

PCBA to Fluidic Machine with BeiJer X2pro System Controller with QuikLok Stand.

The components of PCBA to Fluidic Machine with BeiJer X2pro System Controller with QuikLok Stand.

PCBA and Fluidic Load Assemblies

It is a system involving several interconnected components for a fluidic machine:

1. **PCBA (Printed Circuit Board Assembly):** This is the heart of the system's electronics. It's a PCB (printed circuit board) with all the necessary electronic components like microchips, resistors, and capacitors soldered onto it, making it a functional electronic device.
2. **Fluidic Load Assemblies:** These likely refer to the components and systems responsible for manipulating and controlling fluids within the fluidic machine. Examples could include pumps, valves, sensors, channels, or reservoirs. In some research contexts, "fluidic assembly" can involve self-assembly of microscopic or macroscopic components within a fluid environment.
3. **Connection:** The phrase "OF PCBA to Fluidic Machine" indicates that the PCBA is connected to and likely controls or interfaces with the fluidic machine's components. This connection could be via electrical signals to activate pumps or valves, or it could involve reading data from fluidic sensors.
4. **BeiJer X2 pro System Controller:** This is a high-performance Human-Machine Interface (HMI) panel, which acts as the user interface and control center for the system. These panels are designed for industrial applications and offer:
 - Powerful ARM Cortex-A9 processors
 - High-resolution touchscreens
 - Connectivity options for integration with other equipment
 - iX software for smart communication and vector graphics
 - Robust aluminum housing
5. **QuikLok Stand:** This refers to a type of stand, likely supporting the BeiJer X2 pro controller or other components of the fluidic machine. QuikLok offers various stands, including rolling mixer/remote stands with adjustable height, width, depth, and tilt. These stands are often used in professional studios but can also be adapted for various industrial applications.

In summary: The system comprises a PCBA with its associated electronic components, fluidic load assemblies for handling fluids, a BeiJer X2 pro HMI controller for user interface and control, and a QuikLok stand to support the HMI or other equipment. This configuration suggests an automated fluidic system with electronic control and a user-friendly interface.

https://www.beijerelectronics.com/en/Products/Operator_panels/X2_pro

FOUR (4) Tape Assemblies with Denso HM-40602M-W 4-Axis 600mm SCARA Industrial Robots

DENSO HM-40602M-W 4-axis 600mm SCARA industrial robots, known for their speed and repeatability, can be used with tape assemblies for automated dispensing and application processes.

Here's how tape assemblies work with SCARA robots like the DENSO HM series:

1. Tape Application Systems:

- **RoboTape System:** A comprehensive solution that includes a tape application head mounted on the robot arm and a remote bulk spool feeding system. This allows for continuous production by enabling spool changes without interrupting the process. The RoboTape system can handle various adhesive-backed materials like foams and felts, and can be programmed for specific lengths and widths, [according to RoboTape](#).
- **Active Taping Kit (ATK):** An integrated system utilizing patented Active Compliant Technology (ACT) and an optimized tape applicator for robotic use. The ATK offers precise control over parameters like contact force and cutting, ensuring high-quality, bubble and wrinkle-free tape application on various surfaces.
- **Robot-Mounted Tape Applicators:** These are end-of-arm tools designed for precise tape placement by robots. They remove the need for manual application and cutting, improving productivity.

2. Integration with SCARA Robots:

- The tape applicator head is mounted to the SCARA robot arm.
- The robot's arm moves over the surface, following a programmed path, to apply the tape with precision.
- Some systems, like RoboTape, utilize a remote feeding system to keep the tape spool outside the work cell for continuous operation.

3. Benefits of Automated Tape Application:

- **Increased throughput:** Automating the tape application process significantly speeds up production compared to manual methods.
- **Improved quality and consistency:** Robotic application ensures precise and repeatable tape placement, eliminating inconsistencies and reducing waste.
- **Reduced labor costs and rework:** Automation minimizes the need for manual labor and reduces errors, leading to cost savings.
- **Enhanced productivity:** The ability to work continuously with minimal downtime improves overall production efficiency.
- **Flexibility:** Systems like RoboTape can be integrated into existing lines, new cells, or used as stand-alone solutions.

