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INTRODUCTION

The FPC is a precision, liquid-delivery instrument capable of sample transfer and dilution. It is designed to assist the laboratory technologist in the pipetting of samples and management of results.

GENERAL PRINCIPLE OF OPERATION

The Flexible Pipetting Center (FPC) is a precision, liquid delivery instrument capable of performing sample transfer and dilution. It is designed to assist the laboratory technician in the pipetting of samples and management of results.

The FPC combines a robotics pipetting component, an optional Automatic Bar Code Reader (ABC), and a computer configured with a UNIX® operating system for multitasking capability. The FPC can be interfaced to the analyzers and host computer (LIS) systems and/or data output devices via a multi-port, serial connector cable (Digicable™).

The FPC is capable of maintaining a database of reagent lot numbers and expiration dates. This database can be used during pipetting and shared with connected COMMANDER® Parallel Processing Center(s) Total Process Control (TPC™).

PRIMARY COMPONENTS

- AUTOMATIC BAR CODE READER
- Sensor Module (F-Link)
- Hand-Held Bar Code Reader
- Pipettor
- Computer System

AUTOMATIC BAR CODE READER

The Automatic Bar Code Reader (ABC) electronics section and associated interfaces are basically controlled by the ABC Controller Board circuitry. The major control functions are provided by the ABC Control Microprocessor CPU located on the ABC Controller Board. The ABC Controller controls all system functions based on commands received from the host computer.

SENSOR MODULE (F-LINK)

When the sample tube is placed in the Sample Rack, the tube ID is entered into the computer. The Sensor Module (F-Link) matches this tube's ID to its location in the rack. This positive ID information will be used later to correlate the sample IDs to positions in the assay trays.

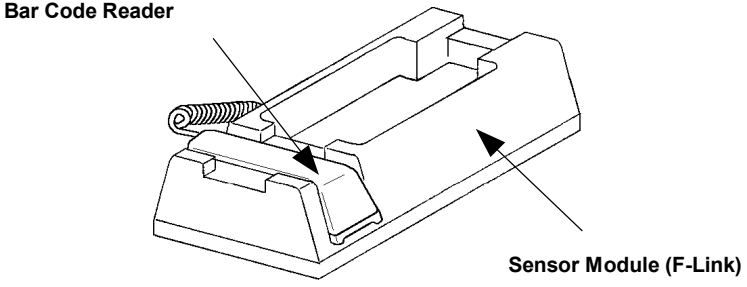


Figure 2-1. Bar Code Reader and Sensor Module (F-Link)

HAND-HELD BAR CODE READER

The Bar Code Reader reads bar code identifications from racks, sample tubes, trays, and boxes and transfers the data to the computer controlling the COMMANDER© FPC. The Bar Code Reader is connected to the Sensor Module (F-Link) by a cable. Data read by the Bar Code Reader is transferred to the system database for storage.

PIPETTOR

PIPETTOR COMPONENTS

- XYZ-Axis Pipette Tip Handler
- Tip Racks (Refer to Pipettor Accessories)
- Sample and Diluent Syringes
- Sample Tray Platform
- Sample Tube Rack (Refer to Pipettor Accessories)
- Pause Switch
- Control Bottle Rack
- Tip Bin
- Diluent Bottle Rack (Refer to Pipettor Accessories)

