



Title

**HUBBUS HANDHELD
PROGRAMMER AND TESTER
TYPE HHP1-H
USER MANUAL**

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1 INTRODUCTION

The HubBus Handheld Programmer and Tester Type HHP1-H is a portable device which is used for:

- Real-time monitoring of the HubBus network
- Configuration of HubBus network components
- View module information and diagnostic data
- Firmware upgrades of HubBus system modules
- Configuration storage and data retrieval.

The handheld has a large and bright backlit LCD screen which is easy to read, providing information at a glance. Menu-specific content makes for easy and intuitive navigation. Additionally, it has large buttons with positive tactile response for ease of use even with gloves on.

In the HubBus network diagnostics mode, the user may monitor in real time the status of all 2000 HubBus digital I/O channels, value of analogue transmissions, simulate network devices, status of emergency and auxiliary interrupts and the current network configuration status.

There is micro SD-card support which provides additional memory capacity. Micro SD cards can be used to deliver firmware upgrades, configuration may be stored and retrieved from the HubBus modules.

Standard off the shelf AA sized alkaline batteries provide power not only for the handheld but also for HubBus modules which are unpowered.

A built-in Bluetooth transceiver is available for transferring data to and from a PC.



Figure 1: HubBus Handheld Programmer and Tester: Type HHP1-H

2 WARNINGS AND PRECAUTIONS

2.1 WARNINGS



WARNING: The HubBus Signal -ve line must not be tied to any common, 0V, ground or Earth points.



BATTERY Do not mix old and new batteries.

WARNING: Do not mix alkaline, standard or rechargeable batteries.

Remove batteries when product is stored for a long period of time or when batteries are exhausted.

Dispose of exhausted batteries properly.

Non-rechargeable batteries are not to be recharged.

Rechargeable batteries are to be removed from the device before being charged.

Only the recommended batteries or equivalent are to be used, volts and size.

Keep all batteries away from children.

Batteries are to be inserted with correct polarity.



WARNING: This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

2.2 SYMBOLS

Markings that may be used across the HubBus range of products to indicate precautions that must be taken to maintain safe operation of the system.


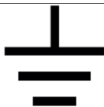


	Direct Current (DC) Supply
	Earth (ground) Terminal
	Caution, possibility of electric shock
	Caution (refer to user manual)

Table 1: Warning Symbols



2.3 PRECAUTIONS

- Only qualified personnel shall install and service the HHP1-H.

2.3.1 USER ACCESS

There are no user serviceable parts within the HHP1-H. The user should not open or disassemble the HHP1-H.

The HHP1-H must only be repaired by an Austdac authorized repairer.

2.3.2 STORAGE, INSTALLATION, USE AND MAINTAINANCE REQUIREMENTS

The HHP1-H should only be installed, operated and maintained by qualified personnel in accordance with the condition of safe use as outlined in this manual.

If cleaning is required, use a moist wipe. Do not use chemical cleaners as it may react with materials.

Ensure that all instructions and warnings are observed.

2.3.2.1 Storage

The specified storage temperature must be maintained during storage.

2.3.2.2 Installation and conditions of use

Prior to installation the HHP1-H should be inspected for the following;

- Any external damage to the enclosure.

3 Handheld Overview

3.1 CASE

The HHP1-H comes with a protective rubber case. The HHP1-H may be removed from the rubber case for battery replacement and access to the micro-SD card slot.



Figure 2: Rubber case

The protective rubber case has a built-in kickstand for easy viewing of the display. To use, simply pull the base of the kickstand out with your finger.



Figure 3: Kickstand

3.2 FRONT PANEL

The front panel of the HHP1-H consists of an LCD display and 16 multi-functional buttons.



Figure 4: HHP1-H front panel view

3.3 PORTS

The top of the HHP1-H enclosure has two ports. These ports are accessible through the protective rubber case.



Figure 5: Ports

3.3.1 HubBus Port

Pin	Function
1	HubBus Signal +
2	HubBus Signal +

Table 2: HubBus Port Pinout

3.3.2 Configuration Port

Pin	Function
1	3V3 Console Port Power
2	9V Transmitter Power
3	0V
4	TTL Tx
5	3V3 Console Port Power
6	RS485 B-
7	RS485 A+
8	TTL Rx

Table 3: Configuration Port Pinout

3.3.3 HubBus Cable

The HubBus network monitoring cable supplied with the HHP1-H has a boot-laced end to allow the user to fit their desired type of plug to interface to the HubBus network.

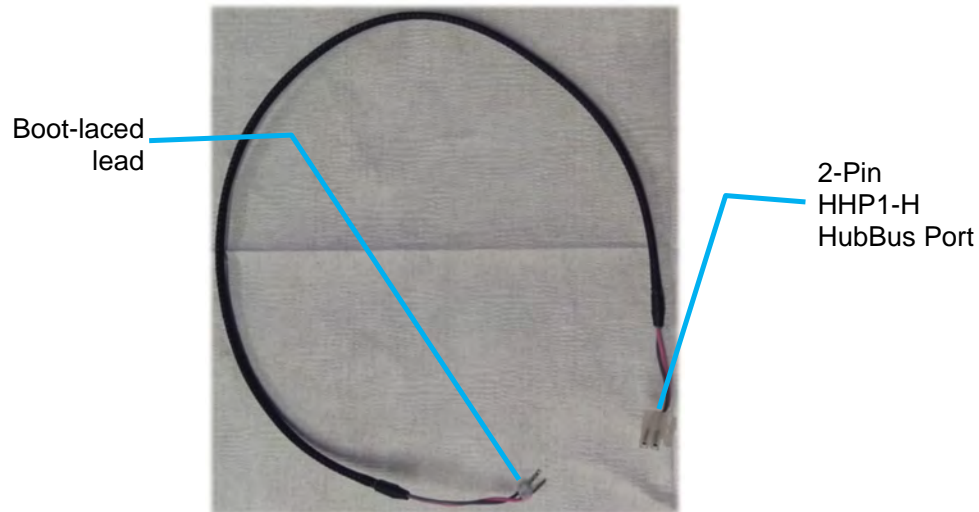


Figure 6: HubBus network interface cable

The HubBus network interface cable plugs into the 2-pin Molex mini-fit connector at the top of the HHP1-H as shown.



Figure 7: HHP1-H HubBus port

3.3.4 Configuration Cable

The HubBus module configuration cable supplied with the HHP1-H has three connectors on the cable. The 8-pin Molex mini-fit connector is plugged into the HHP1-H. The 4-pin connector is for connection to the HubBus module display and interface board's configuration port and the 10-pin Molex mini-fit connector is for direct connection to HBTX2D transmitters and pull-key stations.

