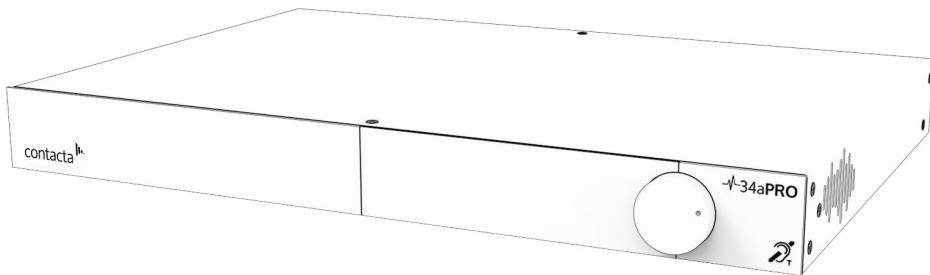


contacta 

- series **PRO**

V22a / V34 / V34a
Hearing Loop Drivers



Installation & User Guide

March 2020

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Contacta has a policy of continuous product development, therefore small specification changes may not be reflected in this manual. Images, labels, packaging, accessories and product colours are subject to change without notice.

Product Overview

Our highly efficient and slimline V Series PRO range of hearing loop drivers (V22a, V34, and V34a) are suitable for medium to large facilities and venues.

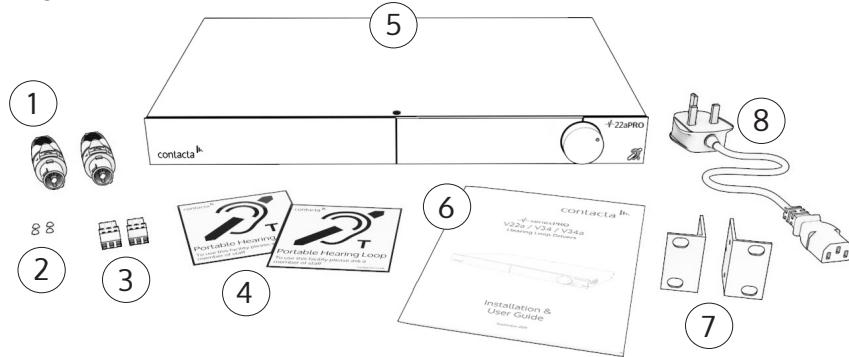
The V34 is a high current hearing loop driver which powers hearing loops utilising a single output. The V22a and V34a are dual output, high current hearing loop drivers with integral phase shifters for phased array configurations. These drivers have a Class-D amplifier output stage and an audio subsystem built around advanced digital systems including an ARM Cortex processor and dual DSPs.

Combined with a powerful CPU to ensure peak performance, the V Series PRO range provides self-monitoring and email alerts, remote setup over local area networks, guided hearing loop setup to make installation simple, and excellent speech and music reproduction.

Note: For large area hearing loop installation instructions, consult Contacta's Large Area Hearing Loop Installation Guide.

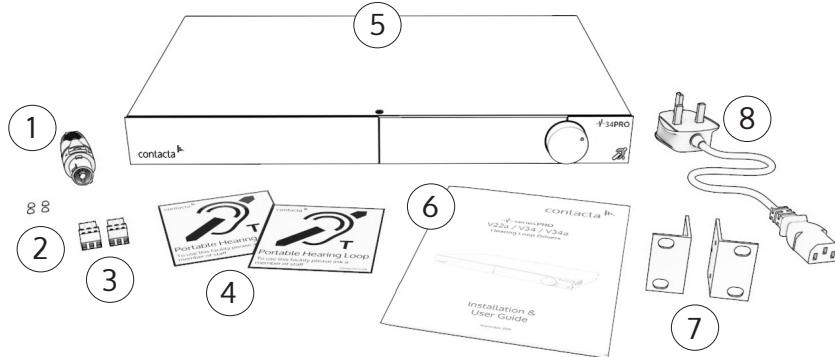
Components

V22a



- | | |
|---------------------------------|------------------------------|
| 1. NL4 Connector x2 | 5. V22a Hearing Loop Driver |
| 2. Rubber Feet x4 | 6. Installation & User Guide |
| 3. 3.5mm Euroblock Connector x2 | 7. Mounting Brackets |
| 4. Signage | 8. IEC Power Lead* |