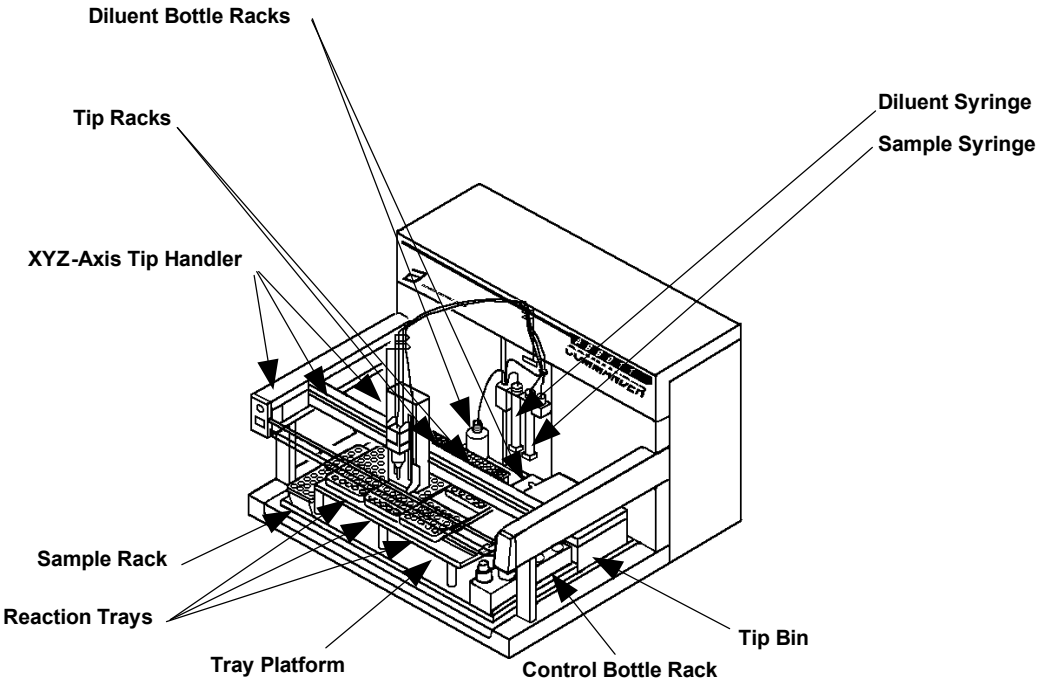


Figure 2-2. Pipettor

XYZ-Axis Pipette Tip Handler

The XYZ-Axis Pipette Tip Handler automatically loads a new tip for each sample, control, or diluent it pipettes and when finished, disposes the tip into the tip bin. A switch on the handler is capable of detecting the presence of a pipette tip. The handler also contains the diluent nozzle.

Syringes

Syringes provide the pumping action necessary for pipetting the volumes specified in the assay protocols. The left syringe dispenses diluent; the right syringe dispenses sample and controls. Plastic tubing connects the syringes to the pipette tip handler.

Sample Tray Platform

The Pipetting Platform is capable of holding up to four Tray Platforms. Use the appropriate Tray Platform or Adapter compatible with the 20-well tray, 60-well tray, and Microtiter. Positioning pins on the Pipetting Platform assist the operator with correct tray placement.

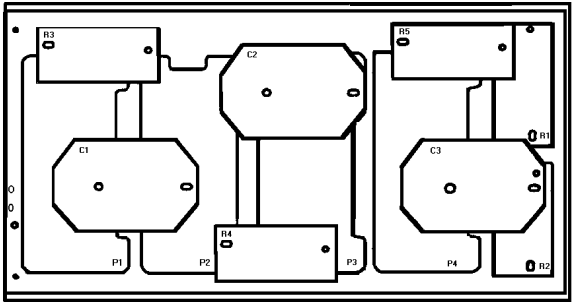


Figure 2-3. Pipetting Platform

Pause Switch

The Pause Switch allows the operator to interrupt the pipetting operation without involving the computer. When the run is restarted, pipetting resumes.

Control Bottle Rack

Controls in bottles and tubes of specific sizes are placed into appropriate positions in the Control Bottle Rack at the far right of the Sample Rack/Tray Platform area. Each position, marked X1 through X5, can hold a 5 ml, 10 ml, 12 ml, 35 ml bottle, TDX one dram or a 13mm diameter tube. Positions are assigned by the computer depending on assays included in the processing run.

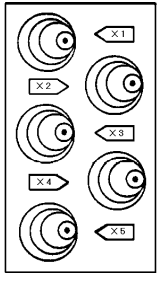


Figure 2-4. Control Bottle Rack

Tip Bin

The Tip Bin holds disposable tips after they have delivered the sample, control, or diluent.

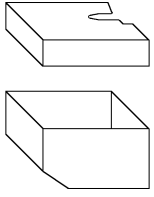
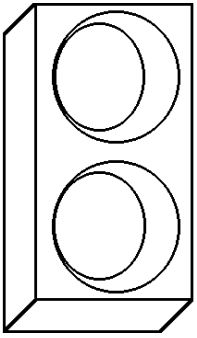


Figure 2-5. Tip Bin

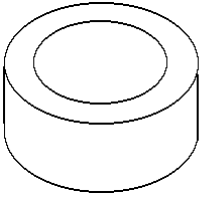
PIPETTOR ACCESSORIES

Diluent Bottle Racks

Appropriate diluents are placed in positions marked D1 and D2 in the Diluent Bottle Rack. Positions are assigned appropriately relative to the assay protocol being run.



D1/D2 Diluent Bottle Rack



D1 and D2 Diluent Bottle Rack Insert

Figure 2-6. Diluent Bottle Racks

Tip Racks

Tip Racks hold disposable tips for the Pipettor. They are located to the rear of the Pipetting Platform.

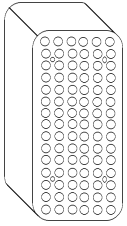


Figure 2-7. Tip Rack

Sample Tube Rack

The COMMANDER® FPC is designed to dispense a sample from tubes in a Sample Tube Rack. The Sample Tube Rack holds sample tubes from 12 mm to 16 mm in diameter and 75 mm to 100 mm in height. Tube positions are labeled A1 through M5.

