling the update to a group of other devices. Use " **Workbench** " and update the "*.frp"-file via the serial port.	
WEB-SERVER	*.zip	This is a perfect solution when multiple deployed AVL devices need updating. The firmware file is located in your web-server and you send to the AVL device the URL of a web server you have set up for downloading over-the-air the firmware file.	
Remote with Workbench	*.frp	This solution lets you update the firmware remotely on several AVL devices. More details can be found in the online help in the Workbench software.	
TCP-SERVER	*.frp	This solution lets you update the firmware remotely on several AVL devices.	
Terminal SW	*.txt	You can upload the firmware with the extension *.txt serially over a terminal SW such as PComm Lite, Tera Term, etc.	

4)   Prerequisites concerning the PC

A 32/64-bit-WINDOWS operating system (Windows XP, Vista, 7) or Linux is running on your PC and about 50 MByte free space on your hard disk is required. The RS-232 interface must

be configured with the following parameters:

- Baud rate: 115200
- Data Bits: 8
- Parity: None
- Stopbits: 1
- Flow Control: None

5) Firmware Update Process

These instructions are specific to updating your LANTRONIX AVL device via COM interface (Serial Port).

(a) Download the firmware file and Workbench software needed from the following hyperlinks.

1. https://www.lantronix.com/products/workbench/#tab-docs-downloads
2. https://www.lantronix.com/products/fox3-series/#tab-docs-downloads
3. Download "**avl_3.12.0_rc2.zip**" and extract the file you downloaded into a temporary folder on your PC.
4. Run the "**workbench**" software. If this software is still not installed on your PC, download it first and start the installation.
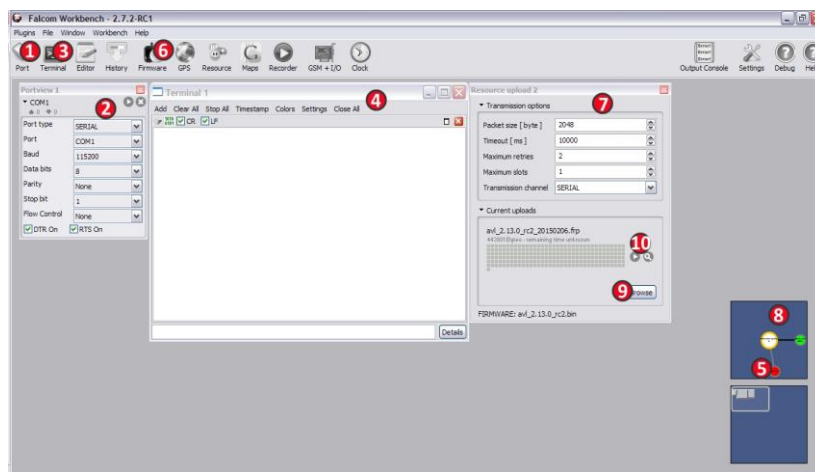
(b) Begin the firmware update process (refer to the fig. above).

1. Connect the AVL device to your PC either directly using the programming cable or the corresponding evaluation board.

2. Do **NOT** update the firmware version 3.x.x on FOX3-2G/3G/4G devices with an older processor. The firmware version 3.x.x is **ONLY** for FOX3-2G/3G/4G and BOLERO40 devices with the **CORTEX (CT)** processor. Please verify the hardware revision from the table "**Hardware compatibility**" above and make sure you are upgrading a FOX3-2G/3G/4G device with CORTEX processor. LANTRONIX takes no liability and no responsibility for any cases,

firmware versions have been flashed wrongly nor will LANTRONIX cover any costs associated with this happening.

3. Click **Port** (1) icon, select the COM port settings from the **PortView1** (2) and click the **Play** button next to the text "COM.." to open the selected COM port.

4. Click **Terminal** (3) icon, select the **TerminalView** 1 (4) and go to the **ConnectionView** (5) and connect it to the **Serial Port COM1**.

5. Click **Firmware** (6) icon, select "SERIAL" from the **Transmission Options** (7), go to **ConnectionView** (8) and connect it to the **Serial Port COM1**.

6. Click **Browse** (9) button and select the firmware file as "*.frp" from the temporary folder where the firmware was expanded.

7. Click **Play** (10) button to start the firmware update. This button appears only if the firmware file has already been selected.

