Communication

ELAD

ELAD DUO-ART 60

HF/50MHz 60W amplifier

USER MANUAL

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Revision History

Revision	Date	Description
Rev 1.0	03/2018	• First version.
Rev 1.1	04/2018	• Added ”**3.4 - Messages**“ section.
Rev 1.2	04/2018	• Updated features section.
Rev 1.3	04/2018	• Added “**Technical Specifications**” section. • Photos updated.

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1 Introduction

1.1 Notice

Amateur radio regulations vary from country to country. Check your local amateur radio regulations and requirements before operating the ELAD DUO-ART.

1.2 Precautions

- Connect the amplifier only to a power source described in this manual.
- Take care when plugging-in cables, avoid applying sideways pressure that might damage the connectors.
- Avoid operating in wet conditions.
- Ground all outdoor antennas for this amplifier using approved methods. Grounding helps protect against voltage surges caused by lightning. It also reduces the chance of build-up of static charge.

1.3 Software and firmware versions

The features described in this manual refers to the following versions :

User Interface software	Internal firmware
Version 0.42 - date 04/12/2018	Version 0.58 – date 04/16/2018

1.4 Features

The DUO-ART 60 is an 60 watt amplifier for HF and 50MHz frequency ranges. It includes the internal PA power supply, preselector filters, an antenna tuner (optional) and acts as remote controller for the FDM-DUO. The DUO-ART 60 has three modes of operation that are called interfaces:

- FDMDUO interface : this interface is used when operating with the FDM-DUO,
- Generic interface : this interface is used when operating with another transceiver,
- FT-817 interface : this interface is used when there is the need to read the frequency through the RS-232 port.

The DUO-ART 60 has 20 memory banks and each one saves :

- the interface used,
- the attenuators setting,
- the antenna used,
- the use of the antenna tuner,
- and other settings.

The USA version of the DUO-ART 60 has a security feature that prevents to amplify in the frequency band 26-28MHz. Any attempt to drive the amplifier in the 26-28MHz frequency band will result in 0dB gain from input to output of the amplifier.

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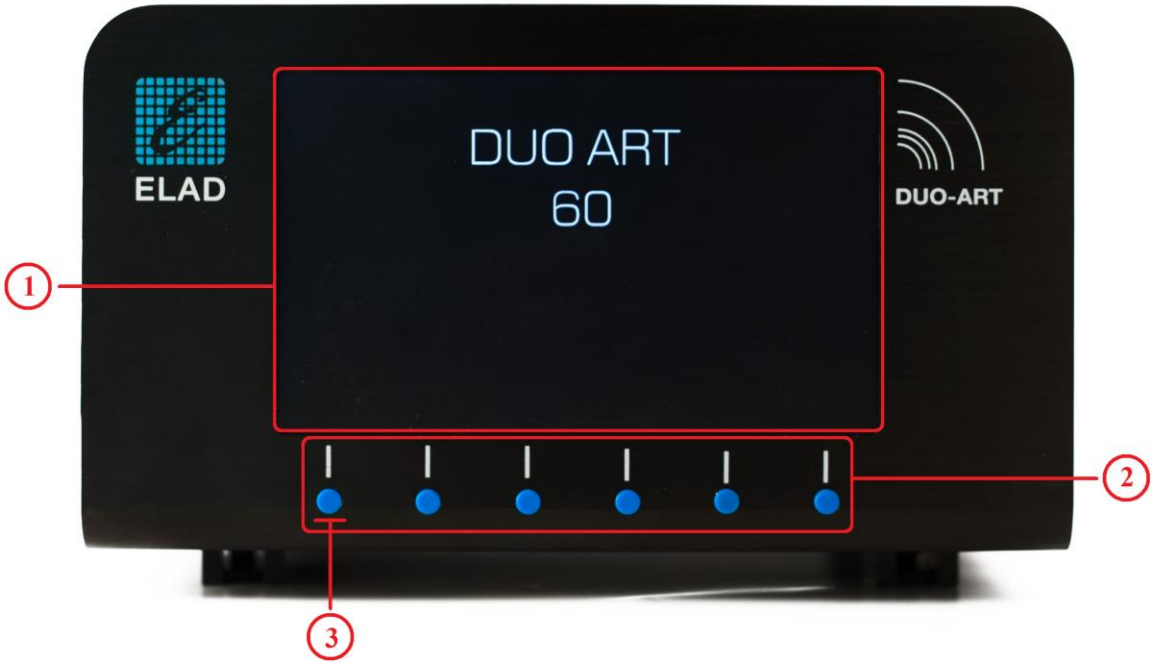
2 Panels Description

2.1 Front Panel Description



1 - Display
5.0 inches LCD TFT display with resolution of 800x480 pixels. Displays menus, power values and amplifier status.