4. DENSO HM-40602M-W Specifics:

- While the search results primarily discuss the HM series in general, the HM-40602M-W model with its 600mm reach, 4-axis configuration, high repeatability of ± 0.02 mm, and fast cycle times makes it suitable for demanding tape application tasks.
- The HM Series robots can handle payloads up to 20kg, allowing for the use of various tape application heads.
- Available in dust- and mist-proof (IP65) configurations, these robots can operate in diverse manufacturing environments.

In summary, DENSO HM-40602M-W robots can be integrated with various tape assemblies, such as the RoboTape system or Active Taping Kit, to automate and enhance tape dispensing and application processes, leading to improved efficiency, quality, and productivity.

<https://www.densorobotics.com/>

FOUR (4) Roll Assemblies

An overview of roll assemblies for PCB to fluidic machines with a Beijer X2pro System Controller and a QuikLok stand:

1. Role of Beijer X2pro System Controller:

- The Beijer X2pro is a high-performance Human Machine Interface (HMI) panel suitable for industrial automation.
- It can act as the system controller, providing an interface for monitoring and controlling automated processes.
- The controller features a powerful processor, advanced screen technology, and various connectivity options.
- Configuration is done using iX Developer software, allowing integration with other equipment like PLCs.

2. PCB Handling Equipment & Fluidic Integration:

- For PCB assembly lines, there are various types of equipment available, including:
- Loaders/Unloaders: To introduce and remove PCBs from the line.
- Conveyors: To transport PCBs between stations.
- Inspection systems: To verify PCB quality.
- Specialized handling systems: For tasks like component placement or sorting.
- Integrating fluidic components and electronic circuits onto a common PCB is possible by adding specific process steps.
- This integration allows for the creation of fluidic microsystems combined with necessary electronics for monitoring sensor signals.

3. QuikLok Stand for Support:

- QuikLok offers various stands for different applications, such as the QL-400 Rolling Mixer/Remote Stand.
- This stand could potentially be used to support and position elements of the PCB-to-fluidic system, such as sensors, actuators, or perhaps even a smaller fluidic module itself.
- The QL-400 features adjustable height, width, and tilt positions for versatility, with locking casters for easy movement and stability.

Putting it all together:

The Beijer X2pro System Controller could manage the automation and process control of a system where PCBs are handled by dedicated equipment and subsequently integrated with fluidic components. A QuikLok stand like the QL-400 might be used to support and position certain parts of this integrated system, potentially including a fluidic module or associated components.

In summary, a system involving roll assemblies for PCB-to-fluidic integration with a Beijer X2pro System Controller and a QuikLok stand could be structured as follows:

- PCB handling equipment manages the flow of PCBs.
- Fluidic components are added or integrated onto the PCB.
- The Beijer X2pro controller oversees the overall process, including PCB handling, fluidic operation, and data monitoring.
- A QuikLok stand provides physical support and flexible positioning for specific elements of the system.

This setup would facilitate the creation of complex, intelligent fluidic microsystems that are both compact and cost-effective.

https://www.beijerelectronics.com/en/Products/Operator_panels/X2_pro

Sealing Wax Dispense Assembly with Nordson EFD PICO Touch Controller

A sealing wax dispense assembly with a Nordson EFD PICO Touch Controller typically involves using the controller to operate a specialized dispensing valve for applying molten wax seals.

Here's a breakdown of the components and functionality:

- Nordson EFD PICO Touch Controller:
- Features an intuitive touchscreen interface for easy setup and programming.
- Allows precise adjustment of dispensing parameters, including pulse time, ramp open/close, and stroke control.
- Provides finer control over valve operating parameters and dispensing performance.
- Can control the dispense of a wide range of fluids and viscosities, including sealants.
- Features a programmable lockout to prevent unintended changes.

- Dispensing Valve (likely PICO Pulse or PICO Pulse Contact Dispense Valve):
- These valves are designed for precise micro-deposit dispensing.
- The PICO Pulse jet valve provides non-contact dispensing at high speeds (up to 1000Hz continuous, 1500Hz burst).
- The PICO Pulse Contact Dispense Valve provides accurate contact dispensing with less turbulence, suitable for small dots and lines.
- The valves are engineered for demanding production environments and are considered robust.
- Fluid Reservoir:
- Holds the molten sealing wax.
- Hydrostatic pressure from the reservoir's height can affect dispensing, so it should be positioned correctly.

How it works:

The PICO Touch controller interfaces with the dispensing valve, allowing users to precisely control the application of molten sealing wax. You can program the controller to dispense the desired amount of wax, at the desired speed and pressure, resulting in consistent and repeatable wax seals. This offers more control and potentially higher throughput compared to manual methods like using a glue gun.