8. Wait until the update process completes. While the update is running, do not send any command to the device and do not manually reboot it until the device restarts itself.

9. After the update process successfully completes, a success message will appear. Click "OK" button to restart the AVL device.

10. After device restarts and configuring the unit, you can execute the command **$PFAL,Cnf.Backup** to save the user configuration as factory settings. If the AVL device was already configured, you can execute the same command after the firmware update to save the user configuration as factory settings.

11. LANTRONIX recommends that you update one device first, to ensure the process completes properly before rolling the update to a group of other devices.

6)   New and Modified Functions

IMPROVEMENTS and BUGS FIXED:

- Synchronization in the CMUX packet handler has been revised and made more reliable. This prevents packet loss in CMUX protocol stream during network traffic.

- Handling the event "eSimLost revised and improved.

- Stop/Release internal IO's before sleep

- Supporting LTE CAT-M1 on FOX3-4G-M (CAT-M1 based on SARA-R2xx)

NEW FEATURES FOR SDCard(Beta code availability):

This section presents what is new since the latest released firmware regarding the Feature SDCard.

SDCard	
Commands	
File.SD.Format	Format an inserted SDCard
File.SD.Mount	Mount an inserted SDCard
File.SD.Unmount	Unmount an inserted SDCard

NEW FEATURES FOR MQTT:

This section presents what is new since the latest released firmware regarding the Feature MQTT.

MQTT

Commands

TCP.MQTT.Connect	-- Open MQTT connection
TCP.MQTT.Disconnect	-- Close MQTT connection
TCP.MQTT.State	-- Show the MQTT connection state
TCP.MQTT.Send,"<topic>@<message>"	-- Sends out a MQTT packet
TCP.MQTT.ClearBuffer	-- Clears the used MQTT buffer
TCP.MQTT.GetRootCA	-- Show RootCA certificates
TCP.MQTT.SetRootCA	-- Set RootCA used by TLS library
TCP.MQTT.GetCertificate	-- Show used certificates
TCP.MQTT.SetCertificate	-- Set certificate used by TLS library
TCP.MQTT.GetPrivateKey	-- Show used private key
TCP.MQTT.SetPrivateKey	-- Set private key used by TLS library
	The certificates or key data must send after the command and the transmission is finished by "."

Events

TCP.MQTT.eConnecting	-- MQTT connection is connecting
TCP.MQTT.eConnected	-- MQTT connection is connected
TCP.MQTT.eDisconnecting	-- MQTT connection is disconnecting
TCP.MQTT.eDisconnected	-- MQTT connection is disconnected
TCP.MQTT.ePacketSent	-- MQTT Packet was sent to server
TCP.MQTT.ePingSent	-- Ping Packet was sent to server
TCP.MQTT.eReceived	-- MQTT Packet was received
TCP.MQTT.eBufferEmpty	-- Outgoing TCP buffer is empty
TCP.MQTT.eFlashBufferEmpty	-- Flash TCP buffer is empty

States

TCP.MQTT.sConnecting	-- MQTT connection is connecting
TCP.MQTT.sConnected	-- MQTT connection is connected
TCP.MQTT.sDisconnecting	-- MQTT connection is disconnecting
TCP.MQTT.sDisconnected	-- MQTT connection is disconnected
TCP.MQTT.sIdle	-- MQTT connection is idle (not active)

Config settings

MQTT.CLIENT.CONNECT=<auto>,<url>,<port>	-- Specify TCP port setup
MQTT.CLIENT.TIMEOUT=<timeout>,<retry_wait>	-- Connection and Reconnect timeouts
MQTT.CLIENT.SENDMODE=<mode>	-- Sendmode setting (mode: 0..2)
MQTT.CLIENT.ID=<ThingID>	-- Specify used thing-ID
MQTT.CLIENT.PING=<period>,<topic>@<message>	-- Specify ping topic and subscription
MQTT.CLIENT.LASTWILL=<topic>@<message>	--Specify LastWill topic and subscription

NEW FEATURES FOR LUA:

This section presents what is new since the latest released firmware regarding the Premium-Feature LUA.

- Implementation of file system commands via LUA (see LUA table below)

- Enhanced WebUpdate for loading LUA scripts. This feature added support for the Web-Update for LUA scripts.

