



DRV-S3200-REVC
EPSON S3200/S800/I3200/I1600/T3200
PRINTHEAD DRIVER BOARD
HARDWARE USER GUIDE



04.12.2023

Version 1.0

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1 Overview

DRV-S3200 is AEWA printhead driver board for EPSON S3200, S800, i3200, i1600 and T3200 printheads. It connects to AEWA Print Manager Board (APMB) via optical fiber cable. Designed with latest technologies, DRV-S3200 enables to control all digital, analog and power interfaces of various EPSON printheads.

Features

- Supports 5 different printhead types from EPSON:
 1. S3200, 600 dpi, 3200 nozzles, single head.
 2. S800, 600 dpi, 800 nozzles, single or double head.
 3. i3200, 600 dpi, 3200 nozzles, single head (also HD and SD versions).
 4. i1600, 600 dpi, 1600 nozzles, single or double head.
 5. T3200, 600 dpi, 3200 nozzles, single head
- Can print 2 colors (S3200, i1600, T3200), 4 colors (i3200, T3200) or 8 colors (i3200-HD) with one printhead.
- Optical fiber interface for long distances, 600 Mbits/sec.
- Generates accurate printhead driving voltages which are factory programmed. Printhead voltages can be further adjusted for special ink types.
- Printhead voltage control with respect to the temperature.
- Correct voltage sequencing during power ON and power OFF.
- Gray scale printing, up to 4 levels.
- Printing waveform stored in the EEPROM.
- Tickling pulse generation logic to keep nozzles always active.
- Printhead temperature monitor, over temperature protection.
- Firmware update over optical interface.
- Single 48V input voltage with reverse polarity, over current and surge current protection.
- SHA Encryption for firmware copy protection.
- Small footprint, 100mm x 142mm.
- Compatible with APMB Software Development Kit (SDK) for C++ and .NET. Supports Windows and Linux operating systems.
- ApmbWave analog waveform designer support with drop watcher interface.
- Compatible with APRINT RIP and Print software.



2 Board Components

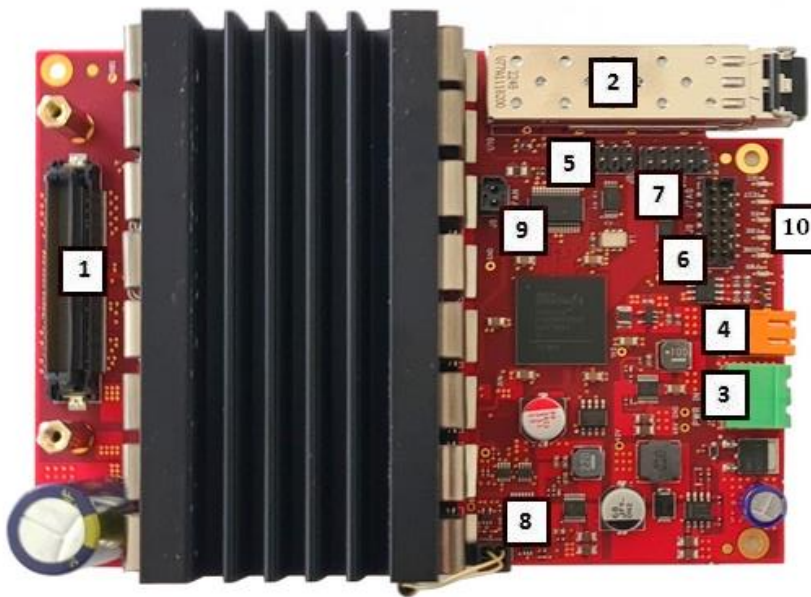


IMAGE 1 – DRV-S3200-REVC BOARD COMPONENTS

2.1 Printhead Connector (J1)

DRV-S3200 connects to the printhead(s) with J1 connectors through different Flex-PCBs or FFC cables. Following images shows all different connection scenarios.

