

FORENSIC CYANOACRYLATE CABINET

Model: FCC171D

USER'S GUIDE

Version: 1.2

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Carter-Scott Design
16 Wilson Avenue
Brunswick
Victoria 3056
Australia

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www.carterscott.com.au csd@carterscott.com.au
Fax: +61-3-9388 9822 Phone: +61-3-9388 9811

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1. Introduction

This User's Guide outlines the features and operation of the Model FCC171D. Forensic Cyanoacrylate Cabinet ("FCC"). The FCC (171 series) replaces the FCC (161 series) which was originally introduced in 1992.

Since the late 1970's it has been known that cyanoacrylate ester ("superglue") fumes can be used for the development of latent fingerprints. The FCC provides a secure chamber to safely control and accelerate this technique.

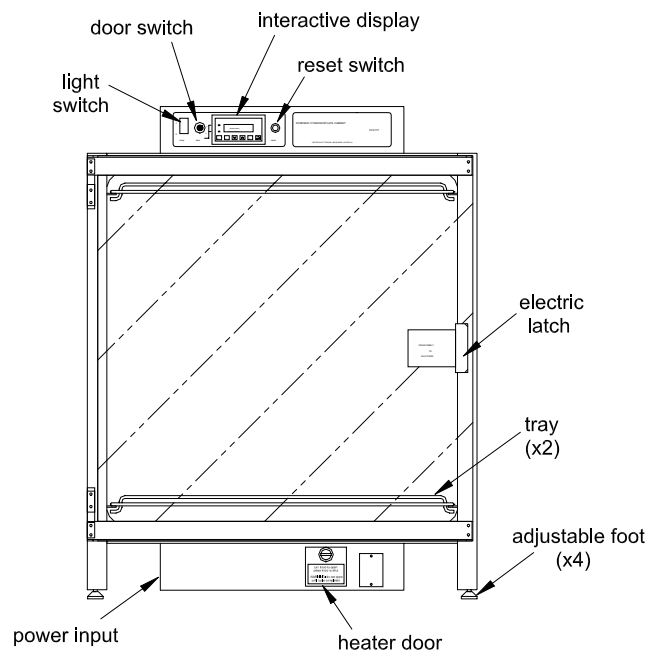
The FCC comprises a sealed aluminium tank with glass sides and a glass door. The tank has two specimen shelves and an overhead lamp. A control box sits above the tank, and a heating unit sits below the tank. The operation of the FCC is under microprocessor control with an interactive display giving clear user prompts.

The heating unit runs at low voltage and its temperature is under closed-loop control to provide a steady evaporation temperature. This temperature is factory set to always be safely less than the temperature (approximately 210°C) at which cyanide fumes may develop. There are separate low voltage fans for fume circulation (gentle) and for fume extraction (high flow).

Various safety interlocks are monitored by the microprocessor, to reduce the possibility of inadvertent exposure to irritating fumes. For example the unit will not function if the tank door is left ajar. The control also monitors for system malfunction, such as a jammed vent flap, in which case the operation is frozen and the User informed via the interactive display.

2. Description of Instrument

The diagram below shows the main parts of the FCC. Technical specifications are listed in Appendix A.



3. Operation

3.1 Initial Setup

Unpack the FCC and place on a convenient bench. If the bench is not level and flat then adjust the four feet so the FCC stands securely. The two specimen trays are packed external to the tank.

Connect the FCC exhaust outlet tube to a suitable external vent. The outlet tube is at the top rear and accommodates 76mm inside diameter flexible ducting. The connection must be loose to allow fresh air from the room to be taken in as well. Avoid strong suction from the external exhaust as this may disrupt proper FCC operation.

Connect the unit to mains power and switch on. The FCC will check its status and then the green LED on the interactive display will light up to indicate that the door switch is enabled. Press the door switch with one hand and pull the door open with your other hand.

Before first using the FCC thoroughly wipe clean with methylated spirits (alcohol) all interior surfaces of the fuming cabinet. Thereafter do not touch the interior of the FCC with bare hands as this will cause depletion of cyanoacrylate fumes and produce a build up of solid cyanoacrylate on inner surfaces. Install the two specimen trays.

Read this Guide and complete several test cycles to become familiar with the operation of the FCC.

The lamp may be switched on, during the fuming phase, for inspection purposes only. Keeping the lamp permanently on is not recommended as this may interfere with fingerprint development.