  Prerequisite, the LUA script must be generated with gzip or 7zip in gzip mode. The file name of the archive must have a certain structure, i.e. "script-LXXXX.[gz|zip]" (e.g. evalkit-L200603.gz).

- Added direct CAN interface for LUA

LUA (File system)

Commands

file := io.open(filename [, mode])	Open a file
io.lines (filename)	Read one line from file
io.read(...)	Read data from file
io.write(...)	Write data to file
io.type (file)	Type of file
io.flush(file)	Flush written data
io.close(file)	Close file
file:read(···)	File operations
file:write(···)	
file:lines()	
file:flush()	
file:close()	
file:seek ([whence] [, offset])	
os.remove(name)	Remove a file on disk
os.rename(oldname, newname)	Rename a file on disk
os.mkdir(name)	Make a directory
Result = avl.can_write(chan, ext, id, data)	Writes a message to the corresponding CAN interface. Returns 1 if sending of the CAN message was successfully. chan - CAN interface [0,1] ext - message type std/ext [0,1] id - message id to send data - message data to send
Result = avl.can_read([table])	Reads a message from CAN interface. Returns a table filled with a CAN message or Nil if no data are available. if a table is passed as argument, it is filled with message data (table) and returned instead of a new table. The attributes are described as follows; attribute data is a string, all the others are numbers. ch - The CAN interface the message is read from [0,1] ext - The type of the message std/ext [0,1] msg - The id of the message size - The length of the message data - The message data (0..8 bytes)

State requests

stat := os.stat(filename [, request|result])	Returns a table with the file attributes corresponding to filename (or nil followed by an error message and a system-dependent error code in case of error). If the second optional argument is given and is a string, then only the value of the named attribute is returned (this use is equivalent to os.stat(file)[request], but the table is not created and only one attribute is retrieved from the OS). if a table is passed as the second argument, it (result) is filled with attributes and returned instead of a new table. The attributes are described as follows; attribute mode is a string. All the others are numbers.

State result of state request

dev, rdev	On Unix systems, this represents the device that the inode resides on. On Windows systems, represents the drive number of the disk containing the file.
ino	On Unix systems, this represents the inode number. On Windows systems this has no meaning
mode	String representing the associated protection mode (the values could be file, directory, or other)
nlink	Number of hard links to the file
uid	User-id of owner (Unix only, always 0 on Windows)
gid	Group-id of owner (Unix only, always 0 on Windows)
access	Time of last access
modification	Time of last data modification
change	Time of last file status change
size	File size, in bytes
permissions	File permissions string
Total	Number of total blocks of the device
Used	Number of used blocks of the device
free	Number of free blocks of the device
blocksize	Used blocksize of the device

File system directory

FS directory object dir := [
    dir:next()
    dir:close()
]

dir:next()	Next entry from directory
dir:close()	Close directory

New Dynamic Variables

&(LatLon) &(LastLatLon) &(ThingID) &(USBData) &(USBData.H) &(USBData.End<n>)	- Current Position as GeoPoint - Last Valid Position as GeoPoint - Configured thing ID for MQTT - Received data over USB interface - Received data over USB interface (displayed in hexadecimal) - Received data over USB interface (displayed last n characters)
&(counter<idx>[*<factor><[+-]offset>]) &(nvcounter<idx>[*<factor><[+-]offset>])	-- Show counter value -- Show counter value

New Config Settings

GPS.HISTORY.SIZE=<size>	-- Size of the used history in bytes
DBG.EN=<0|1>[,SERIAL|SERIAL1|USB|SDCARD]	Close directory

New PFAL Commands

Sys.RUpdate.Init,<type>,<option>,<size>,<sectors>,<config> -- Start FW update	Type is "FW_raw"|"FW_cpr"|"AID_raw"|"file://path_to_file"> option is <"new"|"resume"> size is firmware or file size to update sectors sector size depending on size config is <"raw_cfg"|"compressed_cfg"|"current_cfg"> (i.e. SYS.RUpdate.Init,file:///sys/backup.txt,new,64000,1,current_cfg)

KNOWN ISSUES:

- For Trackers with CAT-M1, some network providers do not handover the GPRS parameters (connectivity) from 2G to 4G and from 4G to 2G. In this case, the buffered TCP (using SENDMODE=2) will be sent when the device reconnects (due to new registration)