User manual

E3 Compact amplifier

59300623, Rev003

TELESTE

Contents

Introduction

E3 is a compact dual output amplifier with wide 16…42 dB gain adjustment range making it suitable for both distribution purposes and line extender use. The E3 amplifier supports 1.2 GHz frequency range, which ensures fulfilment of all future bandwidth needs. The upstream signal path is flexible and it can be updated to 204 MHz.

Adjustments use electrical controls thus eliminating the need of the usual plug-in attenuators in the system set-up. Other standard features include reliable power supply, built-in return path amplifier as well as an efficient surge and ESD protection.

Ingress switches can be remotely controlled via FSK communication of an optional E61 RIS receiver or E62 transponder. This one-way communication channel also enables remote update of software. E62 has also return path FSK transmitter for remote monitoring.

Local configuration of E3 is done via its built-in display and pushbutton user interface. E61/E62 module can be used to add USB interface for configuration using a Windows PC or tablet equipped with CATVisor Commander software or Android mobile device equipped with Teleste Commander software. Wireless Bluetooth connection can be established with AC6901 USB to Bluetooth adapter.

E3 hardware generations

E3 has 3 generations with some differences in hardware and functionality:

- 1st generation E3 has 0 / 13 dB selectable interstage slope.
- 2nd generation E3 has 0…15 dB adjustable interstage slope.
- 3rd generation E3 has 0…13 dB adjustable cable simulator instead of 0 / 13 dB route.

Installation

Mounting

The E3 can be installed either into a street cabinet or to a sheltered outdoor environment. The amplifier should be installed vertically so that the external cable connectors and ventilation hole are facing downward. Figure 1 depicts for the positions of mounting brackets as well as other installation dimensions. Mount the E3 securely onto a wall using appropriate length 5 mm mounting bolts/screws (not supplied) and tighten the mounting bolts/screws. The amount of torque required depends on the mounting surface.

When installing the amplifier in its final location, make certain that it has adequate ventilation on all sides. In particular, it is necessary to provide at least 150 mm of room above and below the node for air circulation. The lid of the amplifier may be opened from either the left or right hand side or removed altogether. This flexibility improves accessibility and permits greater freedom to install the amplifier in confined spaces. Hint! Easiest way to remove the lid is to pull it from retaining bolt after it has been detached from the base.

The lid retaining bolts are fastened with a 4 mm hex key. Use no more than 3 Nm torque. The E3 enclosure classification is IP67. However, in standard delivery condition the lowest sidewall is equipped with a 1 mm ventilation hole. Thus, the practical class of enclosure is IP54 when amplifier is correctly installed and tightened.

NOTICE: IP54 type enclosure - This enclosure provides protection from airborne dust and light sprays or splashing water from all directions.

Before closing the lid it should be checked that:

- nothing is trapped between the lid and the case
- all case gaskets are intact and in their correct positions
- lid seats evenly on the rubber gasket

Amplifier housing should be grounded using a copper conductor of least 4 mm^2 cross section area from a proper earth to the housing ground lug.

Wall mounting

Drill two mounting holes 196.5 mm apart in the mounting surface.

Figure 1 depicts the locations of the wall mount bosses as well as other installation dimensions. Select appropriate length 5 mm mounting bolts (not supplied) and washers. Tighten the mounting bolts. The amount of torque required depends on the mounting surface.

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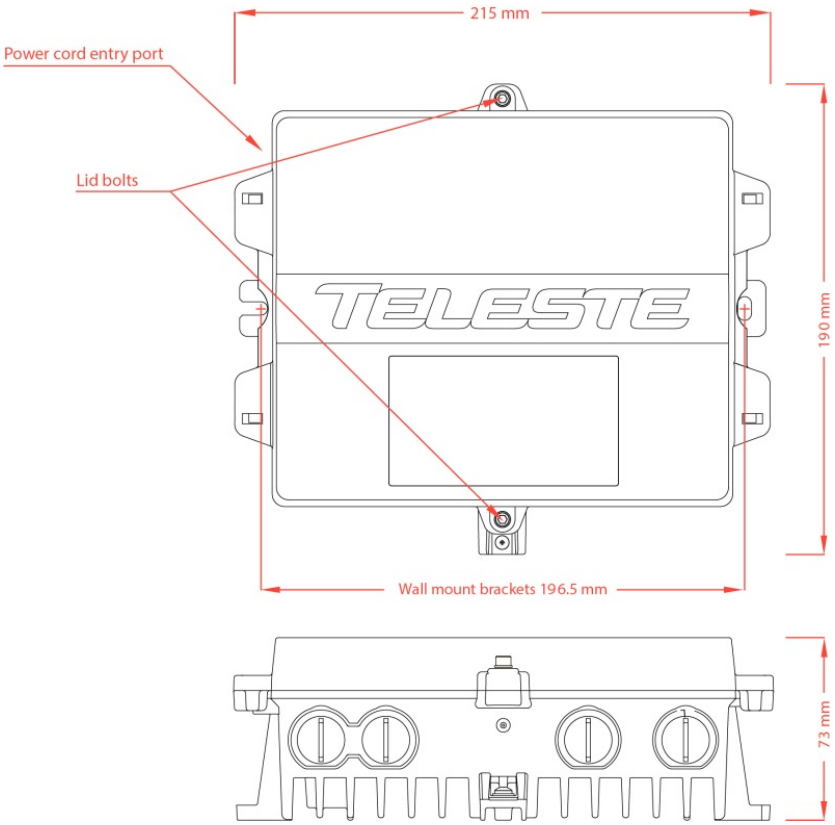