3.2 Safety Notes

Cyanoacrylate ("superglue") is a strong irritant to eyes, and the respiratory tract, and it bonds to skin. The FCC has been designed to reduce as much as is practicable the possibility of any accidental contact, however if superglue does splash into the eyes they must be immediately flooded with copious quantities of water, and medical attention sought. If superglue bonds to the skin it can be removed with acetone.

The heater can become very hot so do not attempt to access the heater until the exhaust/purge phase is complete.

3.3 Control Overview

The FCC171 control cycle consists of three sequential phases: evaporation; fuming; exhaust/purge.

There are six program options for fuming duration, comprising one user selectable option and five pre-sets.

All selections are made by pressing the appropriate function keys/buttons, labeled F1 to F6, on the interactive display.

name	description	initial fume time	fume repeat at 2x previous time
user	operator selects from nine fixed durations	select from: 1, 2, 5, 10, 30min, 1, 2, 5, 8 hr	repeats = 7, for 1, 2, 5 min initial repeats = 5, for 10 & 30 min initial repeats = 1, for 1, 2, 5, 8 hr initial
fresh	for exhibits < 24 hr old	5 min	repeats = 7 (10, 20, 40, 80, 160, 320, 640min)
bknote	for polymer banknotes	1.5 hr	repeats = 0
wet	for exhibits exposed to water or rain	3 hr	repeats = 2 (6 hr, 12 hr)
dry	for exhibits exposed to dry heat, sun, etc	4 hr	repeats = 2 (8 hr, 16 hr)
dust	for exhibits exposed to dust (eg: plastic bags used for drug powder)	4 hr	repeats = 0

Fume times range from 1 minute to 16 hours (960 minutes). Evaporate time is fixed at 8 minutes, and exhaust is fixed at 20 minutes.

At any time during fuming the operator can press the "escape" button to terminate fuming and divert to the exhaust/purge phase.

Where repeat fuming is allowed, a short beep sounds for 60 seconds at the end of fuming. To keep on fuming (at twice the previous duration) the operator must press the "double fume" button during those 60 seconds.

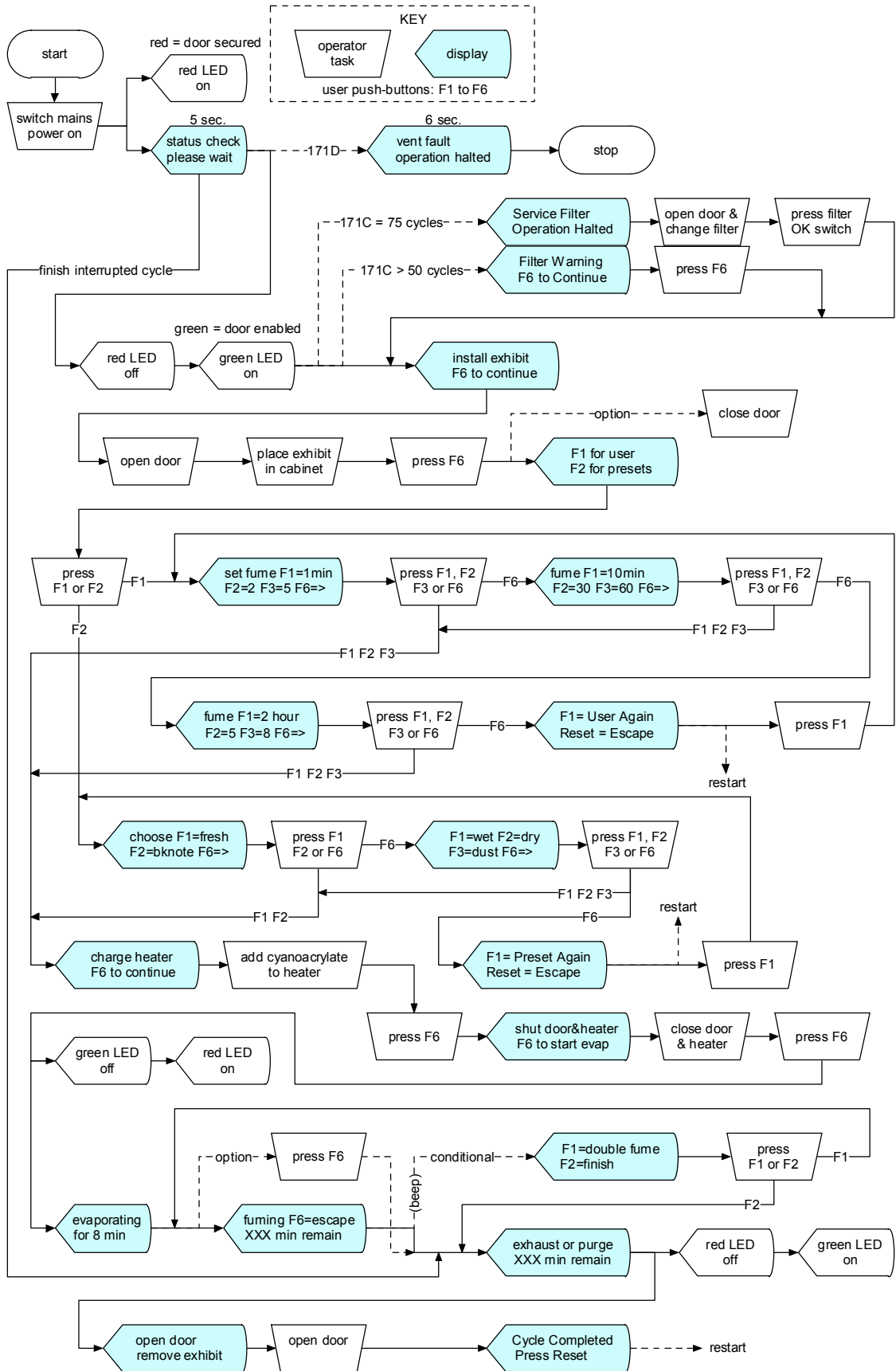
Alternatively the operator can press the "finish" button at any time during the 60 seconds of beeping to divert to the exhaust/purge phase.