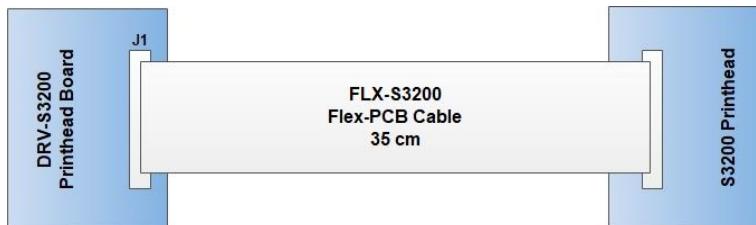


IMAGE 2 – S3200 PRINthead CONNECTION

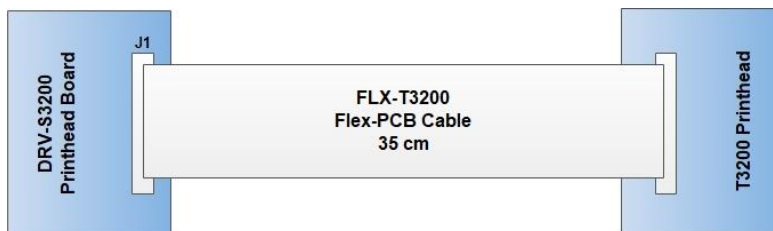


IMAGE 3 - T3200 CONNECTION



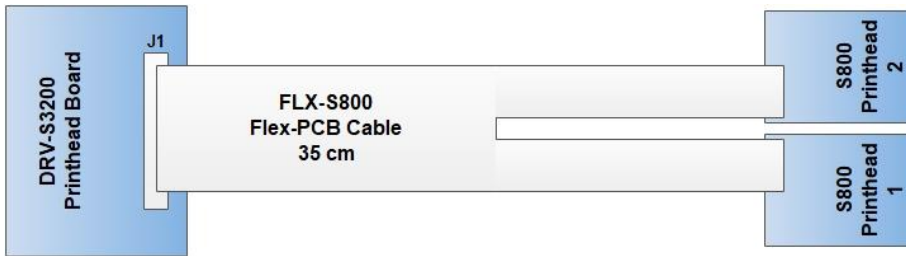


IMAGE 4 - S800 PRINthead CONNECTION

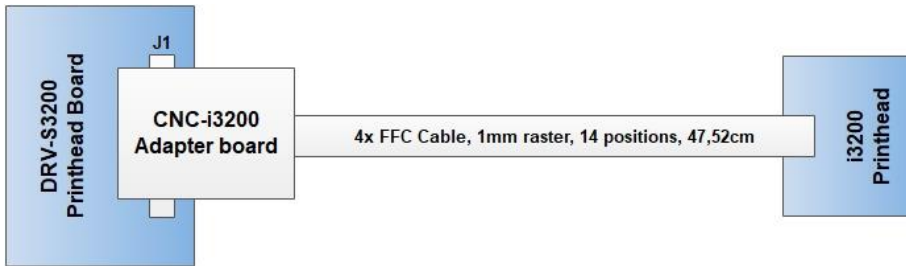


IMAGE 5 - I3200 PRINthead CONNECTION

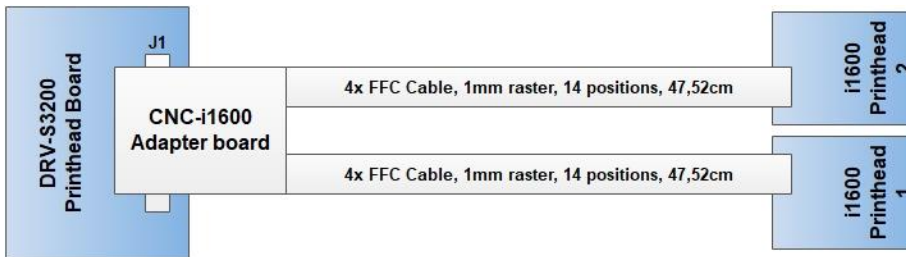


IMAGE 6 - I1600 PRINthead CONNECTION

Following pictures shows DRV-S3200 connections with all possible EPSON printheads.