Figure 1. E3 housing dimensions – top and side view

Interfaces

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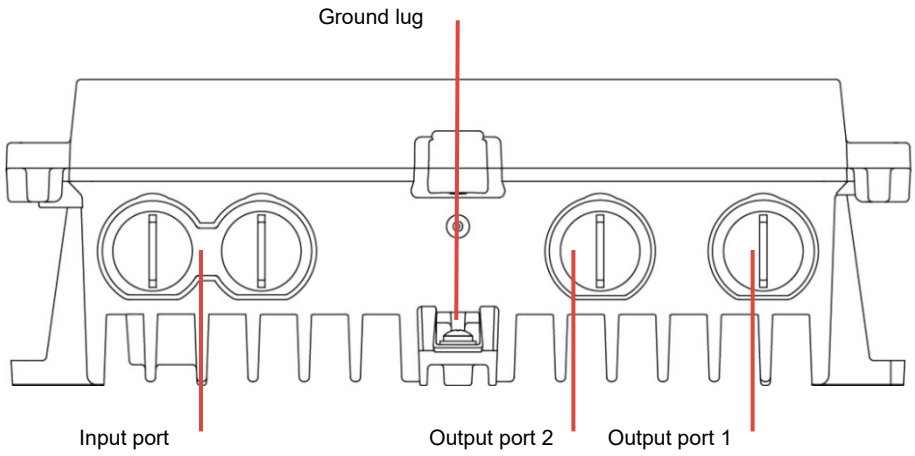

Figure 2. Port locations

The E3 amplifier has three dedicated cable connection points: input and two outputs.

Coaxial connections

The E3 amplifier requires pin-type connectors for all RF connections. The E3 amplifier has spring loaded seizure assemblies on coaxial ports that provide a tight connection with precise alignment between contact points. All coaxial output ports have a standard PG11 thread. Note that Teleste KDC327 (PG11–F) and KDC328 (PG11-3.5/12) connectors fulfils the centre pin equipment requirement for E series.

Suitable length for the centre conductor pin is approximately 21 mm (Figure 3). Pin-type connectors, with pins extending from 19 mm to 23 mm from the connector shoulder, require no trimming. Any longer pins must be trimmed before inserting them into the housing. After cutting the pin, trim the sharp edges. Using connectors with centre conductors pins exceeding 1.8 mm in diameter will permanently damage spring loaded seizure assemblies. Ensure that the centre conductor pin is not deformed, causing destruction of the spring loaded seizure assembly. Note! When using KDC314 (PG11-5/8) adapter, the length of connector's centre connector pin must be 33 mm ±2 mm.

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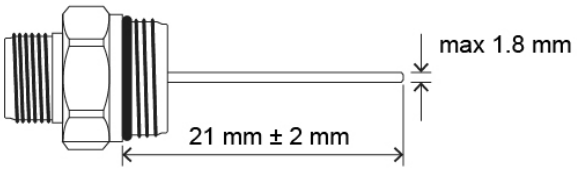

Figure 3. Centre conductor length

Powering

NOTICE: Do not remove the shielding cover. There are no user serviceable parts inside. Unauthorized repairs or modifications will result in permanent damage to the equipment, and will void the warranty.

Common precautions:

- The E3 amplifier is intended for installation in restricted access locations (dedicated equipment rooms, equipment closet, or the like).
- Operate the device only on the specified supply voltage.
- The E3 must never be operated without its power supply unit shielding cover.
- The E3 has no separate power switch thus the power plug must be easily accessible.
- Disconnect the power cord by the connector only. Never pull on the cable portion of the power cord.
- Do not place or drop heavy or sharp-edged objects on the power cord.
- The power must be disconnected when installing or removing the E3.

Additional safety requirements for Norway and Sweden:

- Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system must be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

The E3 is available either with a remote or local powering option. The E3 has an integrated power supply that cannot be replaced. The following subsections describe the differences.

E3 with remote powering: (27...65 V AC)

The supply voltage of the remote powered E3 model (27...65 V AC) is supplied via input/output RF ports only. Feed through capacity is max. 7 A / port. On delivery, RF ports are provided with fuses (MINI Auto Fuse F15A/32V, BLUE, 10.9 x 3.8 x 16.3). Local connection for remote feed is not possible thus the power cord entry port must be plugged.

E3 with local powering: (205…255 V AC)

The locally powered E3 model is connected to the mains voltage of 205…255 V AC with its own power cord and has no fuses nor AC feed-through in its RF ports. The power supply unit is double shielded and does not require separate grounding. However, ensure that the housing of the E3 is properly connected to the earth in order to meet safety requirements. Proper grounding will also improve protection from the effects of interference and thus increase the overall reliability of the system.

Front panel

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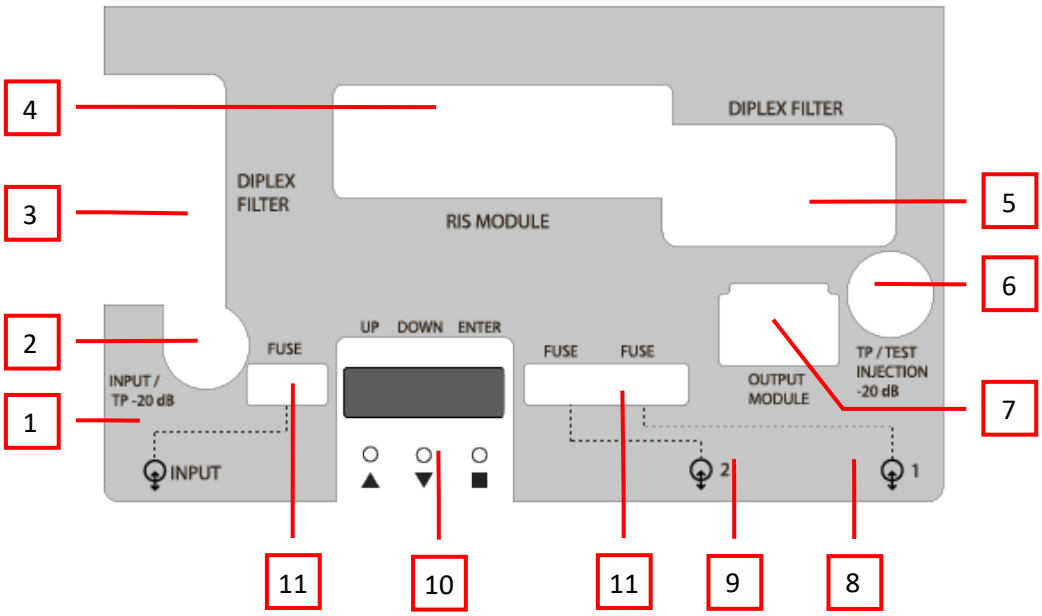

