Model 6202-1

Reduced Oxygen Breathing Device 2

Administrator/Programming mode addendum

ADMINISTRATIVE MODE   (ADMIN mode)

The Administrative mode is a limited access mode and is password protected. Access to this mode allows for changing program information, calibration data, and accessing troubleshooting features. Factory set password is 1234, which can be changed in the system menu, once ADMIN mode is activcated.

When the system is in the normal operator's mode (READY screen), the only two menu items, as seen on the bottom line of the display, are START and OPTION. When the system is in the ADMIN mode, a secondary menu appears in the READY screen. The two menu selections are Program (PROG) and System. Toggle back and forth between the operator's menu and the Admin menu by pressing the MENU key.

Each time the instrument is powered off and on, and the self-tests are run, the system automatically enters the operator's menu. To enter the ADMIN mode, perform the following:

1. From the ready screen or operator's menu (shown below), select OPTION (F3).

```
(DAY)   (DATE)    (TIME)
   ENVIRONICS ROBD2
        READY
START            OPTION
```

2. Arrow down to ADMIN mode and press ENTER.

3. Enter the 4 digit numeric password, factory default 1234. This password can be changed once in the ADMIN mode.

4. Once the 4 digit password has been entered, the screen will display ADMIN MODE ENABLED and automatically. Once exited from the options menu, the display will appear in the ADMIN mode, see below.

```
(DAY)   (DATE)    (TIME)
   ENVIRONICS ROBD2
        READY    ADMIN
START            OPTION
```

Once in the ADMIN mode, access is granted to two other menu items. Press the MENU key to display the following screen.

```
(DAY)   (DATE)    (TIME)
   ENVIRONICS ROBD2
           READY   ADMIN
PROG              SYSTEM
```

Programming the instrument (PROG mode)

The program mode is used to create a sequence of up to 99 steps, which later run automatically when selected in the RUNPRG mode. The RUNPRG mode is part of the PILOT TEST menu within the START menu. The system can store up to 20 programs with up to 99 steps each.

Each step can be programmed as either a HOLD or CHANGE step. For a HOLD step, the system will hold at the specified altitude for the specified amount of time, up to 60 minutes in 1 minute increments, and produce the equivalent oxygen content for that altitude. When programming two HOLD steps in a row, the system jumps instantaneously from one altitude to another. To program a hold step for more than 60 minutes, simply insert a second hold step at the same altitude. For a change step, the system decreases or increases the equivalent 02 content, at the specified ascent or descent rate. Using this information, the system determines total step run time for display purposes in the RUN mode.

For a HOLD step, the user must specify the altitude and hold time in minutes orseconds, depending upon how the altitude setup information is set in the system mode.

For a change step, the user must specify the new altitude and rate of change; FT/MIN or FT/SEC, depending upon how the altitude setup information is set in the system mode. If a change step is specified as the first step in a program, the system assumes starting at sea level.

Perform the following steps to enter a program of altitudes.

1. Select PROG (F1)

2. A right pointing arrow in the farthest left column will align with the last program number run.

3. To create a new program or to select a program to edit, arrow up or down to the program number (1-20) and select EDIT (F1).

4. To create or edit the program name, use the up and down arrow keys to select the letters/numbers/characters and the right and left arrow keys to select the character position within the program name. Each program can have up to 11 characters, including spaces.

5. Press **ENTER** to accept the program name or leave the preexisting program name unchanged.

6. When on the row for a program step, the step can either be deleted or a new step can be inserted. Pressing the right arrow key will bring up the edit menu to select hold or change selections. After selecting the hold or change step and altitude, pressing the right arrow key will advance the cursor to the time/rate column. Exiting will automatically save the program.

