
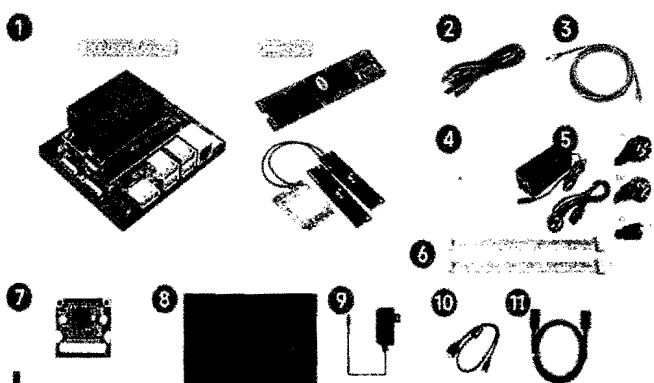


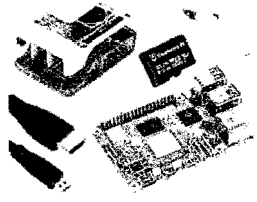
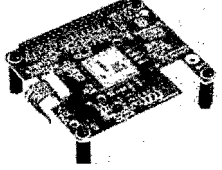
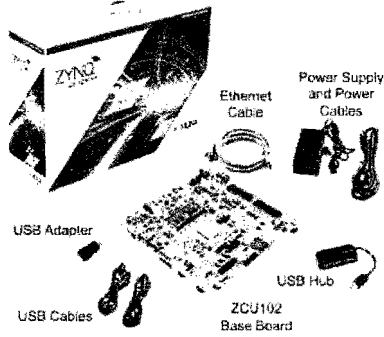


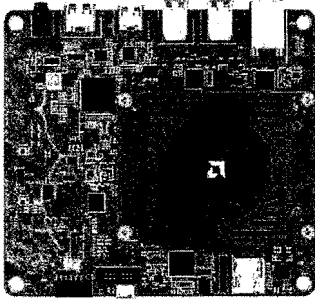

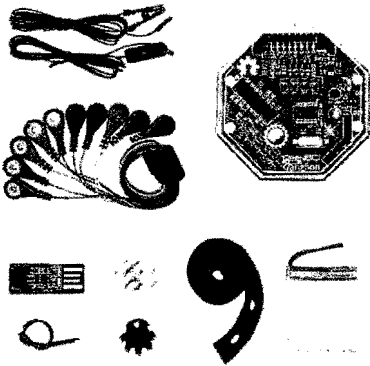
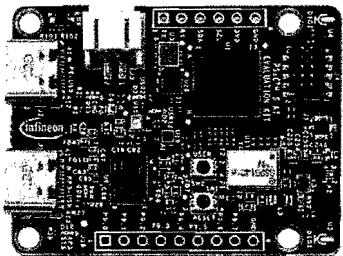
# National Centre for Physics

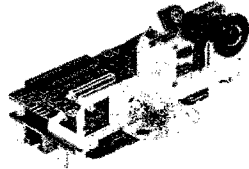
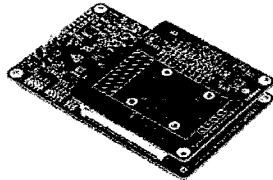
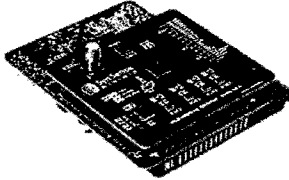

## Detailed specification Document

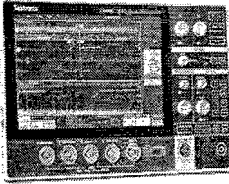
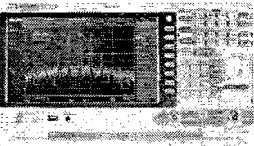
A-299