Figure 4. E3 front panel (remotely powered model)

1) Input port
2) Input test point, F female (-20 dB resistive coupler)
3) Input diplex filter module
4) Slot for RIS/transponder module
5) Output diplex filter module
6) Output test / injection point, F female (-20 dB directional coupler)
7) Output module (see Table 2)
8) Output 1 port
9) Output 2 port
10) Local user interface
11) Fuses (only in remote powered model)

Features

Diplex and output modules

The E3 amplifier is delivered according to the ordering code.

The installed diplex filter (Figure 4 positions 3 and 5) must be new 1.2 GHz types, which are automatically detected by the software. The supported diplex filter types listed in Table 1.

The software automatically recognises diplex filters. "Unknown module" alarm is activated if diplex filter type cannot be detected or if input diplex filter frequency is different from output diplex filter frequency.

Diplex filter	Functionality
CXF065	65/85 MHz frequency split
CXF065 10	65/85 MHz frequency split with ingress blocker, passband f >10 MHz
CXF065 19	65/85 MHz frequency split with ingress blocker, passband f >18MHz
CXF085	85/105 MHz frequency split
CXF204	204/285 MHz frequency split
CXF204 19	204/258 MHz frequency split with ingress blocker, passband f >18MHz

Table 1. Supported diplex filter types

Output modules are passive plug-ins used to control the outputs – see Table 2.

Module	Functionality as output module	Output 1	Output 2
AC6120	0 dB output module, 1 output in use	0 dB	not used
AC6113	2/8 dB tap, 2 outputs in use	-2 dB	-8 dB
AC6117	2/10 dB tap, 2 outputs in use	-2 dB	-10 dB
AC6114	2/12 dB tap, 2 outputs in use	-2 dB	-12 dB
AC6115	1/16 dB tap, 2 outputs in use	-1 dB	-16 dB
AC6124	Two-way splitter, 2 outputs in use	-4 dB	-4 dB

Table 2. Output modules with corresponding nominal attenuation values

Forward path

The input and output amplifier stages are both based on high performance solutions, which allow the user to set E3 output for high and low output levels. The output stage uses a GaN hybrid to improve RF performance over the entire 85 to 1218 MHz passband. Note that E3 must have a proper matching at output port(s) to ensure optimal and reliable operation.

Forward path gain control

E3 has two gain control elements in its forward path signal route: input gain and interstage gain. The software automatically adjusts these elements based on the desired total gain. The total gain is adjustable between -26 and 0 dB in 0.5 dB steps.

When the built-in cable simulator is enabled (input slope < 0 dB) by the user, the available forward path gain at 1.2 GHz decreases by 13 dB (1st and 2nd gen E3) or by the amount of cable simulator value (3rd gen E3).

Gain can also be adjusted by 2nd gen E62 transponder during automatic alignment or ALSC operation.

Forward path slope control

Forward path slope is the frequency response level difference between 85 and 1218 MHz. It is controlled by two elements:

1) **Input slope**, coupled with built-in cable simulator: Adjustable between -13 and 20 dB in 0.5 dB steps. Negative values enable the built-in cable simulator and reduce the maximum gain respectively.
2) **Interstage slope**: Adjustable between 0 and 15 dB in 1 dB steps. Note that 1st generation E3 amplifiers have only two choices: sloped (13 dB) and flat (0 dB).

Interstage slope should be set according to desired output slope. After selecting the correct interstage slope the low frequency output signal levels should be adjusted with a measurement instrument using input slope control.

Increasing slope value decreases low frequency signal levels.

Input slope can also be adjusted by 2nd gen E62 transponder during automatic alignment or ALSC operation.

Power save

The RF performance and power consumption of E3 can be adjusted by controlling the output hybrid's current. Power save is disabled as factory default. This ensures full performance.

If output levels are more than 2 dB below the specified maximum levels the power save can usually be enabled to achieve a ~3 W reduction in power consumption without any effect on RF performance.

Power save can also be controlled automatically by 2nd gen E62 transponder, or remotely via E61 or E62 RIS link.

RF power measurement, automatic power save, automatic alignment and ALSC

2nd gen E62 transponder supports RF output power measurement. When 2nd gen E62 is installed into E3, it enables:

- Total E3 RF output power measurement with alarm
- Automatic E3 power save control based on measured RF power
- Automatic alignment of E3 gain and slope based on user-configurable target values for total output RF power and low-band output RF power
- ALSC with user configurable target levels, hysteresis and delay

These features are in 2nd gen E62 transponder, and thus not visible in E3 local user interface. For more information, see E62 documentation later in this user manual.

