Innova™ CO-48
RS232 Interface

The RS232 Interface connects the incubator to a personal computer or terminal. This allows the incubator to be programmed remotely, and incubator status to be viewed on a remote screen.

In addition to the incubator you will need:
a)   A PC or terminal capable of RS232 communication, with 1 serial (COM) port free.
b)   A "Null-modem" screened cable of suitable length (see note regarding mains connection below). To ensure reliable communication the cable must not be more than 15 metres long. Each end must have a 9-pin female "D" connector to connect the incubator to a PC or terminal.
c)   Suitable communications software such as Terminal or HyperTerminal included with Microsoft Windows.

To avoid earth loop problems the computer should be connected to the mains as close as possible to the incubator.

1.1   Connect one end of the Null-modem cable to the 9-pin male "D" connector at the rear of the incubator. Connect the other end to *either* the 25-pin *male* "D" connector, *or* the 9-pin male "D" connector of the PC or terminal. *Do not connect both!* Switch on the PC or terminal and start the communications software. The incubator requires these settings in the communications software –

Baud Rate	19200 bits / second
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Hardware (some cables may require it to be "None")

Before communications between the PC or terminal and the incubator can be established, an unused serial port is required. If you know which serial port is unused, the next step can be skipped. To locate an unused serial port - using the communications software, select a serial port (COM1, COM2, COM3 etc.) and press the ENTER (↵) key on the PC keyboard. If the serial port is unused, "Type '?' for help" should appear on the computer screen. If any other messages appear, or if nothing happens, select the next serial port and repeat the procedure. If the correct message still does not appear, change the "Flow Control" setting from "Hardware" to "None" and repeat the procedure.

1.2   When a connection between incubator and PC or terminal has been established, type a "?" in the communications software, then press the ENTER (↵) key. The following Menu should appear on the PC or terminal screen:-

```
[Galaxy R Incubator Command Help]
PTnn.n    (P)rogram (T)emperature to nn.n degrees
PCnn.n    (P)rogram (C)O2         to nn.n percent
PATHnn.n  (P)rogram (A)larm (T)emperature (H)igh to nn.n degrees
PATLnn.n  (P)rogram (A)larm (T)emperature (L)ow  to nn.n degrees
PACHnn.n  (P)rogram (A)larm (C)O2          (H)igh to nn.n percent
PACLnn.n  (P)rogram (A)larm (C)O2          (L)ow  to nn.n percent
LD        (L)ist (D)atalogger
LDT       (L)ist (D)atalogger (T)emperature alarms
LDC       (L)ist (D)atalogger (C)O2 alarms
LDP       (L)ist (D)atalogger (P)ower on/off events
S         (S)tatus report
SInn.nn   (S)tatus report at (I)nterval nn.nn (mins.secs)
V         (V)ersion number report
?         (?) Gives this help screen
```

1.3 If any alarms or certain events occur, one of the following messages will be displayed:

[ALARM] TEMPERATURE LOW

[ALARM] TEMPERATURE HIGH

[ALARM] CO2 LOW

[ALARM] CO2 HIGH

[ALARM] TEMPERATURE SENSOR FAILURE

[DOOR EVENT] DOOR OPENED

[DOOR EVENT] DOOR CLOSED

[AUTOZERO EVENT] PROG CO2 A/Z COMPLETED OK

[ALARM] PROG CO2 A/Z SYSTEM INOPERATIVE

After displaying one of the messages above, a normal 'status message' will be displayed like this:-

eg:

[DOOR EVENT] DOOR OPENED
Temperature: Actual 37.0° Setpoint 37.0°
CO2:   Actual 00.1% Setpoint 05.0%
Date Time: 12/04/2001   10:20:42

1.4 The Menu shown on the previous page allows the incubator temperature, CO_2, and alarm set points to be programmed remotely. The Datalogger can also be interrogated and status reports generated. A "running status" report can be generated at user-defined intervals. All reports can be sent to a printer for hard-copy. For further information, refer to the documentation supplied with your communications software.

1.5 Remote Programming. All commands beginning with P can be used to program the incubator from the remote PC or terminal. NB – the commands are not case sensitive, and lower case letters will work in exactly the same way. Examples of how each command might be used are shown below. In each case, the change is confirmed by a message from the incubator e.g. – "Program Temperature 37.5°C OK", "Program Alarm Temperature High 38.0°C OK" etc.

PTnn.n   (P)rogram new (T)emperature set point. Typing "PT37.5" and pressing ENTER (↵) would re-program the incubator to 37.5°C.

PCnn.n   (P)rogram new (C)O_2 level. Typing "PC04.0" and pressing ENTER (↵) would re-program the incubator to 4% CO_2.

PATHnn.n   (P)rogram new (A)larm (T)emperature (H)igh. Typing "PATH38.0" and pressing ENTER (↵) would re-program the incubator alarm high set point to 38.0°C.