SAMPLE SCREEN IN PROGRAM MODE:
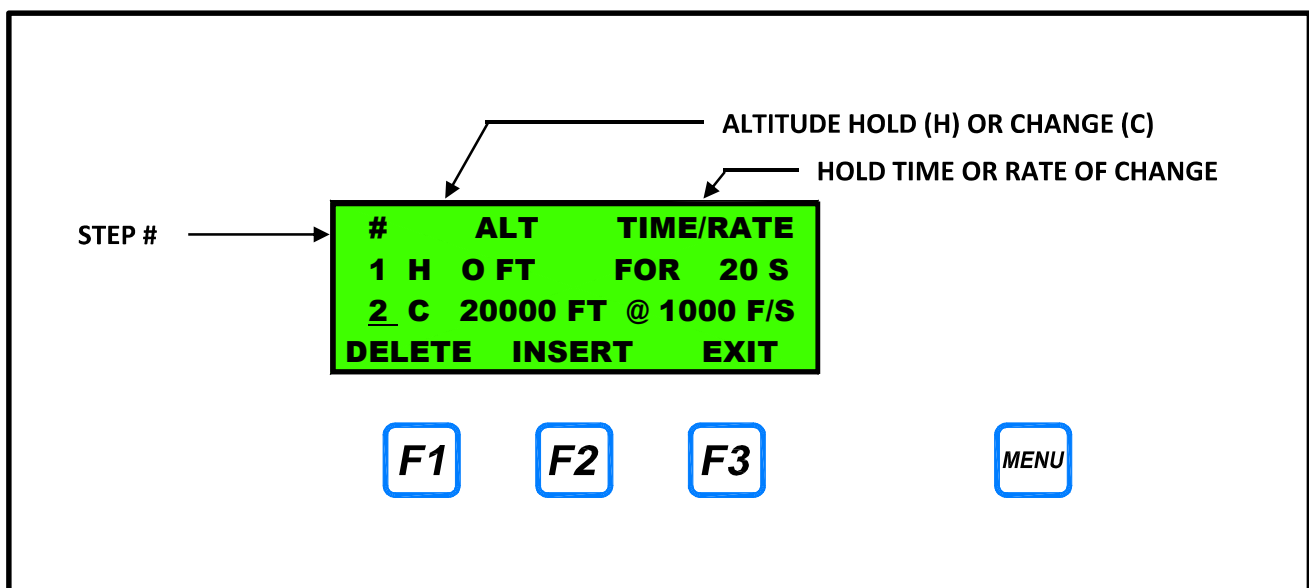
REMOTE COMMUNICATIONS

The system has a remote communications port, which allows it to be controlled remotely by a host computer. The host computer communicates with the system through the RS232 port located on the rear panel.

The system will respond to commands issued by the host computer, but will not issue any unsolicited messages to the host, except to acknowledge a command or to return an error code.

Interface Specification

The communication interface is a standard RS-232C serial interface, connected via a Male DB-9 connector. The system operates as a DTE (Data Terminal Equipment) device, requiring a null modem cable to connect to a PC

Communication port parameters are: 1 Start bit, 8 data bits, 1 Stop bit, No parity bit. The speed of the communications port is fixed at 9600 baud.

Data Format

All remote communications use standard ASCII characters. Commands are terminated with either (or both) of these single byte ASCII codes:

> **<CR> Carriage Return   (ASCII Code 0x0D)**
>   This is used to indicate the end of a command.

> **<LF> Linefeed   (ASCII Code 0x0A)**
>   This is used to indicate the end of a command.

Command Format

Commands sent to the system must be formatted a follows:

> COMMAND FORMAT: **COMMAND <CR><LF>**

The system recognizes the end of the command when it sees a <CR> and/or <LF> character. Commands are not case sensitive.

For each command sent, be sure to wait for a valid response from the system before sending a new command.

Reply Format

All replies from the system to the host computer will be formatted with one of three formats shown, depending on the type of response required.

COMMAND ACCEPTED   If the command received requires no data to be returned, the system will acknowledge that it successfully received and performed the command. This will be indicated by:

     RESPONSE: **OK**<CR><LF>

DATA RETURNED   For commands that require data to be returned, the data will be formatted as follows. If the data consists of a list of values, each value will be separated with a comma.

     RESPONSE: data<CR><LF>

     EXAMPLE: 5000.0<CR><LF>

ERROR RETURNED   If the command received contains errors, or cannot be performed by the system, an error code will be returned. The error message is formatted as:

     RESPONSE: **ERR**(error code)<CR><LF>

     EXAMPLE: ERR12<CR><LF>

Format Of Numeric Data

All numerical values for physical parameters such as Altitude, Pressure, etc. are formatted as floating point values. These values are indicated by the format **"x.xxx"**

Whole number values (for specifying program step, etc.) must be specified without a decimal point. These values are indicated by the format **"n"**

Remote Command List

ROBD2 PROGRAMMING COMMANDS

These commands are used to set up and review the ROBD2 program steps. A total of 20 programs can be created, each with up to 99 steps.