S#	Title of the Project	<i>AI-based Quality Control and Non-Destructive Testing</i>			
	Item	Specification	A/U	QTY	
1.	Jetson AGX Orin Developer Kit 64GB or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> NVIDIA</li> <li>• <b>SKU:</b> 102110842</li> <li>• <b>AI Performance:</b> 275 TOPS</li> <li>• <b>GPU:</b> 2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores</li> <li>• <b>Power:</b> 15W-60W</li> </ul> <p><b>Kit includes:</b></p> <ul style="list-style-type: none"> <li>• NVIDIA Jetson AGX Orin Developer Kit x1</li> <li>• Power Adapter AC Power Brick 90W x1</li> <li>• USB-C Cable x1</li> <li>• Type B (US, CA, JP) Power Cable x1</li> <li>• Type I (CN) Power Cable x1</li> <li>• Type B (TW) Power Cable x1</li> <li>• UPC Label x1</li> <li>• Quick Start and Support Guide x1</li> </ul>		No	2
2.	Jetson Orin NX Developer Kit 16GB or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> NVIDIA</li> <li>• <b>SKU:</b> 24291</li> <li>• <b>Part No.:</b> JETSON-ORIN-NX-16G-DEV-KIT-B-EU</li> </ul> <p><b>Kit includes:</b></p> <ul style="list-style-type: none"> <li>• Jetson Orin NX Module x1</li> <li>• JETSON-ORIN-IO-BASE x1</li> <li>• Cooling Fan x1</li> <li>• 256GB NVMe Solid State Drive (assembled) x1</li> <li>• Wireless network card (assembled) x1</li> <li>• USB Type A to Type-C cable (~1m) x1</li> <li>• Ethernet cable (~1.5m) x1</li> <li>• Jumper x1</li> <li>• Base board power adapter x1</li> <li>• Camera FPC cable ~15cm (2PCS) x1</li> <li>• IMX219-77 Camera (with FFC cable) x1</li> <li>• 13.3inch HDMI LCD (H) (with case) V2 x1</li> <li>• Display power supply x1</li> <li>• USB Type A to Micro B cable (~35cm) x1</li> <li>• DP to HDMI cable ~1m x1</li> </ul>		No	2

3.	Jetson Orin Nano Super Developer Kit 8GB or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> NVIDIA</li> <li>• <b>AI Performance:</b> 67 INT8 TOPS</li> <li>• <b>GPU:</b> NVIDIA Ampere architecture with 1024 CUDA cores &amp; 32 tensor cores</li> <li>• <b>CPU:</b> 6-core Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2 + 4MB L3</li> <li>• <b>Memory:</b> 8GB 128-bit LPDDR5 102 GB/s</li> <li>• <b>Storage:</b> Supports SD card slot and external NVMe</li> <li>• <b>Power:</b> 7W–25W</li> </ul> <p><b>Kit includes:</b></p> <ul style="list-style-type: none"> <li>• Jetson Orin Nano™ 8GB module with heat sink and reference carrier board</li> <li>• DC power supply</li> <li>• 802.11ac/ab/gn wireless network interface controller</li> <li>• Quick Start Guide</li> </ul>	No	2
4.	Raspberry Pi 5 Starter Kit or Equivalent	<ul style="list-style-type: none"> <li>• <b>Brand:</b> Pi Hut</li> <li>• <b>SKU:</b> RPI5-KIT-16GB-UK</li> </ul> <p><b>Kit includes:</b></p> <ul style="list-style-type: none"> <li>• Raspberry Pi 5 (16GB)</li> <li>• Raspberry Pi 27W USB-C Power Supply: 5V/5A</li> <li>• Raspberry Pi 5 Case (Red/White)</li> <li>• Official Raspberry Pi A2-Class 32GB MicroSD Card - pre-loaded with the latest 64-bit Raspberry Pi OS</li> <li>• Micro-HDMI to HDMI cable</li> </ul> 	No	5
5.	Raspberry Pi AI HAT+ or Equivalent	<ul style="list-style-type: none"> <li>• <b>Brand:</b> Pi Hut</li> <li>• <b>SKU:</b> SC1791</li> <li>• <b>Version:</b> 26 TOPS</li> </ul> <p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• 1x Raspberry Pi AI HAT+</li> <li>• 1x Tall GPIO header</li> <li>• 1x Nylon standoff/screws pack</li> </ul> 	No	3
6.	Zynq UltraScale+ MPSoC ZCU102 Evaluation Kit or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> AMD</li> <li>• <b>Part Number:</b> EK-U1-ZCU102-G</li> <li>• <b>DDR4 SODIMM</b> – 4GB 64-bit</li> <li>• <b>DDR4 Component</b> – 512MB 16-bit attached to programmable logic</li> <li>• <b>PCIe® Root Port Gen2 x4, USB3, Display Port, and SATA</b></li> <li>• <b>4x SFP+ interfaces for Ethernet</b></li> <li>• <b>2x FPGA Mezzanine Card (FMC) interfaces for I/O expansion including 16 16.3Gb/s GTH transceivers and 64 user-defined differential I/O signals</b></li> <li>• <b>Maximum I/O Pins: 328</b></li> </ul> <p><b>Package Contents:</b></p> <ul style="list-style-type: none"> <li>• ZCU102-evaluation-board</li> <li>• Access to a full seat of Vivado™ Design Suite: Design Edition</li> <li>• Ethernet Cable</li> <li>• Targus USB-3</li> <li>• USB3 Adapter</li> <li>• USB Micro Cable</li> <li>• Power Cords and Adapter</li> </ul> 	No	1
7.	Kria KV260 Vision AI Starter Kit or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> AMD</li> <li>• <b>Part Number:</b> SK-KV260-G</li> <li>• <b>Device:</b> Zynq™ UltraScale+™ MPSoC</li> <li>• <b>System Logic Cells:</b> 256K</li> </ul>	No	1