Considerations for Sealing Wax Applications:

- Wax properties: The PICO Touch controller and compatible valves are designed for a range of fluid viscosities, [but it's important to consider](#) the specific type of sealing wax and its temperature requirements.
- Heating elements: Ensuring the wax remains molten and at the correct temperature for dispensing is crucial. This may involve heated components in the dispensing system, such as a heated reservoir or nozzle.
- Cleaning and maintenance: Regular cleaning of the valve and fluid body is essential for optimal performance.

In summary, the Nordson EFD PICO Touch Controller, when paired with a compatible dispensing valve, can be a highly effective tool for automating and controlling the application of sealing wax, particularly in applications requiring precision and repeatability.

<https://www.tequipment.net/>

Wax Check Assembly

Wax Check Assembly of PCBA to Fluidic Machine is a quality control step, likely involving visual or automated inspection and potentially cleaning, to ensure that the PCBA is free from wax contamination before or during its integration with a fluidic machine. The goal is to prevent potential issues with the fluidic system's performance and reliability.

The Need for Wax Check:

- **Fluidic System Sensitivity:**

Fluidic systems are often sensitive to contaminants, and wax residue can disrupt fluid flow, clog channels, or interfere with sensor readings.

- **Reliability Concerns:**

Wax contamination can affect the long-term reliability and performance of the fluidic machine.

- **Preventing Failures:**

By performing a wax check, manufacturers can identify and remove potential sources of failure early in the process.

3. Potential Wax Check Methods:

- **Visual Inspection:**

Trained personnel can visually inspect the PCBA for any signs of wax residue, especially in areas near fluidic connections. Magnifying glasses or microscopes may be used for detailed inspection.

- **Automated Optical Inspection (AOI):**

AOI systems use cameras and software to scan the PCBA and identify defects, including potential wax contamination, based on predefined criteria.

- **Specialized Tests:**

Some fluidic machines may have specific tests to check for wax contamination, such as flow rate measurements or pressure drop tests.

- **Cleaning Processes:**

If wax contamination is detected, the PCBA may undergo a cleaning process using solvents like isopropyl alcohol (IPA) or specialized cleaning agents to remove the residue.

- **Ionography:**

For measuring flux residue after washing, ionography can be used to measure the change in conductivity of an alcohol solution after submerging a PCB.

- **Ultrasonic Cleaning:**

In some cases, ultrasonic cleaning, which uses high-frequency sound waves to dislodge contaminants, can be employed.

<https://www.sfcircuits.com/>

Heat Emboss Assembly; Offload - Reject Assembly

"Heat Emboss Assembly" and "Offload - Reject Assembly" represent distinct processes within manufacturing, although they might relate to stages within a larger production workflow.

1. Heat Emboss Assembly:

- **Process:** Heat embossing is a manufacturing technique that utilizes heat and pressure to create raised or sunken designs on a material's surface.

- Mechanism: This typically involves pressing a die or mold against the material while heat is applied, causing the material to conform to the die's pattern.
- Applications: Heat embossing is widely used in various industries for:
 - Adding decorative textures and visual appeal.
 - Branding, such as embossing logos on packaging.
 - Creating functional elements like increased grip or improved destacking of containers.
- Assemblies: "Heat Emboss Assembly" suggests that a component or product undergoes this embossing process as part of its overall assembly.

2. Offload - Reject Assembly:

- Offloading: In manufacturing, offloading can refer to a couple of scenarios:
- Externalizing Production: Assigning the manufacturing of certain components or assemblies to an external supplier, freeing up internal resources and capacity.
- Loading/Unloading in Internal Logistics: The processes involved in receiving raw materials and components, and delivering finished products within a manufacturing facility.
- Reject Assembly: This indicates that an assembly has been identified as defective or not meeting quality standards.
- Connection to Heat Embossing: An "Offload - Reject Assembly" could occur after a heat embossing process, implying that the assembly failed quality control, potentially due to defects from the embossing or other assembly steps.
- Offload and Rejection: The "offload" part in this context might suggest the following:
 - The rejected assemblies might be sent to a specific area for further inspection, rework, or disposal.
 - Alternatively, if the heat embossing was an outsourced process, the rejected assemblies might be sent back to the supplier who performed the embossing.

