DRAFT

GEMINI Nitrox

USER MANUAL

English Language – Imperial Units

Version 001

USER INFORMATION

For your information, please fill in the following information

SERIAL NUMBER OF THE TANK UNIT: _____
SERIAL NUMBER OF THE WRIST UNIT: _____
DATE OF PURCHASE: _____
PLACE OF PURCHASE: _____
ADDRESS: _____
CITY: _____
STATE: _____ **ZIP CODE:** _____
PHONE NUMBER: _____

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FIGURES

FIGURES (continued)

FIGURES (continued)

Fig # **Page Number**

Limited Warranty

To the original purchaser (“OWNER”) only, Cochran Undersea Technology, a division of Cochran Consulting, Inc. (“COCHRAN”), represents this Product to be free of defects in both materials and workmanship under normal SCUBA use for 24 months from the date of shipment from COCHRAN to the Authorized Dealer or Distributor. For purposes of establishing warranty eligibility, this date may be noted on the original product box, or can be determined by contacting COCHRAN.

Any defective Product, unless cause is specifically excluded in the “Warranty Conditions and Limitation” section below will at the sole discretion of COCHRAN, be repaired, replaced, or replaced with a new or refurbished unit of comparable or better function and/or condition. COCHRAN is not responsible for any incidental or secondary damages as a result of Product malfunction

WARRANTY LIMITATIONS AND EXCLUSIONS

Product must have been obtained from a COCHRAN Authorized Dealer. Contact COCHRAN for verification of dealer status. This Warranty is not transferable.

The warranty registration card must be sent to COCHRAN within 15 days of the purchase in order to validate Limited Warranty

Failure to provide proper care for this Product will render this Limited Warranty null and void. Damages or malfunction resulting from accidental or deliberate abuse, tampering, battery leakage, exceeding maximum intended operating depth or other parameters, extreme heat or cold, or other conditions that COCHRAN deem to be outside the intended scope of this Limited Warranty are not covered. Plastics, o-rings, batteries, battery life and flooded battery compartments are NOT covered by this Limited Warranty.

OWNER is responsible for shipping this Product to COCHRAN for service, and paying all associated costs, including shipping, insurance, and import duties. OWNER may take Product to an Authorized Dealer to arrange service under terms of this Limited Warranty. COCHRAN will return Product to OWNER or Dealer via a method and carrier of its choosing. Costs for requested expedited return shipping will be the responsibility of OWNER. Product returned for service under terms of this Limited Warranty must be accompanied by a photocopy of the original sales receipt in order for warranty repair or replacement to be performed if the Warranty Registration Card is not on file.

STATEMENT OF LIMITED LIABILITY

A mathematical model is used by this Product to calculate physiological effects of SCUBA diving related to use of compressed air or other breathing mixtures while at depth. Such effects specifically relate to nitrogen absorption into and elimination from body tissues, as well as effects of oxygen used in Enriched Air Nitrox breathing mixtures.

However, because of the number of variables and the varying degrees to which they may affect individuals engaged in SCUBA diving, COCHRAN DOES NOT GUARANTEE THAT USE OF THIS PRODUCT WILL PREVENT DECOMPRESSION SICKNESS OR ANY OTHER CONDITION OR INJURY INCURRED WHILE USING THIS PRODUCT.

These influencing variables may include, but are not limited to, dehydration, obesity, age, old injuries, or other physical conditions on the part of the diver, or environmental extremes of heat or cold, or poor training, or diving practices, any of which may promote the onset of decompression sickness or other harmful effects.

This Product is sold and intended to be used only as a guide, providing the TRAINED and CERTIFIED diver the information needed to make safe diving decisions. It is expressly understood that by buying and/or using this Product the Diver assumes ALL RISK as to its operability, reliability, quality, performance, accuracy, and suitability for his diving style. Furthermore, Diver recognizes that this Product is an electronic instrument being used in a hostile environment and is subject to failure, which may manifest itself in a number of ways. COCHRAN and its distributors and retailers will not be held liable for any personal injuries or other damages resulting from its use, even if COCHRAN has been advised of such occurrences or damages.

These products must be handled with care and properly maintained to assure the optimum performance. Users must possess the proper training for SCUBA diving activities and should be fully educated in the operation of this product. Users are encouraged to possess and utilize a redundant (backup) computer for their dive planning and execution. And divers are always encouraged to dive with a buddy at all times.

COCHRAN strongly supports and agrees with maximum depth limits of 130 feet for recreational SCUBA diving, as established by recognized training and certification agencies, and in no way encourages diving beyond these or any prudent lesser limits as may be necessitated by environmental, diver-specific, or other conditions.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, WHETHER ORAL OR WRITTEN, EXPRESSED OR IMPLIED. COCHRAN UNDERSEA TECHNOLOGY SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT

LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No Cochran Undersea Technology dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Do not allow the **GEMINI Nitrox** to have low or no batteries for any extended period of time! This will cause the date and time stamp of the computer to be inaccurate.

CAUTION!!! LOSS OF BATTERY POWER WILL CAUSE ALL PREVIOUS DIVE NITROGEN LOADING TO BE LOST. THIS MAY AFFECT NITROGEN CALCULATIONS ON NEAR-FUTURE DIVES. AFTER A BATTERY CHANGE, CONFIRM THAT NO-DECOMPRESSION TIME DATA IS REASONABLE DURING PRE-DIVE PREDICTION MODE. DIVE-OF-DAY NUMBER GOING TO ZERO IMMEDIATELY AFTER CHANGING BATTERIES IS ANOTHER INDICATION OF A LOSS OF NITROGEN LOADING.

FCC Label

FCC ID: LYP744556-04

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Interference Statement

NOTE: This equipment has been tested and found to comply with both the limits for a Class B digital device and an intentional radiator, pursuant to Part 15, Subpart B/C of the FCC Rules. This equipment generates, uses, and radiates radio frequency energy. If not installed and used in accordance with the instructions, it may cause interference to radio communications. The limits are designed to provide reasonable protection against such interference in a residential situation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna of the affected radio or television.
- Increase the separation between the equipment and the affected receiver.
- Connect the equipment and the affected receiver to power outlets on separate circuits.
- Consult the dealer or an experienced radio/TV technician for help.

MODIFICATIONS

Changes or modifications not expressly approved by Cochran Consulting, Inc. could void the user's authority to operate the equipment.

SHIELDED CABLES

This product is designed to be used only with the Analyst® interface cable (RS-232) to maintain compliance with FCC Regulations.

Patent Information

Protected under one or more Foreign or US patents. Other patents may be pending.

CE

NORMES EMC 89/336/EEC
EMC 89/336/EEC STANDARDS
HOMOLOGADA EMC 89/336/EEC
ZERTIFIZIERUNG EMC 89/336/EEC

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GEMINI Nitrox Manual
English - Imperial
Version 001I

Introduction

Your **GEMINI Nitrox** Dive Computer from Cochran Undersea Technology is one of the most advanced instruments made for this application. The **GEMINI Nitrox** is actually two computers in one. The **GEMINI Nitrox** consists of two component parts, the Tank Unit (TU) and the Wrist Unit (WU), the TU contains the High Pressure Transducer Assembly, Depth/Altitude Sensor, and the computer's electronics. The TU is where the time-depth calculations are made it is also were the detailed dive statistics and profiles are stored. The **GEMINI Nitrox** WU is a technological step forward for air integrated hoseless/wireless computers. The **GEMINI Nitrox** WU contains its' own Depth Sensor and microprocessor. It has the capability of being used as an "**independent**" non-air integrated dive computer. In the extremely unlikely situation where the communications link between the TU and the WU is interrupted the **GEMINI Nitrox** WU will automatically revert from its' "**slave**" mode to its' "independent mode and take over and perform the necessary time-depth calculations. The **GEMINI Nitrox** WU can be used as a "independent" stand-alone single mix Nitrox wrist mounted dive computer, but when used in this fashion the diver will loose the profile storage capability that the TU offers. The **GEMINI Nitrox** incorporates more user-programmable functions than any other dive computer made, yet is one of the simplest to use. Once your personal preferences and perhaps some dive site or condition specific settings are entered, its computing power goes to work in the back- ground. What you, the diver, see is all the critical information you need, in an informative and easy to comprehend display, with minimal distraction. To get the safest and most effective use of this instrument, it is important that the user fully understand the product. Please read and understand this entire manual and know the principles and practice safe diving before using this device. By using the **GEMINI Nitrox**, the diver specifically acknowledges that he has been adequately and thoroughly trained and certified to engage in diving by a professional, competent, recognized training agency.

The GEMINI Nitrox: Overview

CONSTANT PO_2 & FO_2 MODES

All other dive computers only compute using air or enriched air (Nitrox) which is referred to as "Constant FO_2" and is commonly found in open-circuit systems and in semi-closed circuit rebreathers. The **GEMINI Nitrox** has this capability, but also computes using a "Constant PO_2" as commonly found in closed-circuit rebreathers. The user can select which of these two modes the **GEMINI Nitrox** uses to compute NDC, DEC and Oxygen Toxicity numbers. The diver may select which mode via Field Programming or the Analyst PC Interface.

If the user selects CONSTANT FO_2 mode, the Oxygen content of the three Nitrox blends can be selected from 21 to 50 percent for blend 1 and from 21 to 99.9

percent for blend 2 & 3. If the user selects CONSTANT PO_2 mode, the Partial Pressure of Oxygen (PO_2) can be selected between 0.5 and 1.5 ata.

It is important to recognize that if CONSTANT PO_2 mode is selected, the unit will stay in the CONSTANT PO_2 mode until the diver changes the selection to the CONSTANT FO_2 mode, and vise versa, via Field Programming or the Analyst PC Interface.

When the **GEMINI Nitrox** is in the FO_2 mode and in the Surface Mode or Logbook Mode the center two digits on the primary screen will be 21. If it is in the PO_2 mode this location will display the PO_2 legend and the PO_2 value that the **GEMINI Nitrox** is programmed for. This Manual has sections that address both the PO_2 mode and the FO_2 mode refer to the table of contents for page numbers.

USER & ENVIROMENTAL ADAPTATION

In addition to its standard time/depth-based decompression algorithm, the **GEMINI Nitrox** is one of the new breed of Dive Computers that adapts its algorithm to the user's diving environment and style as originally pioneered by COCHRAN. All of COCHRAN's newer dive computers incorporate this capability. The factors used for this 'Adaptation' in the **GEMINI Nitrox** are:

Altitude Acclimatization	Water Temperature
Salt/Fresh Water Compensation	Microbubble
User Conservatism	Previous Dive Profile
Workload	

However, the **GEMINI Nitrox** allows the diver, via the optional Analyst® PC Interface, to disable the Temperature and/or Workload decompression compensation should the diver deem a particular diving situation would so warrant. *Calculation of Central Nervous System Oxygen Toxicity (CNS), Mission Oxygen Tolerance Units (OTU's), and the Partial Pressure of Oxygen (PO_2) is yet another added feature of this algorithm.* Twelve half-time compartments ranging from 5 minute to 480-minute theoretical tissue groups are used. You will find that this unit is extremely user friendly and can be customized to your individual diving conditions and practices. Factors that influence the decompression algorithm of your **GEMINI Nitrox** are detailed below.

ALTITUDE ACCLIMATIZATION

Driving or flying to a dive site significantly higher in altitude requires special modifications to the "sea level" algorithm. The **GEMINI Nitrox** regularly samples the ambient barometric pressure to determine these changes in altitude. Accordingly, the decompression algorithm is changed to reflect these barometric pressure changes. Note that temperature and weather systems also affect barometric pressure and hence, apparent altitude. Using the Time-To-Fly digits,

the number of hours required to “adapt” to the new altitude is immediately known to the diver. If a significant altitude change occurs, a minimum of one hour should pass before diving to allow the unit to adapt to this new altitude. Rapid changes in altitude should be avoided. The dive computer may in fact, see particularly rapid changes from a higher to a lower altitude as a dive. Should this occur, removing the batteries for ten minutes would reset the computer, however, all tissue nitrogen loading will also be lost.

Should it be desired to initiate a dive PRIOR to completing the adaptation time, the **GEMINI Nitrox** will treat this dive as a repetitive dive in its algorithm, taking into account the "residual" nitrogen present due to travel to altitude. There are two methods of compensating for altitude. Via the ANALYST® Personal Computer Interface, ZONE or SEAMLESS compensation for altitude may be selected.

In **ZONE** all altitudes less than 2,000 feet above sea level use the sea-level algorithm. At altitudes greater than this, altitude compensation is “seamless”; literally, every small fraction of gained altitude is considered in adjusting the algorithm. ZONE will reduce the occurrences of obtaining slightly different altitude readings and corresponding no-decompression (NDC) limits when diving within a given area. However, ZONE reduces the accuracy of the altitude compensation for the first 2,000 feet above sea level, since all altitudes below 2,000 feet are treated as sea level. However, the advantage in ZONE is that changes in apparent altitude due to temperature or weather changes at sea level will not affect the NDC computations.

In **SEAMLESS**, the algorithm is adjusted for extremely small changes in altitude. However, a difference in altitude may be seen from day-to-day at a given dive site due to temperature or weather systems and their effect on barometric pressures. SEAMLESS will provide the most accurate altitude compensation algorithm, but normal variations in atmospheric barometric pressure may affect the no-decompression time which is more predominantly seen in the Pre-dive Prediction forecast.

WATER TEMPERATURE

Diving in cold water can lead to a lower diver core and skin temperature, which can affect the gas exchange rate of the body’s tissues. The **GEMINI Nitrox** progressively makes its’ nitrogen algorithms more conservative as the water temperature declines below 75 degrees F. Above this water temperature, there is no temperature compensation. If the diver is wearing an insulated dry suit and is relatively warm even in cold water, this temperature compensation factor may be turned off at the divers discretion using the ANALYST® PC software.

MICROBUBBLE

There are several theories regarding the exact method by which a nitrogen bubble forms from a microbubble which was formed from micronuclei. One predominant theory states that more rapid ascents accelerate bubble formation. The **GEMINI Nitrox** attempts to compensate, or adapt, for these higher Ascent Rates. For Ascent Rates less than 30 feet-per-minute (fpm) there is no compensation. As the Ascent Rate goes progressively higher than 30 fpm the compensation progressively increases.

USER CONSERVATISM

Current dive computers cannot tell if the diver is dehydrated, tired, smokes, overweight, or has some other physical issue that may require additional conservatism in the nitrogen algorithm. The **GEMINI Nitrox** allows the diver to input an added degree of conservatism to the nitrogen algorithm from 0 to 50 percent in one-percent increments. Field programming is featured.

PREVIOUS DIVE PROFILES

Under some circumstances, recent dive activity can have an effect on nitrogen loading, particularly if the diver engages in inverted profile diving. This occurs when a deep dive is followed by an even deeper dive. This recent dive history is used to compensate the nitrogen loading for the current dive.

SEA WATER/FRESH WATER RECOGNITION

There is approximately three-percent difference in depth readings taken in fresh water versus seawater. Some dive computers are calibrated in feet of fresh water and some are calibrated in feet of salt water. Diving in a medium different from what the dive computer is calibrated will cause apparent depth errors. Only COCHRAN dive computers, including the **GEMINI Nitrox,** actually determine the type of diving medium and compensate the depth reading accordingly. This is accomplished by measuring the conductivity of the water during a dive. Caution must be taken in interpreting this reading since some apparent fresh water is actually high in minerals or contaminants and is correctly compensated as salt water. This commonly occurs in some caves, springs and lakes.

WORKLOAD COMPENSATION

When a diver's work rate or exertion level increases, he consumes more breathing gas (air) and his Breathing Parameter (BP)/Surface Air Consumption

(SAC) increases. The diver exchanges and retains higher levels of nitrogen in his tissues at a high work rate as compared to a low work rate. The **GEMINI Nitrox** progressively makes its' nitrogen algorithms more conservative as work rate increases. The Workload Compensation starts when the diver's BP exceeds 35 psi per minute and reaches maximum compensation at 98 psi per minute. For accurate Workload Compensation the cylinder size, in liters, must be set correctly, this can be done by Field Programming or with the ANALYST® Personal Computer Interface. The Workload Compensation factor may be turned off at the divers discretion using the ANALYST® PC software.

THEORY OF OPERATION

The **GEMINI Nitrox** Dive Computer consists of two component parts, the Tank Unit (TU) and the Wrist Unit (WU), the TU contains the computer's electronics and the WU displays the information to the diver.

WRIST UNIT

The **GEMINI Nitrox** Wrist Unit consists of a Liquid Crystal Display (LCD) screen that Is the primary method of conveying information to the Diver. The information is presented in an easy to read and understand layout. The Wrist Unit is supplied with TACLITE™, the night vision safe red Backlight. Two N-Cell Size Alkaline batteries power the WU. The WU will receive information from the **GEMINI Nitrox**'s TU from approximately 36 inches; the actual distance will vary depending on the orientation of the WU to the TU. When the WU is beyond the communications range of the TU the WU's display will flash. When the WU is back in communication with the TU the display will cease flashing. If the **GEMINI Nitrox** WU loses its' communication link with the TU for more than one minute the WU will automatically switch from the "slave" mode to the "Independent" Mode. In the Independent Mode the **GEMINI Nitrox**'s WU will take over all Nitrogen and Oxygen time/depth calculations. The WU has the capability of being used as an independent wrist style dive computer. Once the dive has been completed and the Post Dive interval satisfied the WU can be returned to its' "Slave" mode with the TU. The **GEMINI Nitrox** WU contains **NO USER SERVICABLE PARTS**, If the lens is removed from the WU it will **VOID** the limited warranty.

TANK UNIT

The TU contains the High-pressure transducer assembly, the Depth/Altitude Sensor, and the computer's electronics. The TU performs all of the time-depth calculations and also stores the detailed statistics and profile information. The TU transmits all information to the WU once per second where it is displayed. Four AA-cell batteries power the TU; these batteries can be Alkaline, Lithium, Rechargeable, Tester or non-tester. The TU contains **NO USER SERVICABLE PARTS**, If the lid is removed from the TU it will **VOID** the limited warranty.

Enriched Air Nitrox, Three-Blend Capability

Your **GEMINI Nitrox** has the unique ability to provide the diver with the ability to select a single bottom mix and TWO decompression mixes. The oxygen percentage for the three different mixes can be set within the following ranges:

Blend 1: 21.0% to 50.0% in 0.1% increments
Blend 2: 21.0% to 99.9% in 0.1% increments
Blend 3: 21.0% to 99.9% in 0.1% increments

In order to obtain the full benefit of this unique feature, you must designate Blend 1 as your bottom mix, Blend 2 as your first (deeper) decompression mix and Blend 3 as your final (shallower) decompression mix. **The TU must be attached to the cylinder-containing Blend 1.** Here is how the automatic switching occurs:

1. With the TU attached to Blend 1, it continually "senses" a drop in cylinder pressure until you are prepared to switch to your first decompression mix (Blend 2).

2. Once you have made the switch to Blend 2, the TU no longer senses a drop of cylinder pressure from your Blend 1 cylinder and automatically changes its algorithm to Blend 2.

3. For Blend 3, you will be required to not only have programmed the oxygen percentage for this mix, but also the:
   a) Bottom time you will be beyond at which you will begin breathing from Blend 3
   b) The maximum depth at which you anticipate you will begin breathing from Blend 3

The time and depth do not have to be exact. They are simply used as a benchmark with the necessity of both being met in order to allow the algorithm switching to Blend 3. We find that most divers participating in this type of extreme diving usually have a bottom time of greater than 20 minutes before beginning to decompress on a second decompression gas. Therefore, they leave the bottom time factor set for 20 minutes. The maximum depth at which a switch to Mix 3 is allowed in the algorithm is limited to 30 feet.

NOTE: As you will discover in the Subsurface Mode section of this manual, your GEMINI Nitrox displays your breathing rate (BP) and Blend number and the Oxygen percentage of the Blends on the alternate screen of the WU. If the BP is displaying 00, the O_2 percentage of Blend 2 or Blend 3 is being in the algorithm's calculations. Blend 2 is indicated by displaying Ean2 and Blend 3 by displaying EAN3 in all cases the oxygen percentage that has been programmed for that Blend will also be displayed. Should you switch back to your bottom mix (Blend 1), your TU will sense a drop in cylinder pressure and the Blend 1 algorithm will be calculated. This

switching between Blend 1, 2, and 3 is continuous based upon the BP and current depth. Blend 1 BP is displayed between 1 and 98.

The following describes the various factors that determine which mix is being calculated in the algorithm:
Blend 1: TU senses drop in cylinder pressure with BP between 1 and 98 displayed.

Blend 2: TU does not sense a drop in cylinder pressure, BP displays 00; Alternate Screen displays Ean2 and Blend 2 Oxygen percentage, bottom time and depth factors for Blend 3 are not met.

Blend 3: TU does not sense a drop in cylinder pressure, BP displays 00, Alternate Screen displays Ean3 and Blend 3 Oxygen percentage, bottom time and depth factors for Blend 3 are met.

NOTE: The ability to switch mixes MUST be enabled via the Analyst. If you do not have this program, your Authorized Dealer can perform this operation.

In addition, Blend 1 is always calculated for the first five minutes of each dive regardless of the BP. This allows you to "swim" your stage bottles down your ascent line at the beginning of the dive. You can also vary the responsiveness of the Breathing Parameter calculations via the ANALYST. All three Blends are enabled at the factory and set to 21.0% oxygen.