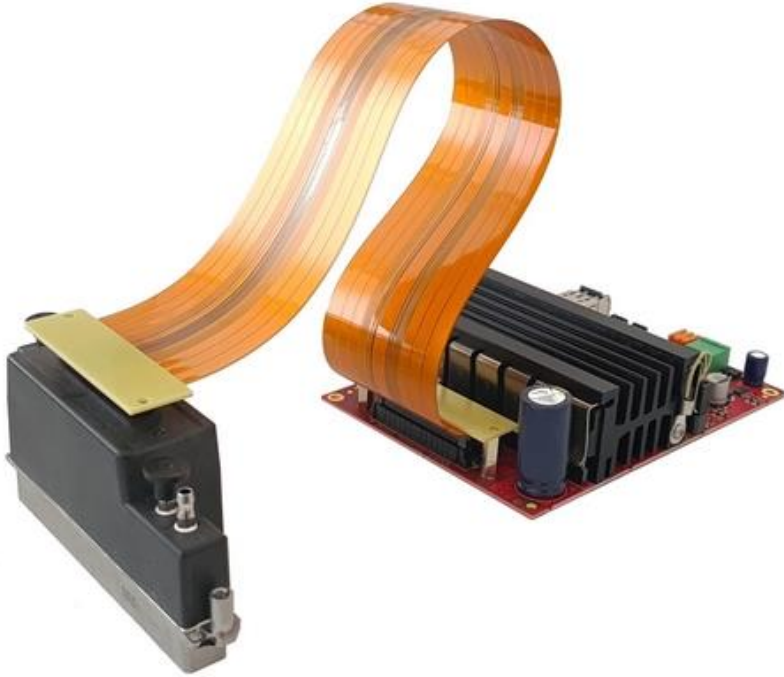


IMAGE 7 – DRV-S3200 WITH FLX-S3200 CABLE

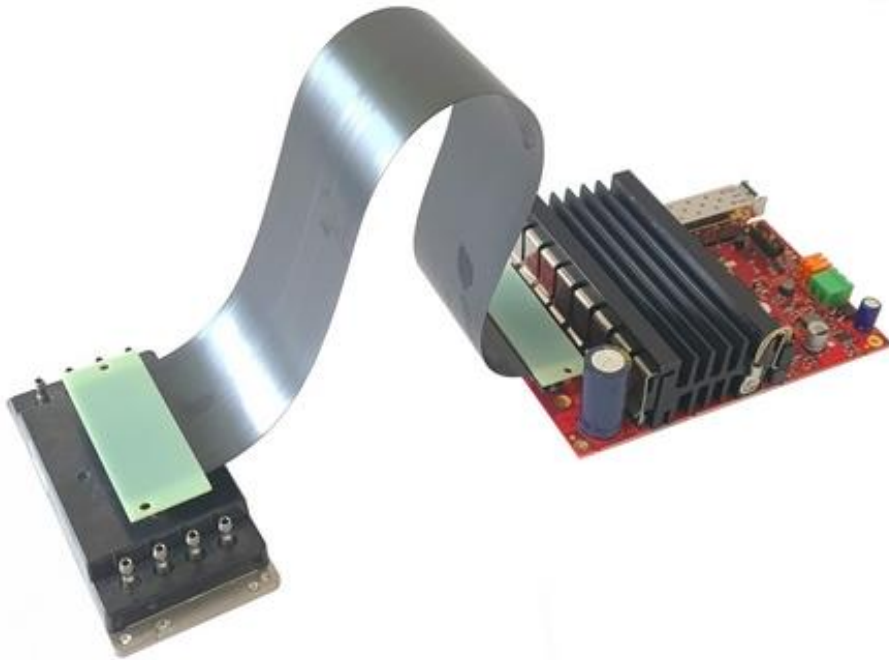


IMAGE 8 - DRV-S3200 WITH FLX-T3200 CABLE





IMAGE 9 - DRV-S3200 WITH FLX-S800 CABLE