Return path

E3 amplifier supports 65 MHz, 85 MHz and 204 MHz return path. The return path bandwidth is automatically set according to the installed diplex filters. If diplex filter type cannot be detected, or the installed diplex filters are not the same type, the “Unknown module” alarm is set and 65 MHz bandwidth is used.

Return path gain and slope control

Return path gain can be adjusted between -20 and 0 dB in 0.5 dB steps.

Return path slope can be adjusted between 0 and 15 dB in 0.5 dB steps.

The return path slope control pivot frequency is 204 MHz (slope measured between 5 and 204 MHz) when 204 MHz diplex filters are installed, otherwise 85 MHz (slope measured between 5 and 85 MHz). Note that in 65 MHz operation the signal level at 65 MHz is thus also affected by slope control, which has 85 MHz pivot frequency.

If diplex filters are changed so that the slope pivot point frequency changes, the E3 software automatically readjusts return path gain and slope controls to obtain similar frequency response.

RFF (Return Follows Forward) functionality

When forward path gain and slope are adjusted by the user, E3 software automatically adjusts return path gain and slope accordingly. This RFF calculation assumes that all needed forward path gain & slope is due to splitting (flat) and cable losses between this and previous amplifier. If the forward path output levels are the same for this and previous amplifier, RFF typically adjusts return path so well that fine-tuning may not be needed at all.

RFF is enabled as factory default. It is automatically disabled if return path gain or slope is adjusted manually. RFF can be re-enabled or disabled by the user.

RFF adjusts only gain and slope. It does not change return path input gain and ingress switch settings and does not include these in calculation.

If forward path is adjusted by 2nd gen E62 transponder during automatic alignment or ALSC operation, and RFF is enabled, also return path adjusts automatically accordingly.

Return path input gain

The return path input gain can be used to add a fixed 10 dB flat attenuation to the first return path gain control element. This can be useful in certain situations, e.g. to force cable modems to transmit at higher levels resulting in better SNR.

The use of return path input offset is similar to adding a return path input attenuator plug to a traditional amplifier equipped with plug-in slot.

Ingress switch

Ingress switch can be used to attenuate return path by 6 dB or to cut it off completely. The ingress switch can also be controlled remotely using Teleste RIS system when E61/E62 module is installed. Remote control overrides local ingress switch control.

Teleste CATVisor Argus element management system supports SmartRIS, which can automatically control ingress switches and isolate ingress problems based on ingress measurements in intelligent Teleste amplifiers and nodes.

Alarms

The E3 alarms displayed in local user interface and PC / Android viewer are described in the table below.

The alarm texts are displayed in separate rows in the local user interface. When the display is sleeping, slowly blinking dot "." means no alarms and rapidly blinking "E" means at least one alarm. See also "Local user interface" chapter.

Local UI text	Alarm in viewer	Description & suggested corrective action
E.INT	Internal error	E3 has an internal error. If resetting the unit does not help, contact Teleste support.
E.PLu	Unknown module	E3 is not able to recognise RIS module or diplex filter type. If software is up to date and removing and reinstalling the plug-in modules does not help, contact Teleste support.
E.PSu	Power supply failure	Internal voltages are not OK. If the supply voltage is within specification and resetting the unit does not help, contact Teleste support.
E.ACV	AC voltage high	Remote AC voltage is above 65 VRMS.
	AC voltage low	Remote AC voltage is below 27 VRMS.
E.TMP	Temperature high	Internal temperature is above 85 °C.
	Temperature low	Internal temperature is below -20 °C.

Table 3. E3 alarms

Local user interface

E3 has a local user interface consisting of a 4*7-segment display and 3 buttons. This local UI can be used for E3 configuration in cases where E61/E62 RIS module is not installed or the use of a PC, tablet or smartphone equipped with CATVisor Commander is not desired.

Using the local user interface

During power-up "Teleste E3R/L X.Y" text (where X.Y indicates the installed software version, R indicates remote powering and L local powering) scrolls through the display. Pressing the “Enter” button (right button with ■ symbol) wakes up the display and activates the first menu item. If there is no button activity during ~3 minutes, the display will go to sleep mode. When in sleep mode, a slowly blinking dot “.” in the display indicates no alarms and rapidly blinking “E” indicates alarms.

The menu structure is described in Figure 5. The “Up” (left button with ▲ symbol) and “Down” (middle button with ▼ symbol) buttons browse through the menu items, the “Enter” button selects the item for modification / reading, “Up” / “Down” changes the value of the selected item and takes it into use, “Enter” returns to the menu.

Possible alarms are displayed in separate rows in the beginning of the menu. For additional information about alarms, see the “Alarms” chapter.

Note that not all settings are visible via the local user interface. For example, the identification texts, 2nd gen E62 RF power measurement and ALSC settings are only available via PC/smartphone/tablet connection via E61/E62.

PIN code

A PIN code can be used to prevent unauthorised local access. The PIN code is disabled (0000) as factory default. It can be changed via the local user interface or via PC / Android viewer when using E61/E62 module.

If the PIN is enabled, i.e. set to value other than 0000, it needs to be entered with “Up” / “Down” / “Enter” buttons each time the display wakes up from sleep. If the PIN is enabled and forgotten, it can only be reset via PC / Android viewer and E61/E62 module.