Equivalent Air Depth

Your **GEMINI Nitrox** uses Equivalent Air Depth (EAD) in determining the no-decompression limits for each individual dive. A standard NOAA equation is used to determine the EAD based upon the oxygen percentage entered. This equation is:

$$EAD = \frac{(1 - O_2\%) \times (D + 33)}{.79} - 33$$

Where O_2 is entered in decimal form and **D** is the actual depth in feet.

For example, if you were diving with NOAA II (36% oxygen) to 70 feet, the EAD used for determining your no-decompression limit would be:

$$EAD = \frac{(1-.36) \times (70+33)}{.79} - 33$$

$$\frac{.64 \times 103}{.79} - 33 = 50.44 \text{ feet}$$

Therefore, the no-decompression time for this example would be calculated to an EAD of 50.44 feet.

Central Nervous System (CNS) Oxygen Toxicity

An additional consideration for the NITROX diver is Oxygen Toxicity. Your **GEMINI Nitrox** will provide audible and visual warnings to alert you to this hazardous condition.

Maximum exposure time for a given depth is calculated based on the Partial Pressure of oxygen (PO2). The following standard formula is used to determine the PO2:

$$D \times O_2\% = PO_2 \text{ level}$$

Where O_2 is entered in decimal form and **D** is the actual depth in atmospheres absolute.

For example, if you were diving to 86 feet with NOAA II your PO2 level would be:

$$(86 + 33 \div 33) \text{ or } 3.61 \times .36 = 1.29$$

which, is rounded up to PO2 = 1.3. PO2 levels from 0.5 to 1.6 are calculated. Exceeding a PO2 of 1.6 will greatly increase the probability of the immediate onset of CNS Oxygen Toxicity. While various training organizations have established maximum PO2 limits, the maximum exposure times and their associated PO_2 levels used in this dive computer's calculations are shown on the following table:

PO2 LEVEL	Max Bottom Time (minutes) (Based on CNS Limitations)
.5	1304
.6	719
.7	496
.8	379
.9	306
1.0	257
1.1	221
1.2	194
1.3	172
1.4	149
1.5	110
1.6	44

Your dive computer calculates CNS or OTU toxicity percentages and it issues a unique, five double-beep audible alarm once per minute should you reach 50 percent of the associated maximum limit. In addition to this audible warning, the WARNING legend will appear and flash AND the left-hand bar graph will display a graphic CNS display, on the Alternate screen the Max Depth digits will be replaced with the current calculated CNS Oxygen Toxicity percentage. This warning will continue until the calculated toxicity percentage is less than 50 percent. For example, the maximum bottom time exposure for a PO2 level of 1.4 is 149 minutes. Once you reached 75 minutes of bottom time with a PO2 of 1.4, this alarm would be issued since 75 minutes is 50% of 149 minutes. At a PO2 of 1.5, this alarm would be issued at 55 minutes, etc.

Note: BY accepted definition of CNS Toxicity. Should a PO_2 value greater than 1.6 ATA be calculated, the CNS Toxicity will be 100%.

PULMONARY (WHOLE BODY) OXYGEN TOXICITY

Another key function to recognize when breathing mixtures with an O_2 content greater than 50 percent is Pulmonary Oxygen Toxicity, also called “Whole Body” Toxicity. This is a cumulative development, which must also be tracked accurately, and is of particular importance should the diver require recompression therapy or have extended exposure to elevated levels of O_2.

The **GEMINI Nitrox** monitors and computes this longer-term effect as "Oxygen Tolerance Units" (OTUs) based on Bill Hamilton's MODIFIED REPEX method of oxygen exposure management. The following chart illustrates how the OTU function relates to diving activity:

REPEX MAXIMUM DAILY OTU CHART

DAY	Daily Dose	Period Total
1	850	850
2	700	1400
3	620	1860
4	525	2100
5	460	2300
6	420	2520
7	380	2660
8	350	2800
9	330	2970
10	310	3100
11	300	3300
12	300	3600
13	300	3900
14	300	4200
15 - 30	300	N/A

OTUs are an exponential function of oxygen partial pressure. The time-dependent limit varies with the number of days that the diver continues to dive without full recovery. The recovery portion of the whole body effect algorithm is a linear reduction of OTUs over time. The Mission OTU Clock continues running as it tracks cumulative Oxygen exposure. Depending on frequency of dives and other determining factors, as well as between-dive recovery time, this clock may run for several weeks. The clock resets to 0:00 when the OTU level has dropped to zero.

Should the OTU Dose reach 50% of the maximum allowable, the audible alarm will sound. In addition to this audible warning, the WARNING legend will flash and the O2TOX legend will illuminate on the Wrist Unit (WU) and on the Alternate Screen the MAX DEPTH digits will be replaced with a lower case "O" and the current calculated OTU Dose percentage. All three digits will also be flashing. This warning status will continue until the calculated toxicity is less than 50 percent. The Symptoms of Pulmonary O_2 Toxicity include burning in the throat and chest, coughing, and shortness of breath. Should any of these symptoms be experienced, discontinue diving immediately and consult a Doctor.

NOTE: While most other audible alarms of the dive computer consist of five long beeps, the OTU, PO_2, and CNS audible alarm consists of a unique short double-beeps that sound for five seconds.

WARNING: It is possible in certain diving circumstances to reach an Oxygen Toxicity limit well before reaching a no-decompression limit. For this reason and many others, a diver who has successfully completed a sanctioned NITROX diving course from a recognized training and certifying agency should only conduct NITROX diving.

We wish to thank Dr. Bill Hamilton for working with us and sharing his considerable knowledge in the areas of oxygen toxicity.

Installation

The Tank Unit (TU) high-pressure sensor installs into a high-pressure port of your first-stage regulator. Your Authorized Dealer should do this at the time of purchase. Should you choose to install the TU yourself:

1. Remove your current high-pressure hose or the high-pressure plug from your first stage regulator.

2. Lightly lubricate the sensor O-ring only with a lubricant approved for use with Enriched Air Nitrox equipment. **DO NOT USE SILICONE GREASE**.

3. Screw the sensor, HAND TIGHT, into the first-stage high-pressure port

4. Using the supplied wrench, a Scuba Tool or thin 9/16" open-end wrench, "snug" the high-pressure transducer connection taking caution to not overtighten. **Do not** use pliers or too large a tool for tightening the high-pressure connection as you may damage the connection and is not covered under the limited warranty.

   CAUTION: DO NOT use your hand to tighten the high-pressure connection. This procedure should only be accomplished by using the appropriate tool placed over the metal nut of the high-pressure connection. It must not be overtightened.

With the first stage properly attached to a filled SCUBA cylinder, slowly open the cylinder valve. Once the valve has been opened, listen to the TU's high-pressure connection for any escaping gas. If possible, completely immerse the tank and regulator in water to see if bubbles form around your connection. If any gas leak is seen or heard, immediately turn the gas off by closing the cylinder valve and take the entire regulator system to the place where you purchased your **GEMINI Nitrox.**

The Tank Unit (TU) clips to a low-pressure hose close to the first-stage, it is recommended that the TU be located on the divers left side. When clipping the TU onto the low-pressure hose, a rolling motion will provide better results rather than pushing the TU straight down onto the hose. The Wrist Unit (WU) may be worn on the wrist or attached to your Buoyancy Control Device with the optional retractor.

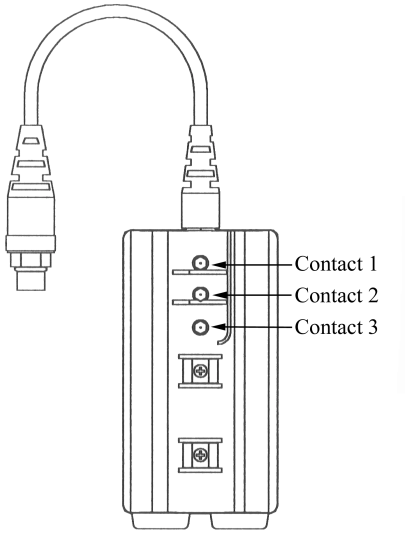

Figure 51
Tank Unit Touch Contacts

Activation

The TU will automatically activate when it senses a cylinder pressure greater than 200 psi. It may also be manually activated by bridging touch contacts one and two, located on the underside of the tank unit, with wetted fingers (Refer Fig 51).

NOTE: If the TU is in the Altitude Adaptation Mode or "sleeping", four beeps instead of five beeps will be issued.

It is also required that the TU be no deeper than 3 feet of water in order to activate. Should you be deeper than three feet and attempt to activate the TU by using either cylinder pressure or manually by bridging the touch contact, the TU will not turn on. You must ascend to the surface and re-initiate the activation sequence.

You cannot manually turn the TU off. The TU will turn off:

1. After 30 minutes if no tank pressure is sensed and no dive is made.

2. After all 12 half-time compartments are completely "off-gassed" on repetitive dives.

During an extended surface interval, the TU will enter a "sleep" mode to conserve battery life. After a dive, your **GEMINI Nitrox** will enter its sleep mode after a surface interval of 40 minutes. During this sleep mode, all off-gassing calculations continue and current surface interval and time to fly can be viewed by activating the TU. Once awakened from its sleep mode, the TU will remain on for one hour before re-entering the sleep mode. This assumes, of course, that no repetitive dive is initiated between each wake-up.

The WU can be activated by bridging the wrist units touch contacts one and two with wetted fingers (see figure 52, page 56). While the WU will activate upon entering the water it is highly recommended that the WU be turned on manually as part of the divers predive check.

OPERATING MODES

Self-Diagnostic Mode

At turn-on, both the TU and WU complete self-diagnostic tests before displaying current information. During these tests, all of the legends and digits on the WU illuminate for approximately five seconds. Upon completion, your computer displays its' WU serial number and then enters the Surface Mode.

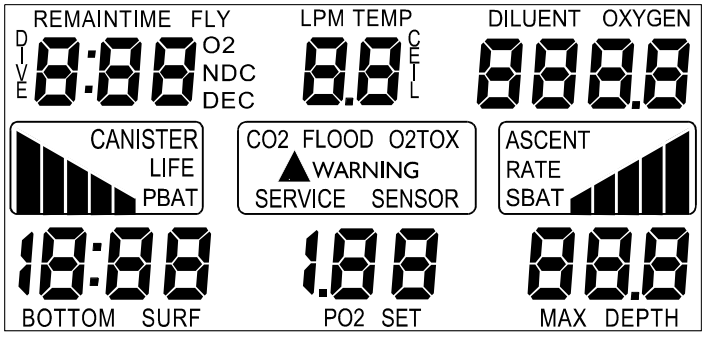

Figure 01 Self Diagnostics Mode

Explanation of Page Layouts

The following pages provide a "snapshot" of the screen displays for each of the computers various functional modes, showing:

1. An illustration of the WU display
2. The LEGEND displayed
3. The MEANING of that legend
4. The VALUE depicted under that legend

Any **WARNINGS** or **NOTES** about that mode will be displayed on this page.

FO2 Surface Mode

At the completion of the Self-Diagnostic Mode, the **GEMINI Nitrox** enters the Surface Mode. The Surface Mode has two displays: a Primary Display and an Alternate Display. You may switch to the Alternate Display by rotating the wrist quickly or tapping firmly on the face of the WU. The Primary Display shows: DIVE number, time-to-FLY, TEMPerature, SURFace time, cylinder pressure, and MAXimum DEPTH (of the last dive). The Alternate Display shows the last dives BOTTOM time, and breathing parameter (BP), Primary BATtery voltage, Secondary BATtery voltage and the oxygen percentage of Blend #1 (Ean1). Figure 2 shows the display with no residual nitrogen. Figure 4 shows the display with residual nitrogen (a repetitive dive).

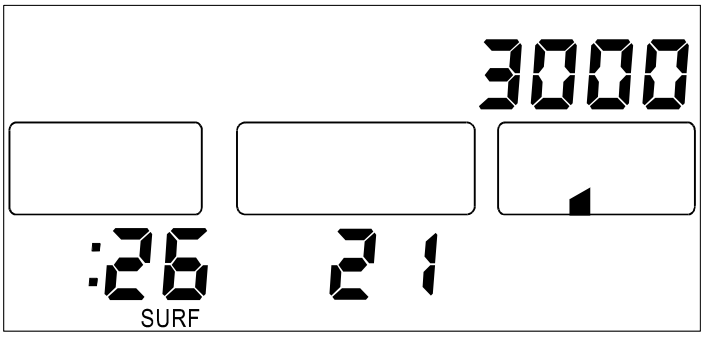

Figure 02 Surface Mode, No Nitrogen, FO2 Mode, Primary Screen

- Cylinder pressure 3000 psi
- Altitude 4,000 to 6,000 ft
- Current SURFace Time :26 minutes
- FO_2 / PO_2 Mode Indicator 21

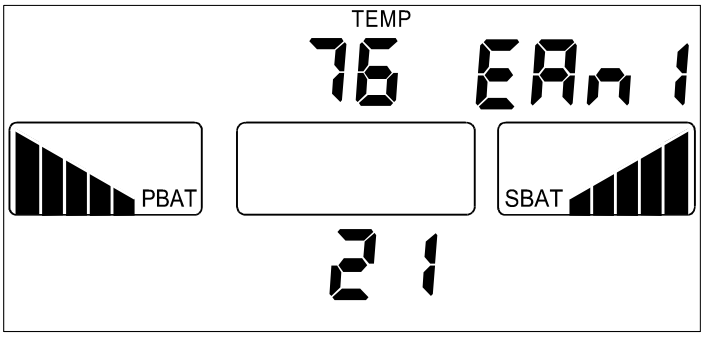

Figure 03 Surface Mode, No Nitrogen, FO2 Mode, Alternate Screen

FO2 Surface Mode (Continued)

- TEMPerature — 76^{O} F
- Ean1 — Denotes Blend #1
- Primary BATtery voltage — 3.25 to 3.00 volts
- Secondary BATtery Voltage — 3.25 to 3.00 volts
- Blend oxygen percentage — 21%

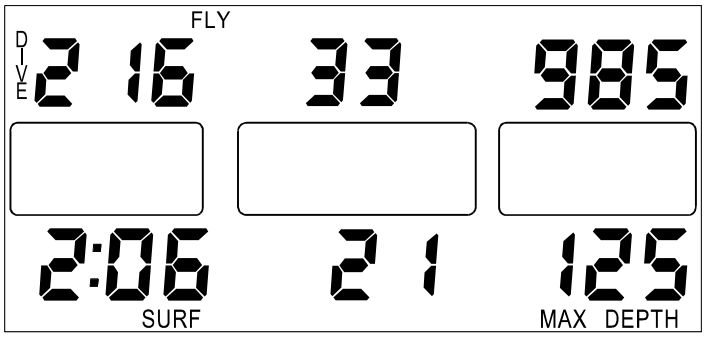

Figure 04 Surface Mode, FO2 Mode, Residual Nitrogen, Primary Screen

- DIVE of day number — 2
- Current time to FLY — 16 hrs
- Average Breathing Parameter Previous dive — 33
- cylinder pressure — 985 psi
- Altitude — less than 2,000 feet
- Current SURFace Time — 2:06 (2 hours 06 minutes)
- FO_2 Mode Indicator — 21
- MAXimum Depth (of the last dive) — 125 feet

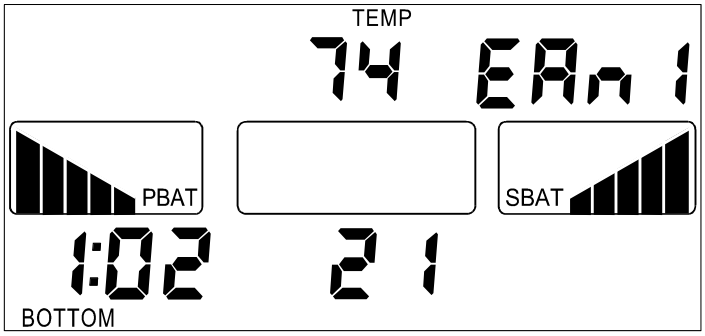

Figure 05 Surface Mode, FO2 Mode, Residual Nitrogen, Alternate Screen

FO2 Surface Mode (Continued)

- Average water TEMPerature — 74^{O} F
- Ean1 — Denotes Blend #1
- Primary BATtery voltage — 3.25 to 3.00 volts
- Secondary BATtery Voltage — 3.25 to 3.00 volts
- BOTTOM time of last dive — 1:02 (1 hours 02 minutes)
- Blend oxygen percentage — 21%

FO2 PRE-DIVE PREDICTION MODE

The PreDive Prediction Screen is accessed through the Tank Unit Field Programming menu (see Field Programming). This enables the diver to view the PreDive Prediction information at the touch of the Contacts. The PreDive Prediction depths start at 30 feet and increase in 10 feet increments. PreDive Predictions will stop when the No-Decompression (NDC) time prediction reaches two minutes or a maximum depth of 330 feet is reached. The PreDive Prediction NDC times are calculated based on the O_2 percentage of Blend 1 if in the FO_2 Mode or on the PO_2 Dive set point if in PO_2 Mode. PreDive Predictions can also be effected by apparent altitude. Other factors that can effect PreDive Predictions are Temperature Compensation being enabled, additional Conservatism and residual nitrogen. Refer to the ANALYST® description about how to modify parameters. During the PreDive Prediction Mode, the unit will compute and display the maximum safe time at that depth. While in the PreDive Prediction Mode once the maximum depth of 330 feet has been reached the unit will return to the PdP menu option of the Field Programming Mode.

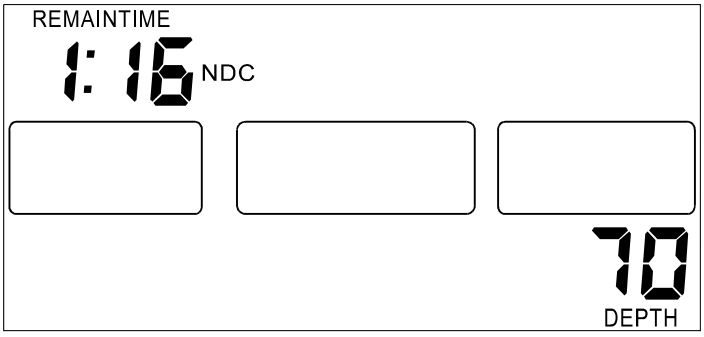

Figure 06 Predive Prediction Mode

TYPICAL NDC PRE-DIVE PREDICTIONS FOR PO_2 MODE:

	I---------- PO_2 Set Points ----------I				
Depth	**0.5**	**0.7**	**1.0**	**1.3**	**1.5**
30	7:51	9:59	9:59	9:59	9:59
40	3:02	5:26	9:59	9:59	9:59
50	1:32	2:23	5:23	9:59	9:59
60	:59	1:16	2:23	5:20	9:59
70	:40	:52	1:16	2:22	3:52
80	:30	:35	:52	1:15	1:53
90	:21	:26	:35	:51	1:05
100	:16	:19	:26	:35	:44
110	:12	:13	:19	:26	:31
120	:09	:10	:13	:19	:23
130	:08	:08	:10	:13	:17
140	:07	:07	:08	:10	:12
150	:06	:06	:07	:08	:09
160	:06	:06	:06	:07	:08
170	:05	:05	:05	:06	:07

TYPICAL NDC PRE-DIVE PREDICTIONS FOR FO_2 MODE:

	|---------- Condition ----------|					
Depth	**A**	**B**	**C**	**D**	**E**	**F**	**G**
30	4:32	2:52	3:05	3:44	9:59	9:59	9:59
40	2:21	1:27	1:24	2:01	6:24	5:34	9:59
50	1:20	:55	:38	1:10	3:22	3:01	9:59
60	:57	:37	:24	:48	2:07	1:54	6:36
70	:40	:28	:18	:35	1:19	1:10	3:54
80	:31	:20	:12	:26	:59	:53	
90	:23	:14	:09	:21	:45	:41	
100	:18	:10	:08	:16	:35	:32	
110	:13	:08	:06	:12	:29	:26	
120	:10	:07	:05	:09			
130	:39	:09	:06	:08			
140	:07	:05	:07				
150	:06	:05	:06				
160	:05	:04	:05				

	Current Altitude	**O2%**	**Dive Depth**	**Bottom Time**	**Surface Interval**
Condition A:	0	21	0	:00	:00
Condition B:	5kft	21	0	:00	:00
Condition C:	0	21	18	:45	:13
Condition D:	0	21	18	:45	2:00
Condition E:	0	36	0	:00	:00
Condition F:	0	36	18	:45	2:00
Condition G:	0	50	0	:00	:00

For these charts, the Temperature Factor is set to off and the Conservatism factor is set to 0%. Both of these factors, in addition to any residual nitrogen, can affect the NDC predictions. Conditions E, F, and G caused the PreDive prediction to terminate when the PO2 reached the current set point of 1.6 ATA. NDC times shown are approximate.

FO2 LOGBOOK MODE

The **GEMINI Nitrox** Wrist Unit is capable of storing the beginning and ending logbook information for the last six dives. The Logbook is accessed via the Wrist Unit Field Programming Menu (see Field Programming, page #?). The most recent dive's Beginning STATS will be displayed first. Logbook information is presented on the Alternate Screen as well as on the Primary Screen. To view the dives Ending STATS, bridge contacts 1 & 2 with wetted fingers. To view the next dive, bridge contacts 1 & 2 with wetted fingers after pausing for a few seconds. Do not use a metal object such as a coin or knife-blade to increment dives since this will cause the unit to revert back to the Field Programming Mode menu.