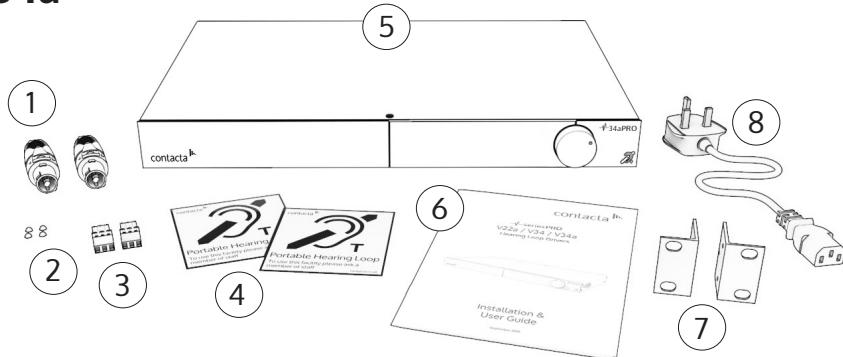
V34



- | | |
|---------------------------------|------------------------------|
| 1. NL4 Connector | 5. V34 Hearing Loop Driver |
| 2. Rubber Feet x4 | 6. Installation & User Guide |
| 3. 3.5mm Euroblock Connector x2 | 7. Mounting Brackets |
| 4. Signage | 8. IEC Power Lead* |

*Plug type varies by country.

V34a



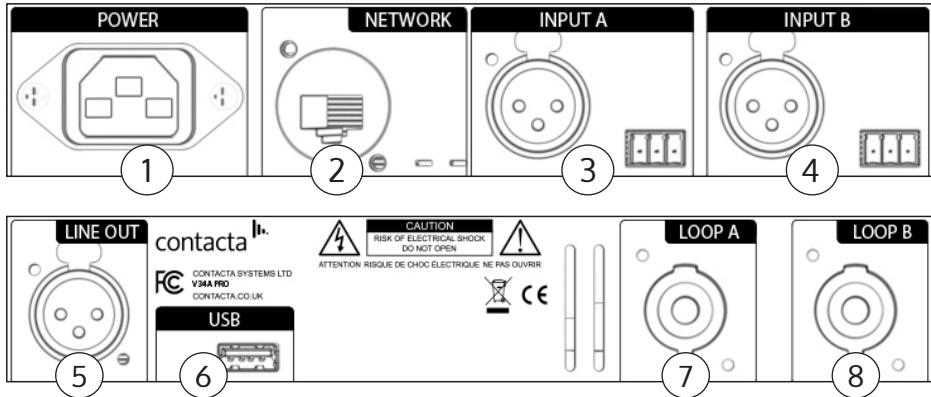
- 1. NL4 Connector x2
- 2. Rubber Feet x4
- 3. 3.5mm Euroblock Connector x2
- 4. Signage
- 5. V34a Hearing Loop Driver
- 6. Installation & User Guide
- 7. Mounting Brackets
- 8. IEC Power Lead*

*Plug type varies by country.

Cable & Equipment: A length of loop cable determined by the loop design is also required. Hearing loop drivers also require additional equipment for audio feeds, such as a microphone or sound system.

Connections

Rear Panel Connections



- Power Supply Input** - The primary method of isolating the amplifier from the mains supply is to disconnect the mains plug. Ensure that the mains plug remains accessible at all times. Unplug the AC power cord from the AC outlet if the unit will not be used for several months or more.
- Network Input** - Ethernet port for setup and remote monitoring.
- Input A** - Microphone or line in via 3 Pin Euroblock or XLR.
- Input B** - Microphone or line in via 3 Pin Euroblock or XLR.
- Line Output** - XLR port for connections with multiple drivers.
- USB** - Storage transfer port.
- Loop A Output** - NL4 port for Loop A.
- Loop B Output** - NL4 port for Loop B.

Connection Examples

XLR to XLR (line)



TRS to XLR (line)



Unbalanced to XLR



XLR to Euroblock (balanced)



Unbalanced to Euroblock



Using the System

Startup



V Series PRO drivers perform a series of tests when powered on. The Contacta logo will appear and driver will therefore take between 40 to 60 seconds to become active.

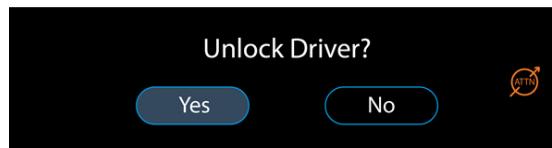
Fault Detected

If a fault is detected, the Attention symbol will appear on the top right of the screen (!) along with an error message:

1. **Open Circuit [Primary/Secondary Loop]:** See Connections on page 6 or consult the Contacta Large Area Loop Installation Guide to ensure the hearing loop is correctly installed and connected.
2. **Short Circuit [Primary/Secondary Loop]:** See Connections on page 6 or consult the Contacta Large Area Loop Installation Guide to ensure the hearing loop is correctly installed and connected.