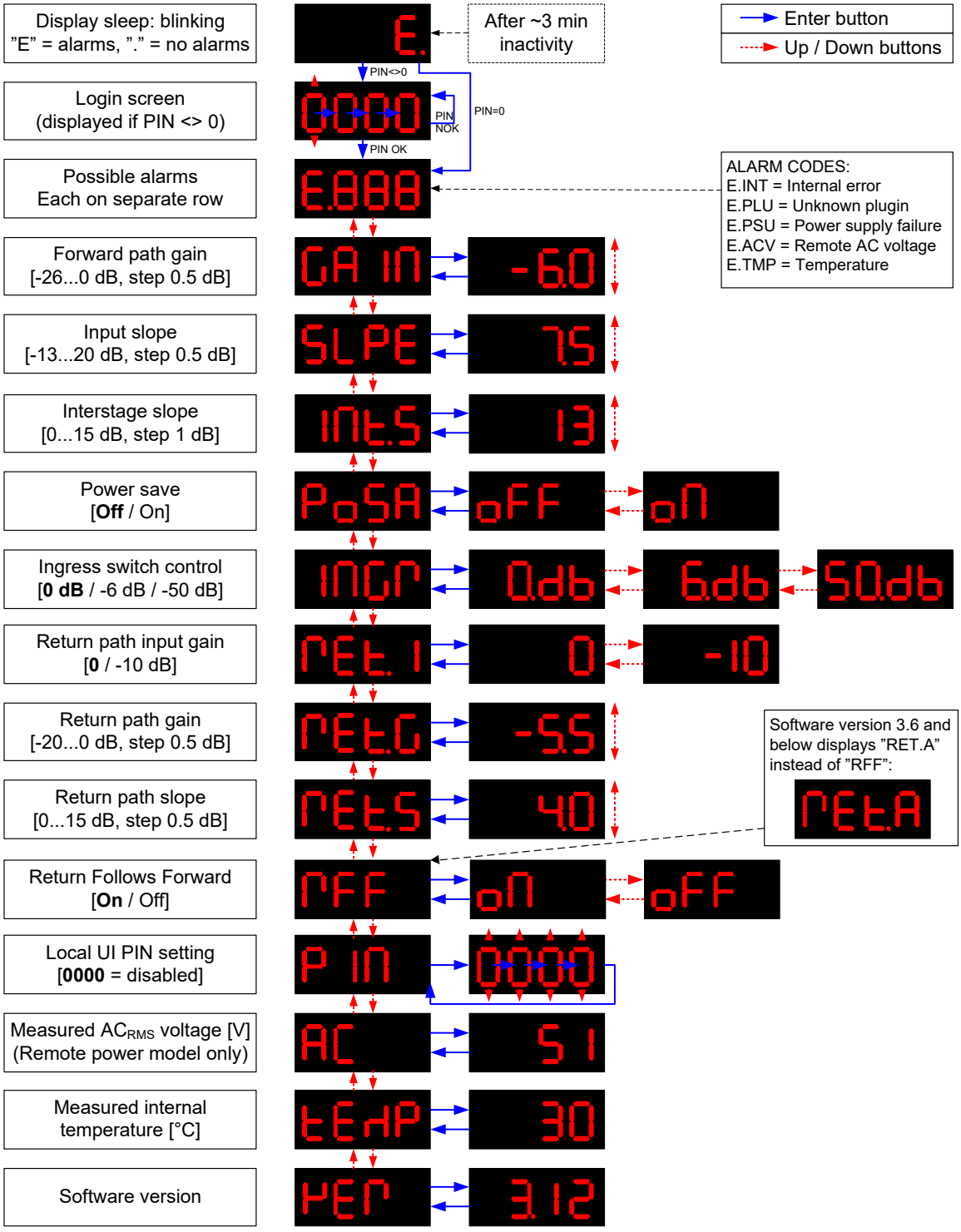

Figure 5. E3 local user interface menu structure. Factory default values are in bold.

E61 RIS receiver and E62 transponder modules

Installation

E61/E62 can be installed without turning off the power by simply pushing the unit firmly to its location marked with “RIS module” until it snaps into place.

The MAC address visible in E61/E62 front panel should be recorded during installation together with unit location and other information. This makes it possible to add the unit into HDM155 RIS controller device table and EMS system later. This data can also be stored and transferred using Teleste Commander software for Android devices.

Note that E61/E62 automatically updates E3 software if it detects different version that is included inside E61/E62. Thus, it is recommended to make sure the E61/E62 software version is up to date before installing it into E3.

Figure 6. E61 installed into E3

E61/E62 features

Feature	E61	E62 1st gen	E62 2nd gen
USB interface	X	X	X
RIS receiver	X	X	X
Monitoring transmitter and lid sensor	-	X	X
RF power measurement, automatic power save, automatic alignment and ALSC	-	-	X

Table 4. E61/E62 features comparison

E61/E62 RIS receiver

E61/E62 automatically scans for RIS carrier generated by HDM155 RIS controller within its tuning range. When a carrier is found, E61/E62 locks to the carrier and reacts to commands sent to its MAC address. If E61/E62 does not receive any packets during 1 minute, it starts scanning again.

E61/E62 front panel has a "RIS" led which indicates communication status and also RF output power status for 2nd gen E62:

- **Dark:** Searching for RIS carrier.
- **Blinking green:** Locked to RIS carrier, but no commands received in last 2 minutes. This usually means that this E61/E62's MAC address has not been entered in RIS controller's device list.
- **Green:** Locked to RIS carrier and receiving commands.
- **Yellow:** Locked to RIS carrier and received "Ingress attenuate" command.
- **Red:** Locked to RIS carrier and received "Ingress off" command
- **Blinking yellow** (2nd gen E62 only)**:** RF output power is below ~3 dBm.
- **Multicolour blink:** E61/E62 is updating E3 software.

E62 monitoring transmitter

E62 monitoring transmitter operates autonomously, sending monitoring data to HDO206 optical receiver using 10.7 MHz FSK carrier. There are no user configurable settings for data transmitter operation.

The monitoring transmitter can also be disabled by the user in 2nd gen E62.

