# Technical Service Bulletin 20
**Digital Display Unit Operation Supplement**
**Revision # 1**
March 21, 2000

This bulletin affects all year 2000 Epic 21, 22, X22 and S22 boats.

## Introduction
The Digital Display Unit (DDU) is a versatile multi-function gauge powered by a small computer. A series of sensors feed analog signals to the Marine Data Computer (MDU) where they are converted to a digital data. The digital data is then sent through a single wire data bus to the DDU where it is displayed on the LCD screen. The system is easy to use, highly accurate and can be quickly expanded with navigation and auto throttle options.

*Do NOT jump start the boat. Do not remove or install the boat battery with the battery switch in the ON position. Failure to follow this precaution will cause damage to the MDU not covered by the warranty.*

## Overview
The DDU can display the following information:
Engine Mode Functions
- Battery Voltage
- Engine Temperature
- Oil Pressure
- Remaining Fuel
- Speed at RPM
- Engine Operating Hours
- Fuel Hours Remaining

Tachometer/Speedometer Mode Functions
- RPM (large)/Speed (small)
- Speed (large)/RPM (small)
- Speed (Port & Starboard) (except on S22)
- Speed Calibrate

Alarm Mode Functions (Flashing display only.  Audible alarm not available)
- Battery Voltage
- Engine Temperature
- Oil Pressure
- Remaining Fuel

Time/Date Mode Functions
- Standard Time
- 24 Hour Time
- Date MM/DD/YY

Stopwatch Mode Functions
- Elapsed Time HH:MM:SS
- Units/ Engine

Depth Gauge Mode Functions
- Continuous Depth
- Shallow Water Warning
- Deep Water Warning
- Air & Water Temperatures

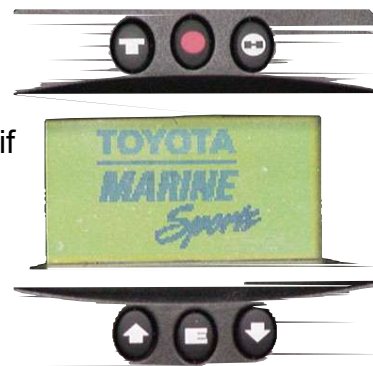Optional Mode Functions
- GPS (With GPS Input)
     Latitude/Longitude
          Bearing/Distance
- AccuSki™ (With AccuSki Pro Tour, RecordPass or Cruise 2000 Systems)
     Features dependant on system installed.

## Operation

**Controls**

The DDU contains six buttons for operation. The function of some buttons is dependant on mode selected.

1. The **"H"** button is used to return to the home screen for the selected mode set.

2. The **Red Dot** button is used to arm the AccuSki auto throttle, if installed.

3. The **"T"** button is used to toggle between screens (main or sub screens).

4. The **Up Arrow** button is used to scroll up or increase the value.

5. The **"E"** button is used to make a selection.

6. The **Down Arrow** button is used to scroll down or decrease the value.

**Using The DDU**

To use the DDU, the boat should be in the water with the engine running for all the functions to operate properly. After starting the engine, the LCD will display the Toyota Marine Sports logo followed by the boat model, and finally Main menu #1. There are three Main menus, each covering different function modes. To cycle through the Main menus, push the **"T"** button once for Main menu #2, push again for Main menu #3, and push again to return to Main menu #1.

After the desired main menu is selected, use the **Up or Down Arrow** keys to scroll to the desired mode (sub screen) and then push the **"E"** button to enter the mode. After entering a mode, you can return to the selected main menu at any time by pushing the **"H"** button. If no selection is made after 10 seconds, the display will automatically return to the selected main menu.

# Main Menu #1

**Modes (sub screens)**

        Contrast
        Engine
        Tach/Speed
        AccuSki (if equipped)

**Contrast –** Adjusts the black level of the LCD display for the ambient lighting conditions. Use the **Up** or **Down Arrow** keys to increase or decrease the contrast.
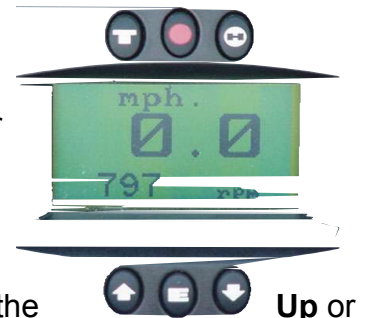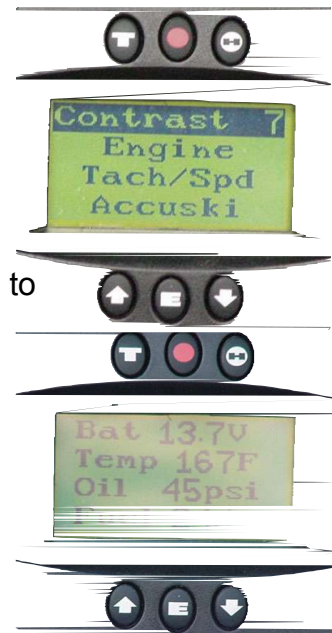
**Engine** – Displays battery voltage, engine temperature, engine oil pressure and remaining fuel. Push the "T" button once to get the HOURS screen showing cumulative engine operating hours (while engine is above 300 RPM) and approximate fuel hours remaining. Push the "T" button again to get the MAX screen showing the highest engine RPM and speed since the current cruise began, and the highest boat RPM and speed ever recorded, for both port and starboard speedometers.