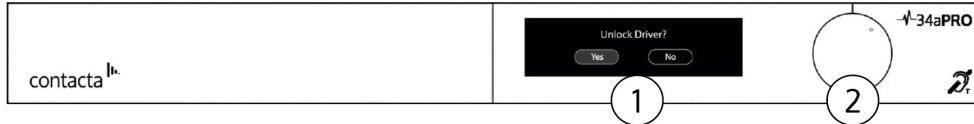
The start-up sequence will be halted. Power should be removed and reapplied to the driver once the fault has been addressed.

Loop Attenuation



If the 'ATTN' (Loop Attenuation) symbol (!) appears on the screen, the driver has detected that due to the characteristics of the loop(s) connected it will be unable to deliver maximum rated current without clipping at 1.6Kz. Maximum current will therefore be attenuated.

Front Panel Overview



1. **Display Screen** - Displays menu and adjustment options.
2. **Control Dial** - Used to unlock the driver and make a range of system adjustments. Rotate the dial clockwise or counter-clockwise to make a selection, then press to confirm any adjustments.

Note: When using V Series PRO menus, selecting "Return" sends the user to a previously displayed screen. Selecting "Exit" will send them to the main menu.

Locking/Unlocking the Hearing Loop Driver



Unlock the Driver

1. To unlock the hearing loop driver, press the control dial, and when prompted "Unlock driver?" click "Yes."
2. Enter the passcode **2239**:
 - a. Rotate the control clockwise to select the first required digit.
 - b. Press the control dial in to select the digit.
 - c. Repeat steps (a) and (b) until all the digits have been selected.

Note: Entering the wrong code returns the hearing loop driver to the lock screen.

When the control dial is not used for half an hour, the hearing loop driver will automatically lock.

Main Menu

After being unlocked, the hearing loop driver will display the main menu.



Inputs

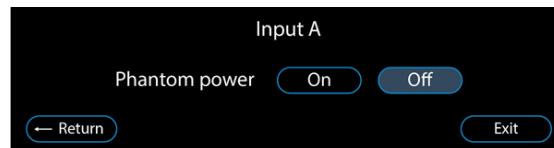
Selecting Inputs from the main menu opens the following screen:



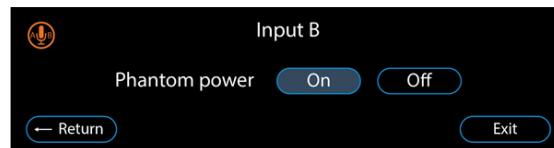
- **Input A** - Adjust connections to Input A.
- **Input B** - Adjust connections to Input B.
- **Audio Time Delay** - Sync audio across large distances to compensate for latency.
- **Low Cut Filter** - Audio filter for when there is low frequency background noise in the surrounding environment of a loop.

Input A/B

1. Menus for Input A and Input B are functionally identical. Selecting either Input A or Input B opens the following screen:



2. Turning on Phantom Power sends power to a connected microphone via the selected input. When either Input A or Input B has enabled this function, a symbol will appear on the left of the display (see page 27 for Notification Guide).



3. Once you have made a selection on the Phantom Power screen, the driver will display the following screen:



- **Adjustment Level** - Displays the input attenuation level (0db to -47dB). Selecting this circle allows attenuation level adjustment.
- **Signal Level** - When optimum Adjustment Level has been achieved, "Good" will display consistently (though peak levels may flash to "Low" or "High"). Consistent display of "Low" or "High" means the level is incorrect and automatic gain control cannot operate.

Audio Time Delay

Selecting Audio Time Delay from Inputs opens the following screen:



In theatres, stadiums, and other large venues, sound sent from speakers will be impacted by the speed of sound, whereas audio sent through a hearing loop will reach a user instantly. This means the two sounds must be aligned or users will hear a constant echo.

Select the screen's circle to adjust syncing and compensate for latency.

Low Cut Filter

Selecting Low Cut Filter from Inputs opens the following screen:



This feature removes low frequency sounds from the hearing loop when background noise such as air conditioners might impact users. Select either 150Hz or 180Hz if required and a green 'LCF' (Low Cut Filter) symbol will be displayed on the left.

Guided Loop Setup

Guided Loop Setup ensures that hearing loops achieve optimum field strength,* ideal frequency response, and avoid clipping.

Only begin Guided Loop Setup once the connected hearing loop cable has been laid in place and all relevant connections have been made (see page 6).