COMMAND   DESCRIPTION

`PROG` n `NAME` progname   **Assign program name**

`PROG` n `NAME` **?**   **Get name of program**

Command parameters:
n   =   Program # (1-20)
progname =   Name of program (10 characters max.)

_____

`PROG` n s mode alt value   **Create a program step**.

`PROG` n s **?**   **Display program step parameters**.

Data is returned as: mode   alt   value

Command parameters:
n   =   Program # (1-20)
s   =   Step # (1-98)
                    (Step 99 is always END and cannot be changed)
mode   =   HLD (hold), CHG (change), or END (end of program)
alt   =   Target Altitude (in feet)
value   =   Hold Time (in minutes) for a HLD step, -or-
                    Rate Of Change (in ft/min) for CHG step.

ROBD2 OPERATING COMMANDS

These commands are used to control the ROBD2.

COMMAND   DESCRIPTION

`RUN READY`   **Enter PILOT TEST mode**

Put software into the Pilot Test mode. Equivalent to pushing
START from the Main Menu.

`RUN EXIT`   **Exit PILOT TEST mode**

Exit from the Pilot Test mode. Equivalent to pushing EXIT
from the Pilot Test Menu.

The following RUN commands require the software to be in the Pilot Test mode

`RUN n`   **Run the specified program**

n = program # to run (from 1 to 20)

`RUN NEXT`   **Advance to next program step**

While running a program, this advances the program to the
next step. This is equivalent to pressing the ADVANCE key
from the front panel.

`RUN ABORT`   **Abort current test**

Abort the current program or test, and return to the Pilot Test
menu.

`SET O2DUMP n`   **Set the Oxygen Dump state.**

n=1, turns the Oxygen Dump ON
n=0, turns the Oxygen Dump OFF.

This command has the same effect as pressing/releasing the
O_2 Dump switch on the front panel.

`RUN O2FAIL`   **Activate O2 Failure condition**

This command initiates an O2 FAIL operation. This is
equivalent to pressing the O2FAIL button while a program is
running. Refer to the RUN PROGRAM section of the manual
for more information.

ROBD2 STATUS COMMANDS

These commands are used to get ROBD2 status information.

> NOTE: SpO2 and Pulse data is valid only after entering PILOT TEST MODE
>   Altitude and Elapsed/Remaining Time are valid only while running a Program

COMMAND   DESCRIPTION

`GET RUN O2CONC`   Get the O_2 Concentration in the breathing loop

`GET RUN BLPRESS`   Get the Breathing Loop Pressure

`GET RUN SPO2`   Get SpO2 reading from Pulse Oximeter

`GET RUN PULSE`   Get Pulse reading from Pulse Oximeter

`GET RUN ALT`   Get the Current Altitude for the current step

`GET RUN FINALALT`   Get the Final Altitude for the current step

`GET RUN ELTIME`   Get the Elapsed Time of the current step

`GET RUN REMTIME`   Get the Remaining Time for the current step

`GET RUN ALL`   Get all run data.   Data format is:

> mm-dd-yy hh-mm-ss, program#, current alt ,final alt, o2conc, breathing loop pressure, elapsed time, remaining time, spo2, pulse<cr><lf>

`GET INFO`   Returns the system model number, software revision and serial number

`GET MFC` n   Get the current flow rate for MFC n

`GET ADC` n   Get the voltage for ADC device n

`GET O2 STATUS`   Get the 100% O2 source status.

                              Returns "1" if the 100% O_2 source pressure is OK.
                              Returns "0" if the 100% O_2 source pressure is LOW,

`GET STATUS`   Returns a 1 if system is not ready (warmup time not expired, low O2 pressure, or self tests not completed)
Returns a 0 if system is ready.

FLIGHT SIMULATOR COMMANDS

These commands are used to put the ROBD2 into Flight Simulator Tracking mode. In this mode, the screen will display FLIGHT SIM TRACKING, and the current altitude, O2 concentration, and breathing loop pressure. No keyboard commands are accepted. This mode is intended to be controlled directly by Flight Simulator software.

COMMAND   DESCRIPTION

RUN FLSIM   Puts the system into Flight Simulator Tracking mode.
                          The "RUN READY" command must be sent before RUN FLSIM

                          To exit from this mode, use the "RUN ABORT" command.

SET FSALT nnnnn   Sets the Flight Sim Altitude to nnnnn feet.
                          Altitude value must be <= 34000.