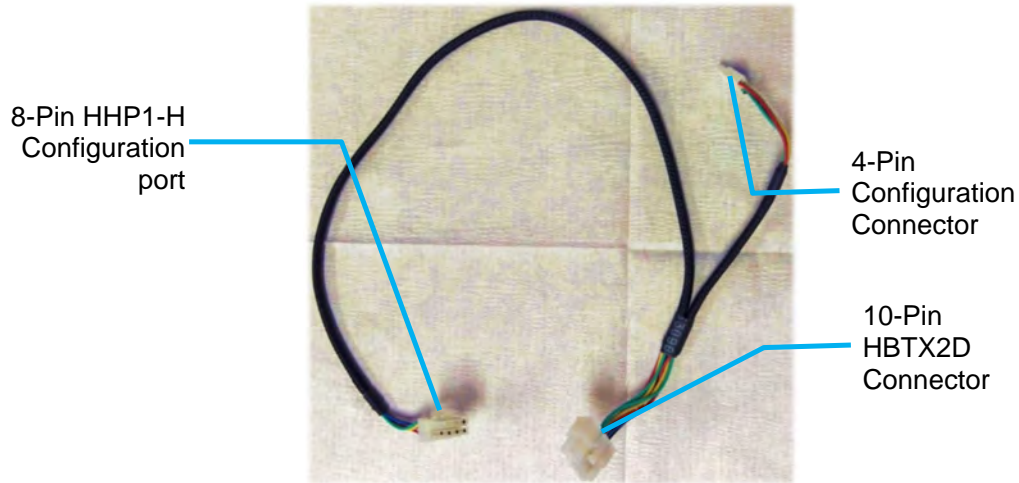


Figure 8: HubBus Configuration cable

The HubBus configuration cable plugs into the 8-pin Molex mini-fit connector at the top of the HHP1-H as shown.



Figure 9: HHP1-H configuration port

3.4 BATTERIES

The HHP1-H uses 4 standard AA sized batteries. The battery compartment is on the underside of the enclosure. Remove the HHP1-H from the protective rubber case and slide off the battery compartment cover to access the battery compartment.

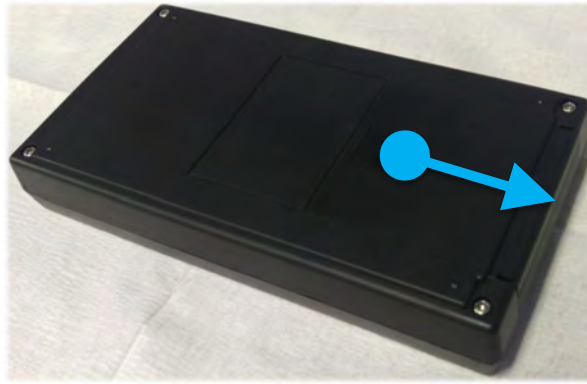


Figure 10: HHP1-H Battery Compartment

Ensure batteries are orientated correctly. Battery polarity is embossed in the base of the battery compartment for each cell.



Figure 11: Battery Orientation

3.5 MICRO SD CARD

Your HHP1-H is supplied with a micro SD card from Austdac. The capacity and make of card may differ over time. Use of cards not supplied by Austdac may fail to work correctly with the HHP1-H. The maximum storage capacity the HHP1-H can support is 8GB and the micro SD card should be rated as a class 10. Please contact Austdac if you require a new micro SD card.

The micro SD card slot is on the bottom end of the enclosure. To access the micro SD card, remove the HHP1-H from the protective rubber case and gently press the edge of the micro SD card and it will pop out. Be careful that the card does not fly out. Micro SD cards are fragile and may be easily damaged.

Re-insert the micro SD card by pushing the card in until it clicks into position. Orientation is critical for correct insertion, with the keypad facing upwards, the micro SD card should be placed in with contacts facing upwards.



Figure 12: Micro SD card slot

3.6 KEYPAD

Keypad lay out and functions are given below. Functionality may change depending on the mode the handheld is in.



Figure 13: HHP1-H Keypad Layout



Key	Default/ Navigation	ALPHA	Numeric	FUNC
	Power ON/OFF (Hold for 3 seconds)			
DEL	Delete/Backspace			
1 +/-	-	+/-	1	Home
2 ABC	-	ABC	2	Repeat
3 DEF	-	DEF	3	Page Up
4 GHI	-	GHI	4	Help
5 JKL	-	JKL	5	View
6 MNO	-	MNO	6	Page Down
7 PQRS	← (LEFT)	PQRS	7	-
8 TUV	↑ (UP)	TUV	8	-
9 WXYZ	→ (RIGHT)	WXYZ	9	-
0 #/1	MENU	#/!	0	-
. SPACE	↓ (DOWN)	SPACE	.	-
	Enter			

Table 4: Keypad Functions

NOTE: Greyed out keys currently have no functionality assigned. May be used in future firmware revisions.

3.6.1 Default/Navigation Mode

The keypad on HHP1-H by default (during power ON and when in the main menu) has the “FUNC” and “ALPHA” modes turned OFF.

The valid keys are “ENTER”, “MENU”, “UP”, “DOWN” and “POWER”.

Pressing the **ENTER** key moves into the sub-menus or into the edit mode.

Pressing the **MENU** key moves back to the previous menu or exit the edit mode and enter the navigate mode. It also toggles between the “Main menu” and the HHP1-H logo screen.

The **UP-ARROW / DOWN-ARROW** key press moves the menu selection arrow accordingly during navigation mode. When the HHP1-H is in selection mode, it allows the user to select a value/string from the predefined list.



Pressing the **POWER** key for approximately 3 seconds will either turn the HHP1-H ON or OFF.

3.6.2 Alpha/Numeric Mode

On the HHP1-H the ALPHA/NUMERIC mode is functional when it's in the edit mode. This can't be selected simultaneously with the function mode.

The **ALPHA** key press will toggle between ALPHA and NUMERIC mode. The current mode of the device will be displayed on the top right-hand corner of the screen with the notations;

- **A** – Alpha mode
- **N** – Numeric mode

When the device is in the numeric mode, the user can enter the values from '0' to '9' as required.

When the device is in the alpha mode, the user can enter characters from 'A' to 'Z' as required. The alpha keys are multi-press keys i.e. user must press two or three times to use the second or third characters respectively on the same key. For example, if the user wants to enter character 'C', the user needs to press the key labelled '2' three times with a maximum delay of 3 seconds between each key press.

3.6.3 Function Mode

On the HHP1-H the function mode is for future functionality and it doesn't have any behaviour currently.

3.7 BLUETOOTH

The Bluetooth version used on the hand-held programmer is Bluetooth 2.1. The Bluetooth profile used is Serial Port Profile (SSP) and the data transfer rate is 300 Kbps.

The hand-held programmer uses the Bluetooth for transferring the "Config" (configuration) and "Hex" files to and from the Windows PC using the AUSTDAC HHP INTERFACE application. Also, the user can "Delete" and "Rename" files on the HHP1-H using the HHP INTERFACE application.

Every HHP1-H has a unique Bluetooth identification name with the common string "AustdacHHP1-" followed by the unique ID of the Bluetooth interface.

For example:

"AustdacHHP1-B8A4".

The user can find the particular HHP1-H device name on the "file transfer" screen. Refer to FILE TRANSFER section for more details.



4 Operation

4.1 MAIN MENU

The main menu screen allows for the selection of the desired operating mode.

Additionally, from the main menu, the handheld will automatically enter the HubBus mode if it detects an active HubBus network connected or alternatively, if it receives valid responses on the Modbus interface it will jump to the Modbus menu.

4.1.1 Mode Selection

- HUBBUS** For HubBus network tester and diagnostic functionality.
- MODBUS** For module configuration and diagnostics.
- TETHERED** Bluetooth connectivity mode.
- HANDHELD** Handheld based settings.