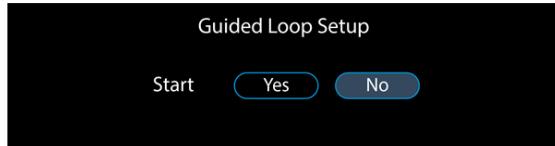
*This is dependant on correct loop design and metal loss.

Required for Setup

- FSM - Contacta Field Strength Meter (IL-CONTACTA-FSM)
- Tripod or similar for mounting the FSM is recommended

Begin the Setup

Begin the Guided Loop Setup by selecting it from the driver's main menu, and when prompted select "Yes" from the following screen:



Note: For large area hearing loop cable installation instructions, consult Contacta's Large Area Hearing Loop Installation Guide.

Stage 1: High Frequency Compensation

High Frequency Compensation will be suggested by the driver when measurements in this section indicate metal in the surrounding environment impacts the hearing loop's signal quality.

1. Select "Yes" when prompted by the following screen:



2. The driver will begin outputting a pink noise signal at a low level (1A on peaks) to allow accurate setup. The following screen will be displayed, with a symbol on the top right indicating "Signal On":



3. Note the hearing loop's field strength at 100Hz, 1KHz, and 5KHz using the Contacta Field Strength Meter (IL-CONTACTA-FSM) set at the 3rd octave band pass setting.

Once completed, select "Continue" on the display to turn off the signal.

4. Enter the three levels into the hearing loop driver. The "Backspace" button will become a "Continue" button when the correct number of digits have been entered for each value:

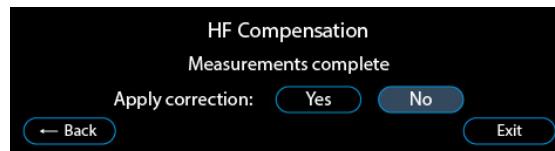


5. When the three levels have been entered, one of following options will be displayed (see next page):

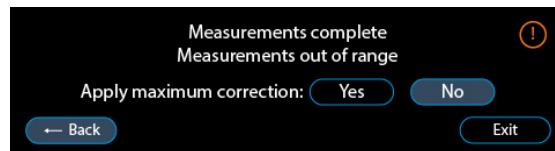
- 5a. If the values at 100Hz and 5KHz are within +/-3db of the value measured at 1KHz, this section is complete. Select "Continue":



- 5b. If the driver has calculated that High Frequency Compensation is required, it will ask whether to apply this correction. Selecting "Yes" is recommended.



- 5c. If the driver cannot provide ideal High Frequency Compensation, it will ask whether to apply the maximum adjustment available. Selecting "Yes" is recommended.



Stage 2: Loop Drive

1. Select "Yes" when prompted by the following screen:



The driver will begin outputting a 1KHz sinewave signal at a low level (2Arms) to allow accurate setup.

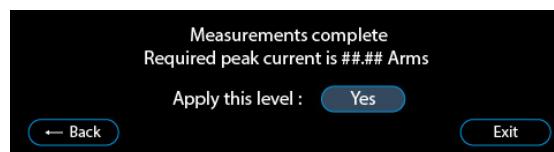
2. The following screen will be displayed, with a symbol on the top right indicating "Signal On":



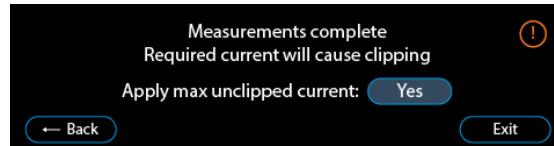
3. Note the hearing loop's field strength at 1KHz using the Contacta Field Strength Meter (IL-COMTACTA-FSM) set at the 3rd octave band pass setting. Once this value has been noted, select "Continue" on the display to turn off the signal.



4. Enter the noted level into the hearing loop driver.
5. One of following three options will be displayed:
5a. If the driver has calculated the ideal peak current to achieve 0dB, the following screen will appear and this section is complete. Select "Apply this level":



- 5b. If the driver cannot deliver the current required to achieve 0dB it will display the following screen:



Select "Yes" when asked to apply the maximum unclipped current.

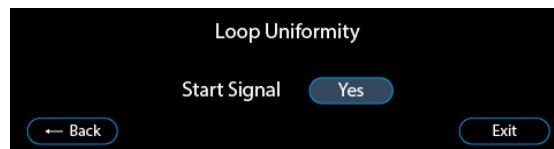
- 5c. If the ideal current is greater than is possible (due to the characteristics of the loop(s) connected being unsuitable to deliver maximum rated current without clipping at 1.6Kz), the maximum current will be attenuated and the maximum value will be displayed:



Select "Continue". The driver will make adjustments to achieve the strongest maximum field strength possible.