In summary:

- Heat Emboss Assembly describes the process of incorporating heat embossing into the manufacturing of a product or component.
- Offload - Reject Assembly signifies an assembly that has been identified as defective and subsequently handled according to the company's quality control and logistical procedures, possibly involving offloading it for further action or return to the supplier.

Understanding both the specific process of heat embossing and the procedures for handling rejected assemblies are crucial for managing manufacturing quality and efficiency.

<https://cncpartstxtj.com/what-is-embossing/#:~:text=Embossing%20is%20a%20decorative%20technique,visual%20interest%20and%20tactile%20appeal.>

THIRTEEN (13) Cognex Digital Cameras

Thirteen Cognex digital cameras are used into a system that transfers PCBs to a fluidic machine, using a Beijer X2pro System Controller and a QuikLok stand.

Cognex Digital Camera for PCB Inspection :

- **Function:** Cognex cameras are commonly used in industrial automation, especially in electronics manufacturing, for tasks like inspecting PCBs for defects, verifying component placement, and ensuring quality control.
- **Key Features:** Cognex cameras are known for their high performance, robust design, and integration capabilities. They can be integrated with various systems, including PLCs and HMI panels like the Beijer X2pro.
- **Example Model:** The Cognex In-Sight 2800 is a vision system designed for error-proofing and improving product quality in factory automation.

<https://www.cognex.com/>

Multiple Festo Stepper Motors / Handlers

This setup outlines a potential automation system involving Festo stepper motors and handling systems, a Beijer X2pro HMI, and a QuikLok stand for tasks involving Printed Circuit Boards (PCBs) and fluidic processes.

1. Festo Stepper Motors and Handling Systems:

- **Stepper Motors:** Festo offers various stepper motor series like the EMMS-ST and EMMB-ST, ideal for simple positioning applications requiring precise control over position and speed.
- **Handling Systems:** These systems can be used for various PCB assembly tasks like moving, positioning, feeding, removing, or securing PCBs. For example, a 2-axis handling module with a stepper motor can handle workpieces and cartons, with precise positioning controlled by the stepper motor.
- **Applications in Fluidic Machines:** Festo handling systems can be integrated with liquid handling solutions, such as dispensing systems, for tasks like precisely filling microwell plates in laboratory automation. These systems offer benefits like simplicity, precision, flexibility, scalability, and productivity.

<https://www.festo.com/us>

SMC Pneumatics

- SMC is a leading manufacturer of pneumatic components, which are devices that use compressed air to perform mechanical work.

- In a fluidic machine context, SMC pneumatics would likely be used to actuate valves, operate pumps, or provide other forms of controlled motion for fluid handling.
- SMC offers a wide range of relevant products including:
- Air cylinders: for linear motion.
- Directional control valves: to direct the flow of air, which in turn controls other pneumatic components.
- Air preparation equipment: filters, regulators, etc., to ensure a clean and controlled air supply.
- Specialty cylinders and valves: potentially tailored to the specific needs of a fluidic application

<https://ieeexplore.ieee.org/document/5213143>

THREE (3) Dorner 7.5, 7.75, and 9.5ft by 2.25in Conveyors [one conveyor each side only]

For transferring Printed Circuit Board Assemblies (PCBA) to a Fluidic Machine, Dorner's 2200 series conveyors appear to be a suitable option based on their characteristics and common applications. They are designed for small to medium-sized parts, precision applications, and flexible layouts, making them suitable for handling PCBs.

- Dorner 2200 Series:
- Low Profile: The 2200 series has a low profile, making it suitable for integrating into machinery like a fluidic machine.
- Precision Handling: The series features options like high-speed nose bar transfers, enabling gentle and accurate positioning of sensitive components like PCBs, essential for electronic medical device manufacturing. They are known for smooth, consistent movement and minimizing vibration, crucial for delicate electronics.
- Modular Belt Option: The modular plastic belt small-pitch option provides tight nosebar transfers (as tight as 0.31 inches), making it suitable for transferring small components and for infeed/outfeed to machinery.
- Widths: The 2200 series is available in various widths, including 1" (25 mm) to 24" (610 mm) for the Precision Move variant. A 2.25 inch width likely falls within the customizable options available from Dorner.
- Lengths: The series is available in various lengths, ranging from 18" (457 mm) to 30' (9,144 mm) for the Precision Move variant. This suggests that 7.5ft, 7.75ft, and 9.5ft conveyors are feasible within the 2200 series.