2 - Push-buttons
These six push-buttons allow to navigate in the menus and change the various working modes.

3 - Power button
To powered up the amplifier, first switch the main power switch on the rear panel, then press the first button on the left. When this button is released the amplifier emits an acoustic signal and in about ten seconds it will be ready to operate.

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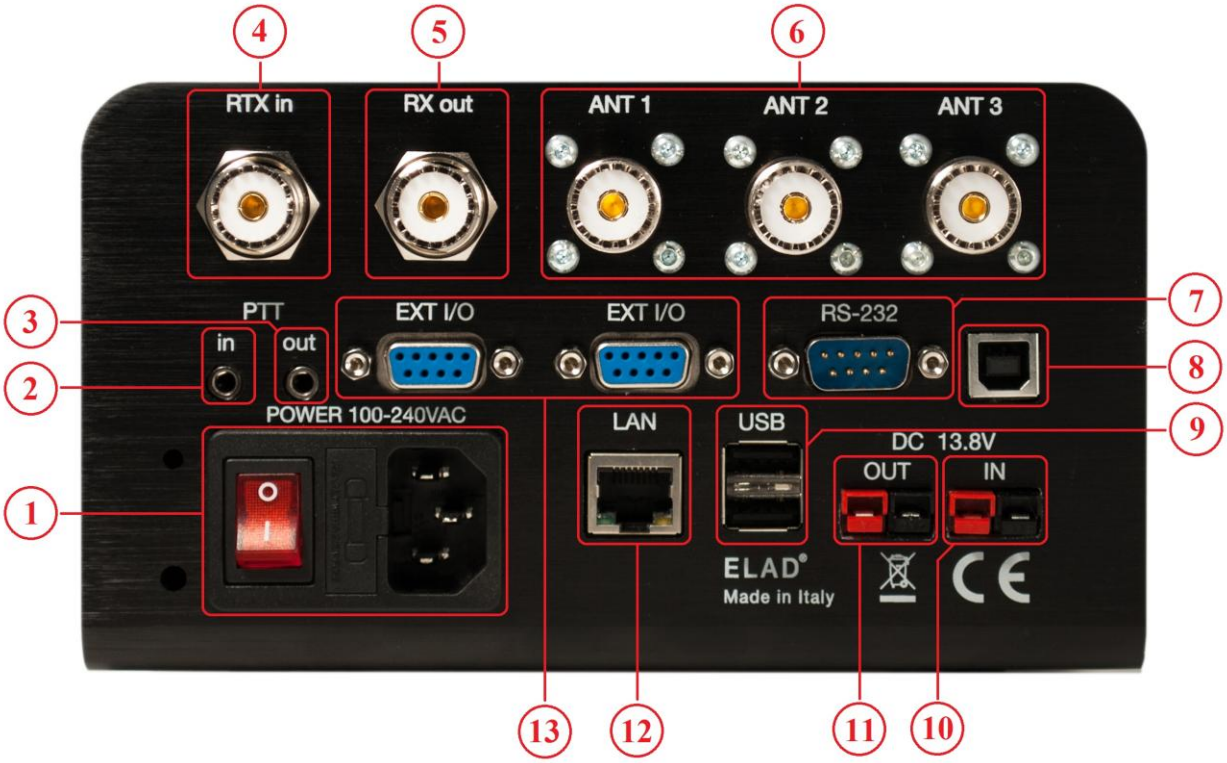
2.2 Rear Panel Description



1 - Main power supply
Power switch, fuse holder and 100-240Vac power supply connector. Insert the power supply cable and use the power switch to power up the amplifier.

2/3 - PTT in/out
3.5mm jack connectors.