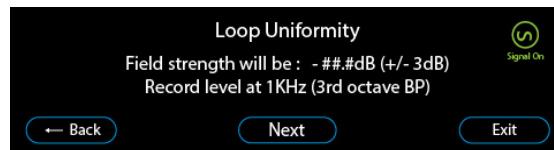
Stage 3: Loop Uniformity

1. Select "Yes" when prompted by the following screen:



The driver will begin outputting a 1Arms at 1KHz sinewave signal at a level below the calculated current required to hit 0dB field strength.

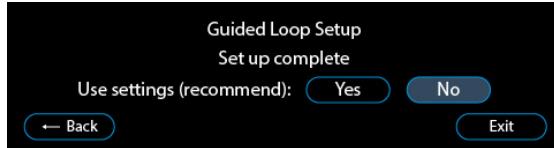
2. The following screen will be displayed, with a symbol on the top right indicating "Signal On":



3. Record field strength at various locations in the hearing loop using the Contacta FSM set 1Khz 3rd octave band pass setting. These details will be required in Compliance Certificate documents. Then, select "Continue".

Stage 4: Completion

1. Select "Yes" when prompted by the following screen to complete the Guided Loop Setup to save settings:



Manual Loop Setup

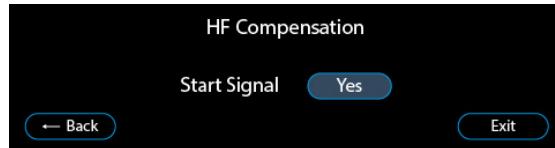
Begin Manual Loop Setup by selecting this option from the driver's main menu.

Note: For large area hearing loop cable installation instructions, consult Contacta's Large Area Hearing Loop Installation Guide.

Stage 1: High Frequency Compensation

High Frequency Compensation is required when metal in the surrounding environment impacts the hearing loop's signal quality.

1. Select "Yes" when prompted by the following screen:



2. The driver will begin outputting a pink noise signal to allow accurate setup. Once a green 'Signal On' symbol is displayed on the right, select "Continue".
3. The following screen will be displayed:



4. The strength of High Frequency Compensation can then be adjusted from 1 (weak) to 7 (strong). Once the appropriate strength has been set, select "Continue".



Stage 2: Loop Drive

- Turn on the driver's internal 1KHz test signal generator by selecting "On" from the following screen. Once a green 'Signal On' symbol is displayed on the right, select "Continue".

Note: An external sine signal source can be connected if required.



- Selecting the left dB circle allows the drive level to be adjusted in 1dB steps from -24dB to 0dB. The real-time measured current is displayed in the right hand circle once a signal is present.



If the hearings loop(s) connected to the driver are of suitable characteristics and installed correctly, the display screen will list the available current for the V34 and V34a as 14Arms and the V22a as 8Arms.



If the driver detects that the loop(s) connected do not have suitable characteristics to deliver the maximum 12Arms, the available current for the driver will be attenuated to prevent clipping (orange 'ATTN' symbol will be visible with the maximum available current below it).

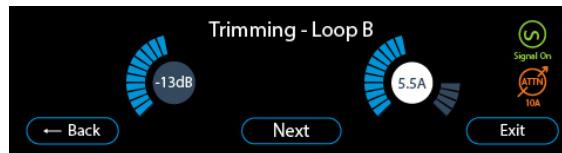
The right hand circle will display where the loop has been attenuated to as grey bars.

Note: If the driver current has been attenuated but the driver has been set up to not go above the maximum value (e.g. the 5.5A display above), then the 'ATTN' symbol will vanish when moving away from this screen.

3. If using a V34, manual loop setup is now complete. If using a V22a or V34a, select "Continue".

Stage 3: Trimming

1. This display allows you to select and trim loop B by up to 3dB if appropriate. If this is not applicable, select "Continue". Otherwise, make necessary trimming adjustments and then select "Continue".

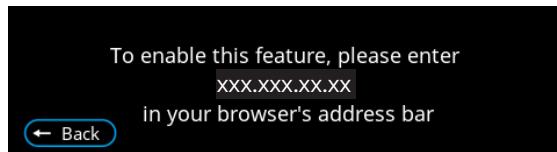


2. Manual loop setup is now complete. Select "Continue" to return to the main menu.

Remote Monitoring

The driver's user interface (display screen) can be accessed through a Local Area Network (LAN) when using a laptop or smartphone. This is to allow installers to minimize installation time by limiting the need to travel back and forth to a driver.