Information contained on the Logbook Primary Screen of each log will include:

- REMAINing time (Lesser of NDC or Air Time)
- Average Breathing parameter for the dive
- Beginning cylinder pressure
- Altitude
- SURFACE time
- PO_2 at the beginning of the dive
- In the depth digits an identification code showing that the information being displayed is Beginning 'b' STATS or Ending 'E' STATS and the logbook dive number (1 to 6) are displayed.

The Alternate Screen will contain:

- DIVE number
- Time-to-Fly
- Average water temperature of the dive
- In the cylinder pressure digits an identification code showing the Blend # i.e. EAn1, Ean2 or Ean3
- Primary BATtery voltage
- Secondary BATtery voltage
- O_2 Percentage of indicted Blend

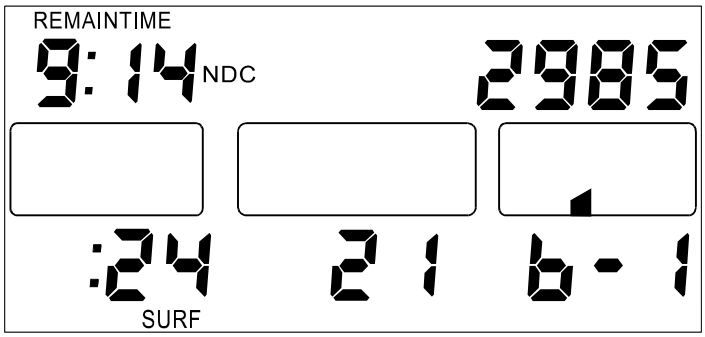

Figure 07 Logbook Mode, FO2 Mode, Normal Dive,
No NItrogen, Primary Screen, Beginning

- REMAINing TIME
- Beginning Cylinder Pressure 2985 psi
- Altitude 4,000 to 6,000 ft
- SURFace Time 24 minutes
- Beginning PO_2 Value .21 ATA
- Beginning STATS for Dive 1

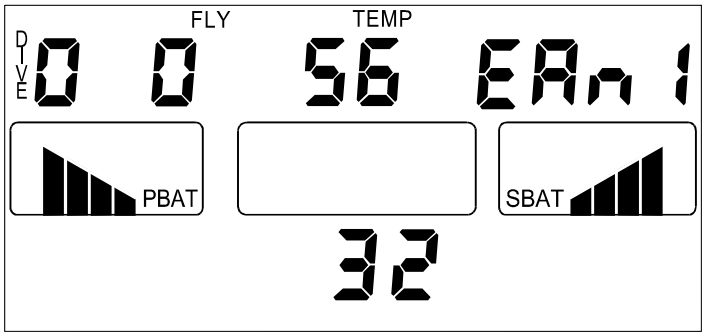

Figure 8 Logbook Mode, FO2 Mode, Normal Dive,
No Nitrogen, Alternate Screen, Beginning

- DIVE number 0
- Time-To-FLY 0 hours
- TEMPerature 56^{O} F
- Blend Indicator EAn 1
- Primary BATtery voltage 2.87 to 3.00 volts
- Secondary BATtery voltage 2.87 to 3.00 volts
- O_2 percentage of indicated Blend 32%

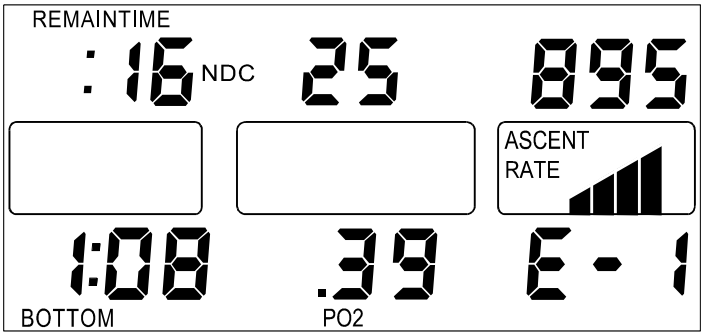

Figure 9 Logbook Mode, FO2,Normal Dive, Primary Screen, Ending

- REMAINing TIME (lesser of NDC or Air) — 16 minutes
- Breathing Parameter (Average) — 25
- Cylinder Pressure — 895 psi
- Maximum Ascent RATE — 40 to 49 ft per minute (fpm)
- BOTTOM Time — 1 hour 8 minutes
- Ending PO_2 Value — .39 ATA

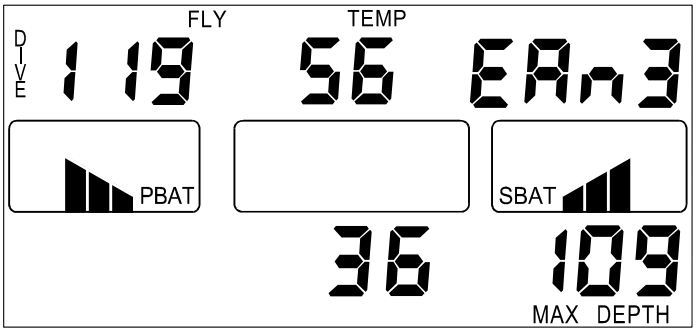

Figure 10 Logbook Mode, FO2, Normal Dive, Alternate Screen, Ending

- Ending STATS for Dive 1
- DIVE number — 1
- Time-To-FLY — 19 hours
- TEMPerature — 56^{O} F
- Blend Indicator — EAn 3
- Primary BATtery voltage — 2.75 to 2.87 volts
- Secondary BATtery voltage — 2.75 to 2.87 volts
- MAXimum DEPTH — 109 feet
- O_2 percentage of indicated Blend — 36%

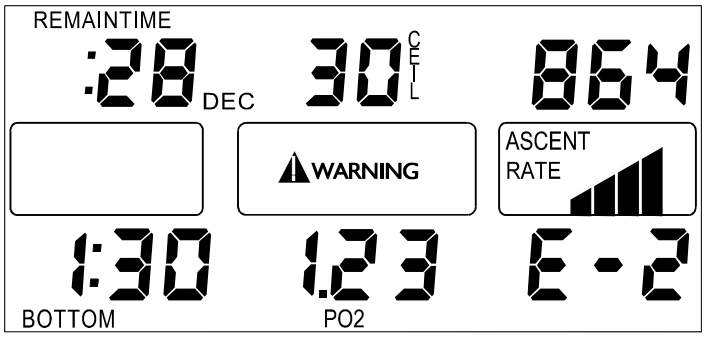

Figure 11 Logbook Mode, FO2, Deco Dive, Primary Screen, Ending

- REMAINing TIME DEC 28 minutes
- CEILing 30 ft
- Cylinder Pressure 864 psi
- Maximum Ascent RATE 40 to 49 ft per minute (fpm)
- BOTTOM Time 1 hour 30 minutes
- Ending PO_2 Value 1.23 ATA
- Ending STATS for Dive 2

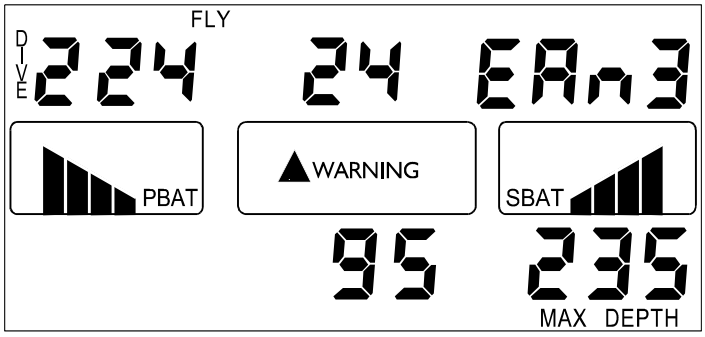

Figure 12 Logbook Mode, FO2, Deco Dive, Alternate Screen, Ending

- DIVE number 2
- Time-To-FLY 24 hours
- Breathing Parameter (Average) 24
- Blend Indicator EAn 3
- Primary BATtery voltage 2.87 to 3.00 volts
- Secondary BATtery voltage 2.87 to 3.00 volts
- O_2 percentage of indicated Blend 95%
- MAXimum DEPTH 235 feet

FO2 SUBSURFACE MODE

Whether in the Surface Mode, PreDive Prediction Mode, Programming Mode or the Logbook Mode, The **GEMINI Nitrox** will automatically enter the Subsurface Mode when the dive computer senses a depth greater than five feet and is exited when the dive computer senses a depth less than three feet.

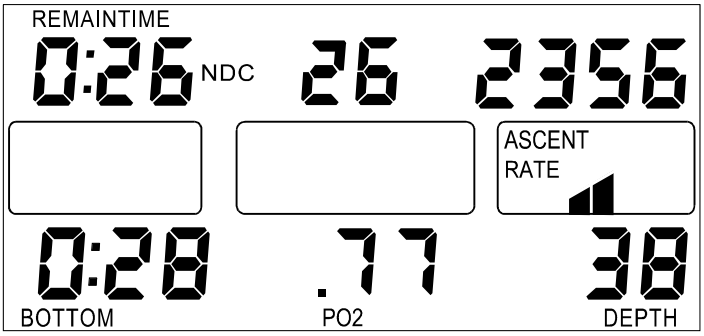

Figure 13 Subsurface Mode, Normal Dive,FO2 Mode, Primary Screen, Showing Gas Blend #1

- REMAINing TIME air
  Or
  REMAINing TIME NDC (lesser of the two) — 26 minutes of remaining NDC time
- Breathing Parameter — 26
- Cylinder Pressure — 2356 psi
- Ascent RATE — 30 to 39 ft per minute (fpm)
- BOTTOM Time — 28 minutes
- Current PO_2 Value — .77 ATA
- Current DEPTH — 38 feet

FO2 SUBSURFACE MODE (continued)

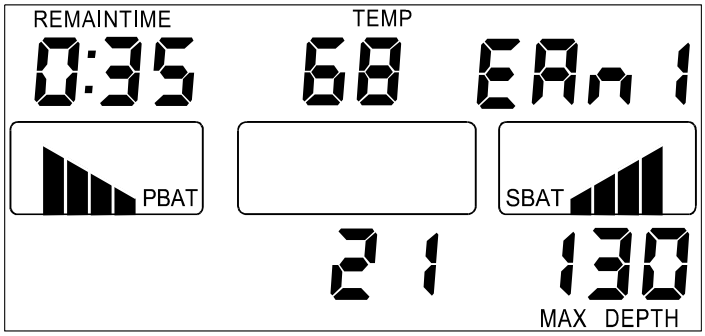

Figure 14 Subsurface Mode,Normal Dive,FO2 Mode,
Alternate Screen, Showing Gas Blend #1

- REMAINing TIME air
  Or
  REMAINing TIME NDC (greater of the two) — 35 minutes of remaining air time
- TEMPerature — 68^{O} F
- Blend Indicator — EAn 1
- Primary BATtery voltage — 2.87 to 3.00 volts
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 21%
- MAXimum DEPTH — 130 feet

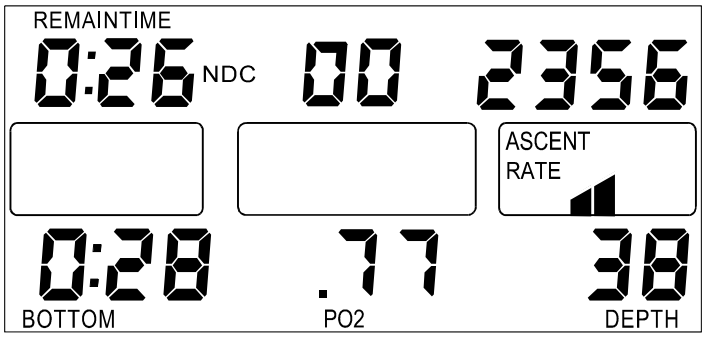

Figure 13a Subsurface Mode, Normal Dive, FO2 Mode,
Primary Screen, Showing gas Blend #2 or #3

FO2 SUBSURFACE MODE (continued)

- REMAINing TIME air
  Or
  REMAINing TIME NDC (lesser of the two) — 26 minutes of remaining NDC time
- Breathing Parameter — 00 (indicates breathing on Blend 2 or 3)
- Cylinder Pressure — 2356 psi
- Ascent RATE — 30 to 39 ft per minute (fpm)
- BOTTOM Time — 28 minutes
- Current PO_2 Value — .77 ATA
- Current DEPTH — 38 feet

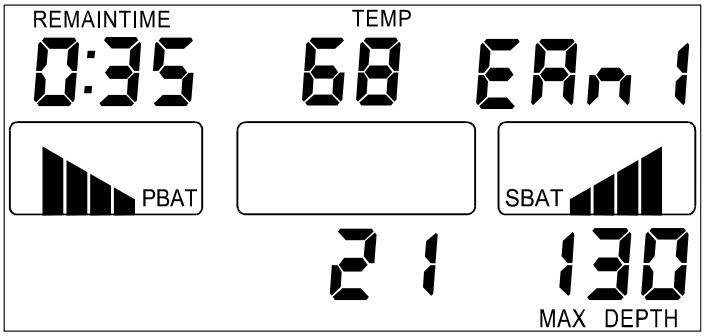

Figure 14 Subsurface Mode,Normal Dive,FO2 Mode, Alternate Screen, Showing Gas Blend #1

- REMAINing TIME air
  Or
  REMAINing TIME NDC (greater of the two) — 35 minutes of remaining air time
- TEMPerature — 68^{O} F
- Blend Indicator — EAn 2
- Primary BATtery voltage — 2.87 to 3.00 volts
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 40%
- MAXimum DEPTH — 130 feet

FO2 SUBSURFACE MODE (continued)

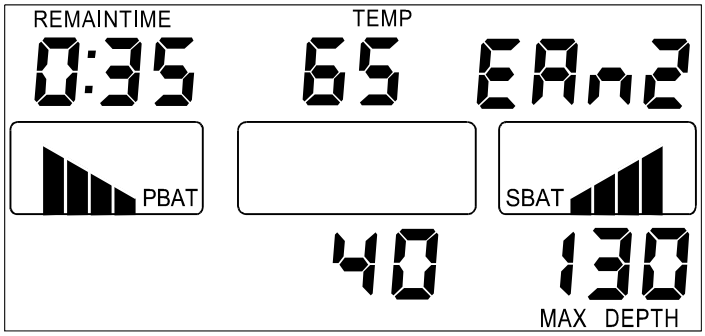

Figure 14a Subsurface Mode, Normal Dive,FO2 Mode, Alternate Screen, Showing Gas Blend #2

- REMAINing TIME air — 35 minutes of remaining air time
- TEMPerature — 68^{O} F
- Blend Indicator — EAn 2
- Primary BATtery voltage — 2.87 to 3.00 volts
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 40%
- MAXimum DEPTH — 130 feet

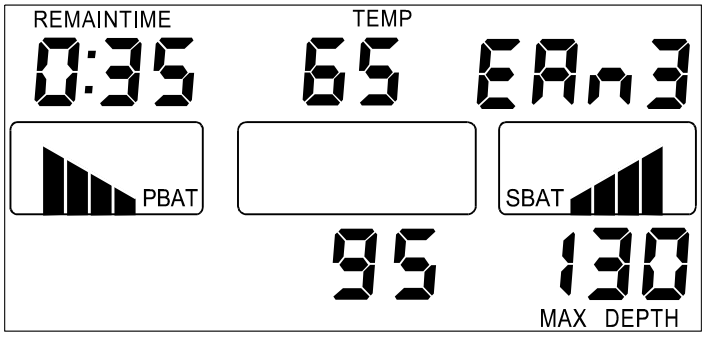

Figure 14b Subsurface Mode, Normal Dive, FO2 Mode, Alternate Screen, Showing Gas Blend #3

- REMAINing TIME air — 35 minutes of remaining air time
- TEMPerature — 68^{O} F
- Blend Indicator — EAn 3
- Primary BATtery voltage — 2.87 to 3.00 volts
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 95%
- MAXimum DEPTH — 130 feet

Emergency Decompression Mode:

WARNING: Your GEMINI Nitrox should not be used for deliberate decompression diving, but merely as an aid to assist you during ascent should you mistakenly overstay your no-decompression limit. Cochran Undersea Technology in no way encourages deliberate decompression diving.

Should you exceed your NDC time limit, your **GEMINI Nitrox** will enter its Emergency Decompression Mode. Five audible warning chirps will sound and the DEC legend will appear on your WU. In this mode, the CEILing digits will display the depth at which the diver must stop and not ascend above during his final ascent. The WU display will display the first Ceiling at 10 feet and continue in 10-foot increments to a maximum of 190 feet. To alert the diver to an even more hazardous situation, the CEILing digits will flash if the ceiling is 100 feet or more. An additional five chirp audible warning will sound if a decompression ceiling greater than 90 feet is calculated. You should IMMEDIATELY begin your ascent to the proper CEILing depth upon hearing these warnings.

Your **GEMINI Nitrox** is configured at the factory to alternate between total decompression time for three seconds and time at current stop for three seconds. Via the optional Analyst® Personal Computer Interface, you can select to have only total decompression time or stop time displayed if you so desire.

CEILING is the depth to which you must ascend, BUT NOT EXCEED, for your first emergency decompression stop. The WU display will indicate the various ceiling stop depths as follows:

Ceiling Calculated	Ceiling Displayed
10 foot	10
20 foot	20
30 foot	30
40 foot	40
50 foot	50
60 foot	60
70 foot	70
80 foot	80
90 foot	90
100 foot	10 – flashing
110 foot	11 – flashing
120 foot	12 – flashing
130 foot	13 – flashing
140 foot	14 – flashing
150 foot	15 – flashing
160 foot	16 – flashing
170 foot	17 – flashing
180 foot	18 – flashing
190 foot	19 – flashing

Emergency Decompression Mode (continued)

NOTE: When completing your decompression stops, minor changes in your depth may occur due to swells at the surface. For this reason, you should make your stop slightly deeper than the CEILing depth. Your GEMINI will continue to give decompression credit when this precaution is taken.

FO2 Emergency Decompression Mode

Predicted Decompression Time at a specific stop assumes that a diver is at the required ceiling and is based on the oxygen percentage that the unit is currently using in its' NDC/DECO calculations. If the diver is breathing from his primary cylinder (EAn 1) then these calculations will be based on the oxygen percentage of blend 1. When he switches to his alternate cylinder (EAn 2 or EAn 3) the DECO times will reflect the change in decompression obligation, due to the change in the oxygen percentage that he has programmed into the computer. However it is not necessary to be precisely at the specific Ceiling. Outgassing credit will be given that is proportional to a depth that is deeper than the specified Ceiling. The Cochran **GEMINI Nitrox** is programmed to have a one-foot margin in ceiling depth when the diver is at a decompression ceiling. This means that if a diver is at nine feet instead of ten he will still receive full credit for the time spent at that ceiling. Ascending above the CEILing depth will cause your **GEMINI Nitrox** to issue a warning chirp. The current depth digits and the WARNING legend will flash. Both the audible alarm and the flashing display will continue until you descend below the CEILing depth. Outgassing will continue even through the diver is shallower than the ceiling.

If the diver surfaces before satisfying his decompression obligation, the Cochran **GEMINI Nitrox** will continue to give outgassing credit as if it was still in a dive at a depth of zero feet. The unit will continue to log data and perform as if actually in a dive. The unit will actually decompress as if it were at the various required decompression stops. When the decompression obligation is finally satisfied, the **GEMINI Nitrox** will begin the 10-minute “PostDive Interval” after which the dive will terminate are the **GEMINI Nitrox** will enter the “Surface Mode”

CAUTION: Ascending above the CEILing depth will cause your GEMINI Nitrox to issue a warning chirp. The current depth digits and the WARNING legend will flash. Both the audible alarm and the flashing display will continue until you descend below the CEILing depth or the decompression obligation has been satisfied as described above.

Your BOTTOM time, TANK pressure, ASCENT rate, and DEPTH gauge will continue to operate normally as if you were in the Subsurface Mode.

FO2 Emergency Decompression Mode (continued)

NOTE: While in the Emergency Decompression Mode if the GEMINI Nitrox is subjected to a depth greater than 327 feet, the GEMINI Nitrox will continue to report current depth until the depth transducer is no longer capable of measuring increases in depth (pressure). At that point the depth digits will begin to flash and the WU will display the last depth reading. This depth will continued to be used in the Emergency Decompression time calculations. Once the GEMINI Nitrox is capable of reporting accurate depths the depth digits will cease flashing and the WARING legend will turn off.