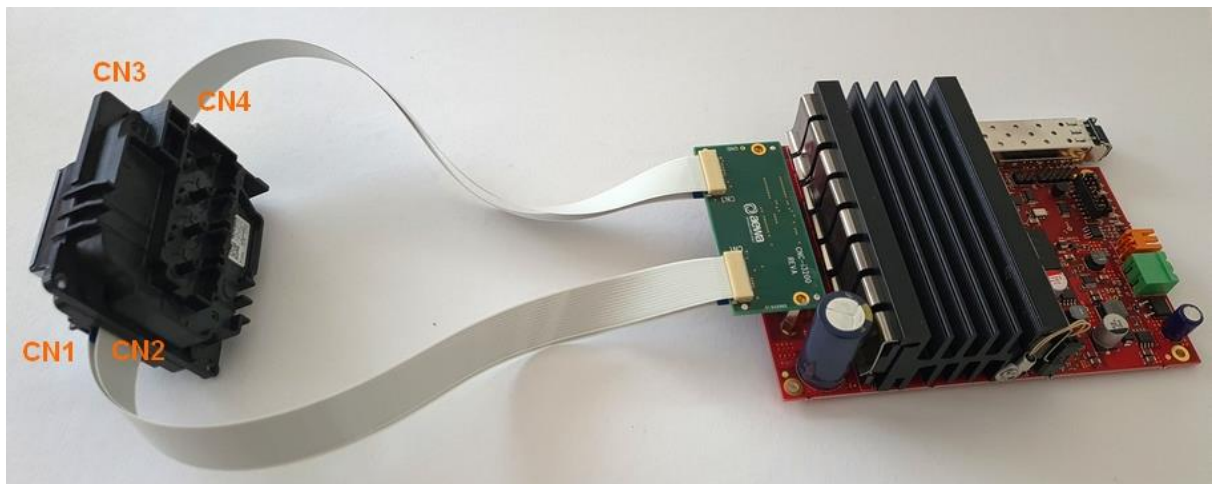


IMAGE 10 - DRV-S3200 WITH CNC-I3200 ADAPTER BOARD



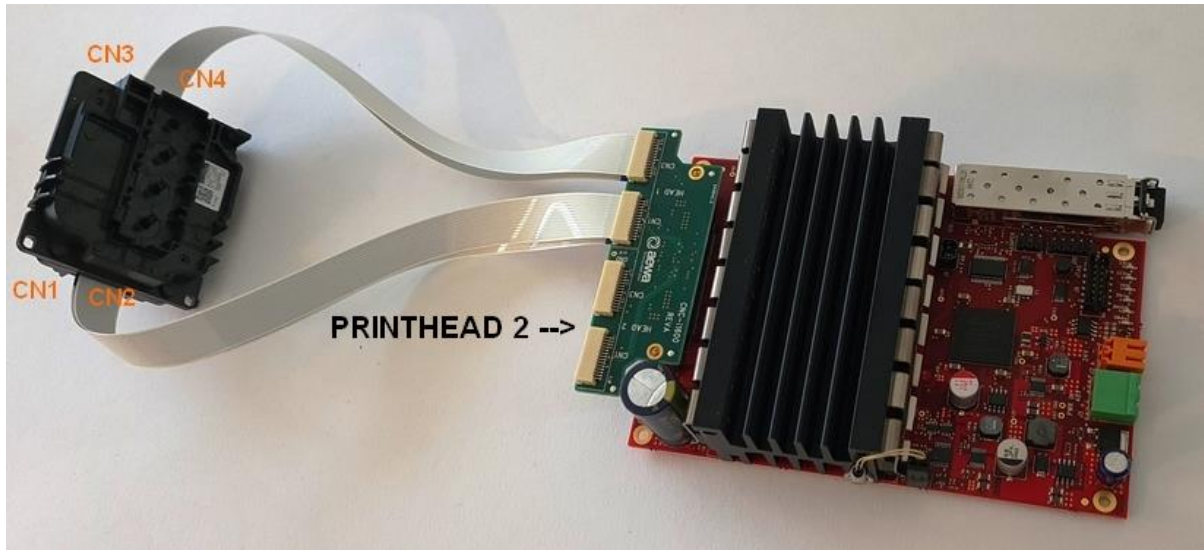


IMAGE 11 – DRV-S3200 WITH CNC-I1600 ADAPTER BOARD

Notes:

1 – T3200 printhead cable FLX-T3200 is similar to FLX-S3200 except its color. FLX-S3200 is light brown/gold whereas FLX-T3200 is black. These cables are not compatible to each other. Each cable must be used with the correct printhead type. **Otherwise printhead and/or printhead board can be damaged.**

2- CNC-i3200 and CNC-i1600 adapter boards have 20cm FFC cables in pictures above. Actual cable length is 47,52cm. FFC cables are delivered with the adapter board.

3- For i-Series printheads: Connect connectors CN1 to CN4 of adapter board to the printhead's CN1 to CN4 connectors through 4x14 pin FFC cables. **Wrong connection may damage the printhead and/or printhead board.**

4 - **IMPORTANT: Don't connect or unconnect the printhead cable when the printhead board is powered on. This may damage the printhead and/or the printhead board.**

2.2 Optical Interface (U19)

DRV-S3200 connects to AEWA Print Manager Board (APMB) over optical fiber cable. Fiber cable is connected to an SFP (small form factor pluggable) transceiver module and plugged into the SFP connector.

DRV-S3200 is delivered with SFP transceiver module, but the optical cable is not included since the distance from the DRV-S3200 to APMB differs from system to system.

Following table shows the fiber cables supported.



Fiber Cable Type	Distance between PHB and APMB
OM2, 62.5µm/125µm, Multimode fiber, with LC connectors	0.5-300m
OM3, 50µm/125µm, Multimode fiber, with LC connectors	0.5-500m

TABLE 1 - SUPPORTED OPTICAL FIBER CABLES



IMAGE 12 - OPTICAL FIBER CONNECTION WITH SFP MODULE

2.3 Power Input Connector (J5)

J5 is a 2-port terminal block connector for power input. Switching mode or analog AC/DC power converters can be used. Converters with PFC feature is recommended. Following table can be used to estimate the total current usage.

Parameter	Value
Input Voltage	48V (+/- 2V)
Max. current consumption, with 1x S3200 printhead connected	2.3A @48V
Max. current consumption, with 1x T3200 printhead connected	2.6A @48V
Max. current consumption, with 1x i3200 printhead connected	2.3A @48V
Max. current consumption, with 1x i1600 printhead connected	1.3A @48V
Max. current consumption, with 2x i1600 printhead connected	2.5A @48V
Max. current consumption, with 1x S800 printhead connected	0.8A @48V
Max. current consumption, with 2x S800 printhead connected	1.5A @48V
Max. current consumption, not printing	0.15A @24V

TABLE 2 - INPUT POWER SPECIFICATIONS



Current consumption values are not exact and collected from printhead manuals. They may change with temperature, printhead voltage, drop settings and the waveform. Please contact EPSON for more accurate values.

2.4 24V Heater power Connector (J2)

J2 is a 2-port terminal block connector for T3200 printhead's heater. Connect 24V power supply with at least 1.5A (Min. Power 36W) to this connector if T3200 heater is used. Printhead board regulates the temperature given by the software automatically.

24V for the fan (J6) is also supplied from this connector.

This connector is not used for other printhead types and must be left open if the fan is not used.

2.5 Jumper (J8)

J8 is a 3-port jumper. Jumper 0 and 1 selects between different printhead types as shown in the following table:

Jumper 1	Jumper 0	Printhead Type Standard Board	Printhead Type Modified Board for i-Series
Open	Open	S3200	i3200
Open	Closed	S1600	i1600
Closed	Open	S800	i3200
Closed	Closed	T3200	i1600

TABLE 3 – JUMPER J6, FUNCTION TABLE

To support i3200 printhead, a modified version of the DRV-S3200 board is needed. Modified boards have a small yellow label on the SFP-Module on which "i-Series only" is written.