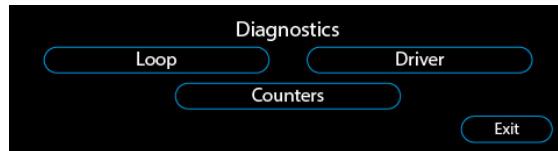
1. To access the Remote Monitoring function through an external device, select Remote Monitoring from the main menu to open the following screen:



1. The driver's I.P. address will be displayed. Enter this string of numbers into the browser of your laptop or smartphone to externally access the driver's display.
2. Press "Connect" when prompted.
3. Enter "root" as the password when prompted.

Diagnostics

Selecting Diagnostics from the main menu opens the following screen:



Loop

Selecting Loop from the Diagnostics menu opens the following screen:



- Loop inductance and resistance are values measured when the driver powers on.
- Hearing loop impedance at 1.6KHz ("z@1.6KHz) is calculated from the measured inductance and resistance.
- Maximum current is calculated from the driver voltage divided by the impedance at 1.6KHz.
- If impedance exceeds the limit the maximum current will be attenuated to prevent clipping.

Driver

Selecting Driver from the Diagnostics menu opens the following screen:



The following data in Driver is for information only:

- **Output enabled (Yes/No)**
- **Heatsink temperature**
- **Fan speed**
- **Supply rail voltage**

Counters

Selecting Counters from the Diagnostics menu opens the following screen:



Counters logs the number of times these events have occurred in the lifetime of the driver:

- **Power cycles** - Power has been recycled.
- **Clipping** - Voltage clipping has been detected.
- **Overtemp** - Internal temperature has exceeded limits.
- **Overcurrent** - Output current has exceeded limits.
- **Loop o/c** - Open circuit loop(s) have been detected.

Service

Selecting Service from the main menu opens the following screen:



- **Go to Idle Screen** - The driver displays an idle screen. An unlock code will not be required to make adjustments/change settings.
- **Go to Idle Screen + Lock:** The driver displays an idle screen. An unlock code will be required to make adjustments/change to settings.
- **Time out setting:** Adjust the time before the driver displays an idle screen from between 0 (no return to idle screen) to 60 minutes. This is adjustable in 1-minute steps.
- **Reboot Device:** Restart the driver. Confirmation (Yes/No) is requested.

Save/Load Settings

Automatic Saving

The driver's internal save file is updated automatically at the file location of /etc/snapui/ whenever the driver is returned to the main menu screen.

Saved settings have the following naming convention when being loaded to or from a USB:

- <model>_settings.dat

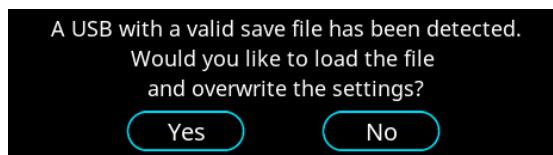
Note: <model> refers to either V22a, V34 or the V34a (for example, V34a_settings.dat)

Settings changed in the Guided Setup or Manual Loop Setup are updated once the user completes the setup. Completing the setup will return to the main menu screen where all settings are saved locally.

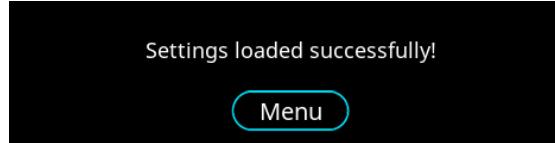
USB Device - Saving and Loading

Note: When the driver automatically saves settings (i.e. if the driver returns to the main menu screen or guided loop setup is completed) and a USB device is connected, settings are saved to both the driver and the connected USB device.

1. If a USB is connected to the driver, the driver will scan for a valid save file. The save file name must match the driver's model (V22a, V34, or V34a).
2. If a save file is located on the USB, the driver will confirm that these settings should be loaded:



- Selecting "Yes" will load the file and overwrite settings saved on the driver, followed by a confirmation message:



- Selecting “No” will overwrite the save file located on the USB with the driver’s newest save file.