4.1.2 Battery Status

The HHP1-H displays its battery level on the top right-hand corner when it is in the “Main menu”. The icon indicates the four stages of battery level as below,

- 100%
- 75%
- 50%
- 25%

The HHP1-H device is operable until it reaches 25%. When the battery level goes below 25%, on basis of safety the HHP1-H prompts the user to replace with the new batteries and the user is not allowed to perform any operation with the device until new batteries are inserted.

4.2 HUBBUS MODE

4.2.1 I/O MAP

The HubBus I/O map shows all the 2048 HubBus channels at a glance. The HubBus I/O map is in the form of a matrix with every page displaying 100 number of channel's status. User can press “Up Arrow” / “Down Arrow” to move across the 2048 HubBus channels in groups of 100 channels per page.

The top right corner of the I/O map screen shows the base channel number and below are the consecutive 100 number of channels that are currently displayed.

The 100 channels per page are displayed as 10 channels per line.

Below are the symbols used to show the status of channels:

Symbol	Status
-	Off-line
X	Fault
□	OFF / Logic 0
■	ON / Logic 1

Table 5: HubBus Map Symbols

Whenever an emergency interrupt is being transmitted by any device on the HubBus network, the character 'E' will be displayed on the top left corner of the I/O map screen like below.



Figure 14: Screen - HubBus Map - Emergency Interrupt

When the HHP1-H is not actually connected to a HubBus network, entering to I/O map will display “NO HUBBUS” message to the user until it is connected back to the HubBus network.

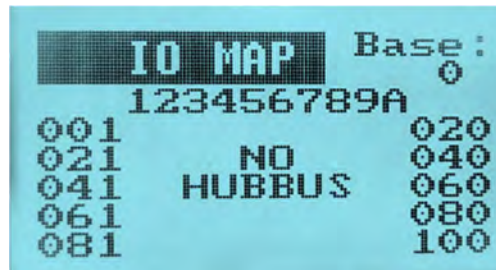


Figure 15: Screen - HubBus Map - No Network

4.2.2 HUBBUS TESTER

The HHP1-H has the ability to simulate devices on the HubBus network by transmitting HubBus channels individually.

There are two modes of transmitting the digital signal on the HubBus network. They are:

- Latch
- Momentary Hold

By default, the arrow will be pointing to the first field “Tx Latch”.

To enable the “Latch” mode, the Tx Latch should be “YES” and to enable the “Hold” mode, the Tx Latch should be “NO”.

4.2.2.1 Latched

With the TX-Latch enabled, there will be two input fields.

- Channel
- Offset

In the channel field, the user can use the numeric keypad to input the desired channel number. Once the channel field is entered, the user should press the “ENTER” key to confirm it and the HHP1-H will be displaying the corresponding channel’s status in multiples of 10 at the bottom of the screen.

The user can then input the offset of the required channel to be controlled using the numeric keypad in the offset field.

Note that the keypad is automatically set to alpha mode.

For example, if the user wants to control the 9th channel. The steps will be as follows,

- User can input value between 0-9 in the channel field.
- The HHP1-H will be displaying the status of the channels 0-9 in the bottom of the screen.
- User should input value 9 in the offset field.
- Now the transmit state will be latched in the HubBus network.

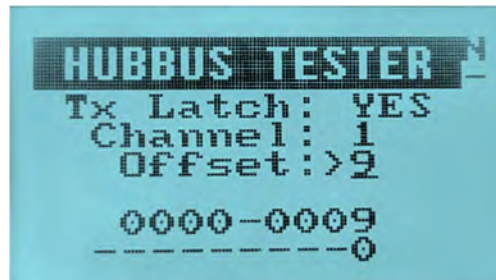


Figure 16: Screen - HubBus Tester – Latch Output

Each time when the corresponding value is inputted in the offset field, the transmit state changes in the below order,

- OFF
- ON
- FAULT
- NONE (no transmit)

In this mode it is possible to "latch" the status on one or more channels. This means that the HHP1-H will continue transmitting the channel(s) set status even though the corresponding transmission button is released. To cancel the transmission on a channel, press the corresponding transmission button again until the NONE status is reached. The latched transmission will continue even if the mode is changed.

4.2.2.2 Momentary Hold

With the TX-Latch enabled, there will be three input fields.

- Channel
- Offset
- Tx Value

The channel and offset field are the same as in Latch mode.

The status which needs to be transmitted on the channel should be set on the “Tx Value” field using the “Up Arrow” / “Down Arrow”. The user should then input the offset of the required channel using the numeric keypad in the offset field.

Then the user can press the numbers 0-9 to activate the corresponding channel in the “Offset” field.

Note that the keypad is automatically set to numeric mode.

The HHP1-H will stop transmitting the channel once the user releases the key press.

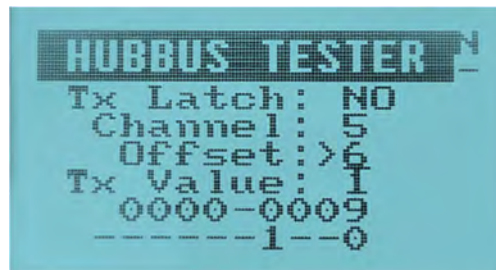


Figure 17: HubBus Tester - Momentary Transmit On



Figure 18: HubBus Tester - Momentary Transmit Off

While exiting the HubBus tester mode, the HHP1-H prompts to the user for clearing the transmitting HubBus buffer. User can press “ENTER” to clear the buffer and exit tester mode or can press “Menu” to exit the tester mode leaving the transmitting buffer un-touched.

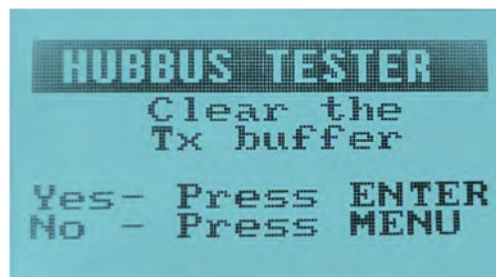


Figure 19: HubBus Tester - Exit Action

4.2.3 ANALOG

The HHP1-H has the ability to show the analog value transmitted on the particular channel.

In the channel field, the user can use the numeric keypad to input the desired channel number.

The HHP1-H dynamically updates the analog value in the output field. It also updates the corresponding hex value on the next line.

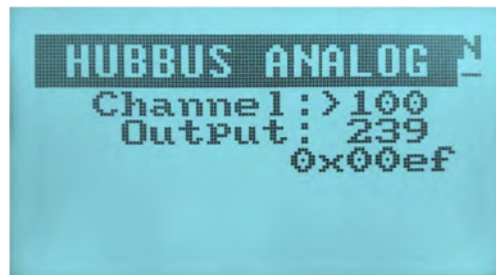


Figure 20: HubBus - Analogue Decode

4.2.4 CONTROL CHANNELS

The HHP1-H has the ability to show the details transmitted by HBSPCG on the control bytes and they are dynamically updated.

The details include:

- Cycle A/B
- Emergency interrupt/auxiliary interrupt
- Multi-link
- Number of channels
- Band-width
- Analogue transmission bits
- Fault



Figure 21: HubBus - Control Channels

4.2.5 INTERRUPT COUNT

The HHP1-H has the ability to display the Emergency and the Auxiliary interrupt counts. It displays the current occurring count in the “Count” field and the cumulative count in the “Concurr” field.