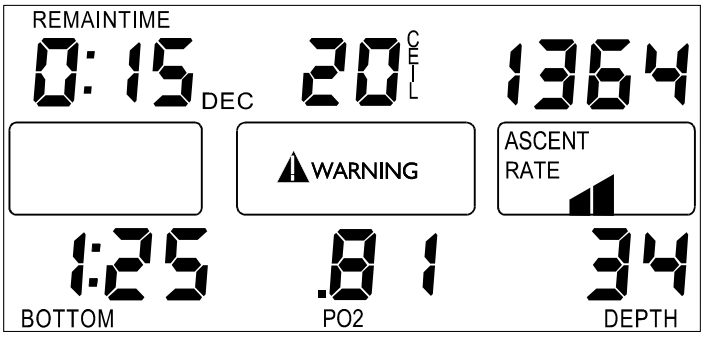

Figure 15 Emergency Decompression Mode, FO2, Primary Screen

- REMAINing TIME DEC* — 15 minutes
- CEILing — 20 feet
- Cylinder Pressure — 1364 psi
- WARNING Legend Illuminated
- Ascent RATE — 30 to 39 ft per minute (fpm)
- BOTTOM Time — 1 hour 25 minutes
- Current PO_2 Value — .81 ATA
- Current DEPTH — 34 feet

*** This value is dependent upon how the dive computer is configured. If BOTH is selected, then this value could mean total decompression time left. See section regarding REMAIN TIME DEC for more information.**

FO2 Emergency Decompression Mode (continued)

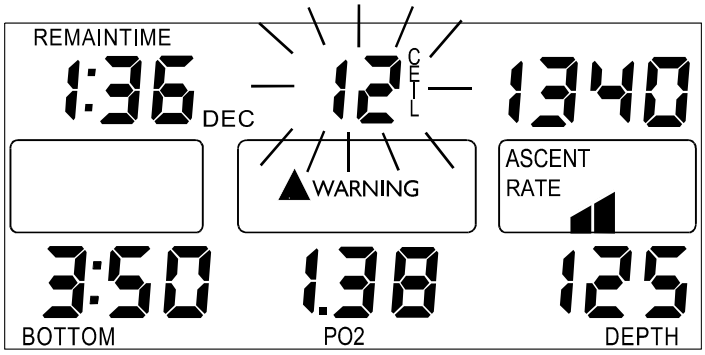

Figure 15a Emergency Decompression Mode, FO2, Primary Screen, 120 foot Ceiling

- REMAINing TIME DEC — 1 hour 36 minutes
- CEILing — 120 feet (flashing)
- Cylinder Pressure — 1340 psi
- WARNING Legend Illuminated
- Ascent RATE — 30 to 39 ft per minute (fpm)
- BOTTOM Time — 3 hour 50 minutes
- Current PO_2 Value — 1.38 ATA
- Current DEPTH — 125 feet

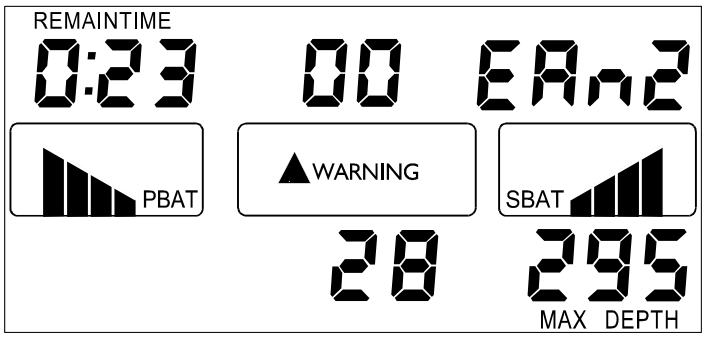

Figure 16 Emergency Decompression, FO2, Alternate Screen

FO2 Emergency Decompression Mode (continued)

- REMAINing TIME air — 23 minutes of remaining air time
- Breathing Parameter — 00 (indicates breathing on Blend2 or 3)
- Blend Indicator — EAn 2
- Primary BATtery voltage — 2.87 to 3.00 volts
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 28%
- MAXimum DEPTH — 295 feet

CNS / OTU TOXICITY DISPLAY:

The **GEMINI Nitrox** has the ability to track Oxygen Toxicity levels for the Central Nervous System (CNS) as well as the Mission Oxygen Tolerance Units Dose (OTU). In addition, a maximum Partial Pressure of Oxygen (PO_2) warning alarm can also be set. While most other audible alarms of the dive computer consist of five long beeps, the CNS, OTU, and PO_2 have a distinctive audible alarm that consists of short double-beeps that sound once per second for five seconds.

As long as one or more of these three parameters is outside its limits, the "WARNING" legend on the display will continue to flash and the audible alarm will be repeated once per minute.

PARTIAL PRESSURE OF OXYGEN (PO_2): High levels of PO_2 can cause severe Oxygen poisoning. Widely different levels of PO_2 can affect individual divers. The user via the ANALYST can set the PO_2 alarm to any level between 0.50 ATA and 1.60 ATA. As shipped from the factory, this is set to 1.60 ATA.

Should the PO_2 be above the alarm set point, the warning legend will illuminate and the audible alarm will sound and the PO_2 value that is being displayed on the WU will flash.

CENTRAL NERVOUS SYSTEM (CNS) TOXICITY: Should the CNS Toxicity reach 50% of the maximum allowable, the warning legend will illuminate and the audible alarm will sound and the "MAX DEPTH" digits will be replaced with a "C" followed by the two digit CNS percentage. All three of these digits on the display will be flashing along with the "WARNING" legend (see Figure 23a). In addition the CNS Warning Bar Graph will appear in the PBAT window of the WU.

By the accepted definition of CNS toxicity, should a PO2 value of greater than 1.6 ATA be measured, the CNS Toxicity will be 100%. During the Surface Interval, this percentage will decrease as the CNS declines toward zero. Once this has dropped below 50%, the MAX DEPTH reading will return.

CNS / OTU TOXICITY DISPLAY (continued)

OXYGEN TOLERANCE UNITS (OTU):
An issue with long term breathing of higher partial pressures of Oxygen above 0.5 ATA is Pulmonary Oxygen Toxicity or sometimes called WHOLE BODY, which must be tracked properly.

The **GEMINI Nitrox** will track the OTU based on Dr. Bill Hamilton's 'REPEX' method of oxygen exposure management. The OTU Dose is an exponential function of oxygen partial pressure and time.

The time-dependent limit varies with length of time (days) that the diver continues to dive without full recovery to zero OTU. The Mission OTU Clock tracks the OTU, which is a running clock that tracks long-term Oxygen exposure. This clock may run for several weeks if frequent dives are made using high levels of PO2. The current Mission Clock, CNS, and OTU can be seen via the ANALYST.

The recovery portion of the OTU algorithm is a linear reduction of OTU over time. The Mission OTU clock is reset to 0:00 when the OTU Dose reaches zero.

Should the OTU Dose reach 50% of the maximum allowable, the audible alarm will sound and the "MAX DEPTH" left digit will be replaced with an "O" followed by the two digit OTU Dose percentage. All three of these digits and the "WARNING" legend will be flashing. Symptoms of Pulmonary Oxygen Toxicity include burning in the throat and chest, coughing, and shortness of breath. Discontinue diving and consult a Physician should any of these, or other, symptoms appear. Whatever the current CNS/OTU Toxicity level, it can also be viewed in the Programming Mode (see figure 39).

FO2 CNS / OTU TOXICITY DISPLAY

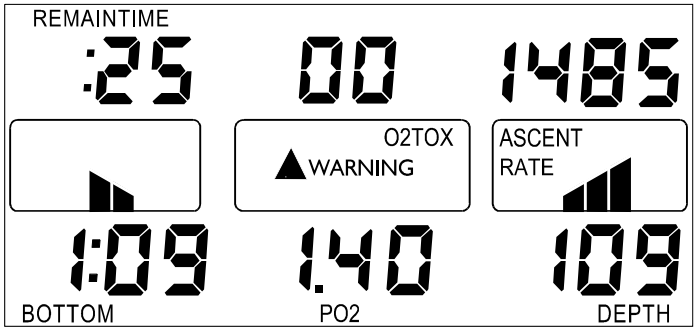

Figure 23 Subsurface Mode, FO2, CNS/OTU Warning, Primary Screen

FO2 CNS / OTU TOXICITY DISPLAY (continued)

- REMAINing TIME air
  Or
  REMAINing TIME NDC — 25 minutes of remaining air
- (lesser of the two) — time
- Breathing Parameter — 00 (indicates breathing on Blend2 or 3)
- Cylinder Pressure — 1485 psi
- CNS exposure — 60 to 69 %
- O2TOX & WARNING legend illuminated
- Ascent RATE — 30 to 39 ft per minute (fpm)
- BOTTOM Time — 28 minutes
- Current PO_2 Value — .77 ATA
- Current DEPTH — 38 feet

The CNS warning bar graph will appear if CNS exposure is calculated at greater than 50%. The diver is supplied with a visual indication of his/her exposure level. Once CNS exposure declines below the 50% level the bar graph will cease to be displayed.

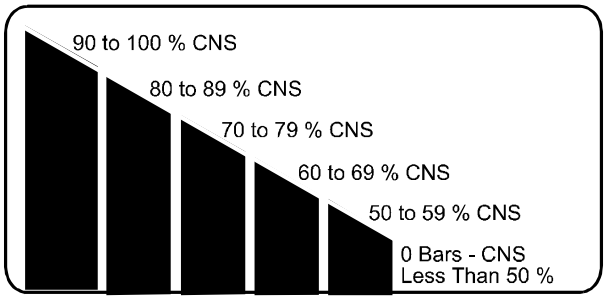

Figure 23a CNS Warning Bar Graph

The percentages indicated are for reference only they do not appear on the WU display.

FO2 CNS / OTU TOXICITY DISPLAY (continued)

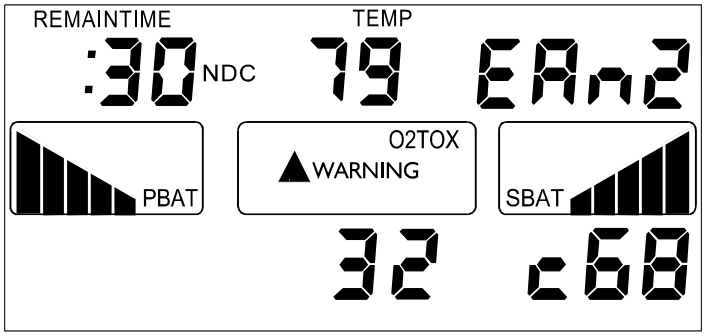

Figure 24 Subsurface Mode, FO2, CNS Warning, Alternate Screen

- REMAINing TIME air
  Or
  REMAINing TIME NDC (greater of the two) — 30 minutes of remaining NDC time
- TEMPerature — 79^{O} F
- Blend Indicator — EAn 2
- Primary BATtery voltage — 3.00 to 3.25 volts
- O2TOX & WARNING legend illuminated
- Secondary BATtery voltage — 3.00 to 3.25 volts
- O_2 percentage of indicated blend — 32%
- MAXimum DEPTH (CNS exposure) — 68%

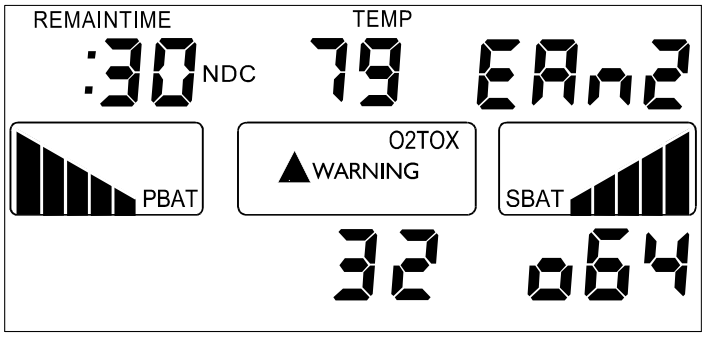

Figure 25 Subsurface Mode, FO2, OTU Warning, Alternate Screen

FO2 CNS / OTU TOXICITY DISPLAY (continued)

- REMAINing TIME air
  Or
  REMAINing TIME NDC (greater of the two) — 30 minutes of remaining NDC time
- TEMPerature — 79^{O} F
- Blend Indicator — EAn 2
- Primary BATtery voltage — 3.00 to 3.25 volts
- O2TOX & WARNING legend illuminated
- Secondary BATtery voltage — 3.00 to 3.25 volts
- O_2 percentage of indicated blend — 32%
- MAXimum DEPTH (OTU exposure) — 64%

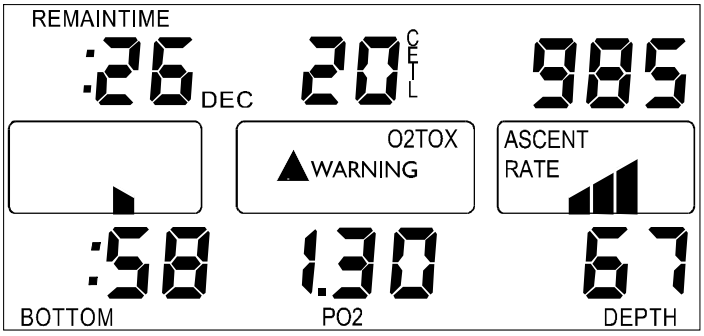

Figure 26 Decompression Mode, FO2, CNS/OTU Warning, Primary Screen

- REMAINing TIME DEC (lesser of the two) — 26 minutes of remaining DEC time
- CEILing — 20 feet
- Cylinder Pressure — 985 psi
- CNS exposure — 50 to 59 %
- O2TOX & WARNING legend illuminated
- Ascent RATE — 40 to 49 ft per minute (fpm)
- BOTTOM Time — 58 minutes
- Current PO_2 Value — 1.30 ATA
- Current DEPTH — 67 feet

FO2 CNS / OTU TOXICITY DISPLAY (continued)

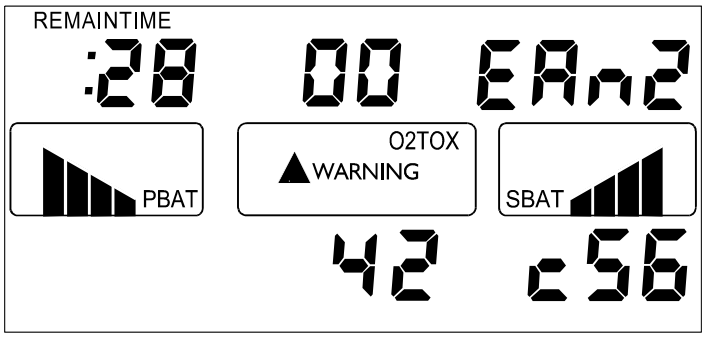

Figure 27 Decompression Mode, FO2, CNS Warning, Alternate Screen

- REMAINing TIME air — 28 minutes of remaining air time
- Breathing Parameter — 00 (indicates breathing on Blend2 or 3)
- Blend Indicator — EAn 2
- Primary BATtery voltage — 2.87 to 3.00 volts
- O2TOX & WARNING legend illuminated
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 42%
- MAXimum DEPTH (CNS exposure) — 56%

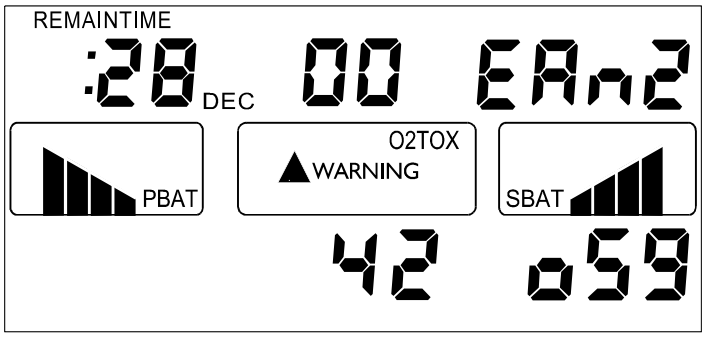

Figure 28 Emergency Decompression Mode, FO2, OTU Warning, Alternate Screen

FO2 CNS / OTU TOXICITY DISPLAY (continued)

- REMAINing TIME air — 28 minutes of remaining air time
- Breathing Parameter — 00 (indicates breathing on Blend2 or 3)
- Blend Indicator — EAn 2
- Primary BATtery voltage — 2.87 to 3.00 volts
- O2TOX & WARNING legend illuminated
- Secondary BATtery voltage — 2.87 to 3.00 volts
- O_2 percentage of indicated blend — 42%
- MAXimum DEPTH (OTU exposure) — 59%

ASCENT RATE BAR GRAPH:

The Ascent Rate bar graph and alarms are active in both the Subsurface Mode and Decompression Mode when the depth is below ten feet. The five-segment bar graph is used to display the diver's rate of ascent. The factory default for maximum ascent rate is 60 feet per minute. With this setting, no bars will illuminate if a diver is ascending at a rate less than 10 feet per minute. If the diver has an ascent rate of more than 60 feet per minute, the entire Ascent Rate Bar Graph will flash, and audible alarm will sound once per second, and the WARNING legend will illuminate. Each segment indicates an additional 10 feet per minute of Ascent Rate.

Via the ANALYST PC Interface, the maximum Ascent Rates alarms can be selected from 20 to 60 feet per minute in one-foot increments. Another ANALYST selection pertains to the bar graph itself. The two selections given are either FIXED or PROPORTIONAL.

With FIXED, each of the five bars indicates an additional 10 feet per minute of Ascent Rate regardless of the maximum Ascent Rate selected. With PROPORTIONAL, each of the five bars indicate 20% (one-fifth) of the selected maximum Ascent Rate.

A third option that is accessible via the ANALYST PC Interface is a VARIABLE Ascent Rate. With this option, the Ascent Rate Alarm is determined by depth. As the diver ascends to shallow depths, the maximum Ascent Rate is lowered. The maximum Ascent Rates and their associated depth are:

60 feet or deeper	60 feet per minute
59 to 30 feet	feet per minute equal to the depth
Less than 30 feet	30 feet per minute

The sensitivity or responsiveness of the Ascent Rate may be selected. Via the ANALYST, eight different levels of sensitivity are available.

ASCENT RATE BAR GRAPH (continued)

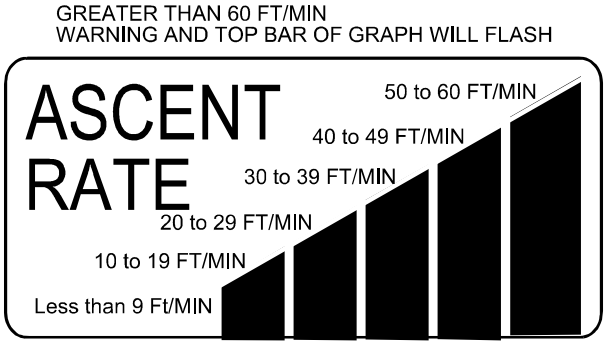

Figure 17 Ascent Rate Bar Graph
(Fixed at 60 feet-per-minute)

NOTE: Customizing the Ascent Rate and Ascent Rate Bar Graph are just two of the many additional programmable features available when using the Analyst PC Interface. See an Authorized Team Cochran Dealer for a complete demonstration. Some available features are described in the section "USER CONFIGURABLE OPTIONS".

The ascent rate footage ranges are for reference only they do not appear on the WU display.

NOTE: Regardless of the Ascent Rate Bar Graph's settings the Ascent Rate legend will only appear when the programmed ascent rate causes the first bar of the Ascent Rate Bar Graph to appear, for a 60 fpm ascent rate this will occur at 10 fpm.

PRIMARY BATTERY (PBAT) VOLTAGE BAR GRAPH

The **GEMINI Nitrox** has two independent isolated battery compartments, The **GEMINI Nitrox** is unique among dive computers in that its' battery compartments each contain a set (two) size 'AA' batteries which can independently power the dive computer, they form a redundant power source. Each battery compartment has its' own power indicator which is indicated by the PBAT and SBAT battery graphs on the WU. The battery compartment as PBAT is the one closest to the Cochran Undersea Technology printing on the TU.

> **NOTE: When replacing the batteries in the Tank Unit it is recommended that all four be replaced at the same time. See Battery Replacement procedure on page XX.**

PRIMARY BATTERY (PBAT) VOLTAGE BAR GRAPH (continued)

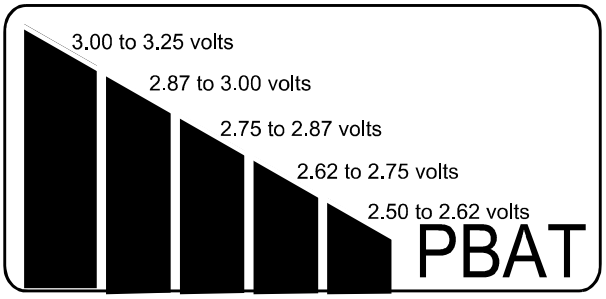

Figure 18 Primary Battery Voltage Bar Graph

The voltages indicated are for reference only they do not appear on the WU display.

SECONDARY BATTERY (SBAT) VOLTAGE BAR GRAPH

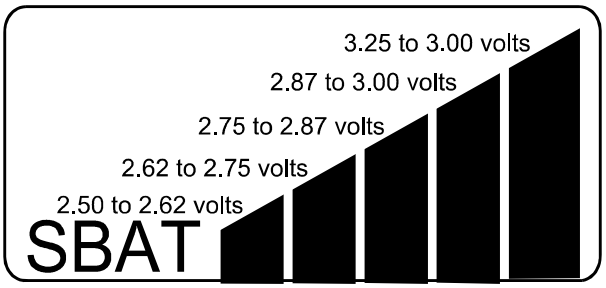

Figure 19 Secondary Battery Voltage Bar Graph

The voltages indicated are for reference only they do not appear on the WU display.

WRIST UNIT BATTERY VOLTAGE BAR GRAPH

The **GEMINI Nitrox**'s Wrist unit is power by to size "N" Alkaline batteries. The power level of theses batteries can be monitored when the WU is in its' Field Programming Mode or by accessing the INFormation screen in the TU's Field Programming menu, see Field Programming page XX. The two batteries should be replaced when there is only one bar illuminated on the WU battery voltage display graph.