PTT in	Input for transmit control, connect TIP to ground to put the amplifier in transmit state.	
PTT out	The TIP goes to ground while transmitting.	

RING connection is not used.

4 - RTX connection
SO-239 connector. Transmit path with the FDMDUO interface. Reception and transmit paths with the other interfaces (Generic and FT-817).

5 - RX connection
SO-239 connector. Reception path with the FDMDUO interface.

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6 - Antennas
SO-239 connectors to connect up to three antennas.

7 - RS-232 port
DB9 connector for the FT-817 interface acting on an RS-232 serial link.

8 - Reserved for service

9 - USB connection
USB type A female connectors for host type connections.

10 - Secondary power supply
13.8Vdc secondary power supply connector. Powerpole connector type.

11 - Output power supply
Allows to power other devices without the need of other power units. Max 2A. Powerpole connector type.

12 - LAN connection
RJ45 connector for LAN connection.

13 - EXT I/O
EXT I/O connection with external hardware such the FDM-DUO.

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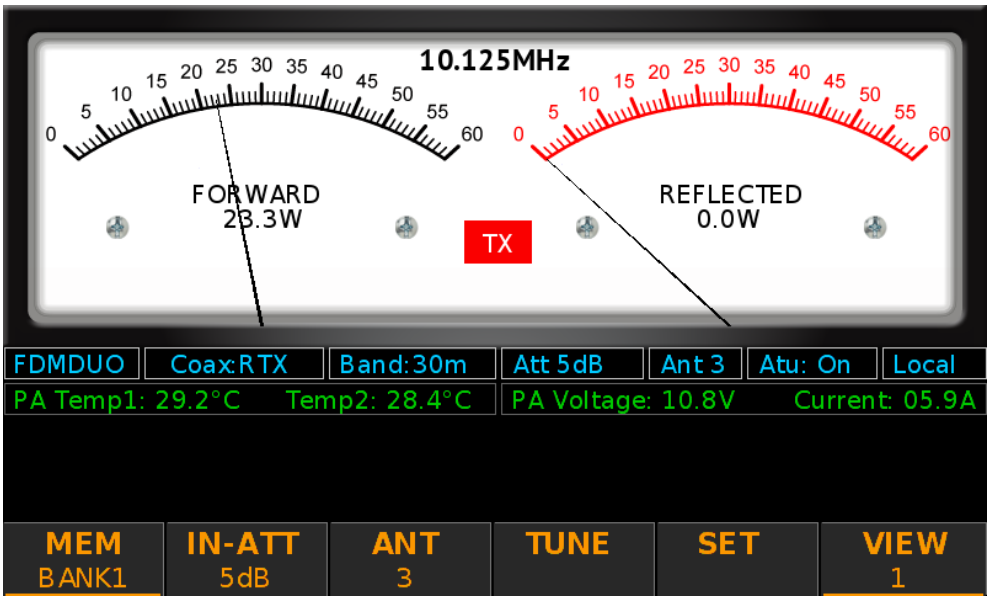
3 User Interface

3.1 Main View

When the DUO-ART 60 is started the main view is displayed. The main view is divided in five horizontal sections. The top one shows a graph with the current transmission power and transmission frequency. The second section is a status bar that includes information about the current settings. The third section is a diagnostic bar that shows some diagnostic information. The fourth section is used to show warnings. The last section is the menu bar which is composed of six choice corresponding to the six push-buttons. The first one and the last one have an long-press option to open other views.



The configurations are saved in memory banks, and it's possible to switch between them pressing the "MEM" button. The banks can be added or deleted until a maximum of 20 banks. The two underlined button (MEM and VIEW) have a second function if pressed longer.

The "IN-ATT" button allows to choose the Stand-by mode and to set the input attenuators value (0, 2, 3 and 5 dB).

The "ANT" button allows to choose the antenna connector used to transmit.

The "TUNE" button allows to enter in the tune menu.

The "SET" button allows to enter in the settings menu.

The "VIEW" button allows to change the displayed graphic :

- View 1 : forward power and reflected power,
- View 2 : forward power and SWR,
- View 3 : forward power and input power,
- View 4 and 5 : spectrum view.