E62 RF output power measurement (2nd gen E62 only)

2nd gen E62 measures RF output power with its wideband power meter. The measurement is made for full band (up to 1.2 GHz) and low band (up to ~600 MHz). The full band measurement is used for RF output power alarm, automatic power save control and gain control during automatic alignment and ALSC. The low band measurement is used for slope control during automatic alignment and ALSC.

The RF output power low alarm is activated when the RF output power is below 3 dBm. It is indicated with blinking yellow RIS led and also sent via the monitoring transmitter.

E62 automatic power save (2nd gen E62 only)

The power save feature can be automatically controlled by 2nd gen E62. When the automatic power save is enabled, E62 enables power save when the measured full band RF output power has been below 14 dBm for more than one minute. Power save is disabled immediately when the measured full band RF output power is above 15 dBm.

Note that the local user interface of E3 only shows the status of the power save feature. The automatic mode must be configured via PC/smartphone viewer.

E62 automatic alignment (2nd gen E62 only)

When the automatic alignment is started via PC/smartphone viewer, the forward path gain and input slope settings are calculated and adjusted so that the user specified RF output power targets are reached.

The interstage slope is not adjusted during automatic alignment and thus it should be set to the desired value before starting the automatic alignment.

If the automatic alignment cannot achieve the targets within ±0.5 dB, a best effort alignment is made and an error message is displayed.

If the RFF (Return Follows Forward) feature is enabled, also the return path is adjusted during automatic alignment.

E62 ALSC (2nd gen E62 only)

The ALSC feature uses full band and low band RF output power measurements and user-specified target levels to adjust forward path gain and input slope. ALSC can also be configured into ALC mode, where slope is not adjusted. The user with these parameters can control ALSC operation:

- Full band RF output power target (common with automatic alignment)
- Low band RF output power target (common with automatic alignment)
- Adjustment mode: manual (default) / ALC / ALSC
- ALSC threshold (default 1 dB)
- ALSC delay (default 1 min)

When the adjustment mode is “ALC” or “ALSC”, E62 first checks that the measured full band RF output power is above 2 dBm. If not, E62 does not adjust gain or slope. E62 then compares the measured full band RF output power to its target value. If the error is more than “ALSC threshold” for longer than “ALSC delay”, the E3 is commanded to adjust its gain by 0.5 dB and the delay is restarted.

When the adjustment mode is “ALSC” and there is no need to adjust the gain, E62 compares the measured low band RF output power to its target value. If the error is more than “ALSC threshold” for longer than “ALSC delay”, the E3 is commanded to adjust its input slope by 0.5 dB and the delay is restarted.

It is up to the user to ensure that E3 gain and input slope have enough room for adjustments before enabling ALSC. No alarms are activated if the adjustments saturate.

E3 forward path gain and input slope adjustments are based on digital step attenuators. A 0.5 dB gain/slope adjustment made by ALSC can in some cases cause a short glitch on forward path channels, possibly visible in TV picture. The effect of these can be minimised by increasing the “ALSC threshold” and “ALSC delay” parameters.

Note that as the RF output power measurement is based on a wideband detector, adding/removing channels in the RF spectrum can cause unwanted ALSC adjustments.

Establishing connection

In addition to the local user interface, the E3 amplifier can also be configured with a PC, tablet or smartphone when E61/E62 module is installed.

Connection to E3 is possible using the following methods:

Local configuration with a PC through E61/E62 USB port

CATVisor Commander 2.10 or later and up-to-date DUS100 user interface collection is needed for USB and Bluetooth support. These both are available for download in Teleste extranet (MyTeleste).

Connection to E61/E62 USB port can be done with a standard USB A plug to USB mini B plug cable, or via AC6901 USB to Bluetooth adapter. The cable or adapter should be disconnected when not in use to avoid possible EMC problems caused by the cable acting as an antenna.

E61/E62 will draw power from the USB connector for E61/E62 and E3 microcontroller and memory if no external power supply is available. This makes it possible to configure E3 settings and update the software without any power supply.

Note that as only the CPU part of the unit is powered via USB, many parameters visible via the user interface may display incorrect values. Installing and removing plug-in modules while the unit is USB powered is not recommended and may lead to unexpected behaviour.

Local configuration with an Android device

Teleste Commander software for Android devices can be downloaded from Google Play. Connection to E61/E62 USB port can be done via AC6901 USB to Bluetooth adapter. The adapter should be disconnected when not in use to avoid possible EMC problems caused by the adapter acting as an antenna.

Remote ingress switch control via RIS link

RIS controller module HDM155 can be used for controlling E3 ingress switch remotely when E61/E62 is locked to HDM155's carrier. Remote ingress switch control overrides local control. See HDM155 documentation for more details.

Software update

New software versions for E3 and E61/E62 are published at Teleste extranet (MyTeleste). These may contain bug fixes, enhancements and completely new features. For details, see the software release history documents also available in MyTeleste.

E3 software

E3 software can be only updated using E61/E62 module. The E61/E62 software includes the E3 software image. Every time E61/E62 software starts, it checks the E3 software version. If it does not match with the version of the E3 software image included in E61/E62 software, the E61/E62 automatically updates E3 software.

Ongoing E3 software update is indicated with multicolour blinking of E61/E62's "RIS" led and typically takes half a minute to complete. E3 new software starts automatically when the software update completes. If the software update is interrupted by e.g. a power failure, E61/E62 resumes update immediately when power returns. Note that E3 does not have functioning software during the software update, so short RF breaks will appear. If E61/E62 is removed during the software update, the E3 will not have any software and does not function at all until E61/E62 is installed again and it completes the software update.