Racks are factory ordered to hold one of two of the following tube sizes:

- 12 mm to 13 mm diameter tubes
- 14 mm to 16 mm diameter tubes

The Sample Tube Rack can also be replaced with the Tray Platform Extender. This allows the operator to use an Abbott 20-well, Abbott 60-well, Library Rack, or a Microtiter Plate as the sample source.

The Sample Tube Rack is placed on the left side of the Sample Tube Rack/Tray Platform, parallel to the Reaction Trays, and is the source for all pipetting. Controls and/or standards may also be placed in the Sample Rack based on user requirements.

The pipette tip locations of 20-well and 60-well Abbott Assay Trays have been pre-programmed in the FPC for use with Abbott Diagnostic Test Kits. The assay trays are placed in the four positions of the FPC Sample Rack/Tray Platform. The tray for Assay 1 is placed in position 1 as marked on the platform. The remainder of the trays are similarly placed into position.

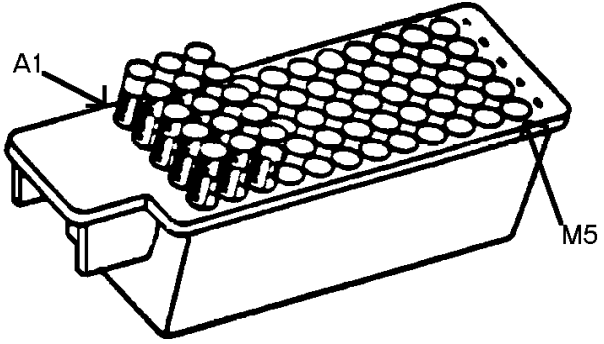


Figure 2-8. Sample Tube Rack

Sample and Diluent Syringes

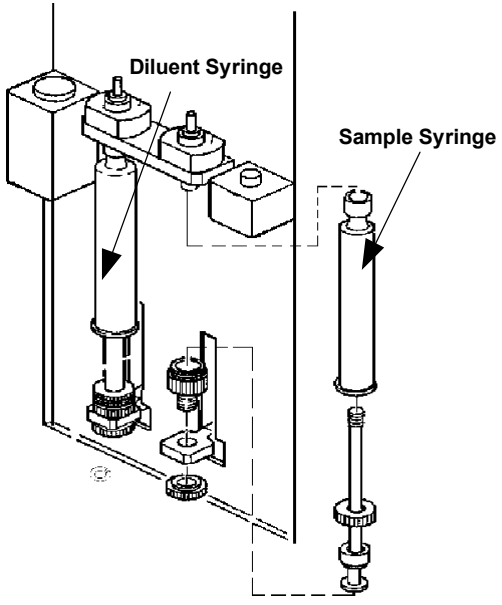


Figure 2-9. Syringes

Control Bottles

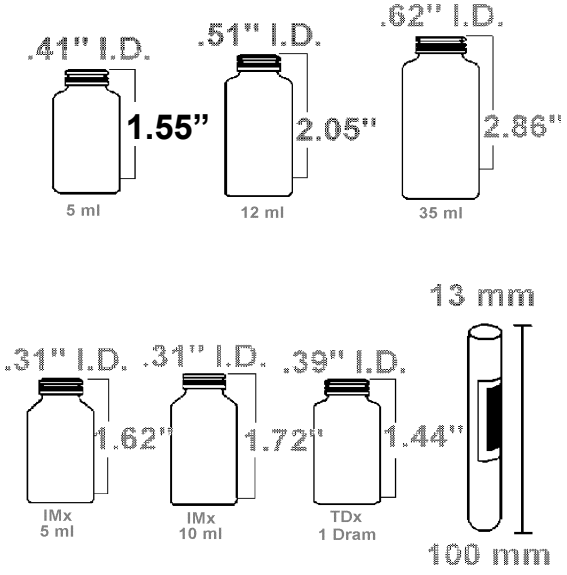
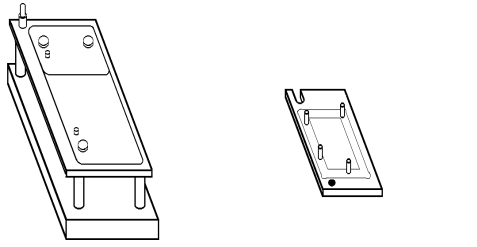


Figure 2-10. Control Bottles

Tray and Microtiter Adapters

Tray Adapters are used to adapt 20-well or 60-well trays. The Microtiter Adapter is used to adapt any of the tray locations to Microtiter Trays or Library Racks.