NOTE: Fuel capacity is determined based upon the boat model established during MDC setup. Different boat models have different fuel capacities. Fuel capacity of the selected model is used to calculate approximate remaining fuel hours shown in this display.

**Tach/Speed** – Displays engine RPM in large digits and boat speed in small digits. Pressing the **"T"** button in this mode will invert the display showing boat speed in large digits. Push the **Red Dot** button once to enter the port & starboard speedometer calibration mode. To calibrate the speedometers, you must have a radar gun, recently calibrated analog speedometer or course time data. Drive the boat at a steady constant speed (30 mph recommended), use the arrow buttons to select the port or starboard speedometer and push the **"E"** button once; the selected line will blink. Adjust the display speed reading with the **Up** or **Down Arrow** buttons until it matches the reference speed. Push the **"E"** button once to lock in the setting.

**AccuSki -** If your boat is equipped with the optional AccuSki auto throttle, this mode is used for setup and calibration. Please refer to the User's Manual for operational information.

# Main Menu #2

**Modes (sub screens)**
      **Alarm**
      **Time/Date**
      **Stopwatch**
      **Setup**

**Alarm –** The system is pre-programmed with the same operating parameters for battery voltage, engine temperature, engine oil pressure and fuel capacity. If any of the monitored functions should fall outside the programmed parameters the screen will flash.  Push the **"E"** button once to show the operating parameters for each function.
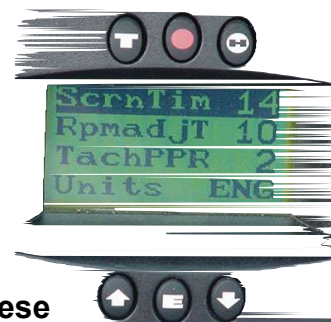
*Dealers Only: To adjust the alarm parameters, select the Alarm mode and press the "E" button twice for the battery, three times for the engine temperature, four times for the engine oil pressure, or five times for the fuel capacity. Use the **Up or Down** Arrow buttons to select the Threshold settings and push the "E" button; the selected line will blink. Use the **Up or Down Arrow** keys to adjust the Threshold setting and then push the "E" button once to lock in the setting.*

**Time/Date –** To adjust the time or date use **the Up or Down Arrow** buttons to select the desired line and push the **"E"** button once. Use the **"T"** button to scroll to the desired value: Hours, Minutes, Seconds, AM/PM, Month, Day, Year. Use the **Up or Down Arrow** buttons to adjust the value.  All seven fields need to be stepped through before any changes to any fields will take affect.  The time and date ate kept current even when the boat ignition is off.  *Note:  Disconnecting the boat's battery will require the time and date to be reset after the battery is reconnected.*

**Stopwatch –** The timer can be used to measure accumulated time, event time and time interval. The first screen displays both accumulated time and event time. Accumulated time is measure in one-second intervals, and is started and stopped pressing the "E" button.

**Setup** – Setup is a multifunction display. The first screen is used to establish tachometer accuracy by setting the PPR (pulses per revolution in a range from 1 to 48) sent to the MDC, or set display units (English or metric). If metric units are enabled, fuel data is displayed as liters, temperature appears in centigrade units, and pressure is displayed in kilopascals. The second screen is used to restore factory defaults if the values have been altered. The third screen, which is password protected, is provided for use by factory-trained mechanics only.  **Note: It is recommended that these settings not be altered, as any change will cause gauges to give false readings.  The photo to the right shows the correct factory preset values.**

# Main Menu #3

**Modes (sub screens)**
> **GPS**
> **Depth**
> **Temp**

**GPS** – If your boat is equipped with the optional GPS system, this mode can display Latitude, Longitude, Bearing, Track and Distance traveled information by using the **"T"** button. Please refer to the User's Manual for operational information.

**Depth** – This mode can display continuous depth or can be set for SHALLOW and/or DEEP water depth alarms. Use the **"T"** button to toggle between continuous depth and depth alarms. To set depth alarms, use the **"E"** button; the setting and **Up or Down Arrow** buttons to select shallow or deep and push the line will blink. Use the **Up or Down Arrow** buttons to adjust the press the **"E"** button to lock it in. The Shallow Alarm can be set from 1 foot to 100 feet. The Deep Alarm can be set from 100 feet to 999 feet.

**Temp –** Use this mode to check the ambient air and water temperature.

**If your boat is equipped with the optional AccuSki auto throttle and/or GPS navigation, please refer to the User's Manual for operational information.**