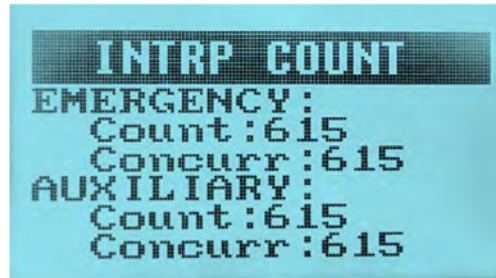


Figure 22: HubBus - Interrupt Counts

4.3 MODBUS MODE

4.3.1 INFORMATION FIELD

The HHP1-H has the ability to display the basic information of the connected HubBus module. Information such as the module type, identity and versions shall be viewed.

User can press the “Up Arrow” / “Down Arrow” to parse the information.

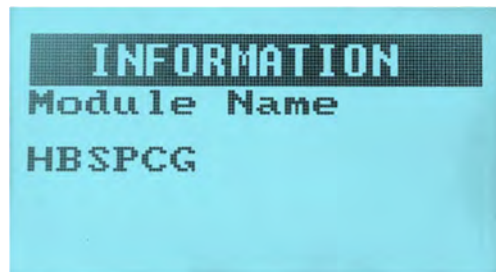


Figure 23: Modbus Mode - Information Mode

4.3.2 DIAGNOSTIC FIELD

The HHP1-H has the ability to display the connected HubBus modules diagnostic information such as the state of the I/O, Voltage levels, Current driven etc...

User can press the “Up Arrow” / “Down Arrow” to move across the diagnostic information.

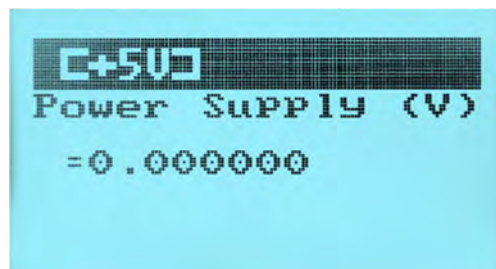


Figure 24: Modbus Mode - Diagnostic Mode

4.3.3 CONFIGURATION

The HHP1-H has the ability to display and configure the connected HubBus modules specific parameter. The parameters shall be number of channels, bandwidth, sample count, etc...

User can press the “Up Arrow” / “Down Arrow” to move across the configuration parameters to view/edit.

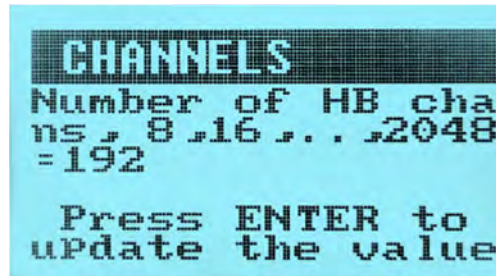


Figure 25: Modbus Mode - Configuration Screen

To edit a parameter, user should press the “Enter” key. HHP1-H enters the edit mode. Once in edit mode, the HubBus devices will get the input parameters from user in two categories. They are:

- Value between the pre-defined range.
- Value from the pre-defined set of values.

4.3.3.1 Configuration Process

Refer to the specific module user manual for detailed configuration information. This is an overview of the configuration process for each parameter.

Configuration of safety devices follow the below process:

1. Enter the configuration option when the HHP1-H is connected to the device.
2. Scroll to the desired parameter to be modified.
3. The handheld will display the current value of the displayed parameter.

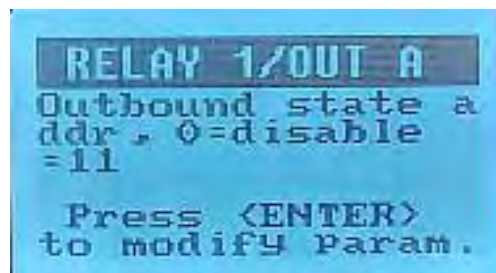


Figure 26: Configuration process - select parameter

4. Press [ENTER] key to modify the parameter

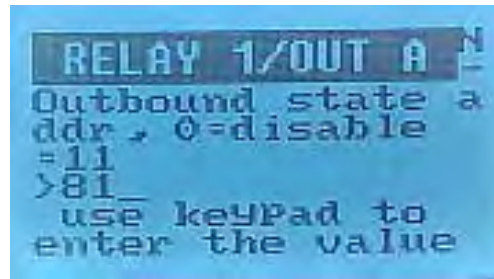


Figure 27: Configuration process - modify parameter

5. Modify the parameter to the desired value.
 - a. Press **[MENU]** to cancel and revert to the previous configured value.
 - b. Press **[ENTER]** to accept the new value and send to device.
6. The value will be checked by the handheld and the device. If there are any problems an error message will be displayed on the handheld indicating the type of problem.
7. The new parameter value will be sent back to the handheld for visual confirmation by the user.
8. The user will be prompted to:
 - a. Save the value by pressing the **[ENTER]** key, or
 - b. Revert back to the original value by pressing the **[MENU]** key

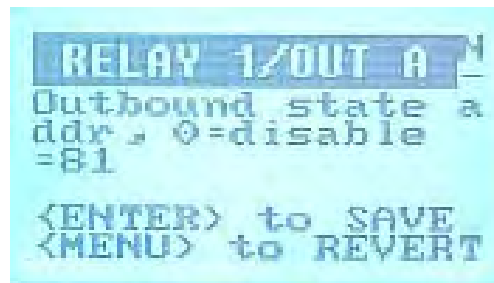


Figure 28: Configuration process - Save or Revert

9. The handheld will now display the parameter value as store in non-volatile memory in the device.
 - a. If save selected, command sent to device to save updated configuration from RAM to FLASH memory

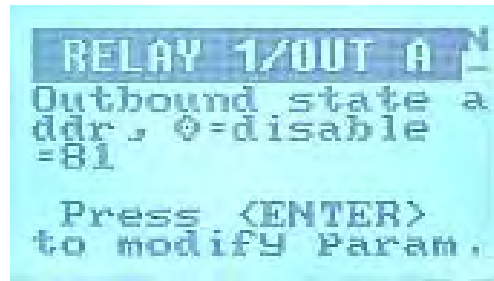


Figure 29: Configuration Process - Parameter Saved

- b. If revert selected, command sent to device to restore previous configuration from FLASH memory

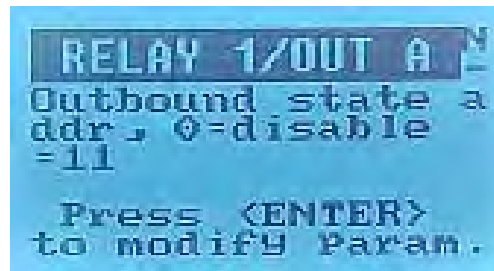


Figure 30: Configuration Process - Parameter Reverted

Note: Prior to disconnecting the handheld programmer, the user should verify all safety parameters are correct and document any changes made. Before restarting the system after making changes to safety parameters the safety functions must be validated.

4.3.3.2 Numeric Value Entry

If the parameter takes a value between the pre-defined range, the user shall use the numeric keypad to input the new value to update. If the value is not within the range, the message “Out of range pls retry” along with the defined low value and high value will be displayed.