The beeping stops as soon as either button is pressed. If no buttons are pressed by the end of the 60 seconds of beeping then the exhaust/purge phase automatically activates.

During evaporate/fuming/exhaust the red LED on the interactive display will light up to indicate that the door switch is disabled and the door can not be opened.

If the FCC is interrupted after evaporation has commenced (eg: by a power failure) it will automatically default to a full 20 min. exhaust when restarted. This default can not be bypassed by the User.

The control structure of the FCC is concisely illustrated in the following flowchart¹:



¹ some functions on this flowchart refer to an alternative FCC model, the 171C version.

3.4 Operation Procedure

1) Switch the unit on. Turn the mains switch on and wait for the status check to finish.

2) Load the cabinet. Press the door switch with one hand and pull the door open with other hand. Load exhibits spacing them throughout the cabinet. In the case of a large bag, squash the bag slightly so it can fit into the cabinet. When all exhibits are loaded firmly push the door shut.

Warning! Do not put **wet** or **oily** exhibits in the cabinet. Wet exhibits must be dried at room temperature first. Oily exhibits will contaminate the cabinet.

3) Select the fume time. Select the fume time according to the state of your exhibits (see Section 3.3). It is a good idea to familiarize yourself with the six available programs prior to first using the FCC.

4) Prepare the evaporation boat. Use the boat press-tool supplied with the FCC to make an aluminium foil evaporation boat for the hotplate. See Appendix B.

Warning! Never place cyanoacrylate directly on the evaporation hotplate. Cyanoacrylate residue on the hotplate will prevent good thermal contact with the foil boat and result in poor cyanoacrylate evaporation and thus hamper good fingerprint development.

5) Charge with Cyanoacrylate. Unlock the heater door by turning the knob clockwise, then gently pull the evaporation unit out. Place pre-made evaporation boat in the hotplate recess ensuring good contact to the bottom. Charge the boat with 12-20 drops of cyanoacrylate depending on exhibits load (Loctite 406 is recommended²). Gently push the evaporation unit in, then press the knob firmly to secure the door.

Note: there is a spring resistance on the final 25mm of evaporation unit travel.

6) Start the cycle. Select and press the relevant function key to start the cycle. The FCC will automatically sequence through evaporation-fuming-exhaust.

Note: Inspect the state of fingerprint development during the fuming phase. If strong development is evident, or if any sign of background development occurs, then press the "escape" key to finish the cycle. If development is not adequate then double the fuming time (if allowed). The FCC will automatically start the exhaust phase (20 min.) when fuming is completed. The door cannot be opened until the exhaust phase has completely elapsed.