WRIST UNIT BATTERY VOLTAGE BAR GRAPH (continued)

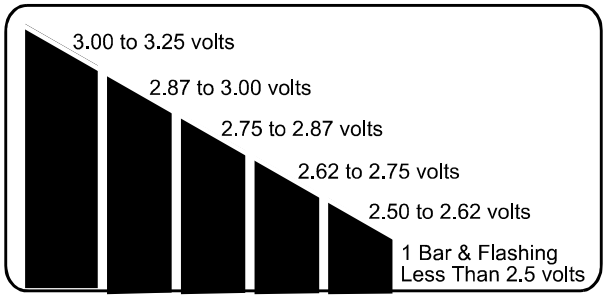

Figure 21 Wrist Unit Battery Voltage Bar Graph

The voltages indicated are for reference only they do not appear on the WU display.

ALTITUDE BAR GRAPH

The **GEMINI Nitrox** has a maximum altitude capability of 15,000 feet above mean sea level. Altitude is indicated in six ranges via the Ascent Rate Bar Graph as follows (Altitude compensation is seamless from 2,000 feet to 15,000 feet above sea level. The six ranges are for display purposes only.

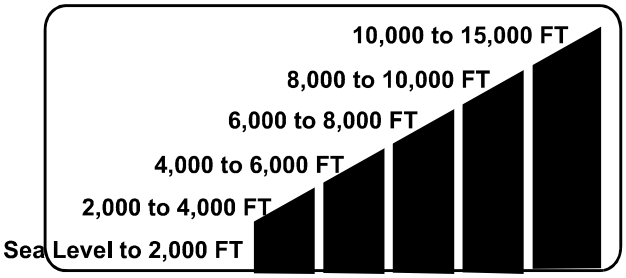

Figure 20 Altitude Bar Graph

The altitude ranges are for reference only they do not appear on the WU display.

SENSOR WARNING MODE

The **GEMINI Nitrox** has the capability of monitoring the integrity of its' sensors, both the high-pressure cylinder and the low-pressure depth/altitude. When the computer detects an error in one of the transducers, the diver is alerted to this condition by the illumination of the warning legend, warning symbol and SENSOR legend, the computer will also issue a 5-chirp audible alarm once per minute to alert the diver to this condition. On the WU the MAX DEPTH digits will be replaced with S-H to indicate the high-pressure transducer or S-d for the low-pressure depth transducer. In the highly unlikely situation were both sensors are detected as having errors, the WU display will alternate S-h and S-d. This warning will be issued whether the computer is in the Surface Mode, Subsurface Mode or Decompression Mode. In the unlikely case that your computer issues one of these warnings the unit should be returned to the factory for evaluation and/or repair.

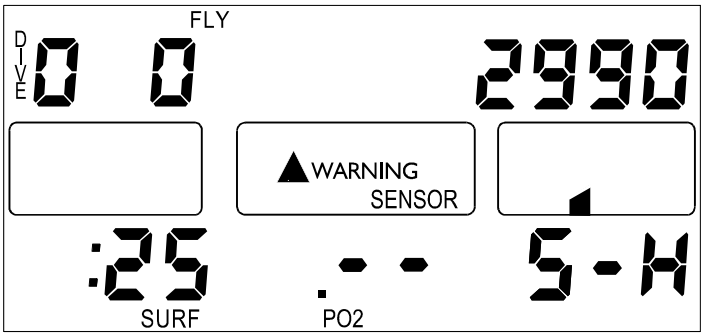

Figure 29 Surface Mode, Primary Screen, No Nitrogen, High Pressure Trandsucer Sensor Warning

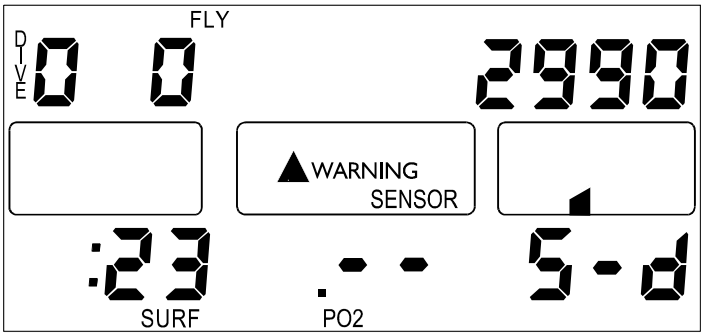

Figure 30 Surface Mode, Primary Screen, No Nitrogen, Depth Transducer Warning

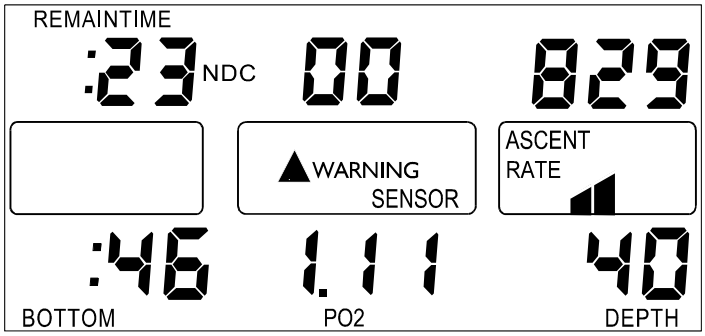

Figure 31 Subsurface Mode, Primary Screen, Sensor Warning

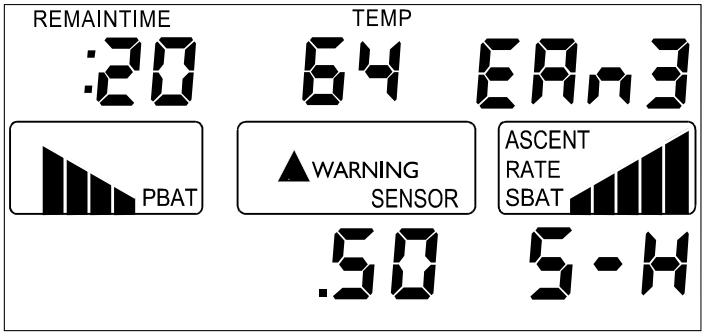

Figure 32a Subsurface Mode, Alternate Screen,
High Pressure Sensor Warning

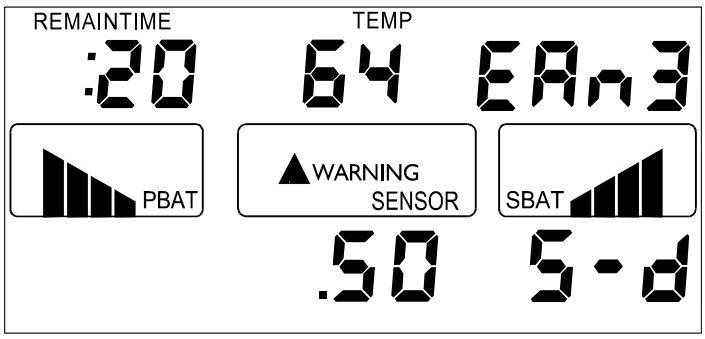

Figure 32b Subsurface Mode, Alternate Screen,
Depth Sensor Warning

POST-DIVE INTERVAL

During the first ten minutes after a dive the **GEMINI Nitrox** is in the Post-Dive Interval. This is indicated by the Surface Time being less than ten minutes. Should an another dive be commenced before the completion of the Post-Dive Interval the dive will be considered as a continuation of the pervious dive. In this case, bottom time will NOT include the time spent on the surface in this Post-Dive Interval Mode. However, when reviewing the profile with the ANALYST® the time spent on the surface in this mode will be shown. After the ten minute Post-Dive Interval has expired the information on the dive is stored in the **GEMINI Nitrox**'s electronics.

PSEUDO-OFF (SLEEP) MODE

Thirty minutes after the **GEMINI Nitrox** has concluded the Post-Dive Interval the **GEMINI Nitrox** will enter into a "Sleep" Mode. In the "Sleep" mode the **GEMINI Nitrox**'s computer continues to perform out-gassing calculations and keep track of the Surface time, and Time-To-Fly but ceases all other activities. When the **GEMINI Nitrox** enters the "Sleep" Mode, the Wrist Unit's display will flash. The **GEMINI Nitrox**'s Wrist Unit will enter its "Sleep" Mode thirty minutes after the rebreather goes to "Sleep". To "Wake-up" the rebreather turn on the **GEMINI Nitrox**'s WU and then you bridge contacts one and two on the Tank Unit, the **GEMINI Nitrox** will issue four wake-up beeps and display current information on the Surface Mode Screen.

FIELD PROGAMMING MODE

The **GEMINI Nitrox** has two Field Programmable components, the Tank Unit and the Wrist Unit.

TANK UNIT TOUCH CONTACTS

For identification purposes, place the **GEMINI Nitrox** TU face up with the mounting clips facing up and the battery caps toward the top (refer to FIG 51, page 20). There are three contacts on the top of the unit. The closest contact toward the high- pressure transducer cable is Contact 1; the middle contact is Contact 2, while the contact farthest away from the high-pressure transducer cable is Contact 3. Contacts are used to:

- Turn the unit on by sensing wetted Contacts 1 & 2;
- Enter Programming Mode by sensing shorted Contacts 1 & 2;
- Step through Programming functions by sensing shorted Contacts 1 & 2;
- Increment Programmable options by sensing shorted Contacts 2 & 3;
- Determine water conductivity when in a dive via Contacts 1 & 2 & 3;
- Communicate with the ANALYST PC Interface via Contacts 1 & 2 & 3.

It is important that the Contacts be kept clean and dry when the computer is not in use. Do not use solvents. Use only clean, fresh water.

FIELD PROGRAMMING MODE (continued)

Contacts 1, 2, & 3 on the Tank Unit are for programming the following:

- Turning on the Tank Unit
- Selecting PO_2 or FO_2 Mode
- Accessing PreDive Prediction
- Displaying CNS & OTU information
- Displaying primary WU battery voltage
- Setting the PO_2 Set Point
- Setting the maximum depth alarm
- Programming an added degree of conservatism
- Setting Cylinder Size
- Setting the O_2 % of Blend #1, 2 and 3
- Setting Blend #3 Depth and Time Benchmarks
- Change the tank unit's address code.

Contacts 1, 2, & 3 on the Wrist Unit are for:

- Turning the WU on.
- Accessing the WU's Logbook Mode
- Programming the TACLITE™
- Setting the Alternate Screen dwell time
- Selecting Independent or Slave Mode for the WU
- Changing the WU address code.

FIELD PROGRAMMING MODE - TANK UNIT

To begin the programming sequence:

1. Turn on both the TU and Display WU by bridging Contacts 1 and 2 with wetted fingers on both the TU and WU.

2. Using a coin or other highly conductive metal, briefly bridge Contacts 1 and 2 on the TU until a short beep is heard and the Programming Menu's first option is displayed on the WU. The Programming Menu contains thirteen options, which are displayed in sequence, each time that Contacts 1 & 2 are bridged with a **coin** the menu selection increments to the next selection. The program option is displayed on the upper row of the WU Display, the current setting for this option is displayed in the upper right if it is an alpha or on the bottom row of the display if it is a numeric.

3. To change the displayed menu options information, bridge Contacts 1 & 2 with wetted fingers. This will cause the current setting to flash or in the case of multi-digit numbers, the least significant digit will flash. For PO2 this is the .01's digit, for the depth alarm this will be the 1's digit, for conservatism this will be the 1's digit, etc.

FIELD PROGRAMMING MODE - TANK UNIT (continued)

4. Using wetted fingers, bridge Contacts 2 & 3 to toggle the selection or to increment the numeric value. A confirmation beep will sound with each increment.

5. Next using wetted fingers, bridge Contacts 1 & 2 to select the next digit, once selected the digit will flash to identify that it is being programmed. Bridge Contacts 2 & 3 till the desired value is displayed.

6. Repeat step 5, until all digits have been programmed.

7. To save the changes that have been made bridge Contacts 1 & 2 with a coin or other highly conductive metal. Once the changes have been saved the next programming option will be displayed.

8. To increment through the PreDive Prediction option you must bridge Contacts 1 & 2 with wetted fingers. Each time the Contacts are bridged the PreDive Prediction Depth will increment ten feet and display the NDC time for that depth. The depth will continue to increase until a depth is reached that has less than two minutes of NDC time or a maximum depth of 330 feet is reached. To exit from the PreDive Prediction Mode bridge Contacts 1 & 2 with a coin.

Once all of the desired values have been programmed the new values can be reviewed by continuously bridging Contacts 1 & 2 with a coin. This will cause the unit to step through all thirteen programmable items and display their current settings.

NOTE: All audible and visual Alarms are suspended while the GEMINI Nitrox is in the Field Programming Mode. Upon exiting the Field Programming Mode the all Alarms are reactivated.

NOTE: If the Tank Unit is left in the Field Programming mode for five minutes without the contacts being touched, the Tank Unit will automatically increment through the remaining Field Programming options and exist the Field Programming Mode and return to the Surface Mode. Once this occurs the Tank Unit will retain the previously programmed settings.

FIELD PROGRAMMING MENU FO2 MODE

The following table lists the various Tank Units' programming choices with their display identification and figure number. The Field Programming sequence and choices are determined by the selection of PO2 or FO2 mode. This table assumes Field Programming choice #1 is FO2

Identification		Description	Figure
PO2 / FO2		Toggles between PO2 or FO2 Mode	37a & 37b
PdP	**On**	PreDive Prediction	38
InF		WU battery voltage and CNS & OTU information Oxygen Percentages of the three blends	39 39a
dEp	**ALA**	Depth Alarm. Maximum allowable value is 320 feet.	40
Con		Added Conservatism. Maximum allowable value is 50%.	41
L		Cylinder size in liters .	42
	EAn1	Oxygen Percentage of Blend #1, allowable range 21% to 50% in .1% increments	43
	EAn2	Oxygen Percentage of Blend #2, allowable range 21% to 99.9% in .1% increments	44
	EAn3	Oxygen Percentage of Blend #3, allowable range 21% to 99.9% in .1% increments	45
	EAn3	Bottom Time Benchmark for Activation of Blend #3. Maximum allowable value is 600 minutes	46
	EAn3	Depth Limit Benchmark for Activation of Blend #3. Maximum allowable value is 90 feet.	47
Add	**COdE**	Wrist Unit Address Code. Allowable values between ????? and ?????.	50

NOTE: If the GEMINI Nitrox Tank Unit is left in the Field Programming mode for five minutes without the contacts being touched. The Tank Unit will automatically increment through its' remaining Field Programming options and exist the Field Programming Mode and return to displaying the Mode it was in before Field Programming was invoked. Once this occurs the Tank Unit will retain the previously programmed settings.