E61/E62 software

E61/E62 software can be updated locally via USB or AC6901 Bluetooth adapter using CATVisor Commander or Teleste Android Commander. It is also possible to update E61/E62 software (and thus also E3 software) remotely via the RIS link. Contact Teleste support for more details on remote software update.

The new E61/E62 software is taken into use after it has been completely transferred and the device is reset. This reset takes ~10 seconds after which the E61/E62 is fully functional and running the new software and, if needed, starts to update the E3 software. If the E61/E62 software update fails, E61/E62 continues to use its original software.

Viewer pages

This chapter presents E3 graphical user interface (=”viewer”) pages when connecting to E3 with CATVisor Commander PC software via E61/E62 module USB port using USB cable or AC6901 Bluetooth adapter.

The same settings but in slightly different layout are also available when using an Android tablet or smartphone with Teleste Commander software.

Status viewer page

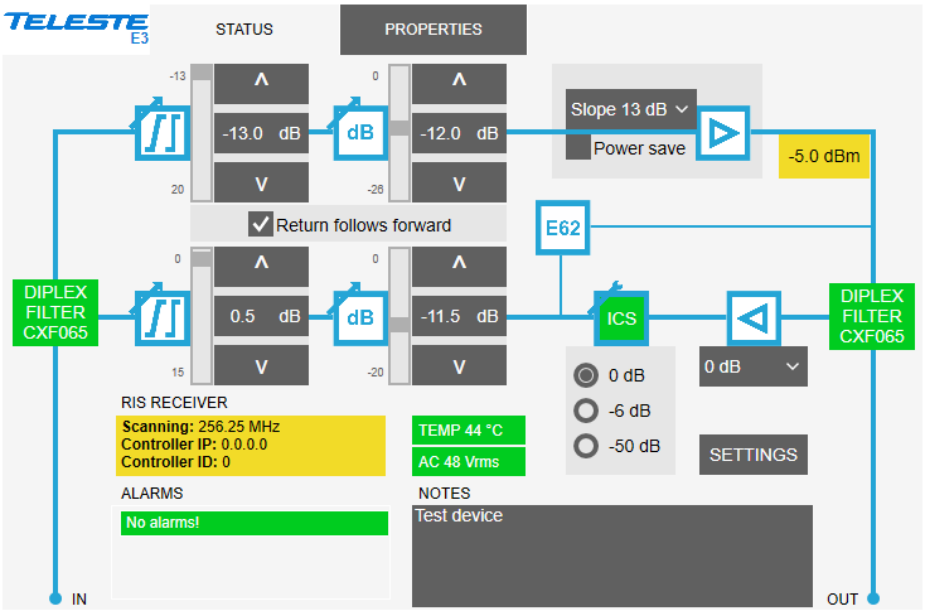

Figure 7. The Status page

The Status page displays unit's alarms and controls together with measurement data and a graphical view of the current configuration.

Forward and return path controls

Forward path interstage slope and return path input gain can be selected from the drop-down menu according to installation requirements.

The “Power save” checkbox controls output hybrid current and power consumption. This checkbox is read-only when 2nd gen E62 automatic power save control is enabled.

Gain and input slope can be adjusted by clicking the up and down buttons or typing a value into the fields. The slider indicates relative position of the control to its limits. They are read-only when 2nd gen E62 is in AL(S)C adjustment mode.

The measured full band RF output power is displayed in the upper right corner with 2nd gen E62, with background colour indicating alarm status.

When “Return follows forward” is checked, return path gain and slope are automatically adjusted based on forward path settings and frequency range. Adjusting return path manually disables this RFF feature.

The radio buttons control the ingress switch. The “-50 dB” selection cuts off the return path RF signal and thus disconnects all cable modems behind this unit. If ingress switch commands are received via RIS link, they override local control.

Detected diplex filter types are shown in respective positions in green when the types are detected OK and match each other, otherwise in red.

RIS receiver

When E61/E62 module is installed, the communication frequency and status is shown with:

- **Scanning:** Searching for RIS carrier.
- **Locked:** Locked to RIS carrier, but no commands received in last 2 minutes. This usually means that this E61/E62’s MAC address has not been entered in RIS controller’s device list.
- **Connected:** Locked to RIS carrier and receiving commands.

The **Controller IP** and **Controller ID** fields display the RIS controller (HDM155) identification data received via RIS link. These are needed in networks equipped with multiple RIS controllers for assigning the RIS receivers to correct RIS controllers.

Alarms

Active alarms are listed in the bottom left corner and colour coded according to severity. For additional information about alarms, see table of module alarm descriptions in the "Alarms" chapter.

Measurements

The “TEMP” field displays E3’s internal temperature. It is typically 10…25 degrees above ambient temperature depending on installation.

The “AC” field is visible only with remote powered E3 model and shows the measured RMS value of the remote supply voltage. This value is calculated using sliding average and thus reacts quite slowly to changes.

The background colour of each field shows the parameter's alarm status.

Notes

The “Notes” field allows storing up to 200 character message.

Settings dialog

The “Settings” button opens a dialog for configuring settings related to 2nd gen E62 RF output power measurement, automatic alignment and ALSC.