7. Enable the next cycle. Press-hold the "reset" button for several seconds. This will interrupt power to the controller and reset it.

² or equivalent cyanoacrylate with a viscosity of 20mPa.s

4 Maintenance

4.1 Lamp Replacement

- Unplug the unit from mains power.
- Remove the control box from the top of the tank (nine screws inside tank roof).
- Replace the faulty lamp with a dichroic bulb GU5.3, 50W, 12V, wide flood.
- Reassemble the control box.

4.2 Fuses

Dual 5A slo-blo fuses are housed in a fuse drawer in the mains power input module.

A thermal fuse (228°C) protects the heater. This fuse is accessed by removing the shroud that is secured to the hotplate with security screws. This procedure should only be undertaken by authorized service personnel.

4.3 General Faults

The FCC is modular in construction, so the correction of mechanical or electronic faults usually entails the replacement or adjustment of the appropriate sub-assembly. Only qualified personnel should attempt to repair the instrument, otherwise it is recommended that a faulty FCC be returned to the distributor or manufacturer for repair.

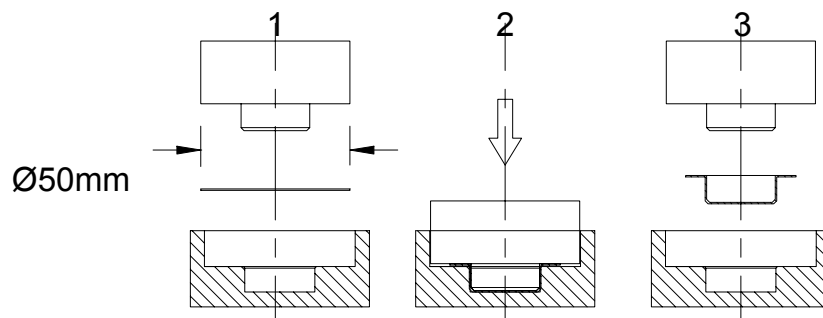
Appendix A

Technical Specification for Model FCC171D

evaporate phase	fixed, 8 minutes (automatically continues to fuming)
fuming phase	selectable, 1 minute to 16 hours can be extended or terminated (automatically continues to exhaust/purge)
exhaust/purge phase	fixed, 20 minutes; 40m ³ /hr max. flow rate
door lock	'fail locked' electric latch (door remains locked until exhaust complete)
door lock override	external connector for manual access ³
display	interactive 32-character alphanumeric LCD
keypad	key assignment interactive with display
preset program selections	five typical development selections
mains power	240VAC/50Hz or 110VAC/60Hz
cabinet construction	anodized aluminium & laminated glass
shelf	two chrome plated steel wire trays (self-supporting when partially removed)
internal working dimensions	780W x 640D x 780H mm. 1275mm diagonal. volume = 0.39 m ²
external dimensions & weight	800W x 690D x 1010H mm, 55kg

Appendix B. Hotplate Boat

Make evaporation boat for hotplate with the special press-tool supplied with the FCC.



- 1) Cut aluminium foil⁴ to 50mm diameter (this is the same diameter as the Plunger of the press-tool).
- 2) Place the foil into the Ring and press the Plunger fully in.
- 3) Withdraw the Plunger and place the foil boat into the FCC hotplate.

³ consult authorized service personnel.

⁴ use aluminium "kitchen" foil or similar.

4) Appendix C

Temperature Adjustment

The heater temperature is factory set but can be adjusted by authorized service personnel. The adjustment is accessed through an opening beside the heater door. This opening is fastened with security screws to hinder unauthorized access.

APPENDIX D

Warranty

Carter-Scott Design warrants this product to be free from any defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which, under normal use, and service disclose such defect, provided the unit is delivered to our factory intact for our examination with all the transportation charges prepaid, within one (1) year from the date of delivery to the purchaser, and providing that such an examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside our factory, nor to units used with accessories not manufactured or recommended by us.

This warranty is in lieu of all other warranties or liabilities and Carter-Scott Design makes no other warranty, expressed or implied. In no event will Carter-Scott Design be liable for consequential or resulting loss or damage, whether or not due to causes covered by this warranty.