2.6 JTAG Connector (J9)

This connector is for internal use by AEWA for testing, debugging and updating the firmware. DRV-S3200 firmware can also be updated over optical interface using ApmbDiag or APRINT software.



2.7 Test Connector (J10)

Test header. Only for AEWA internal usage.

2.8 Amplifier temperature sensor connector (J7)

An external NTC thermistor is already installed here and connected to the amplifier heat-sink.

2.9 Amplifier fan connector (J6)

Optional connection to a 24V (max 100 mA) fan to cool down the amplifier. Reserved for future use.

2.10 LEDs

There are 6 diagnostics LEDs on the DRV-S3200 PCB.

PWR LED is connected to the 3.3V voltage rail. It is ON when board power is OK.

DONE LED is ON when FPGA firmware is loaded correctly, otherwise none of the features of DRV-S3200 is available.

FIRE LED is ON when printhead nozzles are active and printing. It switches OFF when printing is stopped.

RX LED is ON when AEWA Print Manager Board is sending printing data to DRV-S3200 board, otherwise it is OFF.

SEC LED is OFF when SHA Encryption keys programmed into the device is correct. If this LED is ON, printing functions of the DRV-S3200 board are disabled.

TEST LED is error indicator LED. Following table shows errors reported by TEST LED.

TEST LED Behavior	Meaning
OFF	No error. Image data stream is counting data.
ON	No error. Image data stream is not counting data.
Blink once, than OFF for 1 second	Checksum Error. Incoming data packages from Print Manager Board have CRC checksum errors.
Blink 2 times, than OFF for 1 second	Data packaging error. Incoming data packages from Print Manager Board have wrong number of bytes.



Blink 3 times, than OFF for 1 second	Speed error. Printing speed or row to row delay setting is too high.
Blink 4 times, than OFF for 1 second	Waveform error. Either no waveform is loaded or the loaded waveform has errors.
Blink 5 times, than OFF for 1 second	No meaning. Reserved for future use.
Blink 6 times, than OFF for 1 second	Printhead voltages are switched off due to an over temperature, overcurrent or voltage error condition.

TABLE 4 – TEST LED FUNCTIONS

Same errors can also be read by APMB software. More error types might be added in future with firmware updates.