Figure 31: Modbus Mode - Configuration Numeric Entry

4.3.3.3 Set Value Entry

If the parameter takes a value from the pre-defined set of values, the user shall use the “Up Arrow” / “Down Arrow” to select a new value to update.

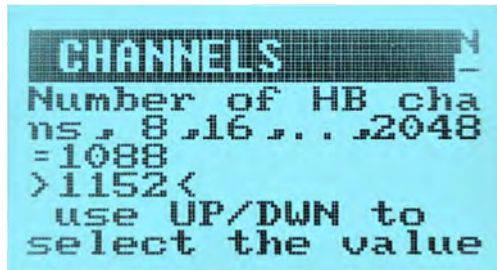


Figure 32: Modbus Mode - Configuration Fixed Values

In both the cases, once a new value is fed in the user shall press “Enter” key to update the new value to the HubBus module and exit the edit mode.

4.3.3.4 Logic Entry

Devices may require the configuration of logic functions. The initial screen appears similar to the following figure. The screen shows the parameter name, address range displayed, the offset from the starting address (0 through to F or 15) and the logic value for that address offset.

Where:

Symbol	Logic
-	Ignore, not resolved in logic function
0	OFF or Reset
1	On or Lockout
F	Fault or missing state

Table 6: Logic function states

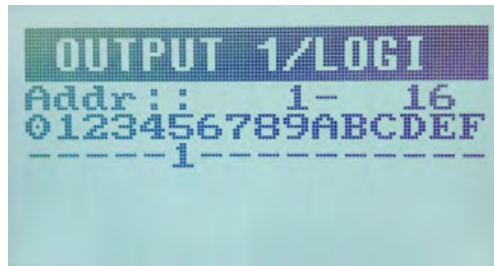


Figure 33: Logic Configuration – Enter

Scroll left [←] and right [→] using the cursor keys to view the desired channels. Display increments in groups of 16 channels.

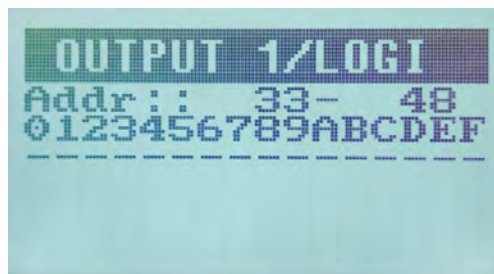


Figure 34: Logic Configuration - Select Range

Keep scrolling until the required channel to be modified is in the displayed range.

Press **[ENTER]** to enter the logic edit mode. **[MENU]** may be pressed at any time to exit the edit mode and revert to previous configuration.

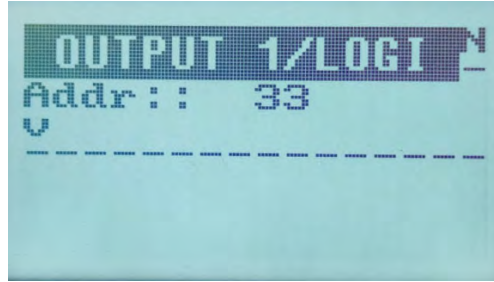


Figure 35: Logic Configuration – Enter Edit Mode

Scroll left **[←]** and right **[→]** using the cursor keys to select the desired channels. The **V** symbol indicates the currently selected channel. Additionally, the currently selected channel is also displayed numerically below the parameter name.

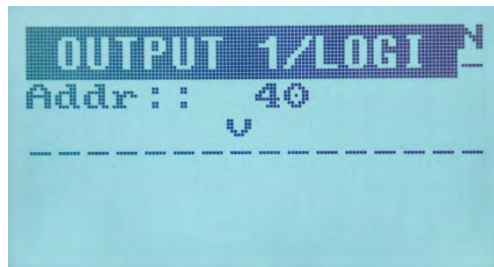


Figure 36: Logic Configuration – Select Address

Scroll up **[↑]** or down **[↓]** using the cursor keys to select the desired logic state for that channel. See the table above for description of channel states.

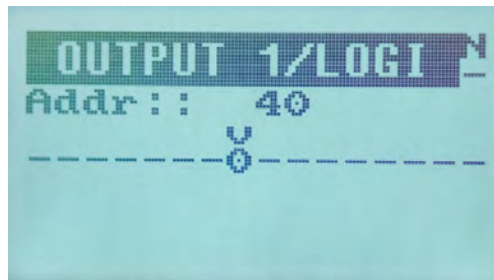


Figure 37: Logic Configuration - Change Value

Once desired state has been set for that channel, you may edit other channels within the displayed group of 16 channels. When finished, press **[ENTER]** to save the new logic state.

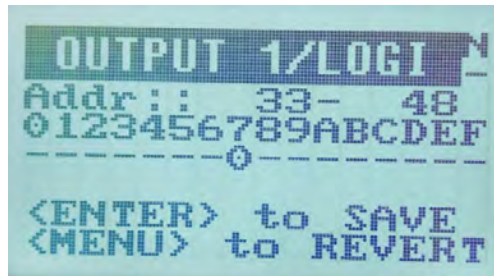


Figure 38: Logic Configuration - Save or Revert

The configured state as uploaded to the devices is displayed on screen. Save the value by pressing the [ENTER] key, or revert back to the original value by pressing the [MENU] key

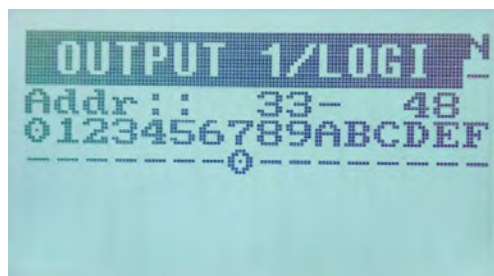


Figure 39: Logic Configuration - Saved Change

Configuration complete. New logic state is displayed.

4.3.4 LOGGING

The HHP1-H has the ability to display the events that are logged in the particular HubBus module.

User shall view the total number of logs that the connected HubBus module has logged in the “Log status” page.



Figure 40: Modbus Mode – Log statistics

To view the individual log details, user shall view the “Log data” page. The “Log data” page will display the below details,

- Event index
- Event ID
- Event type
- Data

- Log created date
- Log created time
- Log description
- Data value

```
Ev.Idx:>0001      N
Ev.ID: 0x0001     -
Ev.Type: 0x000D
Ev.Data: 0x5060
Date: 20/02/07
Time: 11:56:16
RTC RESET
Data value: 2057
```

Figure 41: Modbus Mode - Log Entry

Not all HubBus modules support the logging feature. If a HubBus module doesn't support the logging feature, an exception message will be displayed on the screen once the user enters the "LOGGING" page.

```
LOG
MBUS exception
No log datas
available.
```

Figure 42: Modbus Mode - Log Unavailable

4.3.4.1 EVENT TABLE

The HHP1-H uses a decoding file to translate a log event to text description. The "Events.txt" file (officially released by "Austdac") is a mandatory file that should be present on the micro SD card's root directory to access the logging feature.

The content on the "Event.txt" file should not be modified by the user.

4.3.5 Upload/Download Menu

4.3.5.1 UPLOAD CONFIG

The upload configuration is used to take a previously saved configuration file from the micro SD card and upload it to the target HubBus device. This method of configuration ensures exact cloning during maintenance and system expansions.