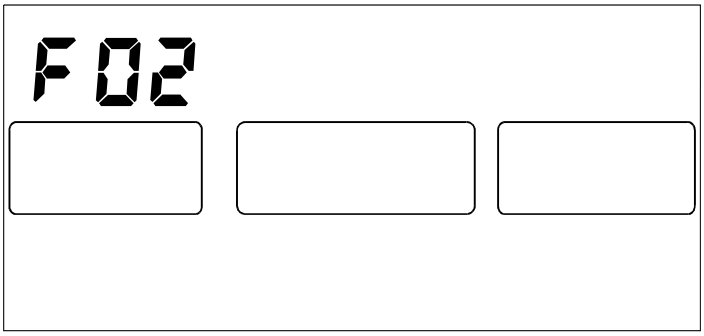

Figure 37b Field Programming Mode, PO2/FO2 Mode, Showing FO2 Selected

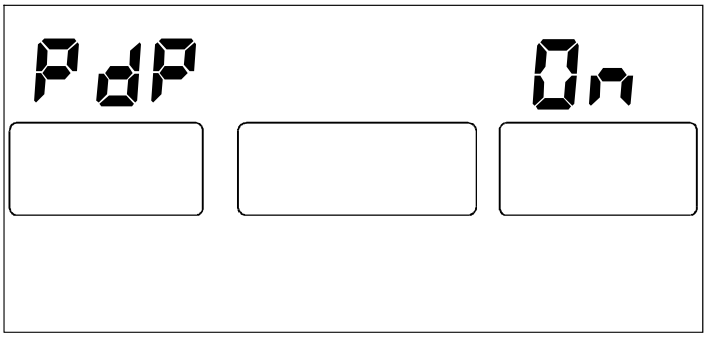

Figure 38 Field Programming Mode, Pre Dive Prediction

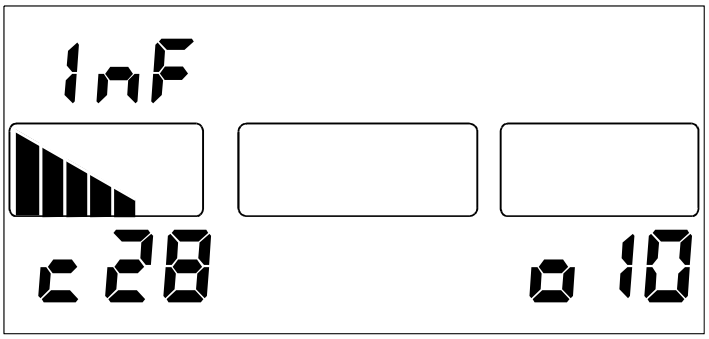

Figure 39 Field Programming Mode, Information Display

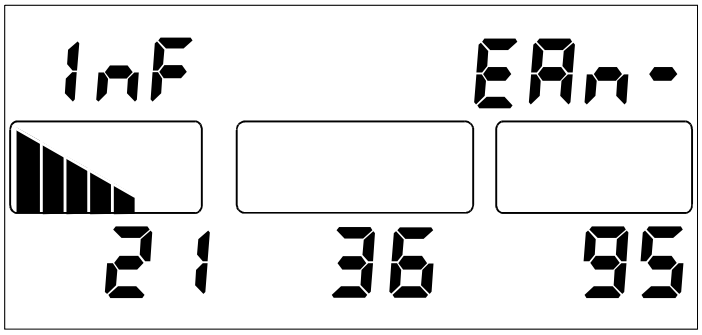

Figure 39a Field Programming Mode, Information Display, Primary Screen

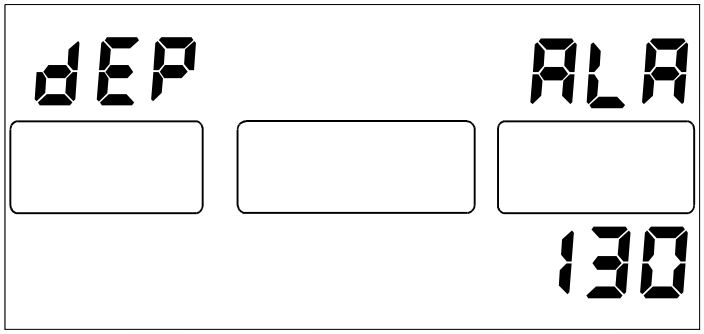

Figure 40 Field Programming Mode, Depth Alarm

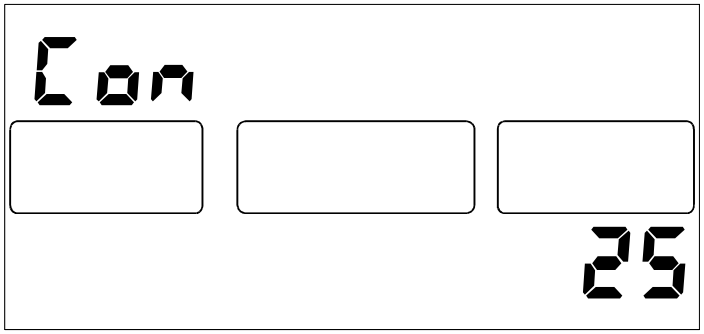

Figure 41 Field Programming Mode, Added Conservatism

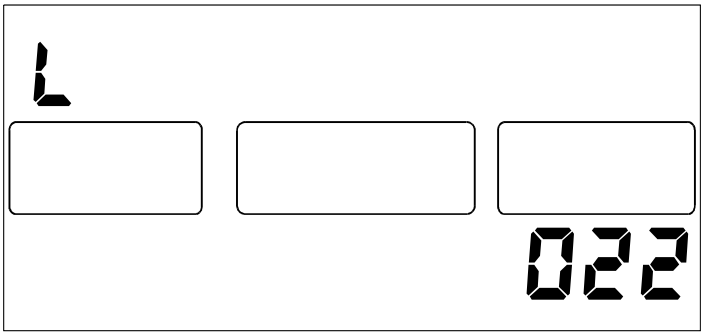

Figure 42 Field Programming Mode, Cylinder Size

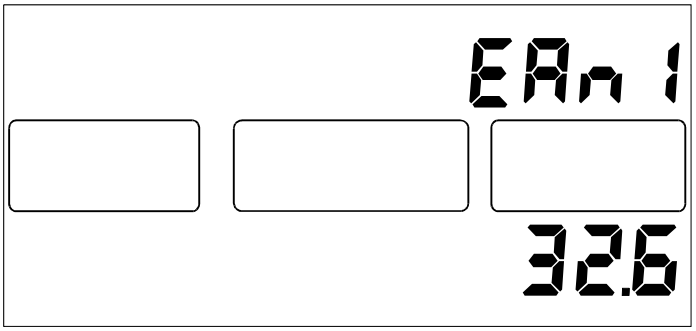

Figure 43 Field Programming Mode, Setting Blend One O2 Percentage

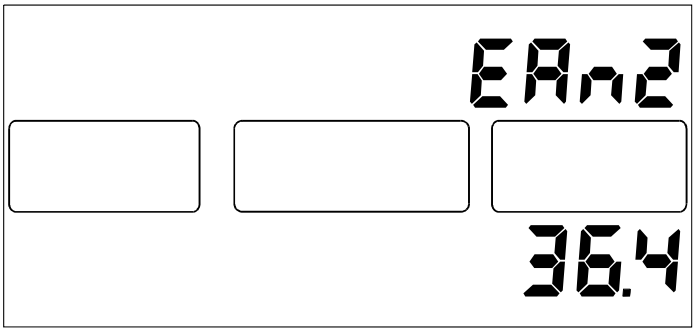

Figure 44 Field Programming Mode, Setting Blend Two O2 Percentage

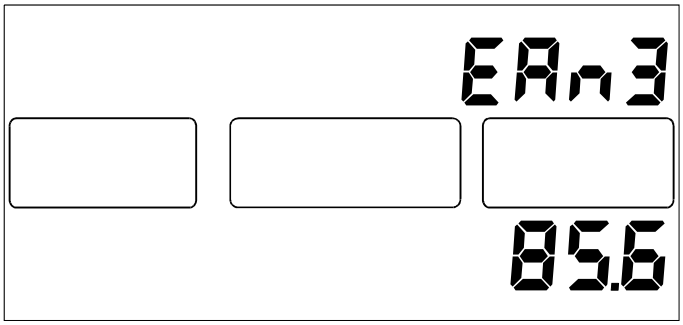

Figure 45 Field Programming Mode, Setting Blend Three O2 Percentage

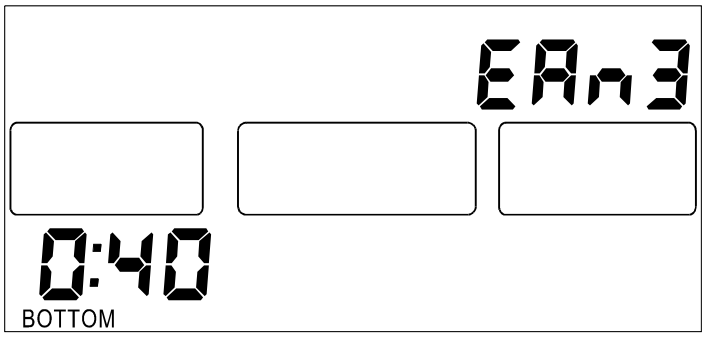

Figure 46 Field Programming Mode,
Setting Blend Three Time Benchmark

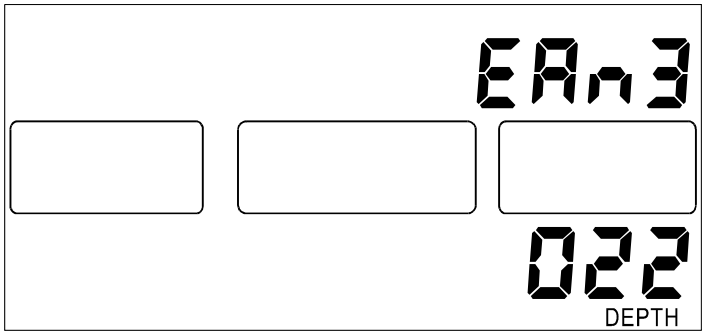

Figure 47 Field Programming Mode,
Setting Blend Three Depth Benchmark

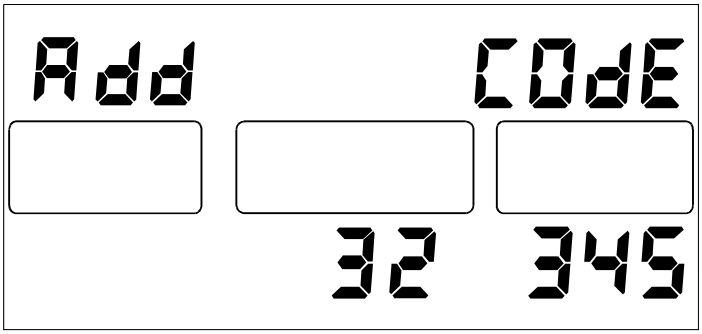

Figure 50 Field Programming Mode, Wrist Unit Address Code

FIELD PROGRAMMING MENU PO2 MODE

The following table lists the various Tank Units' programming choices with their display identification and figure number. The Field Programming sequence and choices are determined by the selection of PO2 or FO2 mode. This table assumes Field Programming choice #1 is PO2

Identification		Description	Figure
PO2 / FO2		Toggles between PO2 or FO2 Mode	37a & 37b
PdP	**On**	PreDive Prediction	38
InF		WU battery voltage and CNS & OTU information	39
dEp	**ALA**	Depth Alarm. Maximum allowable value is 320 feet.	40
Con		Added Conservatism. Maximum allowable value is 50%.	41
L		Cylinder size in liters .	42
PO2	**SET**	PO_2 set point, Allowable values from 0.5 to 1.50	49
Add	**COdE**	Wrist Unit Address Code. Allowable values between ????? and ?????.	50

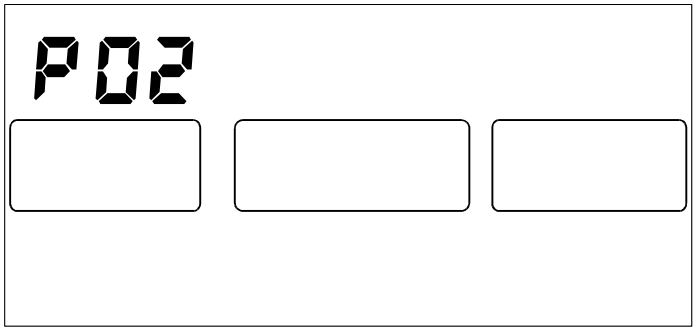

Figure 37a Field Programming Mode, PO2/FO2 Mode, Showing PO2 Selected

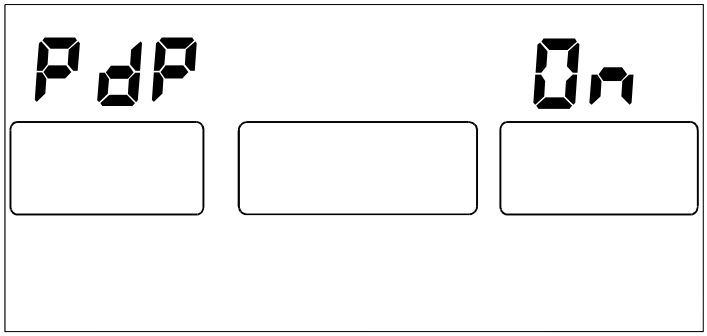

Figure 38 Field Programming Mode, Pre Dive Prediction

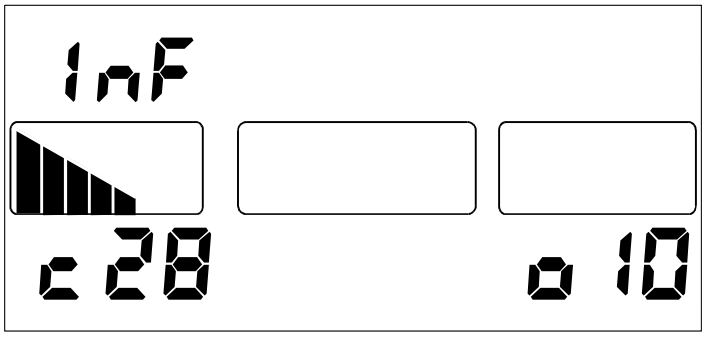

Figure 39 Field Programming Mode, Information Display, Alternate Display

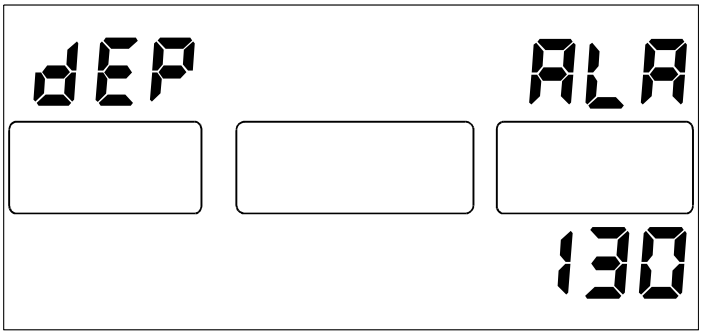

Figure 40 Field Programming Mode, Depth Alarm

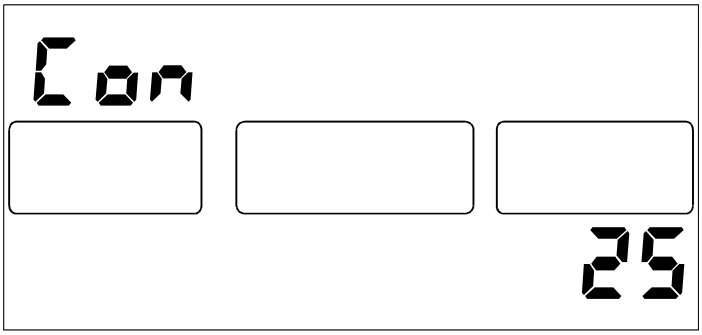

Figure 41 Field Programming Mode, Added Conservatism

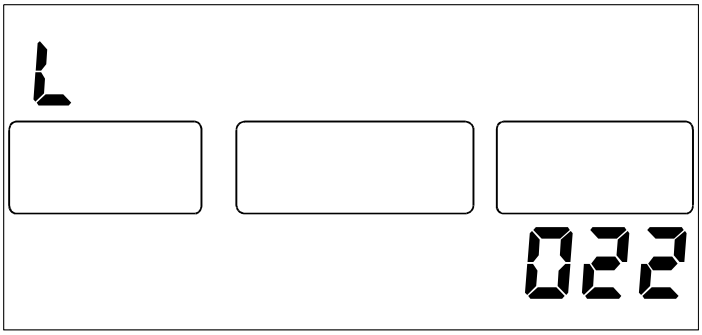

Figure 42 Field Programming Mode, Cylinder Size

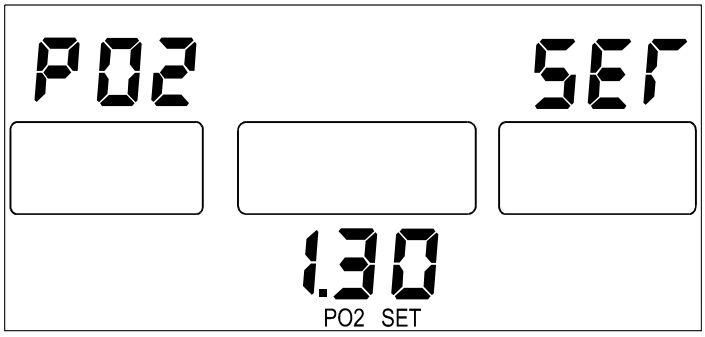

Figure 49 Field Programming Mode, PO2 Set Point

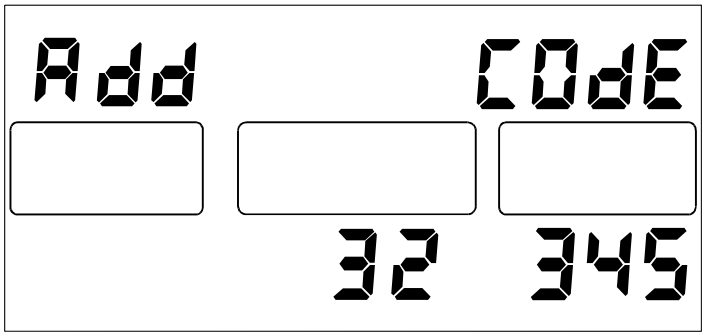

Figure 50 Field Programming Mode, Wrist Unit Address Code

WRIST UNIT TOUCH CONTACTS

For identification purposes, place the **GEMINI Nitrox** WU face up in the orientation that allows the display, display bezel and product name to be read. There are three contacts on the side of the unit. The closest contact toward the bottom of the display is Contact 1; the middle contact is Contact 2, while the contact farthest away at the top of the display is Contact 3. Contacts are used to:

- Turn the unit on by sensing wetted Contacts 1 & 2;
- Enter Programming Mode by sensing shorted Contacts 1 & 2;
- Step through Programming functions by sensing shorted Contacts 1 & 2;
- Increment Programmable options by sensing shorted Contacts 2 & 3;
- Communicate with the ANALYST PC Interface via Contacts 1 & 2 & 3.

It is important that the Contacts be kept clean and dry when the computer is not in use. Do not use solvents. Use only clean, fresh water.

FIELD PROGRAMMING MODE - WRIST UNIT

At this time the programming menu for the WU when in the "**Slave**" Mode contains five menu items. They are Logbook, TACLITE™ Dwell Time, Alternate Screen Dwell time, Independent or Slave Mode for the WU and changing the Address Code of the **GEMINI Nitrox** TU that the WU communicates with. When in the "**Independent**" Mode this menu contains seven menu items. They are Logbook, TACLITE™ Dwell Time, Alternate Screen Dwell time, Depth Alarm, Conservatism, Blend O2 % and Independent or Slave Mode for the WU.

The Programming sequence for the Wrist Unit uses the same routine, by bridging Contacts 1 & 2 with a coin or other highly conductive metal the WU will enter the programming mode. The first menu item is for accessing the **GEMINI Nitrox**'s last 6 dives that are presented in a beginning and ending logbook format. When Contacts 1 & 2 are bridged with wetted fingers the most recent dive logs information is presented, each time that contacts 1 & 2 are bridged with wetted fingers the dive logs beginning or ending information will be displayed. The second menu item is for turning on, turning off or setting the amount of time that the TACLITE™ stays on when the WU is tapped. In the upper left will be displayed “TAC” and in the upper right will be displayed “dEL” and the current setting will appear in the lower right. This setting will be a number from 00 to 99. If the TACLITE™ programming number is set to 00 the TACLITE™ will not turn on. If the TACLITE™ programming number is set to 99 the TACLITE™ will be on whenever the WU is on. If the programming number is between 1 and 98, this number indicates the number of seconds that the TACLITE™ will stay on when the WU is tapped, i.e. 90 = 1.5 minutes. Bridging Contacts 1 & 2 with wetted fingers will cause the current digit that is being programmed to flash. Bridging Contacts 2 & 3 with wetted fingers increments the value of the digit being programmed. Once the requested value is displayed, bridging Contacts 1 & 2 with wetted fingers will select the next digit to be programmed. Repeat until all digits have been programmed with the requested value. To save the changes and access the next programming option, bridge Contacts 1 & 2 with a coin. The Alternate Screen can be programmed to stay on from 3 to 15 seconds before returning to the Primary Screen.

> **NOTE: If the GEMINI Nitrox Wrist Unit is left in the Field Programming mode for five minutes without the contacts being touched. The Wrist Unit will automatically increment through its' remaining Field Programming options and exist the Field Programming Mode and return to displaying the Mode it was in before Field Programming was invoked. Once this occurs the Wrist Unit will retain the previously programmed settings.**

FIELD PROGRAMMING MEMU, WU, SLAVE MODE

The following table lists the various Wrist Units' programming choices with their display identification and figure number. The Field Programming sequence and choices are determined by the selection of "Independent" or "Slave" mode. This table assumes the WU is in the "Slave" Mode.

Identification		Description	Figure
LOG	**On**	Logbook	33
TAC	**dEL**	Controls length of time that the TACLITE is on. Allowable values 0 to 99.	34
Scr	**dEL**	Controls length of time that alternate screen is viewed. Allowable values 3 to 15.	35
Ind / SLA		Toggles between Independent or Slave WU mode.	48a & 48b
Add	**COdE**	Tank Unit's Address Code. Allowable values between ????? and ?????.	36

NOTE: The Tank Unit does not have to be turned on to program the WU.

NOTE: Whenever the WU is in the programming mode, the WU's battery voltage will be displayed as a bar graph (see figure 21).

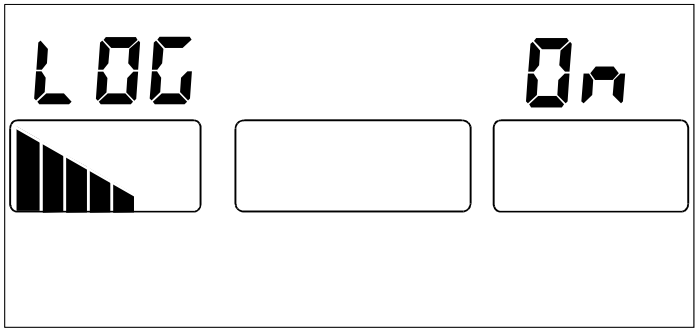

Figure 33 Field Programming Mode, WU, Logbook

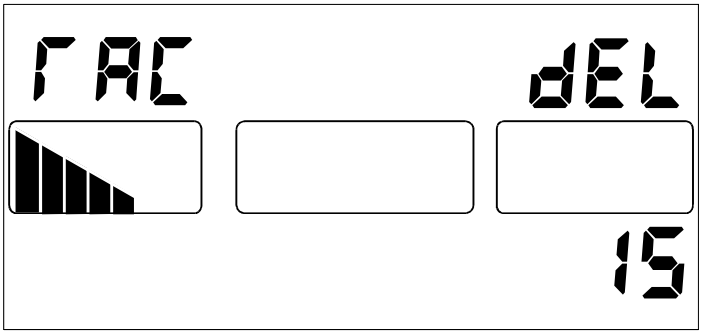

Figure 34 Field Programming Mode, WU, TACLITE Delay

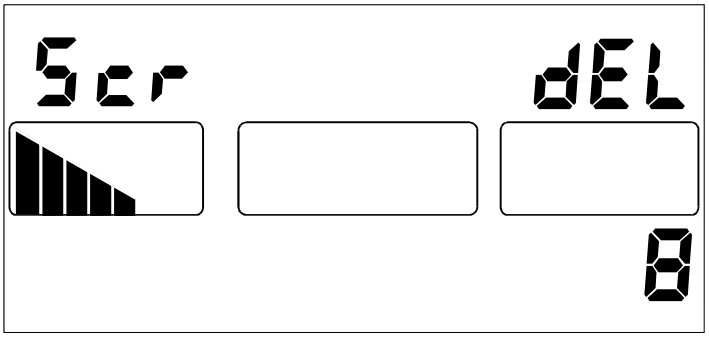

Figure 35 Field Programming Mode, WU, Alternate Screen Delay

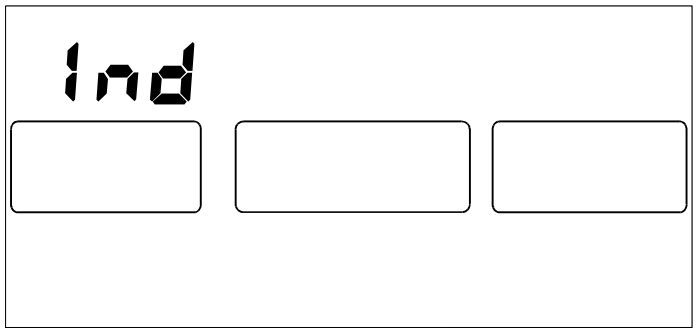

Figure 48b Field Programming Mode, WU, Independent or Slave Mode Showing Independent Selected

FIELD PROGRAMMING MODE, WU, SLAVE MODE (continued)

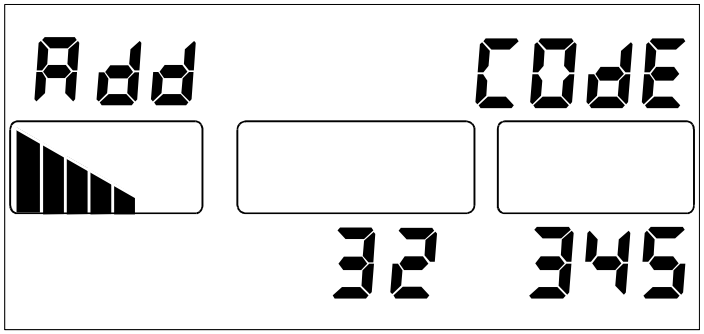

Figure 36 Field Programming Mode, WU,Tank Unit Address Code

FIELD PROGRAMMING MEMU, WU, INDEPENDENT MODE

The following table lists the various Wrist Units' programming choices with their display identification and figure number. The Field Programming sequence and choices are determined by the selection of "Independent" or "Slave" mode. This table assumes the WU is in the "Independent" Mode.

Identification		Description	Figure
LOG	**On**	Logbook	33
TAC	**dEL**	Controls length of time that the TACLITE is on. Allowable values 0 to 99.	34
Scr	**dEL**	Controls length of time that alternate screen is viewed. Allowable values 3 to 15.	35
dEp	**ALA**	Depth Alarm. Maximum allowable value is 320 feet.	40
Con		Added Conservatism. Maximum allowable value is 50%.	41
	EAn1	Oxygen Percentage of Blend #1, allowable range 21% to 50% in .1% increments	43
Ind / SLA		Toggles between Independent or Slave WU mode.	48a & 48b
Add	**COdE**	Tank Unit's Address Code. Allowable values between ????? and ?????.	36

FIELD PROGRAMMING MEMU, WU, INDEPENDENT MODE (continued)

NOTE: The Tank Unit does not have to be turned on to program the WU.