- **Load Capacity:** The 2200 Precision Move can handle loads up to 200 lbs (91 kg).
- **Cleanroom Compatibility:** Dorner offers cleanroom-compatible conveyors, which might be important depending on the specific requirements for handling PCBs for a fluidic machine.
- **ESD Protection:** For sensitive electronics like PCBs, ESD-safe materials and designs are crucial, and Dorner offers these capabilities in their systems.
- **PCBA to Fluidic Machine Application:** Dorner's conveyor systems are specifically highlighted for electronic medical device manufacturing, including automated PCB handling and testing. Their ability to provide gentle handling, integrate with automated testing equipment, and offer customizable layouts makes them well-suited for this type of application.
- **Fluid Conveyor Principle:** The fluid conveyor belt principle involves using nonuniform slip to create a directional fluid flow, potentially useful within the fluidic machine itself. This is distinct from the function of the Dorner conveyors which would be used to transport the physical PCBA to the fluidic machine.

In summary:

Based on the information available, Dorner's 2200 series conveyors, with their precision, low profile, modularity, and options like tight nosebar transfers and ESD protection, are well-suited for transferring PCBAs to a fluidic machine. The specified lengths (7.5, 7.75, and 9.5ft) and a 2.25-inch width are likely within the customizable options for the 2200 series. The specific configuration would depend on the precise requirements of the fluidic machine and the PCBAs being handled.

<https://www.dornerconveyors.com/products>

Modular Enclosure with Omron D4JL-2NFA-C5 Basic / Snap Action Lock Switches

A modular enclosure for an Omron D4JL-2NFA-C5 safety door switch would be designed to house and protect the switch while providing the necessary structural support for its installation on a machine or safety guard.

Here's a breakdown of the Omron D4JL-2NFA-C5 and what to consider for its enclosure:

Omron D4JL-2NFA-C5 Features and Specifications:

- **Type:** Guard Lock Safety Door Switch.
- **Functionality:** Mechanical lock/24 VDC solenoid release, preventing accidental entry into hazardous areas.

- **Contact Configuration:** Features 2 normally closed (NC) and 1 normally open (NO) contact for both door position detection and lock monitoring.
- **Holding Force:** Provides a minimum holding force of 3,000N, suitable for larger and heavier safety doors.
- **Trapped Key (Optional):** Helps prevent being locked inside a hazardous area by requiring a key to operate the switch.
- **Rear Release Button (Optional):** Allows for emergency unlocking from within the hazardous area.
- **Ingress Protection (IP) Rating:** IP67, indicating dust tight and waterproof protection.
- **Termination Style:** Screw terminals.
- **Housing Material:** Plastic head.

Modular Enclosure Considerations:

- **Protection:** The enclosure must be durable and protect the switch from the operational environment, including potential impacts, dust, and moisture, consistent with the switch's IP67 rating.
- **Mounting:** The enclosure should provide a stable platform for mounting the D4JL-2NFA-C5, ensuring correct alignment with the corresponding actuator on the safety door. Mounting options could include horizontal or vertical configurations.
- **Access:** The enclosure should facilitate easy wiring via the G1/2" conduit outlet. If a trapped key system or rear release button is used, the enclosure design needs to accommodate their access and functionality.
- **Durability and Security:** The enclosure should be constructed from suitable materials like metal or robust plastic to withstand typical industrial conditions and deter tampering, aligning with general machine guarding requirements.
- **Modular Design:** A modular enclosure would ideally be part of a larger system, allowing for flexible configuration and integration with other components of a safety system, such as safety relays or control units.

Finding Suitable Modular Enclosures:

Since Omron provides the safety door switch itself, you would typically look for a compatible modular enclosure system designed to integrate with safety components like the D4JL series.

- You might search for modular enclosure systems designed for safety interlock switches, noting the D4JL-2NFA-C5's dimensions and mounting hole pattern, if available, in the datasheets.
- Manufacturers of machine guarding systems often offer compatible enclosures or mounting solutions for safety switches.
- When evaluating potential enclosures, prioritize those that meet or exceed the safety requirements for machine guarding as outlined by organizations like OSHA.
- Always ensure the chosen enclosure doesn't compromise the functionality or safety ratings of the D4JL-2NFA-C5.

<https://www.powermotionstore.com/products/D4JL-2NFA-C5>