User when entering into the upload config menu, the HHP1-H will scan for the connected HubBus device on the config/Modbus port and list the matching config files for that particular device from the μ SD card.

When there is no HubBus device found on the config/Modbus port, the message "No device found" will be displayed to the user.

When there is no micro SD card on the HHP1-H, the message "NO SD Card" will be displayed to the user.

Only config files that match the device name of the connected device will be listed. When there is no config file matching the above credential, no files will be listed and only the connected device's details will be shown.

At one instance, 3 number of matching config files will be listed on the screen and if there are more files to be listed, there will be a "Next>" on the right bottom of the screen. User can use the "Right Arrow" to view the next set of 3 files. Up on pressing the "Right Arrow", if there are some more files to be listed, there will a "Next>" on the right bottom of the screen and "<Back" on the left bottom of the screen or only "<Back" on the left bottom of the screen. User can use the "Left Arrow" to view the previous set of 3 files.



Figure 43: Modbus Mode - Upload Configuration Select

Once the required file is selected, user can press the "Enter" key to upload the particular configuration file to the device. The message "Loading" will be show while the upload is in progress.

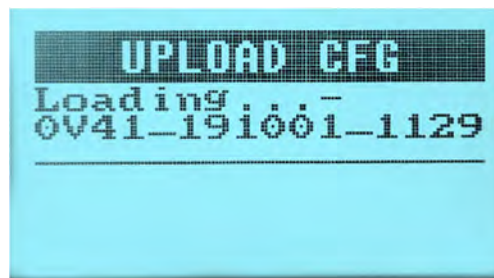


Figure 44: Modbus Mode - Upload Configuration – Upload in progress

Upon successful upload, user will get the message "Loaded". If it's a failure, user will get the message "Failure".

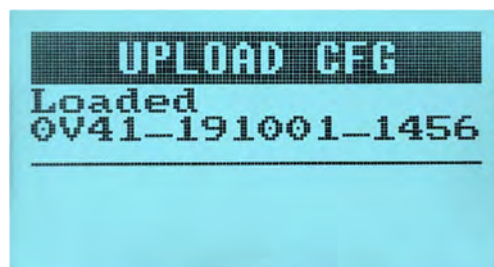


Figure 45: Modbus Mode - Upload Configuration – Upload Complete

4.3.5.2 DOWNLOAD CONFIG

The download configuration is used to extract the configuration profile of any HubBus device via the config/Modbus port and save it as a config file on the micro SD card. The details on the downloaded configuration file is as below,

- The first line will be the device type.
- The second line will be the device serial number.
- The third line will be the date and time of downloaded configuration.
- The fourth line will be the version number of device.

The above will not be as a part of the data and it's for reference.

The following lines in the downloaded configuration file will have the below details in sequence,

- Modbus address
- Register size
- Register type
- Value in that register
- Description about the register

Having an exact copy of the configuration is useful for record keeping and future cloning of a new HubBus device for maintenance or system expansion.

When entering into the download config menu, the HHP1-H will scan for the connected HubBus device on the config/Modbus port to download the configuration file from the corresponding device.

When there is no HubBus device found on the config/Modbus port, the message “No device found” will be displayed to the user.

When there is no micro SD card on the HHP1-H to store the downloaded configuration file, the message “NO SD Card” will be displayed to the user.

The message, “Saving” will be displayed while the downloading is in progress.

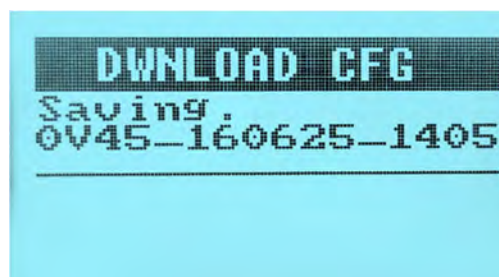


Figure 46: Modbus Mode - Download Configuration - Saving

Once the downloading is done, by default the downloaded configuration file will be stored on the micro SD card in the naming format
AAAAAA_BBBB_CCCCCC_DDDDDD.bin.

Where,

- AAAAAA – Device type
- BBBB – Device Firmware Version
- CCCCCC – Current date on the HHP1-H

- DDDDDD – Current time on the HHP1-H

For example,

HBSPCG_0V45_170519_243040.bin

For easy reference to the user, the HHP1-H also allows the user to rename the downloaded configuration file. Once the downloading is done, the HHP-H prompts the user asking for a rename option. If the user wants to rename, the user can edit the “DDDDDD” on the above auto-created name using the alpha-numeric keypad. Else if the user wants to skip the renaming and proceed with the actual auto-created name, the user should press “MENU” when the prompt appears.



Figure 47: Modbus Mode - Download Configuration – Save Filename

4.3.5.3 SW UPDATE

The SW update is used to update the firmware of any HubBus device. The HHP1-H gets the firmware hex files from the micro SD card.

User when entering into the SW update menu, the HHP1-H will scan for the connected HubBus device on the config/Modbus port and list the matching HEX files for that device from the micro SD card.

When there is no HubBus device found on the config/Modbus port, the message “No device found” will be displayed to the user.

When there is no micro SD card on the HHP1-H, the message “NO SD Card” will be displayed to the user.

Only HEX files that match the connected device name will be listed. When there is no HEX file matching the above credential, no files will be listed and only the connected device’s details will be shown.

At one instance, 3 number of matching HEX files will be listed on the screen and if there are more files to be listed, there will be a “Next>” on the right bottom of the screen. User can use the “Right Arrow” to view the next set of 3 files. Up on pressing the “Right Arrow”, if there are some more files to be listed, there will a “Next>” on the right bottom of the screen and “<Back” on the left bottom of the screen or only “<Back” on the left bottom of the screen. User can use the “Left Arrow” to view the previous set of 3 files.



Figure 48: Modbus Mode – Firmware Download – File Select

Once the required file is selected, user can press the “Enter” key to download the HEX file to the device.

Upon successful download, user will get the message “Software update successful”. If it’s a failure, user will get the message “Configuration Failure Rebooting”.

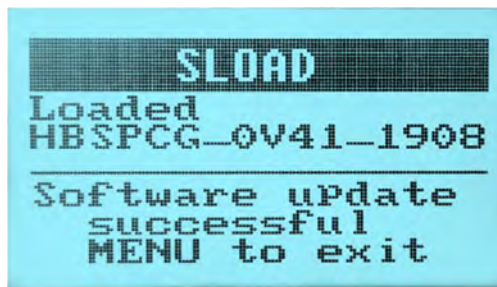


Figure 49: Modbus Mode – Firmware Download – Successful

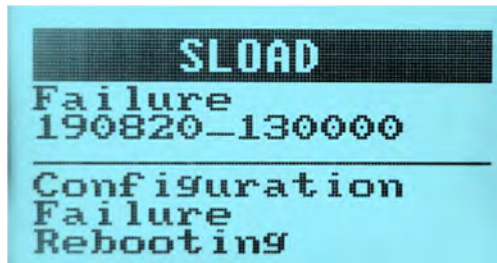


Figure 50: Modbus Mode – Firmware Download – Failed

Note that the HEX file must follow the following file name convention:

AAAAAA_BBBB_CCCCCC_DDDDDD.hex

Where,

- AAAAAA – Device type
- BBBB – Device Firmware Version
- CCCCCC – Current date on the HHP1-H
- DDDDDD – Current time on the HHP1-H

For example,

HBSPCG_0V45_170519_243040.hex

4.3.6 MODBUS SETTING

HHP1-H when connected to any HubBus module, it reads the modules address and self-update the “Slave Addr” section. User must press “Enter” key to enter the edit

mode and use the numeric keypad to force update the slave address. The HHP1-H by default uses the slave address as zero.