3 Mechanical Dimensions

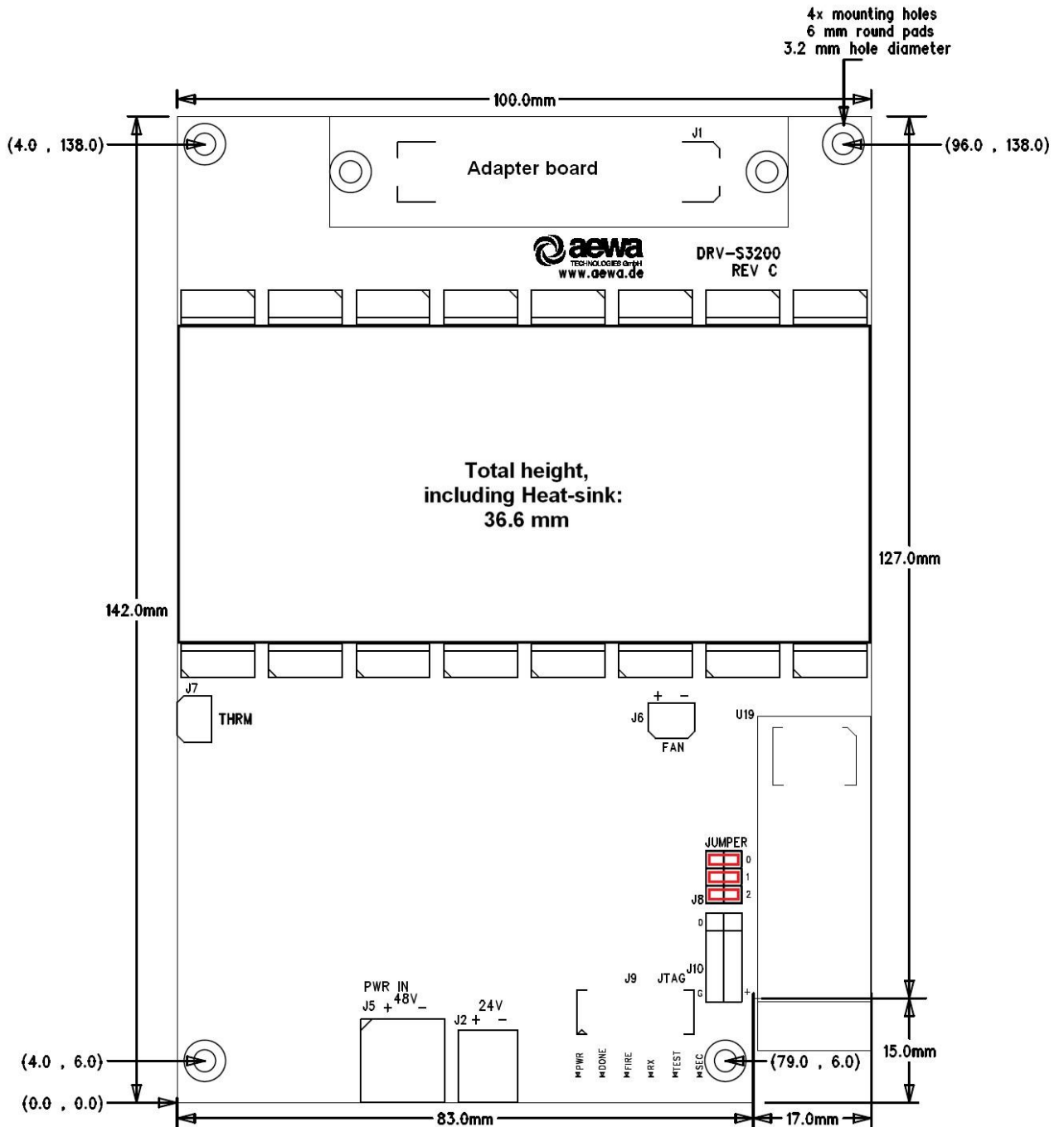


IMAGE 13 – DRV-S3200 MECHANICAL DIMENSIONS



4 Connectors and Cables

DRV-S3200 is assembled with very high quality industrial terminal blocks and connectors for power and input/output. Following table lists the PCB connectors and their mating cable connectors.

Description	PCB Side	Mating Side
J5, Power input connector	PCB header, 5.08 mm raster, 2 poles, MSTBA 2,5/ 2-G-5,08 Manufacturer: Phoenix Contact Order No: 1757242	Plug, 5.08 mm raster, 2 poles, MSTB 2,5/ 2-ST-5,08 Manufacturer: Phoenix Contact Order No: 1757019 or equivalent
J6, J7	PCB header, 2.5mm raster, 2 poles Manufacturer: Phoenix Contact Order No: 1778557	Plug, 2.5mm raster, 2 poles Manufacturer: Phoenix Contact Order No: 1778832 or equivalent
J2	Weidmüller, 3.5mm raster, 2 pins SL 3.50/02/90G Order No: 1605070000	Weidmüller, 3.5mm raster, 2 pins BL 3.50/02/180 SN or BX Order No: 1597360000

TABLE 5 – CONNECTORS AND CABLES

5 Ordering Information

Order No	Item
DRV-S3200	DRV-S3200 board
FLX-S3200	EPSON S3200 printhead cable, Felx-PCB, light brown/gold color.
FLX-T3200	EPSON T3200 printhead cable, Felx-PCB, black color.
FLX-S800	EPSON S800 printhead cable, Felx-PCB.
CNC-i3200	EPSON i3200 printhead adapter board with 4x 47,52cm FFC cables.
CNC-i1600	EPSON i1600 printhead adapter board with 4x 47,52cm FFC cables. For single printhead.
CNC-i1600-2	EPSON i1600 printhead adapter board with 8x 47,52cm FFC cables. For 2 printheads.

TABLE 6 – ORDERING INFORMATION