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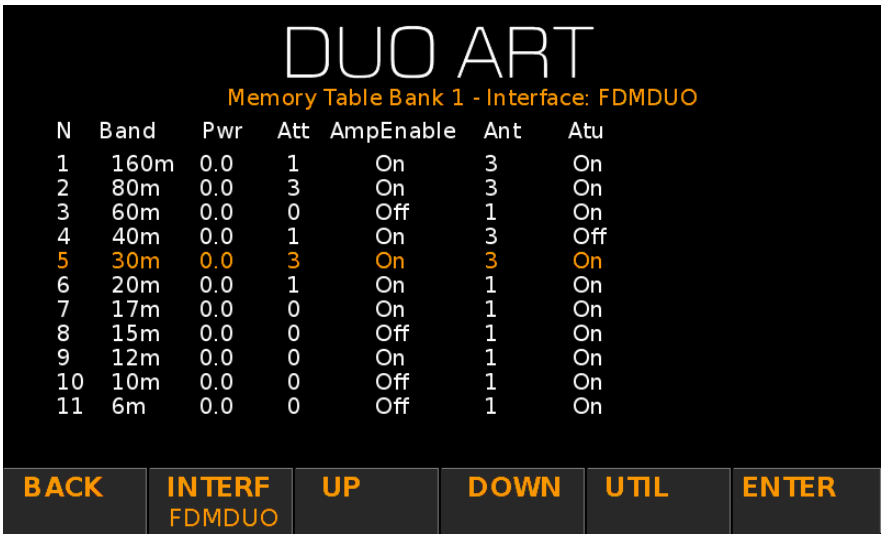
3.2 Memory Bank View

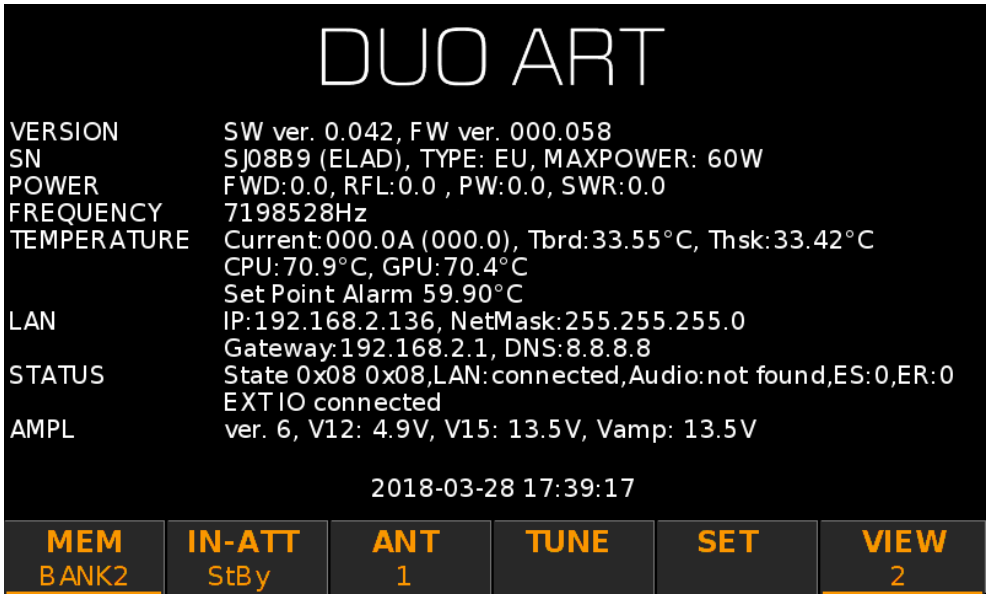
When the Main View is displayed, doing a long-press on the “MEM” button opens the Memory Bank View that contains all the presets which can be personalized. There are different parameters and also the possibility to change the interface used, the interfaces permit to the amplifier to work in different ways in order to be use also if not used with the FDM-DUO.



Using the “UP” and “DOWN” button it is possible to go through the table and modify it.

3.3 Information View

When the Main View is displayed, doing a long-press on the “VIEW” button opens the Information View which displays some information about the DUO-ART 60 amplifier.