NOTE: Sending too many SET FSALT commands will return an ERR99, which means the command buffer for the flight simulator mode has overflowed. The software will store the last 5 altitude commands, but it updates the MFCs only once per second, so sending this command more frequently than once per second should be avoided.

When in the Flight Simulator mode, the GET RUN ALL command behaves slightly differently:
- Program # will be 99, to indicate Flight Sim mode.
- Elapsed time will reset to 0 each time a new SET FSALT command is received.
- Remain time will always be 1 second.

DIRECT GAS CONTROL COMMANDS

These commands allow the gas concentration and flow rate of gas to be directly controlled. These commands should not be used while a program is running, or when in Flight Simulator mode.

COMMAND	DESCRIPTION
`RUN GAS xx.xx yyyyy`	Causes the specified concentration of O2 (xx.xx%) to flow at the specified flow rate of yyyyy ccm

The concentration specified must be < 20.94%, unless the system is equipped for hyperoxia operation.

To stop gas from flowing, use the command RUN GAS 0 0

`RUN AIR yyyyy`	Causes air to flow at the specified flow rate of yyyyy ccm
	Acceptable values are from 4000 to 80000 ccm

To stop air from flowing, use the command RUN AIR 0

CONFIGURATION COMMANDS

These commands change/read the configuration and operating parameters of the system. These commands should not be used while a program is running, or when in Flight Simulator mode.

COMMAND	DESCRIPTION
`SET MASKFLOW xxxxx`	Sets the flow rate of gas delivered to the mask, in units of cc/min. Flow rate must be in the range of 40000-80000 ccm This command is equivalent to changing the FLOW RATE in the OPTION - ROBD CONFIG menu
`GET MASKFLOW`	Returns the mask flow rate setting, in units of cc/min.
`SET O2FAILFLOW xxxxx`	Sets the flow rate value to be used during an O2 Failure condition, in units of cc/min. Flow rate must be in the range of 4000-80000 ccm This command is equivalent to changing the O2FAIL FLOW in the OPTION - ROBD CONFIG menu
`GET O2FAILFLOW`	Returns the O2FAIL flow rate setting, in units of cc/min.

<u>Remote Command example:</u>

The following example shows how to program and operate the ROBD2. Commands are shown first with a description of each command. The response from the ROBD2 is shown indented below each command

```
PROG 1 NAME TEST001          Assign name "TEST001" to Program 1
  OK
PROG 1 1 HLD 0 1             Prog 1, Step 1: Hold at 0 feet for 1 min.
  OK
PROG 1 2 CHG 5000 5000       Step 2: Change to 5000 feet at 5000 ft/min.
  OK
PROG 1 3 HLD 5000 2          Step 3: Hold at 5000 feet for 2 min.
  OK
PROG 1 4 CHG 30000 10000     Step 4: Change to 30000 feet at 10000
                                     ft/min.
  OK
PROG 1 5 END                 Step 5: End of program.
  OK
PROG 1 2 ?                   Display Prog 1, Step 2 information.
  CHG 5000 5000              > Change to 5000 ft at 5000 ft/min
GET O2 STATUS                Get status of 100% O2 source
  1                          >  O2 pressure is OK
RUN READY                    Enter Pilot Test mode
                                  (required to run a program)
  OK
RUN 1                        Start running Program 1.
  OK
GET RUN ALL                  Get Status information
  12-31-05 17:55:49,1,0,0,21.04,3.12,3,57,99.2,68
RUN NEXT                     Advance to the next step
  OK
GET RUN ALL                  Get Status information
  12-31-05 17:56:05,1,975,5000,20.98,3.09,9,51,99.2,67
RUN ABORT                    Abort program
  OK
RUN EXIT                     Exit Pilot Test Mode
  OK
```

Remote Error Codes

ERROR	DESCRIPTION
4	**COMMAND OVERFLOW**
	The input command is too long. Commands are limited to 79 characters.
12	**UNKNOWN COMMAND**
	An unknown command was received.
18	**COMMAND ERROR**
	Specified command is recognized but does not match the required format.
19	**TOO MANY TOKENS**
	Command contained too many data elements to be processed.
53	**VALUE OUT OF RANGE**
	One of the specified values is out of range.
60	**UNKNOWN PROGRAM STEP**
	Unknown program step type. Must be HLD, CHG or END
98	**SYSTEM RUNNING**
	Command cannot be processed when system is already running
99	**FLIGHT SIMULATOR COMMAND OVERFLOW**
	Too many SET FSALT commands received. Do not send command faster than once per second.