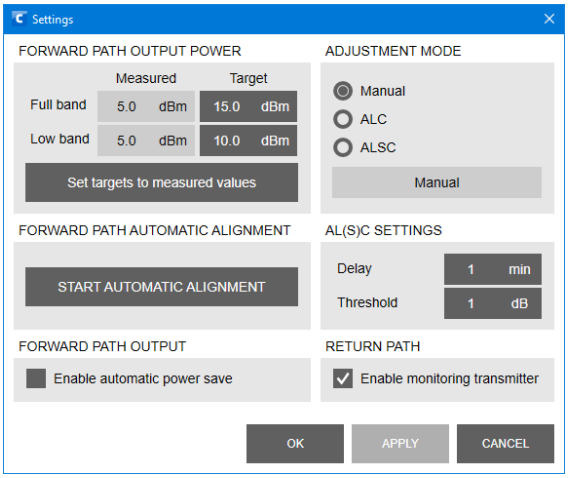

Figure 8. The Settings dialog

Forward path output power targets can be edited manually or copied from the measured values with the “Set targets to measured values” button. This makes it easy to manually adjust E3 output and then enable ALSC to keep the output levels stable.

Forward path automatic alignment can be started with a button. A dialog showing the adjustment result (Success/Failed) is displayed. Adjustment is considered successful if both full band and low band RF output power measurements are within ±0.5 dB from their targets. If the RFF feature is enabled, also the return path is adjusted simultaneously.

Automatic power save can be enabled with the checkbox.

Adjustment mode can be selected with the radio buttons. In ALC mode E62 adjusts E3 gain to achieve full band RF output power target value. In ALSC mode E62 adjusts also E3 input slope to achieve low band RF output power target value. The **AL(S)C settings** allow fine-tuning ALSC operation: a 0.5 dB adjustment step is commanded when the RF power error has been above the “Threshold” value for longer than the “Delay” value.

The adjustment status is displayed below the radio buttons:

- **Manual**: Manual mode, no automatic adjustment.
- **Freeze**: ALC or ALSC mode, but full band RF output power is below 2 dBm.
- **OK**: ALC or ALSC mode, RF output power error is less than “ALSC threshold”.
- **Gain up** / **Gain down**: ALC or ALSC mode, gain up/down adjustment need detected, waiting for “ALSC delay” time to elapse.
- **Slope up** / **Slope down**: ALSC mode, slope up/down adjustment need detected, waiting for “ALSC delay” time to elapse.

Return path monitoring transmitter can be disabled with the checkbox.

Properties viewer page

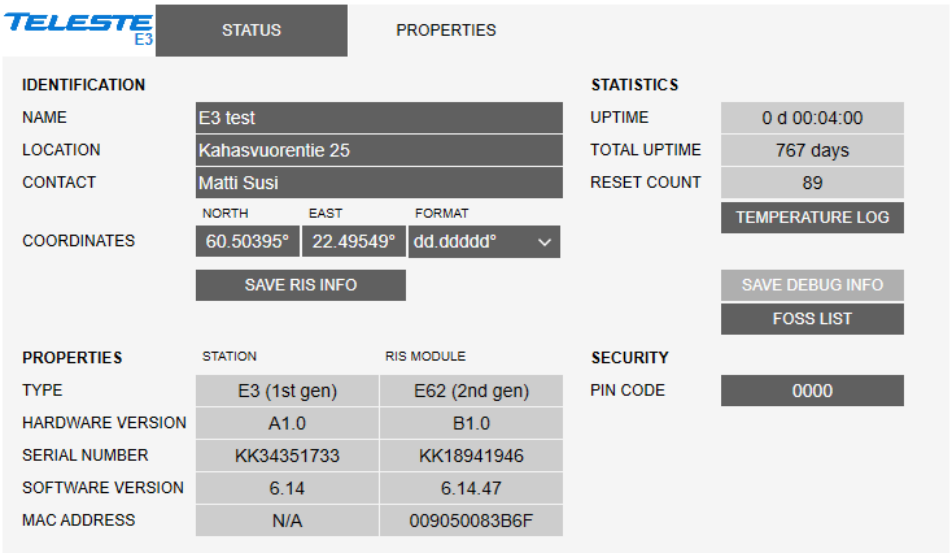

Figure 9. The Properties page

The “Properties” page displays unit identification and statistics data.

Identification

A descriptive alias name for the station can be entered into the “Name” field, site location into “Location” field and contact information into “Contact” field. All these fields can contain up to 63 characters.

The geographical coordinates can be entered into respective latitude and longitude fields. The preferred format for the coordinates can be selected from the "Format" drop-down field. When entering coordinates, special characters (º/'/") can be simply omitted.

The "Save RIS info" button opens a dialog for saving RIS identification data to a file. This file can then be used for adding the amplifier to management system.

Properties

The type, hardware version, serial number and software version are shown for both station and RIS module.

RIS module MAC address used for remote communication is displayed here and on RIS module front panel.

Statistics

The “Uptime” field shows the time since the last reset or power up. The format is days, hours, minutes and seconds, with ±5 s/day accuracy.

The "Total uptime" field shows the total number of full operating days.

The "Reset count" field shows the total number of resets.

The “Temperature log” button opens a histogram chart of the unit internal temperature history. The histogram shows the total number of operating hours of the unit in 10 °C steps between 0 (i.e. < 5) and 90 (i.e. > 85) °C.

Security

The PIN code can be enabled to protect the E3 local user interface from unauthorised access. When a value other than 0000 is entered, the correct PIN needs to be entered every time the local user interface is used. Note that the PIN is not needed for PC/smartphone/tablet configuration via E61/E62.

Legal declarations

Teleste reserves the right to make changes to any of the products described in this document without notice and all specifications are subject to change without notice. Current product specifications are stated in the latest versions of detailed product specifications.

To the maximum extent permitted by applicable law, under no circumstances shall Teleste be responsible for any loss of data or income or any special, incidental, consequential or indirect damages howsoever caused.

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"**f4usb**", STM32F4xx USB xxx Library: MCD-ST Liberty SW License Agreement V2:
http://www.st.com/software_license_agreement_liberty_v2
"**freertos**", FreeRTOS: modified GPL, http://www.freertos.org/a00114.html
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