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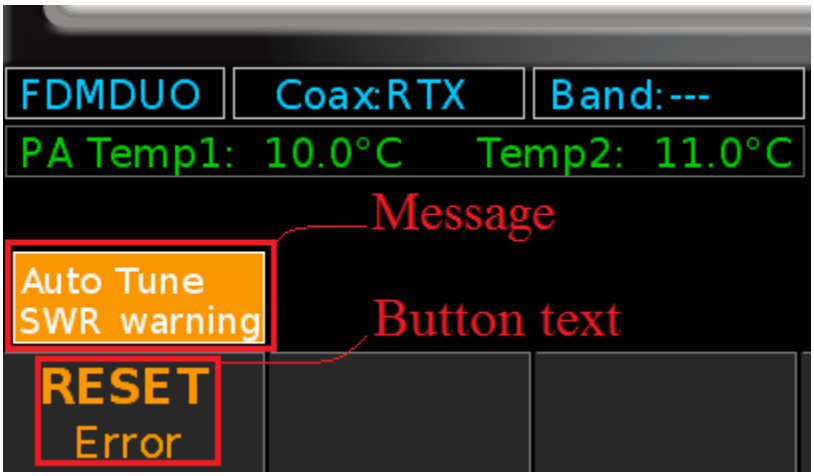
3.4 Messages

This section provides the list of messages that can be viewed on the DUO-ART amplifier display. There are two types of messages : warning and error. They are displayed in the lower left corner of the display. The image below shows the position of the **message** and which button to press to reset the warning or error. More than one message may appear in the same time on the display. It is necessary to reset the messages with the reset button before using again the DUO-ART amplifier.



The following table provides the list of all messages with their description.

Name	Type	Code	Description
No LAN warning	Warning	W-100	-
Web socket warning	Warning	W-101	-
Audio not found	Warning	W-115	The DUO-ART cannot find the sound card of the FDM-DUO. This warning is only displayed if the REMOTE mode is active.
Audio read warning	Warning	W-116	Problem with receiving audio coming from the FDM-DUO. This warning is only displayed if the REMOTE mode is active.
Audio write warning	Warning	W-117	Problem of audio transmission to the FDM-DUO. This warning is only displayed if the REMOTE mode is active.

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Name	Type	Code	Description
DUO mode not activated	Warning	W-130	The DUO-ART is in REMOTE mode but the active interface is not FDMDUO.
DUO EXTIO warning	Warning	W-131	Reporting a communication problem between the DUO-ART and the FDM-DUO.
Comm warn	Warning	W-145	Indicates an internal communication problem. After "warn" a code composed of alphanumeric characters is added.
Micro Reset warning	Warning	W-146	Indicates an internal problem of the operation of the DUO-ART. This problem resolves automatically. *Warning code: ST-P10-b3.*
CMD not available	Warning	W-147	Indicates the inability to perform an internal operation.
Band warn StBy	Warning	W-148	Automatic activation of the stand-by following an unauthorized transmission. *Warning code: ST-P10-b2.*
Auto Tune timeout	Warning	W-160	This warning appears when the maximum time available for automatic tuning of the antenna expires. This time can be set from the "AutoTune Timeout" menu.
Auto Tune SWR warning	Warning	W-161	This warning appears if the target SWR has not been reached after the time-out has been set. This warning is only displayed if the "Target SWR" menu is set to a value other than 0.
Auto Tune DUO aborts	Warning	W-162	The FDM-DUO has left the tuning mode (Tune) before the DUO-ART. This warning is displayed if the tuning mode of the FDM-DUO times out or if the FDM-DUO detects a high SWR.
Auto Tune Max SWR	Warning	W-163	This warning appears if the DUO-ART has found a tuning point but the calculated SWR is too high.
High temperature	Warning	W-175	High temperature warning.
High temperature	Error	E-400	Maximum temperature exceeded. **This error cannot be reset**. It is necessary to wait for the temperature to decrease before you can use the DUO-ART amplifier again.