System Updates

There are 2 types of system updates:

- **Software updates** (see page 28)
- **Disk image updates** (see page 29)

Software updates require the following 4 files to be placed in the root (top-level/default) directory of a USB connected to the driver:

- pn1001-image-imx6ul-var-dart.ubi
- pn1001-image-imx6ul-var-dart.ubi.sig
- update.sh
- update.sh.sig

Disk image updates requires the same 4 files as the software update and an 4 additional files (for a total of 8 files):

- SPL-nand
- SPL-nand.sig
- u-boot.img-nand
- u-boot.img-nand.sig

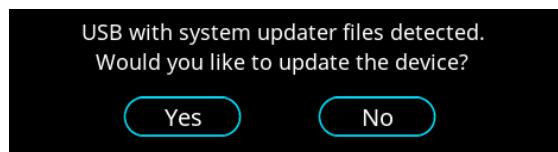
The average update (software or disk image) takes three minutes to both finish installation and restart the system.

Note: Update related screens do not timeout to idle screens.

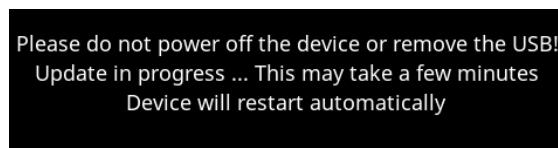
Software Updates - USB

Software updates can be run from a connected USB without any risk to the driver. Even if a USB is removed midway through an update, the device will restart while maintaining the previously installed version of the software.

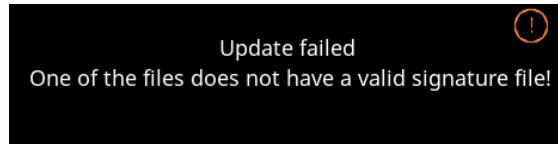
1. To install a software update, connect a USB device which contains the required files.
2. Select "Yes" when prompted by the following screen:



3. The driver will scan the USB's files.
- 3a. If the USB's files are valid, the driver will begin installing the update before automatically restarting. The following screen will be displayed:



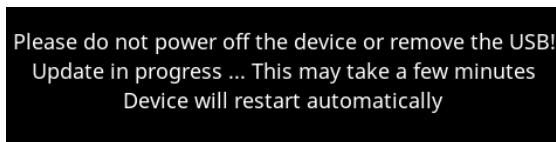
- 3b. If any of the USB's files are not valid, the driver will display the following screen:



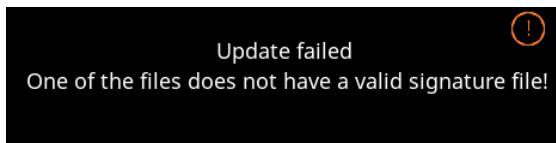
Disk Image Updates - USB

If the driver is low on memory, there will be a warning if a disk image update is attempted as the driver could be damaged if the USB is then removed mid-update. The user will be asked to confirm that they are aware of this risk.

1. To install a disk update, connect a USB device which contains the required files.
 2. Select "Yes" when prompted.
 3. The driver will scan the USB's files.
- 3a. If all files are valid, the driver will begin install the update and display this screen to the user before automatically restarting. The following screen will be displayed:



- 3b. If any of the USB's files are not valid, the following screen will be displayed:



Troubleshooting

Symptom	Possible Fault	Action
Driver does not turn on.	1) Mains power is absent. 2) Internal issue.	1) Check mains power. 2) Seek assistance.
Interference (buzzing/whistling/hissing) is heard through induction loop.	1) Poor input signals. 2) Internal issue.	1) Power off the hearing loop driver and confirm that interference isn't from external origin. 2) Disconnect input signals. If sound disappears, check inputs.
Driver is excessively hot to touch.	1) Large amount of mains hum present on input. 2) Internal issue.	1) Check input signal source. 2) Incorrect hearing loop driver being used.
Loop output level indicates current is flowing but I hear nothing in the loop.	1) Shorted feeder cable. 2) Loop listener is not working or being used too far from loop.	1) Check feeder cable, although the hearing loop driver will usually refuse to tune to shorted feeder. 2) Check listener and location.
Sound is distorted.	1) Input level has been turned up too high for signal level at input. 2) Input signal is distorted. 3) Output signal is clipping.	1) Reduce input level setting. 2) Check signal source. 3) Refer to "The Clipping Status Lights are lit" below.
Audio from the hearing loop driver is clipping.	The connected hearing loop cable is too long.	1) Reduce the length of the hearing loop cable. 2) Use a larger diameter cable. 3) Create a two-turn loop. 4) Use a higher voltage driver.

Please contact your distributor (or Contacta if appropriate) if you are experiencing technical difficulties with the product.