		<ul style="list-style-type: none"> <li>• Block RAM Blocks: 144</li> <li>• UltraRAM Blocks: 64</li> <li>• DSP Slices: 1.2K</li> <li>• Ethernet Interface: One 10/100/1000 Mb/s</li> <li>• DDR Memory: 4 GB (4 x 512 Mb x 16 bit) [non-ECC]</li> <li>• Primary Boot Memory: 512 Mb QSPI</li> <li>• Secondary Boot Memory: SDHC card</li> <li>• Image Sensor Processor: OnSemi AP1302 ISP</li> <li>• IAS MIPI Sensor Interfaces: x2 (supports auto-focus)</li> <li>• Raspberry Pi Camera Interface: x1</li> <li>• Pmod 12-pin Interface: x1</li> <li>• USB® 3.0/2.0 Interface: x4</li> <li>• DisplayPort™ 1.2a: x1</li> <li>• HDMI™ 1.4: x1</li> </ul>			
8.	Kria KV260 Basic Accessory Pack or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> AMD</li> <li>• <b>Part Number:</b> HW-BACCP01-SK-G</li> </ul> <b>Pack includes:</b> <ul style="list-style-type: none"> <li>• KV260 Power Supply &amp; Adapter (AC/DC WALL MOUNT ADAPTER 12V 36W)</li> <li>• USB-A to micro-B Cable</li> <li>• Ethernet Cable</li> <li>• HDMI Cable (Male to Male)</li> <li>• MicroSD card and MicroSD to SD Adapter</li> <li>• 13MP Auto Focus RGB Camera Module</li> </ul>		No	1
9.	EXG Experiment Bundle or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> OpenBCI</li> <li>• Ganglion Board 4-channel, incl. USB dongle, battery, charger, and case x1</li> <li>• EEG Polymer Snap Electrodes, incl. case clip and velcro headband x8</li> <li>• EMG, ECG, or EXG Disposable Gel Snap Electrodes, 50-pack x1</li> <li>• Snap Cables Pack x1</li> <li>• Earclip Electrode Pair, for reference and ground x1</li> </ul>		No	2
10.	PSOC™ 6 AI Evaluation Kit or Equivalent	<ul style="list-style-type: none"> <li>• <b>Make:</b> Infineon</li> <li>• PSOC™ 6 AI Evaluation Kit (CY8CKIT-062S2-AI)</li> </ul> <b>Kit contents:</b> <ul style="list-style-type: none"> <li>• PSOC™ 6 AI Evaluation Board</li> <li>• Inlay card (a printed QR code points to a getting started webpage)</li> </ul>		No	1
11.	Qualcomm® Robotics RB5 Vision Kit or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> Thundercomm</li> </ul>		No	1

