

Pre-Installed Temperature Protocols

PreProgrammed temperature controllers use an internal memory chip which is pre-installed with protocol information required to run FREEZE CONTROL® systems. The **CL5500** and **CL2200** are preprogrammed temperature controllers. The user-programmable **CL8800** controller may also be preprogrammed.

Pre-installed protocols are always available and cannot be changed by the end user. A new chip, however can be ordered at a later date and supplied with instructions for installation.



Each internal Protocol stored on a memory chip is assigned a Program Number or Letter. The listing and graphs for each protocol on the chip are provided at the back of the systems user guide.

Temperature Protocols specify the freezing curve for a given specimen. A protocol contains a series of steps (see over) that are executed sequentially by the temperature controller.

Examples of Protocols that may be present on a memory chip installed inside a temperature controller are shown below.

FREEZE CONTROL® Programs by **CryoLogic**
Chip Name: FCBOVIN.ROM For Model **CL5500**

Rate (°C/min)	Target Temp (°C)	Hold Time (min)
Program 0: <i>Ethylene Glycol 1</i>		
0.00	- 7.0	10.0
0.60	- 35.0	0.0
Program 1: <i>Ethylene Glycol 2</i>		
0.00	- 6.0	10.0
0.50	- 32.0	0.0
Program 2: <i>Ethylene Glycol 3</i>		
4.00	- 7.0	10.0
0.60	- 35.0	0.0
Program 3: <i>Ethylene Glycol 4</i>		
3.00	- 6.0	10.0
0.50	- 32.0	0.0
Program 4: <i>Glycerol</i>		
0.00	- 6.0	10.0
0.30	- 30.0	0.0
0.10	- 33.0	0.0

Key Facts for Preprogrammed Chips

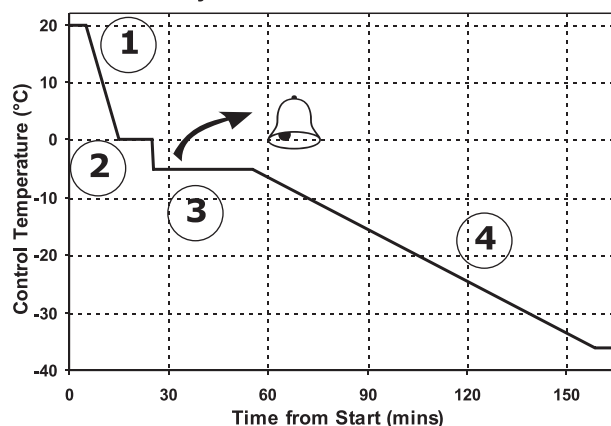
- Customers preferably supply their own Protocols
- Proprietary customer protocols are the property of the customer and remain confidential
- Protocol details are specified when ordering a new system
- New protocols can be ordered at any time after purchasing a system. New protocols are supplied on another program chip and can be easily installed

Pre-Installed Temperature Protocols

Temperature protocols on a memory chip contain the following elements:

- 1 Starting Temperature**
The temperature at which specimens are loaded into the cryochamber.
- 2 Ramp Step**
This includes the rate and target temperature. It specifies the constant rate of change in the temperature between the last temperature and the target temperature. Cooling rate depends on the specifications of the particular cryochamber used.
- 3 Hold Time**
Length of time specimens will be held at the last temperature before the next step begins.
- 4 Final State**
Specifies the temperature at the end of the protocol.
Hold State- Temperature is held indefinitely at the last temperature.
FreeFall- Temperature falls towards liquid nitrogen temperature at the maximum cooling rate of the cryochamber.

PROGRAM 7: Oocyte



Bell Signals

For **CL8800** models audible signals may be turned on at predetermined points during the protocol to be notified that a stage of a protocol has been reached during execution.

Custom Protocol Chip

Number of Protocols	Order Code
4 Protocols	CEP4
8 Protocols	CEP8
16 Protocols	CEP16