Notification Guide



Attention



Phantom Power Inputs A + B are on



Phantom Power Input A is on



Phantom Power Input B is on



Low Cut Filter is on



Loop is being attenuated



Signal on

Signal On

Technical Specification

V22a:

Technical Data		
Audio Inputs	2 X line/microphone inputs (switchable) XLR or Euroblock	Line (optimised for -10dBV to 0dBv)
		Microphone (12V phantom power via 680Ω optimised for levels above -45dBv)
Loop Outputs	Outputs Voltage	2 x 22.66Vrms (64.09V pk-pk)
	Output Current	2 x 8Arms @ 1KHz (22.62A pk-pk) >1200 seconds (20 minutes)
	Loop Connector	2 x NL4
Audio System	Frequency Response	100Hz to 5KHz
	Distortion	THD<1% (-40dB) full current both channels driven
	Automatic Gain Control	DSP controlled, peak detecting
	High Frequency Compensation	7 DSP controlled, optimised stages
	Audio Signal Delay	10ms to 40ms
Display	Backlit TFT 480 x 128 pixels (95mm x 25mm)	
Control	Single Rotary Push Control	
Mains Input	Voltage	100V-120V /200V-240V AC (universal auto switching with PFC)
	Frequency	50Hz/60Hz
	Connection	IEC
Cooling	Custom heatsink with temperature-controlled fan	

Technical Specification

V34:

Technical Data		
Audio Inputs	2 X line/microphone inputs (switchable) XLR or Euroblock	Line (optimised for -10dBV to 0dBv)
		Microphone (12V phantom power via 680Ω optimised for levels above -45dBv)
Loop Outputs	Outputs Voltage	34Vrms (96.1V pk-pk)
	Output Current	12Arms @ 1KHz (33.94A) pk-pk >1200 seconds (20 minutes)
	Loop Connector	NL4
Audio System	Frequency Response	100Hz to 5KHz
	Distortion	THD<1% (-40dB) full current both channels driven
	Automatic Gain Control	DSP controlled, peak detecting
	High Frequency Compensation	7 DSP controlled, optimised stages
	Audio Signal Delay	10ms to 40ms
Display	Backlit TFT 480 x 128 pixels (95mm x 25mm)	
Control	Single Rotary Push Control	
Mains Input	Voltage	100V-120V /200V-240V AC (universal auto switching with PFC)
	Frequency	50Hz/60Hz
	Connection	IEC
Cooling	Custom heatsink with temperature-controlled fan	

Technical Specification

V34a:

Technical Data		
Audio Inputs	2 X line/microphone inputs (switchable) XLR or Euroblock	Line (optimised for -10dBV to 0dBv)
		Microphone (12V phantom power via 680Ω optimised for levels above -45dBv)
Loop Outputs	Outputs Voltage	2 x 34Vrms (96.1V pk-pk)
	Output Current	2 x 12Arms @ 1KHz (33.94A) pk-pk >1200 seconds (20 minutes)
	Loop Connector	2 x NL4
Audio System	Frequency Response	100Hz to 5KHz
	Distortion	THD<1% (-40dB) full current both channels driven
	Automatic Gain Control	DSP controlled, peak detecting
	High Frequency Compensation	7 DSP controlled, optimised stages
	Audio Signal Delay	10ms to 40ms
Display	Backlit TFT 480 x 128 pixels (95mm x 25mm)	
Control	Single Rotary Push Control	
Mains Input	Voltage	100V-120V /200V-240V AC (universal auto switching with PFC)
	Frequency	50Hz/60Hz
	Connection	IEC
Cooling	Custom heatsink with temperature-controlled fan	

Standards

EMC

- BS EN 55103-1: 2009 (EMC emissions)
- BS EN 55103-2: 2009 (EMC immunity)

This product has been designed and tested to comply with the following North American and Canadian standards:

- FCC class "B" EMC (emissions)
- ICES-003



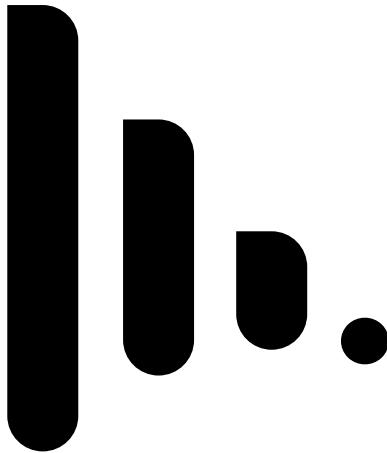
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by Contacta Systems LTD or an authorised partner could void the user's authority to operate the equipment.



Correct disposal of this product

This marking indicates that this product should not be disposed with other household waste throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal and to conserve material resources, this product should be recycled responsibly. To dispose of your product, please use your local return and collection systems or contact the retailer where the product was purchased.



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