		<ul style="list-style-type: none"> <li>Storage: 128 GB UFS3.1 Onboard Storage</li> <li>Camera: IMX577 1, GMSL 1, OV9282 1, Accessories: Nuvoton® (ToF) – Sensor[MN34906], Intel® RealSense (D435i)</li> <li>Power source: 12 V @2.5A adapter with a DC plug</li> </ul>  <p><b>Package List:</b></p> <ul style="list-style-type: none"> <li>Qualcomm® Robotics RB5 Core Kit + power supply + USB cable + Vision mezzanine with tracking &amp; main camera + Heatsink</li> </ul>		
12.	Xylo™ IMU Development Kit or Equivalent	<ul style="list-style-type: none"> <li><b>Manufacturer:</b> SynSense</li> <li>Contains one Xylo IMU inference processor</li> <li>3-axis Accelerometer IMU on board(MC3632), ODR of 400Hz</li> <li>USB bus powered, USB 3.1 for interfacing with a host PC</li> <li>High-level Python API (Rockpool) for application development, HDK interfacing and deployment</li> <li>Support up to ~500 reservoir neurons and up to 16 classifications</li> <li>1-bit configurable interrupt indicating classification / detection</li> <li>4-bits monitor pins for debug purpose</li> <li>Up to 50 MHz internal operating frequency</li> <li>Extremely low memory footprint (~75 KB), memory power control granularity down to 2 KB</li> <li>Ultra-low average working power consumption (&lt;300 uW)</li> </ul> 	No	2
13.	Xylo-Audio Development Kit or Equivalent	<ul style="list-style-type: none"> <li><b>Manufacturer:</b> SynSense</li> <li>MEMS MIC on board, supports both single end and differential mode</li> <li>External audio SMA input port</li> <li>1x USB 3.0 TYPE-C port</li> <li>Single end to difference module, for external audio signal only</li> <li>Support up to 1000 reservoir neurons and up to 8 classification</li> </ul> 	No	2
14.	USB-6001 DAQ or Equivalent	<ul style="list-style-type: none"> <li><b>Manufacturer:</b> National Instruments</li> <li><b>Part Number(s):</b> 782605-01   782604-01</li> <li>Supported Power Input: Bus Powered</li> <li>Maximum Number of Single-Ended Analog Input Channels: 8</li> <li>Maximum Number of Differential Analog Input Channels: 4</li> <li>Maximum Sample Rate: 20 kS/s</li> <li>Simultaneous Sampling: No</li> <li>Analog Input Resolution: 14 bits</li> <li>Bus Connector: USB 2.0</li> <li>Number of Analog Output Channels: 2</li> <li>Maximum Update Rate: 5 kS/s</li> <li>Number of Bidirectional Digital Channels: 13</li> <li>Number of Counters/Timers: 1</li> <li>Analog Input Absolute Accuracy: 26 mV</li> <li>Analog Input FIFO Buffer Size: 2047 samples</li> </ul> 	No	1
15.	3.6V C ER26500 Li-SoCl2 Battery or Equivalent	<ul style="list-style-type: none"> <li>Voltage-rated: 3.6V</li> <li>Capacity: 9000 mAh</li> <li>Series: Li-SOCl2</li> </ul>	No	10

16.	Tektronix MSO24 Oscilloscope or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> Tektronix</li> <li>• Analog Bandwidth: 70 MHz - 500 MHz</li> <li>• Analog Channels: 4</li> <li>• Digital Channels: 16</li> <li>• Sample Rate: Up to 2.5 GS/s</li> <li>• Record Length: 10 M</li> <li>• Model Number: MSO24</li> </ul>		No	1
17.	Siglent Technologies Spectrum Analyzer or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> Siglent Technologies</li> <li>• <b>SKU:</b> SSA3021X</li> <li>• Frequency range: 9 KHz~2.1 GHz</li> <li>• Resolution bandwidth (RBW): 1 Hz~1 MHz, in 1-3-10 sequence</li> <li>• Phase noise: Total Amplitude Accuracy: <math>\pm 0.7</math> dB</li> <li>• Display average noise level (DANL): -161 dBm/Hz (Normalized to 1 Hz (typ.))</li> <li>• Note: Tracking Generator (TG) is now included at No Charge.</li> </ul> <p><b>Accessories:</b></p> <ul style="list-style-type: none"> <li>• USB Cable</li> <li>• Quick Start Guide-SSA</li> <li>• TG-SSA3000X</li> </ul>		No	1
18.	Siemens S7-1500 Trainer Kit with HMI or Equivalent	<ul style="list-style-type: none"> <li>• <b>Manufacturer:</b> Siemens</li> <li>• PLC CPU: SIMATIC CPU 1511C-1 PN</li> <li>• Power Supply: PM1507 (24 V DC)</li> <li>• Digital I/O: SM 321 (DI), SM 322 (DQ)</li> <li>• Analog I/O: SM 331 / SM 332</li> <li>• HMI Panel: KTP700 Basic</li> <li>• Trainer Frame: Tabletop panel with switches, pilot lights, potentiometers</li> <li>• Communication: PROFINET onboard / CP modules</li> <li>• Software: TIA Portal Software (license)</li> </ul>		No	1

**Note: All the components installed should be compatible with the system and each other.**

**Please tick the relevant box**

Installation       Testing       Commissioning       Training

Warranty requirement     Any other please specify