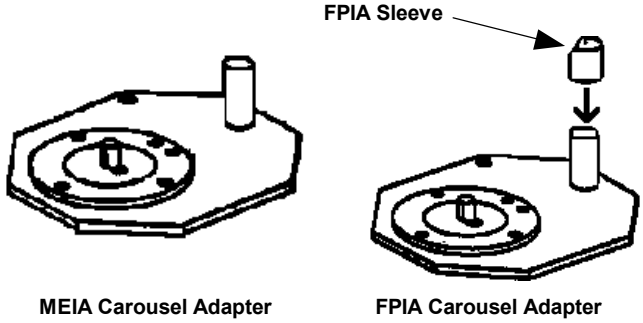


Tray Adapter **Microtiter Adapter**

Figure 2-11. Tray Adapter and Microtiter Adapter

MEIA and FPIA Carousel Adapters

Carousel Adapters are used to adapt to MEIA and FPIA Carousels.



MEIA Carousel Adapter **FPIA Carousel Adapter**

Figure 2-12. MEIA and FPIA Carousel Adapters

COMPUTER SYSTEM

The computer portion of the FPC makes primary use of the function keys and the numeric keypad of the Keyboard to simplify operation. Only function keys F1 through F8 are used by the system and are displayed on Monitor screen as they are activated for use for specific tasks by the software. Keys F1 and F2 are dedicated to "System" and "Print", respectively.

COMPUTER SYSTEM COMPONENTS

- Computer
- Keyboard
- Monitor
- Printer

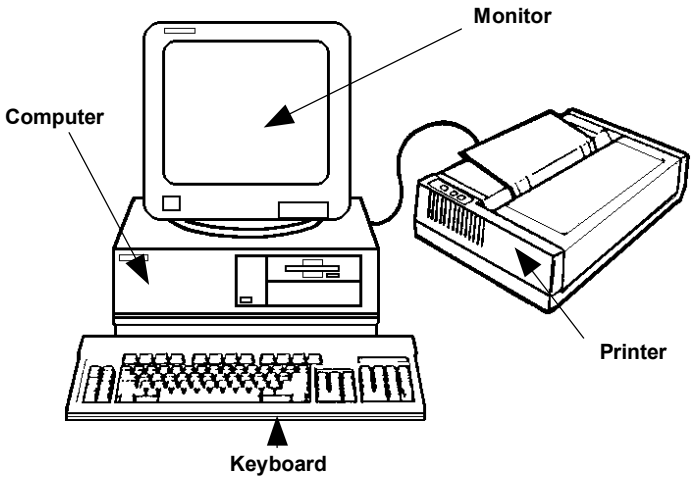


Figure 2-13. Computer System Components

PIPETTOR SPECIFICATIONS

Pipettor Dimensions

Height	24.0 in. (61.0 cm)
Width	34.0 in. (86.5 cm)
Depth	30.5 in. (77.5 cm)
Weight	242 lb. (110 kg)

Sensor Module Dimensions

Height	3.9 in. (9.8 cm)
Width	6.7 in. (17.0 cm)
Depth	15.3 in. (38.9 cm)
Weight	5 lb. (2.3 kg)

Electrical Requirements

Line Voltage	100/120/220/240 VAC ± 10% 50/60 Hz
Power Consumption	Less than 400 VA (startup)
Fuses	6.25A Fuse for 100/120 VAC Operation
	3.15A Fuse for 220/240 VAC Operation

Data Communication Characteristics

Baud Rate	300, 600, 1200, 2400, 4800, or 9600
Parity	Odd, Even, or None
Bits Per Character	Seven or Eight

Pipettor Operating Temperature and Humidity

Temperature	15 to 30 °C
Humidity (Relative)	15% to 85% RH at 25 °C (Non-Condensing)

COMPUTER SPECIFICATIONS

Note:
The following dimensional specifications may vary depending upon the computed brand or style installed with the system.

Computer Dimensions

Without Keyboard or Monitor

Height	6.7 in. (17.0 cm)
Width	16.7 in. (42.5 cm)
Depth	15.4 in. (39.0 cm)
Weight	33 lb. (15 kg)

Monitor Dimensions

Height	13.0 in. (33.0 cm)
Width	13.0 in. (33.0 cm)
Depth	13.0 in. (33.0 cm)
Weight	19.5 lb. (8.8 kg)

Keyboard Dimensions

Height	Flat Position - 1.4 in. (3.5 cm)
	Standing Position - 2.2 in. (5.6 cm)
Width	18.4 in. (46.7 cm)
Depth	7.8 in. (19.8 cm)

Electrical Requirements

Line Voltage	100/120/220/240 VAC ± 10% 50/60 Hz
Power Consumption	Less than 500 VA

PRINTER

Physical Dimensions

Height (with paper guide)	4.0 in. (10.2 cm)
Width	11.5 in. (29.2 cm)
Depth	8.0 in. (20.3 cm)

Electrical Requirements

Line Voltage	100/120/220/240 VAC ±10% 50/60 Hz
Power Consumption	Less than 20 VA

Notes