The HHP1-H has the ability to allow user to select the communication medium to the HubBus modules between TTL and RS485. User when entering this menu must press “Enter” key to enter the selection mode and use the “Up Arrow” / “Down Arrow” to select the communication medium in the “Scan Port” section. The HHP1-H by default has the communication medium as TTL.



Figure 51: Modbus Mode – Modbus settings

4.4 TETHERED MODE

The file transfer is used to transfer files between HHP1-H and a Windows PC having the AUSTDAC HHP INTERFACE application installed on it.

User when entering into the FILE TRANSFER menu, the HHP1-H will turn on its Bluetooth and make it ready for file transfer. It also displays its Bluetooth friendly name on the display for the user to connect the same on the AUSTDAC HHP INTERFACE application.



Figure 52: Bluetooth Mode Screen

The B8AC is the Bluetooth friendly name and it is unique for every HHP1-H

4.5 HANDHELD MODE

4.5.1 LCD BACKLIGHT

The LCD backlight menu has the option to turn ON/OFF the LCD backlight.

User when entering this menu must press “Enter” key to enter the edit mode and use the up arrow/down arrow to turn ON/OFF the LCD backlight.



Figure 53: Handheld Settings - LCD Backlight

4.5.2 SET DATE/TIME

The Set Date/Time menu has the option to set date and time to the HHP1- H.

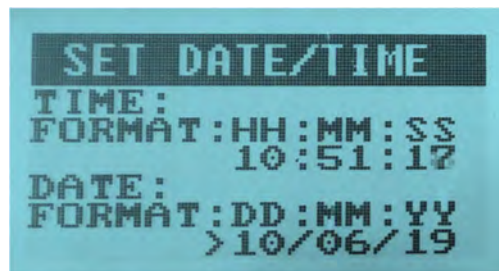


Figure 54: Handheld Settings - Time and Date

User when entering this menu has to press “Enter” key to enter into the edit mode and also to move to the next edit field. On every edit field, the user can use the “Up Arrow” / “Down Arrow” keys to change the value.

The HHP1-H uses the 24 Hours’ time format HH:MM:SS and the time format is DD:MM:YY.

Every edit field has its own maximum possible limits,

- 24 for the hour field
- 60 for the minute field
- 60 for the second field
- 31 for the day field
- 12 for the month field
- 99 for the year field

4.5.3 ABOUT

The About menu display the basic details of the HHP1-H device like,

- Serial number of the device
- Firmware checksum
- HHP1-H firmware Version



Figure 55: Handheld Settings - Handheld Info/About Screen

The Serial number of the device is in the format YYMMSSSS. Where,

- YY is the year
- MM is the month
- SSSS is the sequential number.

4.5.4 SYSTEM UPDATE

The System update menu is used to make a firmware upgrade to the HHP1-H devices.

The firmware binary “HHP1.a43” will be officially released by Austdac. Only this binary to be loaded into the micro SD card and it should be loaded before getting into the System update screen.

While the user enters this screen and if a valid binary is present on the SD card the below screen will be prompted.

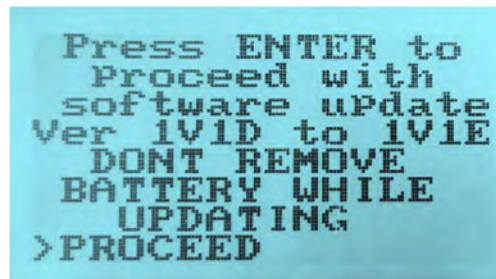


Figure 56: Handheld Settings - Firmware Update Confirmation

The validation before the system update includes the below stuffs.

- Battery level
- Device type
- Boot support

If the battery level is less than 25%, the system update will be terminated and the user will be getting a prompt as below,

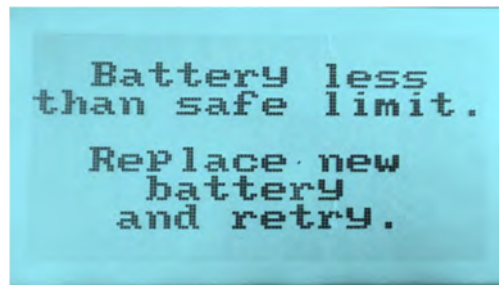


Figure 57: Handheld Settings - Firmware Update Battery Warning

If the binary file doesn't belong to this device, the system update will be terminated and the user will be getting a prompt as below,

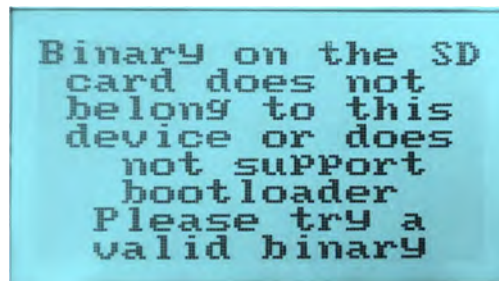


Figure 58: Handheld Settings - Firmware Update Invalid File

If there is no SD card or no "HHP1.a43" binary file on the SD card, the system update will be terminated and the user will be getting a prompt as below,

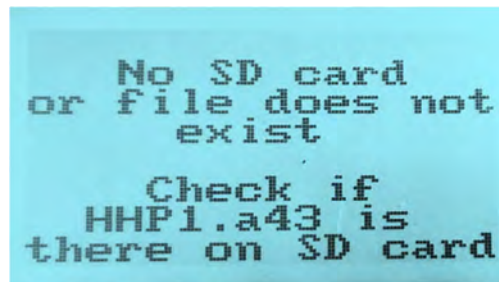


Figure 59: Handheld Settings - Firmware Update No Valid File Found

Once the validations are cleared, the device goes through a sequence of process to have the firmware updated. The process includes,

- Erasing temporary memory.
- Updating temporary memory.
- Erasing main memory.
- Updating main memory.

These processes will be update to the user on the screen as below.

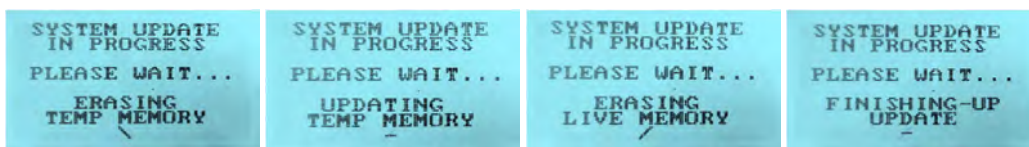


Figure 60: Handheld Settings - Firmware Update In Progress



Upon a successful firmware update, the device reboots with the new firmware. Please check to the updated firmware version on the “ABOUT” screen in the settings page.

If the firmware update fails while erasing or updating the temporary memory, the device gets booted with the previous valid firmware that is contained.

If the firmware update fails while erasing or updating the main memory, the device stays on the boot mode and retries the firmware update with the firmware binary which is loaded on the SD card.