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Name	Type	Code	Description
HI SWR error	Error	E-410	Error generated by a too high SWR. This is a hardware protection. *Error code: ST-P2-b1.*
Error I OUT	Error	E-420	The current absorbed by the DUO-ART has exceeded the maximum threshold. *Error code: ST-P9-b0.*
Error REFL	Error	E-421	The calculated reflected power has exceeded the maximum threshold. *Error code: ST-P9-b1.*
Error FWD	Error	E-422	The calculated forward power has exceeded the maximum threshold. *Error code: ST-P9-b2.*
Error SENS PW	Error	E-423	The input power of the DUO-ART has exceeded the maximum threshold. *Error code: ST-P9-b3.*
Error FILTER TX	Error	E-440	Set filter selection error. This error is generally due to an incorrect frequency setting. *Error code: ST-P10-b0.*
PWR IN error	Error	E-441	Error regarding the input power of the amplifier. The input power may be too high or the PTT input may not be connected properly. *Error code: ST-P10-b1.*

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Technical Specifications

AC Power Supply	100 – 240 Vac 50/60Hz 2.3A (115V) 1.2A (230V)
DC Power Supply	13.8 Vdc (12 – 14 Vdc) Max 13A (no Aux DcOut) Max 15A (2.2A Aux DcOut)
Frequency Range	1.8 – 30 MHz, 50 – 54 MHz Not allowed 26 – 28 MHz (USA version)
Optimized Frequency Band	160m -> 1.800 – 2.000 MHz 80m -> 3.500 – 4.000 MHz 60m -> 5.3305 – 5.4035 MHz 40m -> 7.000 – 7.300 MHz 30m -> 10.100 – 10.150 MHz 20m -> 14.000 – 14.350 MHz 17m -> 18.068 – 18.168 MHz 15m -> 21.000 – 21.450 MHz 12m -> 24.890 – 24.990 MHz 10m -> 28.000 – 29.700 MHz 6m -> 50.000 – 54.000 MHz
Input Power	Typical 4W for 60W output (HF) 10W Maximum
Power Gain	Less than 15 dB, 13dB typical
Output Power	60W with 5W input (HF band) 50W with 5W input (6m band)
Output Harmonic / Spurious Distortion	> 50 dBc in HF band typical 60 dBc > 65 dBc in 6m band typical 68 dBc
Meterering	Output Power, Input Power, VSWR, Drain Current, Drain Voltage, Temperature
Ports	RTX Input Connector (SO239) RX Input Connector (SO239) PTT Input Connector (3.5 mm) PTT Output Connector (3.5 mm) Antenna Output 1 (SO239) Antenna Output 2 (SO239) Antenna Output 3 (SO239) RF Ground EXT I/O1 in/out Connector

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	EXT I/O2 in/out Connector RS233 Connector USB Connector (AUX) LAN Connector USB host1 USB host2 DC IN Connector (Powerpole) DC OUT Connector (Powerpole) AC Power In Connector
Dimensions (H x W x L)	1100 mm x 1800 mm x 2750 mm
Weight	4 Kg

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Product Warranty

ELAD S.r.l. warrants the DUO-ART 60 for a period of 2 years inside Europe, and for a period of 1 year outside Europe unless otherwise specified. Warranty begins from the purchase date. All DUO-ART 60 will be repaired or replaced due to malfunction resulting from no fault of the end user. This warranty covers normal intended usage of the product and does not cover misuse, abuse, accidents, viruses, unauthorized service parts or the combination of other unauthorized branded products used in conjunction with the DUO-ART 60.

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Declaration of Conformity (EC)

The product marked as

DUO-ART 60

manufactured by

Manufacturer:	ELAD S.r.l.
Address:	Via Col De Rust, 11 - Sarone 33070 CANEVA (PN)

is produced in conformity to the requirements contained in the following EC directives:

- RED Directive 2014/53/CE
- EMC Directive 2004/108/CE
- Low Voltage Directive 2006/95/CE
- RoHS Directive 2011/65/CE

The product conforms to the following Product Specifications:

Emissions & Immunity:
ETSI EN 301 489-1 V1.9.2
ETSI EN 301 489-15 V1.2.1
ETSI EN 301 783-2 V1.2.1

Safety:
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013

And further amendments.

This declaration is under responsibility of the manufacturer:

ELAD S.r.l.
Via Col De Rust, 11 - Sarone
33070 CANEVA (PN)

Issued by:

Name: Franco Milan
Function: President of ELAD

Caneva	February, 28th 2018	
Place	Date	Signature

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