NOTE: Whenever the WU is in the programming mode, the WU's battery voltage will be displayed as a bar graph (see figure 21).

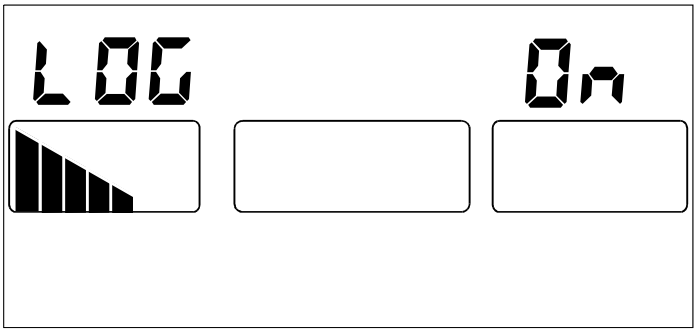

Figure 33 Field Programming Mode, WU, Logbook

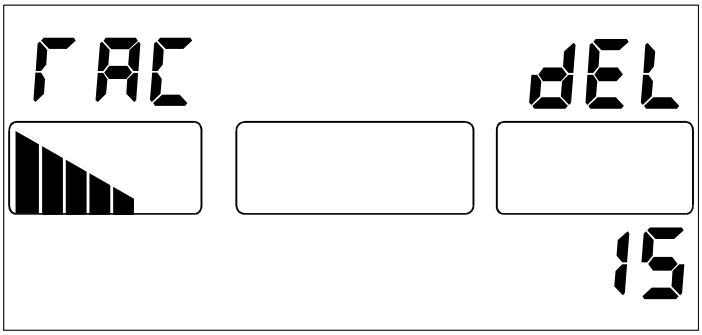

Figure 34 Field Programming Mode, WU, TACLITE Delay

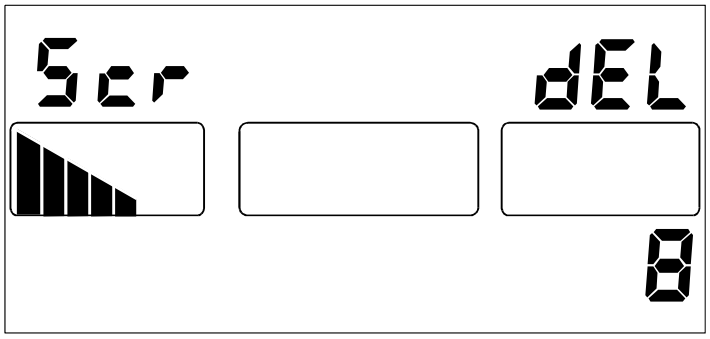

Figure 35 Field Programming Mode, WU, Alternate Screen Delay

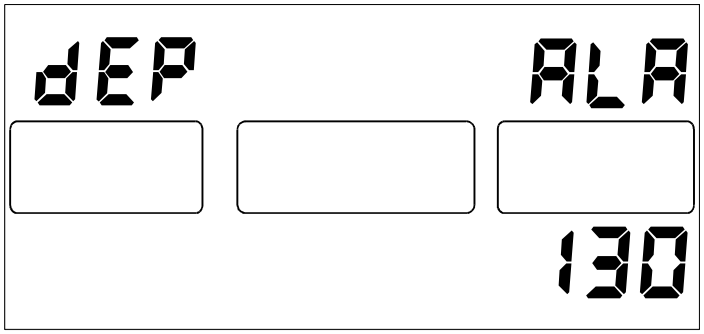

Figure 40 Field Programming Mode, Depth Alarm

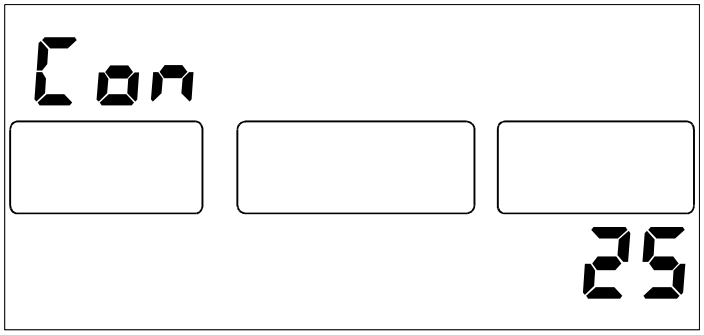

Figure 41 Field Programming Mode, Added Conservatism

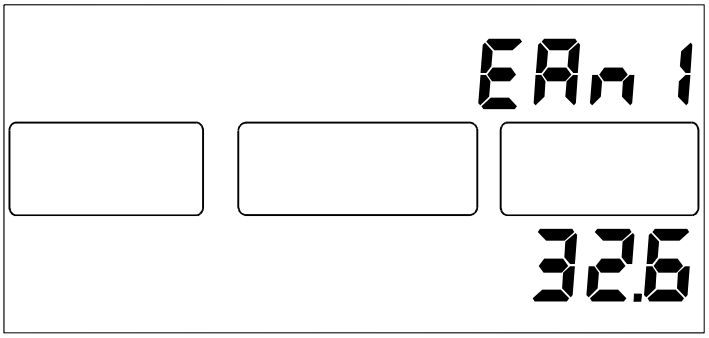

Figure 43 Field Programming Mode, Setting Blend One O2 Percentage

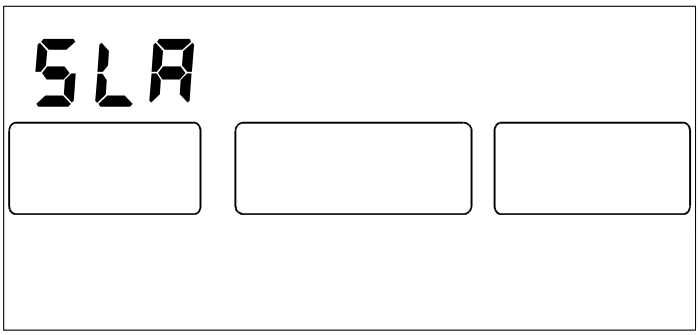

Figure 48a Field Programming Mode,WU, Independent or Slave Mode Showing Slave Selected

EXPLANATIONS

DESCRIPTION OF FUNCTIONS

Altitude Diving

Your **GEMINI Nitrox** senses the barometric pressure for altitudes up to 15,000 feet above sea level. Barometric pressures at a given altitude can change due to high and low-pressure weather systems as well as temperature.

When compared with most analog depth gauges at altitude, **GEMINI Nitrox** will display a greater depth. This is due to the reduced atmospheric pressure at the surface. Your **GEMINI Nitrox** is no substitute for the completion of a sanctioned altitude diving course from an international recognized certifying agency. The **GEMINI Nitrox** will only provide information that will allow the trained altitude diver to make safe diving decisions. Greater care should be taken when diving at altitude to avoid extending no-decompression times to their maximum limits.

WARNING: Diving at altitude requires a slower rate of ascent as well. Your GEMINI Nitrox will continue to display your rate of ascent as usual, but rates slower than 60 feet per minute should be used. Your certifying agency in altitude diving will provide you with their current recommended rates.

Ascent Rate

Subsurface Mode or Emergency Decompression Mode:

Ascent rate is averaged over a running four-second period. For purposes of the description, this manual will just refer to ascent rate with the reader understanding that this is a four-second averaged ascent rate and not an instantaneous ascent rate.

You can also select between a Fixed and Variable Ascent Rate with the optional Analyst® Personal Computer Interface.

FIXED: In the fixed mode, the ascent rate will be fixed throughout the entire dive profile regardless of depth. The fixed rate set at the factory is 60 feet per minute. With this default setting, your computer will alarm if you exceed an ascent rate of 60 feet per minute.

The diver may select fixed rates from 20 to 60 feet per minute.

VARIABLE ASCENT RATE: This feature utilizes several different ascent rates that are depth dependent. At depths greater than 60 feet, the maximum allowable ascent rate is set to 60 feet per minute. At depths less than 30 feet, the maximum allowable ascent rate is set to 30 feet per minute. From depths between 30 and 60 feet, the maximum allowable ascent rate

will be the same as the current depth. For example, when you are at 43 feet, the maximum allowable ascent rate is 43 feet per minute.

Logbook Mode: The maximum speed of ascent recorded on the dive is displayed.

Note: Ascent rate is only computed and displayed at depths greater than 10 feet.

Ascent Rate Bar Graph

The Ascent Rate Bar Graph is comprised of a five-segment bar (see Figure 17). With the optional Analyst® Personal Computer Interface, you can select this bar graph to either represent the rate (speed) of your ascent or a percentage of the selected maximum ascent rate.

SPEED: With this option, each bar of the graph represents an additional 10 feet per minute of speed. For example, if you were ascending between 10 and 19 feet per minute, one bar segment would illuminate. If you were ascending between 20 and 29 feet per minute, two bar segments would illuminate, and so on with all five bar segments appearing when ascending between 50 and 60 feet per minute. The performance of this option remains the same regardless of the type or the maximum ascent rate selected.

PERCENTAGE: With this option, each bar of the graph represents an additional 20% of the maximum ascent rate selected. For example, if you had selected a fixed ascent rate limit of 30 feet per minute, each bar segment would represent an additional ascent rate of 6 feet per minute. (6 is 20% of 30) This option is especially useful if a variable ascent rate is selected. Regardless of the depth and associated maximum ascent rate, you will quickly be able to identify if you are approaching 100% maximum limit.

The Ascent Rate Bar Graph is set at the factory to display SPEED.

Bottom

This is the total bottom time (displayed in hours and minutes) calculated for a particular dive. Should a diver ascend to the surface, remain on the surface for less than 10 minutes and then commence another dive, the bottom time will continue to increment as though there was no time spent on the surface.

Surface Mode: The bottom time of your last dive is provided to you on the Alternate Display in hours and minutes. At the start of a new dive day, the bottom time will be 0:00.

Logbook Mode: The bottom time for the profile viewed is displayed on the Primary display.

Subsurface Mode or Emergency Decompression Mode: Your dive computer begins to count your bottom time when you have descended below five feet.

Bottom time continues to be counted until you have ascended above three feet. This time is expressed in hours and minutes.

CNS/OTU Toxicity Display: The current CNS Toxicity percentage.

BP

Breathing Parameter (BP) is a measure of your breathing efficiency. The more you dive, the more efficient your breathing becomes. With your dive computer, you will be able to monitor and log your progress. The number displayed is the amount of air you breathe per minute in psi normalized to the surface (one atmosphere). This data is sometimes referred to as Surface Air Consumption (SAC). Since Breathing Parameter is a "parameter", it remains in psi per minute regardless of metric or imperial calculations. Via the optional Analyst® Personal Computer Interface, you can also select Breathing Parameter to display liters per minute.

By eliminating depth as a variable, you will easily be able to compare your breathing rate from depth to depth and dive to dive. As you know, the amount of actual air you breathe per minute varies proportionate with depth even if your breathing rate remains unchanged. By normalizing your breathing rate to the surface, an immediate comparison of the rates can be made. For example, let's say that you made two dives, the first to 99 feet and the second to 66 feet. Lets also assume that your breathing rate was the same on both dives; and using the previous example, lets say your BP displayed 23, indicating your breathing rate as 23 psi per minute normalized to the surface. If depth entered the equation, your 99 foot dive would display a BP of 92 (23 x 4ATM's = 92) while the dive to 66 feet would display a BP of 69 (23 x 3ATM's = 69). With your dive computer, you can immediately see that your rate remained unchanged from the first to second dive. If the actual psi per minute breathed at depth were displayed, you would have seen two very different numbers, 92 and 69, and you would then have to calculate further to achieve a comparison.

Since BP is computed by monitoring the drop in tank pressure, a larger volume tank will show a more efficient BP while the BP of a smaller tank will be less efficient. For normal, casual sport SCUBA diving on a 10-litre (80 cubic foot tank), a BP of between 18 and 35 is considered normal. Breathing Parameter is computed and updated only at depths below ten feet.

Subsurface Mode: The averaged Breathing Parameter for the dive in progress is displayed.

Logbook Mode: The average BP for the profile view is provided.

Ceiling

Logbook Mode: This will show whether or not the dive profile viewed was a no-decompression dive. If you entered Emergency Decompression Mode on that particular dive, the CEILing would display the deepest stop that was required.

Emergency Decompression Mode: The depth above which you must not ascend when in the Emergency Decompression Mode.

Subsurface Mode: When making a no-decompression dive, the CEILing will not be displayed indicating that you may make a direct ascent to the surface without completing any decompression stops. Should you enter into a decompression situation, the CEILing will indicate, in feet or meters, the depth to which you must ascend and complete a Decompression Stop.

Depth

Subsurface Mode: The numbers above the DEPTH legend are used to display the current depth. Your dive computer has the intelligence to automatically determine if you are diving in fresh or seawater thereby providing you with the actual depth for the type of water in which you are diving.

NOTE: While in the Subsurface Mode if the GEMINI Nitrox is subjected to a depth greater than 327 feet, the GEMINI Nitrox will continue to report current depth until the depth transducer is no longer capable of measuring increases in depth (pressure). At that point the depth digits will begin to flash and the WU will display the last depth reading. This depth will continued to be used in the Emergency Decompression time calculations. Once the GEMINI Nitrox is capable of reporting accurate depths the depth digits will cease flashing and the WARNING legend will turn off.

Emergency Decompression Mode: The numbers above the DEPTH legend are used to display the current depth.

Predive Prediction Mode: In this mode, the digits above the DEPTH legend indicate the depth associated with the displayed NDC prediction.

Logbook Mode: The numbers above the DEPTH legend are used to display the average depth of the dive.

CNS/OTU Toxicity Display: On this display, the numbers are used to display the OTU Toxicity percentage.

Dive

Surface Mode: The dive number counts the number of dives made in a single "dive day". This counter begins with 0 and continues through 9, resetting back to 0 each time the TU is powered on.

Logbook Mode: The dive number in the Logbook Mode will identify which dive of that particular "dive day" you are viewing. For example, if you had just made your third dive of the day, the dive number would display 3 for the first profile viewed. The next would display 2, and the next would display 1. The next would display the last dive's DIVE number from the previous day. If you only made two dives on that previous day, the DIVE number would display 2 and so on.

NOTE: A "dive day" is defined as from the time you turn the TU on and lasting until all twelve half-time compartments reach normal levels. For this reason, you may have more than one "dive day" within a single 24- hour period or a "dive day" may last for more than 24 hours.

Max Depth

Surface Mode: After your dive, the maximum depth reached on that dive will be displayed up to the maximum gauge depth of 327 feet.
Logbook Mode: The maximum depth recorded on the profile viewed is displayed.
Subsurface Mode: This is the maximum depth recorded during the dive.

Mission OTU Clock

This is a running clock that tracks your long-term risk to Oxygen Toxicity. This clock may run for several weeks. The Mission OTU Clock is reset to 0:00 when the OTU level is also 0.

Remain Time Air

Predive Prediction Mode: When tank pressure greater than 500 psi is present on the computer's high pressure transducer, the lesser of either remaining airtime or the predicted no-decompression time is displayed for each depth.
Subsurface Mode: The display on which this data appears is dependent on whether the remaining airtime is greater or less than the remaining no-decompression. If the remaining airtime is less than the remaining no-decompression time, it will appear on the Primary Display. If the remaining airtime is greater than the remaining no-decompression time, it will appear on the Alternate Display.
Emergency Decompression Mode: The remaining airtime is always displayed on the Alternate Display.
Logbook Mode: If during the profile being displayed, the minimum recorded remaining time data was remaining airtime, the Alternate Display will display this data under the REMAIN TIME legend.

Remain Time NDC

Predive Prediction Mode: When tank pressure greater than 500 psi is present on the computer's high pressure transducer, the lesser of either remaining airtime or the predicted no-decompression time is displayed for each depth. If there is less than 500 psi present on the computer's high-pressure transducer, all predive predictions will be made using only no-decompression times.

NOTE: If the no-decompression limit for a given depth is less than two minutes, your dive computer will not make a predive prediction for that depth.

Logbook Mode: If during the profile being displayed, the minimum recorded remaining time data was remaining no-decompression time, the Alternate Display will display this data under the REMAIN TIME legend.

Subsurface Mode: This is the amount of no-decompression time remaining displayed in hours and minutes.

Remain Time DEC

Emergency Decompression Mode: The time displayed will be dependent upon how the dive computer has been setup. The information displayed will be either:

- Total time to complete all required decompression - or -
- Time Remaining at each individual stop - or -
- Alternating between total and stop time.

If the alternating option is selected, each time is displayed for 3 seconds.

Logbook Mode: If you are viewing an Emergency Decompression dive, the total required decompression time would be displayed followed by the DEC legend.

Surface Time

Surface Mode: Surface time is displayed in hours and minutes from the time the TU is turned on or at the end of a dive when ascending above three feet. Surface times from 0:00 to 17:03 will be displayed.

Cylinder

Surface Mode, *Subsurface Mode, or Emergency Decompression Mode*: The numbers in the upper right-hand corner of the display are used to display the current tank pressure in one-psi increments.

Predive Prediction Mode: If the amount of air remaining in your tank allows five minutes or less of bottom time for a given depth during the Predive Prediction Mode, the cylinder pressure digits will flash. This flashing will only occur for the predicted depths, which apply.

Logbook Mode: The beginning or ending tank pressure for the dive profile viewed.

Temp

Surface Mode: The current temperature that is calculated by the TU will be displayed.

Subsurface Mode: This is the water temperature calculated by the TU.

Logbook Mode: This is the average water temperature recorded for the viewed profile

Time-To-Fly

Surface Mode: If you plan to fly after diving, you must first allow time for your body to eliminate all of the residual nitrogen it has absorbed from diving. Your dive computer calculates this for you and displays the hours you must wait before safely flying or traveling to altitude after diving. The time calculated includes an additional 12-hour surface time for added safety. For example, if it would take your body three hours to eliminate all residual nitrogen, the time-to-FLY would display 15 hours (three hours plus the 12 hour added safety margin).

Logbook Mode: In the Logbook Mode, the time-to-FLY calculated at the end of that particular dive profile is displayed.

CAUTION: It is always recommended that you wait at least 24 hours before flying after diving.

AUDIBLE & VISUAL WARNINGS

This chapter describes and explains the audible and visual warnings that your **GEMINI Nitrox** may issue to alert you of potentially hazardous conditions. Failure to observe audible and/or visual warnings and take corrective action may result in injury or death.

NOTE: Information concerning the warning may appear on the Alternate Screen as well as the Primary Screen.

The WARNING symbol and legend is illuminated whenever there is a warning being issued.

NOTE: All Alarms are suspended when the GEMINI Nitrox TU is in the Field Programming Mode. Upon exiting the Field Programming Mode the Alarms are reactivated.

User Defined Maximum Depth Alarm

Should you descend to a depth deeper than your selected maximum depth, the DEPTH digits will flash once per second and once every two minutes, the five-chirp audible alarm will sound. The factory setting for this warning is 130 feet.

> **NOTE: The Depth Alarm is disabled during the Decompression Mode to avoid confusion with the "Shallower Than Ceiling" alarm.**

Ceiling Violation:

When in the Decompression Mode, ascending to a depth shallower than the Ceiling depth will cause your Primary Wrist Unit Display to flash the WARNING legend and the DEPTH digits and continuously sound its unique audible low-to-high "sweep" alarm once every two seconds until the situation is corrected.

This is not a settable alarm.

90 Foot Decompression Stop Warning:

If a Ceiling of 90 feet or greater is computed, a one time five-beep audible alarm will sound and the Ceiling digits will flash once per second.

1/2 Tank Pressure Alarm

When you have consumed one-half of the cylinder's "usable" pressure, your dive computer will issue a one time five-chirp audible alarm. If you use all of the "usable" tank pressure, you will still have a safety reserve of 500 psi. The point at which the 1/2 Tank Pressure Alarm will sound is easily determined by using the following formula:

$$TP - \frac{(TP - 500)}{2} = \text{1/2 Tank Pressure Alarm limit}$$

Where: TP = beginning tank pressure

For example, let us say you started your dive with a tank pressure of 2500 psi.

$$2500 - \frac{(2500 - 500)}{2} = 1500 \text{ psi}$$

The 1/2 Tank Pressure Alarm would sound at 1500 psi. This warning is disabled when shipped from the factory. You can enable this option via the Analyst®.

Low Cylinder Pressure:

Should you approach 500 psi of pressure remaining in your Cylinder or 5 minutes or less of remaining airtime, your **GEMINI Nitrox** will issue a five-beep audible alarm once every two minutes. Both the WARNING legend and Cylinder Pressure on your Primary Display will flash once per second. On the surface this warning is disabled.

Cylinder Pressure < 5 Minutes DECO Time:

While in a decompression situation if at your current air consumption rate you have less air cylinder pressure than that required to complete five minutes of decompression, your **GEMINI Nitrox** will issue one five-beep audible alarm. The WARNING, Cylinder Pressure and the DEC TIME on your primary display will flash once per second.

Two-Minute Warning:

Should you have less than two minutes of remaining no-decompression time, your **GEMINI Nitrox** will issue a one time, five-beep audible warning, and flash the WARNING legend on the WU for as long as the situation exists.