PATLnn.n   (P)rogram new (A)larm (T)emperature (L)ow. Typing "PATL36.0" and pressing ENTER (↵) would re-program the incubator alarm low set point to 36.0°C.

PACHnn.n   (P)rogram new (A)larm (C)O_2 level (H)igh. Typing "PACH05.5" and pressing ENTER (↵) would re-program the incubator CO_2 alarm high set point to 5.5%.

PACLnn.n   (P)rogram new (A)larm (C)O_2 level (L)ow. Typing "PACL04.5" and pressing ENTER (↵) would re-program the incubator CO_2 alarm low set point to 4.5%.

1.6 Listing Commands. All commands beginning with L can be used to interrogate the incubator from the remote PC or terminal. NB – the commands are not case sensitive, and

lower case letters will work in exactly the same way. Examples of how each command might be used and sample screens are shown on the next page.

LD   (L)ist (D)atalogger. Typing "LD" and pressing ENTER (↵) will show the contents of the Datalogger, most recent events first:-

          List Datalogger All Alarms
31/08   10:20   CO2 HIGH   05.5 PROG: 05.0
30/08   9:55   POWER ON
29/08   10:00   TEMPERATURE HIGH 38.0 PROG: 37.0
Press "ENTER" to continue, "ESC" to abort

When the end is reached, the screen displays "No more records available"

LDT   (L)ist (D)atalogger (T)emperature alarms. Typing "LDT" and pressing ENTER (↵) will display only temperature alarms in a similar manner to LD above.

LDC   (L)ist (D)atalogger (C)O$_2$ level alarms. Typing "LDC" and pressing ENTER (↵) will display only CO$_2$ level alarms recorded by the Datalogger, most recent events first:-

          List Datalogger CO$_2$ Alarms
31/08   10:21   CO2 HIGH 06.0 PROG: 05.0
31/08   9:54   CO2 LOW 04.0 PROG: 05.0
Press "ENTER" to continue, "ESC" to abort

When the end is reached, the screen displays "No more records available"

LDP   (L)ist (D)atalogger (P)ower on / off events. Typing "LDP" and pressing ENTER (↵) will show only power on / off events recorded by the Datalogger, most recent events first:-

          List Datalogger Power Events
30/08   10:00   POWER ON
30/08   9:55   POWER OFF
Press "ENTER" to continue, "ESC" to abort

When the end is reached, the screen displays "No more records available"

1.7   Status Commands. All commands beginning with S can be used to interrogate the incubator from the remote PC or terminal and display the current status of the incubator. NB – the commands are not case sensitive, and lower case letters will work in exactly the same way. Examples of how each command might be used and sample screens are shown below.

S   (S)tatus report. Typing "S" and pressing ENTER (↵) will display a current status report:-

Date Time: 31/08/1999   10:20:42
Temperature: Actual 37.0°C   Setpoint 37.0°C
CO2:   Actual 05.0%   Setpoint 05.0%

SInn.nn   (S)tatus report at (I)nterval of n minutes, n seconds. Typing "SI60.00" and pressing ENTER (↵) will display a current status report as shown above every hour:-

Status report at interval 60.00 will be given
Press "Enter" or "ESC" to stop reports

V   (V)ersion number report. Typing "V" and pressing ENTER (↵) will display the firmware version report:-

Innova Serial ####: AA1908991337 BA2112041223
(c) RS Biotech 1998-2004

?   (?) Help. Typing "?" and pressing ENTER (↵) will return to the initial screen.
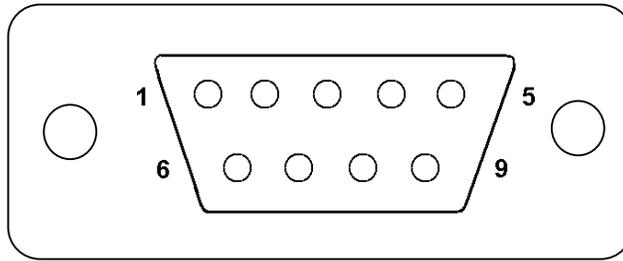
This is a female connector viewed from the soldering side

6W screened cable with 9 way D-type female connectors (null modem)

This procedure allows the wiring of an RS232 cable for connection of an NBS incubator to a personal computer (null modem).

Connections used are 9 way D-type female connectors and 6W screened cable.
(see parts list)

INCUBATOR SIDE	WIRE COLOUR
1	
2	RED
3	BLUE
4	GREEN
5	YELLOW*
6	
7	WHITE
8	BLACK
9	

PC SIDE	WIRE COLOUR
1 & 6	GREEN
2	BLUE
3	RED
4	
5	YELLOW & SCREEN*
7	BLACK
8	WHITE
9	

*NOTE: Screen of cable is connected to pin 5 at computer end only.