Annex A. Specifications

General	
Name	HubBus Hand Held Programmer and Tester
Type	HHP1-H
Interface	
Number of HubBus terminals	1
RS485	1 x Modbus 2 wire
Configuration	TTL, 19,2k/8/1/E
Physical	
Dimensions (Enclosure)	101.6mm (W) x 32.8mm (D) x 190.5mm (H)
Dimensions (Protective Case)	116mm (W) x 47mm (D) x 224 (H)
Mass	800g
Ingress Protection	IP20
Enclosure Material	ABS (Acrylonitrile Butadiene Styrene) (UL94HB)
Enclosure Colour	Black
Protective Case Colour	Alert Red
Terminals	
Configuration	8-Pin Molex Mini-Fit
HubBus	2-Pin Molex Mini-Fit
Environment	
Operating Temperature	0°C to 40°C
Storage Temperature	-20°C to 80°C
Humidity	80% to temps. up to 31°C decreasing linearly to 50%rH at 40°C max 80% rH, non-condensing
Pollution Degree	2
Installation Category	1
Altitude	2000m
Electrical	
Power Supply	4 x AA Cells
Power Consumption	45mA (Backlight Enabled) 100mA (Backlight and Bluetooth)
Battery Life (Estimated)	40 Hours (2000mAh Cells)
Operating Voltage	4.4-6.0VDC
HubBus current consumption	10mA maximum @ 12-48VDC
HubBus Unit Load	2
Config. Terminal Supply	3.3VDC (10mA)
Transmitter Supply	8 – 12VDC (10mA)
Inactivity Auto Power Off	15 minutes
Display	
LCD	Transflective
Resolution	128x64pixels
Backlight	LED

Table 7: Specifications

Annex B. Cables

B.1 HUBBUS NETWORK INTERFACE

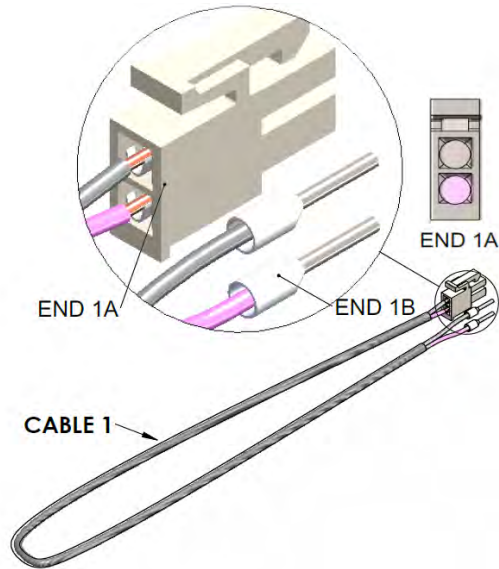


Figure 61: HubBus Network Interface Cable Drawing

B.2 HUBBUS MODULE CONFIGURATION

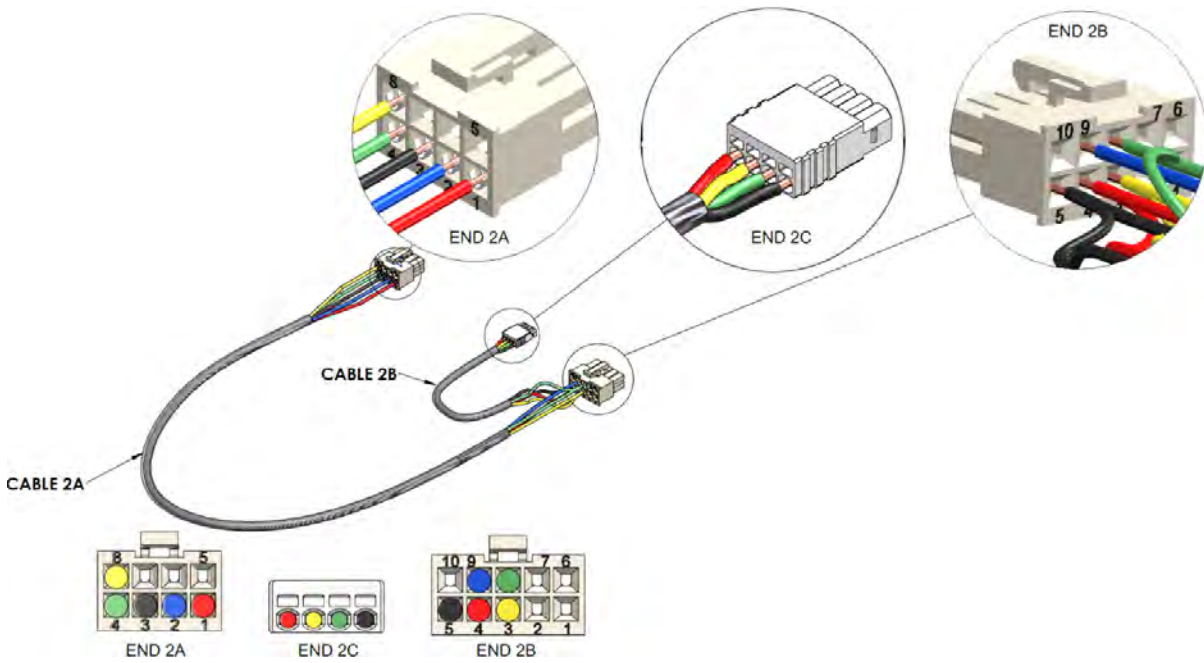


Figure 62: HubBus Module Interface Cable Drawing

Annex C. AUSTDAC HHP INTERFACE APPLICATION

The AUSTDAC HHP INTERFACE application, on launch will scan for all possible AUSTDAC HHP devices within the range.



Figure 63: AUSTDAC HHP INTERFACE application startup screen

Once the scanning is done, the AUSTDAC HHP INTERFACE application will list all the scanned AUSTDAC HHP devices to the user. The user can then select the required device from the list and connect to it.

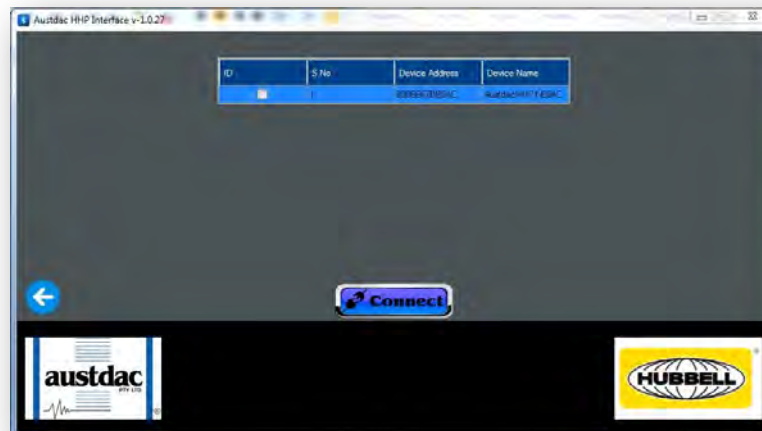


Figure 64: List of files on the connected HHP1 device

If the device connected previously is within the range and in the file transfer mode, the scanned device listing step will be skipped, and that device will be directly connected.

Once a successful connection is made, the AUSTDAC HHP INTERFACE application will fetch all the .hex and .bin files from the HHP1-H and list it to the user.