Entering Decompression Mode:

Should you enter Decompression Mode, the **GEMINI Nitrox** will issue a five-beep audible alarm once every two minutes and flash the WARNING legend on the WU for as long as the Decompression Mode is active.

Maximum PO_2 Alarm (FO_2 Mode Only):

This alarm is settable via the ANALYST® PC interface and allows you to set a desired maximum PO_2 level from 0.5 to 1.6 ATA. Should your PO_2 exceed this setting, the **GEMINI Nitrox** will issue the double beep toxicity alarm once every two minutes and flash the WARNING legend and the PO_2 value digits and illuminate the O2TOX legend. The factory setting for this alarm is 1.6 ATA.

Minimum PO_2 Alarm (FO_2 Mode Only):

This alarm is settable via the ANALYST® PC interface and allows you to set a desired minimum PO_2 level from 0.2 to 1.0 ATA. Should your PO_2 decline below this setting, the **GEMINI Nitrox** will issue the double beep toxicity alarm once every two minutes and flash the WARNING legend and the PO_2 value digits. The factory setting for this alarm is 0.2 ATA.

Breathing Parameter Alarm:

Using the ANALYST®, you may enter predefined high and low limits for the Breathing Parameter. If your Breathing Parameter is greater than your high limit or less than your low limit, your **GEMINI Nitrox** will issue a five beep alarm once every minute and flash the WARNING and breathing parameter digits until your Breathing Parameter is back within the decided range. This feature is disabled from the factory can only be enabled via the ANALYST®.

Oxygen Tolerance Units (OTU) Dose Warning:

Should you reach 50 percent of the allowable Mission OTU dosage, your **GEMINI Nitrox** will issue an audible warning consisting of short, double-beeps that sound for five seconds, this alarm will repeat every two minutes. The WARNING legend will flash and the O2TOX legend will appear. The MAX DEPTH digits on the alternate display will be replaced with a lower case “o” plus the current calculated OTU toxicity percentage. This visual warning will continue until the calculated toxicity percentage is less than 50 percent. (See Figures 23, 25, 26, 28 & 39)

Central Nervous System (CNS) Oxygen Toxicity Warning:

Should you reach 50 percent of the associated maximum limit, your **GEMINI Nitrox** will issue an audible warning consisting of short, double-beeps that sound for five seconds, this alarm will repeat every two minutes. The WARNING legend will flash and O2TOX legend will appear. The MAX DEPTH digits on the alternate display will be replaced with a lower case “c” plus the current calculated CNS Oxygen Toxicity percentage. This visual warning will continue until the calculated toxicity percentage is less than 50 percent. (See Figures 23, 24, 26,27 &39)

NOTE: If both CNS and OTU levels are greater than 50 percent, the more critical of the two percentages will be displayed.

Ascent Rate Alarm:

Your **GEMINI Nitrox** allows the user to select either fixed or variable Ascent Rate warnings. See the description of Ascent Rate under the EXPLANATION OF FUNCTIONS section for a description of fixed and variable ascent rates.

Exceeding the maximum ascent rate will cause the **GEMINI Nitrox** to Flash the WARNING legend and the ascent rate bar graph and sound its audible alarm once every second. The sound of this audible alarm is unique. Rather than a low-to-high "sweep", the Ascent Rate Alarm sound is a high-to-low "sweep".

Cylinder Pressure Transducer Alarm:

Should the pressure transducer on the TU mounted on the breathing mix cylinder fail, your **GEMINI Nitrox** will flash the WARNING legend and cylinder pressure and illuminate the SENSOR legend and sound a five beep alarm once every two minutes. On the Primary Screen MAX Depth will be replaced with "S-H" to indicate that the sensor experiencing difficulties is the Cylinder Pressure Transducer. (See Figures 29, 31 & 32a)

Depth Transducer Alarm:

Should the depth transducer fail, your **GEMINI Nitrox** will flash the WARNING legend and the DEPTH digits as well as illuminate the SENSOR legend and will sound a five beep alarm once every two minutes. On the Primary Screen MAX Depth will be replaced with "S-d" to indicate that the sensor experiencing difficulties is the Depth Transducer. (See Figures 30, 31 & 32b)

Low Battery Voltage:

Standard, user-replaceable batteries power both the **GEMINI Nitrox** TU and WU. The **GEMINI Nitrox** TU batteries (PBAT & SBAT) are four, size-"AA" batteries. Two size-"N" alkaline batteries power the WU. Should the **GEMINI Nitrox** batteries become low, the WARNING legend and PBAT and/or SBAT voltage graph will flash and a one-time five-beep alarm will sound. The batteries should be replaced as soon as possible after the low battery indicators appears. (See Figures 18, 19 & 21)

> **NOTE: There is no low battery warning for the Wrist Units batteries, The diver needs to check the battery voltage during the startup cycle of the WU or by accessing the Information screen of the Field Programming Mode. See the section regarding BATTERY REPLACEMENT, page #?.**

USER CONFIGURABLE ITEMS:

By using the ANALYST® Personal Computer Interface, the user has the ability to change the following items:

Dive Time/Date Stamp:

This is the internal clock setting that is used by the system to time-stamp each individual dive as it occurs. Due to changes in battery voltage and temperature, the internal Time-of-day clock may slowly drift from the ideal. It is recommended that this clock be periodically set to your local time via the ANALYST®.

Metric or Imperial:

The diver may select whether the data is computed and displayed in Metric or Imperial units. The **GEMINI Nitrox** may be ordered either way as shipped from the factory.

Select Altitude <2000 feet as One Zone (Off or On):

This option provides "actual" altitude for any given day at any diving location as explained in the previous section “ALTITUDE ACCLIMATIZATION”. With changes in barometric pressure due to temperature and weather systems, it is possible, even expected, to have a different apparent altitude at the same dive site from day to day.

While the seamless means of monitoring provides the most accurate decompression schedule, all altitudes less than 2,000 feet above sea level can be treated in the algorithm as sea level if so selected.

With this option OFF, the unit is calculating altitude in a seamless fashion. With this option ON altitudes less than 2,000 feet above sea level will be treated as sea level. Regardless of the selection, altitudes greater than 2,000 feet above sea level will be treated in a seamless manner. From the factory, this is set to sense seamless altitude from sea level to 15,000 feet above sea level.

Selectable NDC Conservatism (0% to 50%):

This feature will allow the diver to input an added degree of conservatism to the decompression algorithm from 0 to 50 percent in one-percent increments. This may be desirable if the diver is dehydrated, tired, or has some other factor that warrants added conservatism. This option may also be set via the Field Programming method. Conservatism is set to zero as shipped from the factory.

Temperature Dependent NDC Computations (Off or On):

This feature compensates the decompression algorithm proportional to the ambient water temperature if the water temperature is below 75 degrees F. If the diver is using a warm, well-insulated dry suit, it may be desirable to turn this feature off. From the factory this option is set off.

Workload Dependent NDC Computations (Off or On):

This feature compensates the decompression algorithm proportional to the Diver's workload. From the factory this option is set off.

Select Decompression Time Display (Total, Stop, Both):

There are three options for the manner in which the decompression time is displayed.

If you select TOTAL, the decompression time displayed will indicate the total time you will spend in decompression, including ascent to the surface. Watch the Ceiling depth change in order to identify when to ascend to the next stop depth.

If you select STOP, the decompression time displayed will indicate the time you must remain at the current Ceiling. When this time is 0:00, the Ceiling depth will decrease and the new stop time will be displayed.

If you select BOTH, the TOTAL time and STOP time will alternate at the rate of once every 2 seconds. From the factory, the unit is set to BOTH.

Cylinder Size:

This is the water volume in liters of the oxygen cylinder. This is set at 11 from the factory. To calculate an approximate water volume of a cylinder; divide Cylinder size in Cu. Ft by the working pressure and multiply by 411.

Selectable Type of Ascent Rate Alarm (Fixed or Variable):

This option gives the diver the ability to utilize a fixed ascent rate warning or a warning based on depth. Should the diver prefer the fixed ascent rate warning, the diver can select the maximum ascent rate limit can be selected in one-foot increments from 20 to 60 feet per minute (See next topic). As shipped from the factory, this is set to FIXED. If the VARIABLE rate is selected then the warning will illuminate based on the following table:

DEPTH	AVERAGE ASCENT RATE
60 feet and deeper	60 feet per minute
59 to 30 feet	same as depth
Shallower than 30 feet	30 feet per minute

The **GEMINI Nitrox** is shipped from the factory as FIXED with a 60 feet-per-minute alarm.

Selectable Fixed Ascent Rate Alarm Limit:

If FIXED Ascent Rate alarm was selected from the above topic, the user may enter the desired Ascent Rate for the alarm to sound. The **GEMINI Nitrox** is shipped from the factory as FIXED with a 60 feet-per-minute alarm.

Selectable Ascent Rate Bar Graph (Fixed or Proportional):

This option determines whether the Ascent Rate bar graph indicates the speed of ascent or the percentage of the selected maximum ascent rate. The **GEMINI Nitrox** is shipped from the factory as FIXED.

Ascent Rate Responsiveness (0 to 7):

This option determines the responsiveness or sensitivity of the Ascent Rate Bar Graph. Zero is highly responsive and seven is very slow. This feature is set to three as shipped from the factory.

Enter Wrist Unit ADDRESS Code:

This option allows you to assign a different wrist unit address code number to the **GEMINI Nitrox**.

Enter PO_2 Set Point (PO_2 Mode only, 0.5 to 1.4):

This feature allows the **GEMINI Nitrox** to be used as a constant PO_2 computer on CCR rebreathers. As shipped from the factory this feature is set to 1.30 ATA.

Enter Maximum PO_2 Alarm Value (0.5 to 1.6):

This option allows you to set a desired maximum PO_2 value that if exceeded will cause an alarm that will sound once per minute. The WARNING legend and the PO_2 digits will flash and the O2TOX Legends will illuminate. As shipped from the factory this feature is set to 1.6 ATA.

Enter Minimum PO_2 Alarm Value (0.3 to 1.4):

This option allows you to set a desired minimum PO_2 value that if the PO_2 value falls below will cause an alarm that will sound once per minute. The WARNING and PO_2 digits will flash. As shipped from the factory this feature is set to 0.3 ATA.

Too Deep Depth Alarm (30 to 327):

This option allows the diver to select a maximum depth below which the diver does not wish to descend before an alarm is sounded. This function is disabled when in the Decompression Mode. The Field Programming Mode previously described may also modify this setting. As shipped from the factory, the Depth Alarm is set for 130 feet.

Data storage types & Capacity:

The **GEMINI Nitrox** has the following internal distinct data storage activities that can be recalled, viewed, and stored with the ANALYST® PC computer interface:

- **Current Variable Information:** Local Time, CNS toxicity, OTU dose, OTU Mission Clock, Altitude, Primary Battery voltage, Secondary Battery voltage, Time to Fly remaining, 12 tissues loading.
- **Current Configuration Data:** As can be seen in “USER CONFIGURABLE ITEMS”, below.
- **Historical Totals Summaries:** Dive Time, Number of Dives, Number of Marginal Dives, Number of Violated Dives, Number of Warnings, Decompression Dives, Decompression Time, Number of Battery changes.
- **Each Dive Beginning Statistics:** 12 tissues loading, Local Time Clock, Dive of Day, Dive Number, Surface Time, CNS Toxicity, OTU Dose, OTU Mission Clock, Altitude, Time to Fly, Primary Battery Voltage, Secondary Battery voltage, GMT Time, Cylinder Pressure, Cylinder Size, Capacity is the most recent 512 dives.
- **Each Dive Ending Statistics:** 12 tissues loading, Bottom Time, Max Depth, Average Depth, Min NDC Time, Time Min NDC occurred, Max Deco Time, Max Deco Ceiling, Missed Ceiling, Missed Deco Time, CNS Toxicity, OTU

Dose, Max Ascent Rate, Max A/R Time, Max A/R Depth, Min Temperature, Average Temperature, Maximum Temperature, Min Battery Voltage, Time to Fly, number of Warnings, Max PO_2, Min PO_2, Average PO_2, Dive PO_2 Set Point, High PO_2 Alarm, Cylinder Pressure, Min Remaining Air Time, Min Breathing Parameter, Max Breathing Parameter, Average Breathing Parameter. Capacity is the most recent 512 dives.

- **Each Dive Configuration Data:** Full and complete configuration of the system, including User Conservatism. Capacity is the most recent 512 dives.
- **Profile Graphical Information:** Depth Graph, Ascent Rate Graph, Temperature Graph, PO_2 Graph, O_2 % Graph, CNS Graph, OTU Graph, Cylinder Pressure Graph, and Breathing Parameter graph. Capacity is 550 hours at one second sampling.

QUESTIONS AND ANSWERS

CARE AND MAINTENANCE

Rinsing and Cleaning

Your dive computer is designed to require minimum care and maintenance. Both the TU and WU are molded from fiberglass-reinforced resins that are extremely resistant to salt, chlorine, and exposure to ultraviolet light. However, both the TU and WU contain sophisticated electronic components, and therefore, require reasonable care and treatment.

- Avoid sharp impacts to the TU and WU.
- Do not expose units to extreme heat or cold.
- Replace batteries when they become discharged, or once a year, whichever should occur first.
- Rinse both units with fresh water and allow them to air-dry after each use. Take special care when rinsing the opening on the TU that is between the battery caps. DO NOT attempt to clean this area with a

pointed object or with blasts of compressed air. Doing so will cause severe damage to your TU, rendering it inoperable and voiding the Warranty

You can extend the service life of your dive computer by simply rinsing it with fresh water. When using a garden hose to rinse your unit, keep the water pressure very low. No chemicals of any type should be used on your dive computer. The WU's rubber strap may be conditioned with silicone spray especially developed for use with SCUBA equipment. You will find this type of silicone spray at your local dive shop. Care should also be taken to prevent your WU's lens from becoming scratched or damaged. Minor scratches will become invisible underwater. However severe gouges or cracks in the lens would require that it be replaced.

High-pressure Transducer Care

When installing your high-pressure transducer, use the supplied wrench, scuba tool or a thin open-ended wrench on the transducer's hex nut to tighten, **DO NOT use tools such as vise-grips or channel lock pliers. These tools can damage the transducer and such damage is not covered by the limited warranty**. When the TU is not attached to your regulator, replace the dust cap on the high-pressure transducer to prevent contaminants from entering the opening. **NEVER** insert any object into the high-pressure transducer opening. **SEVERE DAMAGE** may result.

Battery Type and Replacement

Your dive computer operates on two different sizes of user-replaceable batteries. The TU requires four 'AA' batteries while the WU requires 2 alkaline 'N' batteries. We recommend using only high quality alkaline batteries for the WU. **The TU may be powered by any of the following types of batteries, Alkaline (tester or non-tester), Lithium and Nickel Cadmium.** Use of old, off-brand, incorrect and/or visibly corroded batteries will also affect performance, damage the units, and void the warranty. Always replace all four AA-size TU batteries at the same time, **Do not mix new and used batteries.**

There are factors, which can significantly vary battery-operating life. These include:

- Original quality of battery as manufactured.
- Age of battery prior to installation.
- Length of time the batteries have been installed.
- Frequency and cumulative number of WARNINGS issued by the computer.
- Temperature of battery in operation.

Fresh batteries installed in the TU will read about 3 volts as indicated on the PBAT and SBAT battery graphs (five bars). At 2.5 volts the low battery alarm will cause the PBAT and SBAT bar graphs to display one bar and flash. At 2.4 volts, your TU will not turn on. Since the WU is equipped with the TACLITE backlighted display, battery life in the WU will be affected depending upon the number of times you activate the TACLITE. On a new, fresh set of N-type batteries in the Wrist Unit, you should get approximately 10,000 TACLITE cycles.

To replace batteries:

a) Prepare four new alkaline batteries
b) Double check the orientation of batteries with the picture on the bottom of the battery tubes
c) Remove one battery cap; replace batteries, re-install the battery cap carefully making sure not to cross-thread the battery cap
d) Remove other battery cap; replace batteries, re-install the battery cap carefully making sure not to cross-thread the battery cap

Battery Care

Two separate, sealed TU battery compartments isolate the alkaline batteries from the Primary computer. Gases given off by the chemical reaction that produces electricity within batteries react with the metal contacts of the batteries, causing corrosion. Over time, this coating accumulates and lowers the amount of power the battery can deliver. Even though batteries that have been in the dive computer for a period of time may indicate ample voltage, the corrosion interferes with delivery of power from the battery to the dive computer. Preventive maintenance in the form of the periodic burnishing of the battery's contacts and applying a thin film of silicone grease to the battery terminals will greatly minimize this corrosion from forming.

NOTE: It is always advisable to replace older or questionable TU batteries with new, fresh batteries before a long series of dives, especially if your dive computer has been inactive for an extended time.

NOTE: Remember, your TU cannot be manually turned off; and since the TU computes all of the diving data, if the WU turns off it will not affect your decompression information. Residual nitrogen elimination, as well as time-to-FLY can be viewed by turning the WU back on.

CAUTION!!! DO NOT ALLOW THE **GEMINI Nitrox** TO HAVE LOW OR NO BATTERIES FOR ANY EXTENDED PERIOD OF TIME! LOSS OF BATTERY POWER WILL CAUSE ALL PREVIOUS DIVE NITROGEN LOADING TO BE LOST. THIS MAY AFFECT NITROGEN CALCULATIONS ON NEAR-FUTURE DIVES. AFTER A BATTERY CHANGE, CONFIRM THAT NO-DECOMPRESSION TIME DATA IS REASONABLE DURING PRE-DIVE

PREDICTION MODE. DIVE-OF-DAY NUMBER GOING TO ZERO IMMEDIATELY AFTER CHANGING BATTERIES IS ANOTHER INDICATION OF A LOSS OF NITROGEN LOADING.

- **NEVER TEST OR SUBJECT THE PRODUCT TO PRESSURIZED AIR!**
- **NEVER REMOVE THE LENS FROM THE UNIT!**
- **ONLY USE FRESH WATER TO CLEAN THE UNIT! NEVER USE SOLVENTS!**
- **DO NOT USE A SCREWDRIVER TO REMOVE THE BATTERY CAPS!**
- **ALWAYS KEEP FRESH BATTERIES INSTALLED!**
- **ALWAYS USE 1.5 VOLT BATTERIES!**
- **LUBRICATE BATTERY ENDS WITH A THIN FILM OF SILICONE GREASE!**

TECHNICAL SPECIFICATIONS

(Subject to change without notice)

No-Decompression Model

Algorithm: Modified Haldanean
Number of Half Time Compartments: 12

Decompression Ceilings

Ceiling Depths: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120,130,140,150, 160, 170, 180, 190 feet
3, 6, 9, 12, 15, 18, 21, 23, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57 meters

Altitude Diving Model

Procedure: Altitude adjust is seamless from sea level to 15,000 feet (4600 meters) above sea level.

FUNCTIONAL

	RANGE	INCREMENT
Dive Number	0 - 9 dives	1 Dive

Depth	0 - 327 feet	1 foot
	0 - 99.9 meters	0.1 meter
Temperature	0 - 99 deg F.	1 degree
	0 - 37 deg C	1 degree
Surface Time	0 - 17 hours 03 minutes	1 minute
Maximum Depth	0 - 327 feet	1 foot
	0 - 99.9 meters	0.1 meter
Tank Pressure	0 - 5119 psi	1 psi
	0 - 353 BAR	0.1 BAR
	0 - 360 Kg/cm2	0.1 Kg/cm2

OPERATIONAL

Depth/Max Depth	327 feet / 99.9 meters
Tank Pressure	5119 psi
	353 BAR
	360 Kg/cm2
Clock Timer	17 hours 03 minutes
Logbook	512 dives
Dive Of the Day Counter	9 dives
Altitude	15,000 feet / 4,600 meters
Altitude Functional Range	15,000 feet / 4,600 meters
Breathing Parameter	98 psi per minute
Second-by-second Profiles	550 hours

HARDWARE

Casing	Fiberglass reinforced ABS Plastic
Lens Material	Polycarbonate

POWER

	TANK UNIT	WRIST UNIT
Battery	4 ‘AA’	2 ‘N’
Battery type	Alkaline, Lithium, Nickel Cadmium	Alkaline

TURN-ON

	TU	WU
Activation	Touch Contacts/Tank Pressure	Inertial Switch

ACCURACY

Temperature	+/- 1.5% full scale
Depth Gauge	+/- 1.0% full scale
Tank Pressure	+/- 1.0% full scale
Bottom/Surface Time	+/- 1.0 sec. /24 hours

REPLACEMENT PARTS

High-pressure O-ring:	19917
Tank Unit Battery Cap O-ring:	
Tank Unit Battery Caps w/O-rings	
Wrist Unit Battery Cap O-ring:	
Wrist Unit Battery Cap w/O-rings	19934
Mounting Clips, TU, Pkg. of Two	
Pins (2), replacement	19949
Wrist Unit Lens Protector	
Large Retractor	15925
Large Retractor w/compass	15935

ANALYST® PERSONAL COMPUTER INTERFACE

The Analyst® Personal Computer Interface Is a complete hardware/software systems that uploads data from the **GEMINI Nitrox** dive computer to an IBM or compatible Personal Computer with a Windows ® 95/98/NT operating system. The Analyst® Personal Computer Interface allows the diver to retrieve dive data, customize the dive computer and to also enter and store additional information for each dive in a logbook database. Visit Your Team Cochran Dealer for a demonstration.