



## MFD and PHD Display



## PRODUCT USER GUIDE

The A+T Multi Function Display (MFD) and Pilot Head Display (PHD) are engineered to the highest specification with bonded LCD, anti glare toughened glass. The highest attention has been paid to water integrity under the harshest of conditions.

The displays are fully compatible with existing B&G H2000, H3000, WTP2/3 and all Pilots using the Fastnet bus and will fit the cut out and fastening holes of existing B&G displays. Also supplied as an Ethernet unit for use with an A+T ATP1, 2 and Pilot Processors.

### **Specifications:**

Input voltage	10-40 Vdc, internal self resetting fuse
Power consumption	0.9 to 1.4 W
Weight incl bezel and cable	0.52 kg
Environmental	IP68, tested at 1m submersion for 24hr
Operating temperature	-10 to +70 deg C
Backlighting	Red or Green, tunable brightness

### **Warranty:**

The A+T MFD and PHD are warranted against manufacturing defects for five years from date of shipping from factory on a return to factory basis. Warranty is void if opened except by A+T. An integral tamper sensor is fitted.

The warranty specifically excludes physical damage, lightning strike to the vessel, overvoltage on supply or signal lines and use outside the normal operating environment of a yacht.

### **Trademarks:**

A+T is a registered trademark of A+T Instruments Ltd. B&G, H2000, H3000, WTP, WPT2 & WPT3 are product names or trademarks of Navico UK Ltd whose use here is acknowledged.

### **Conformity.**

This display complies with the CE EMC directive 2004/108/EC and Level 2 of the Radio communications (Electromagnetic Compatibility) standard 2008





## **Functionality**

- The MFD displays all data available from the instrument processor and can control a connected A+T Mini display
- The PHD is used to Start, Stop and control the pilot.
  - The Fastnet PHD can set up and commission a B&G pilot, and display instrument data
- In addition to preset data pages, user pages may be configured on the MFD (up to 6) and the Fastnet PHD (4)
- All displays offer MOB alarm activation via key presses on the displays or a remote button
- Two-way NMEA0183 interfacing is available to send and receive navigation data on the Fastnet MFD,
- Ethernet display firmware is updated via the A+T web-server, Fastnet based displays via Bluetooth link

### **Bluetooth connection**

See Appendix B for details on connecting a Windows PC to a Fastnet MFD or PHD over Bluetooth, and updating firmware.

### **Appendices:-**

- A. Display wiring
- B. Fastnet display firmware update and Bluetooth connection
- C. Mounting instructions and cut-out template
- D. MFD Menu and operation
- E. PHD Menu and operation

### **NOTE:**

Where this guide refers to 'Displays', the information is common to both the MFD and PHD.

## APPENDIX A

Displays are supplied with a 3 metre bare ended cable. This can be shortened without affecting the unit or warranty. Custom cable lengths are available, as are IP68 rated in-line connectors. Contact A+T to discuss your requirements.

### Fastnet:

The colour codes in the cable are:-

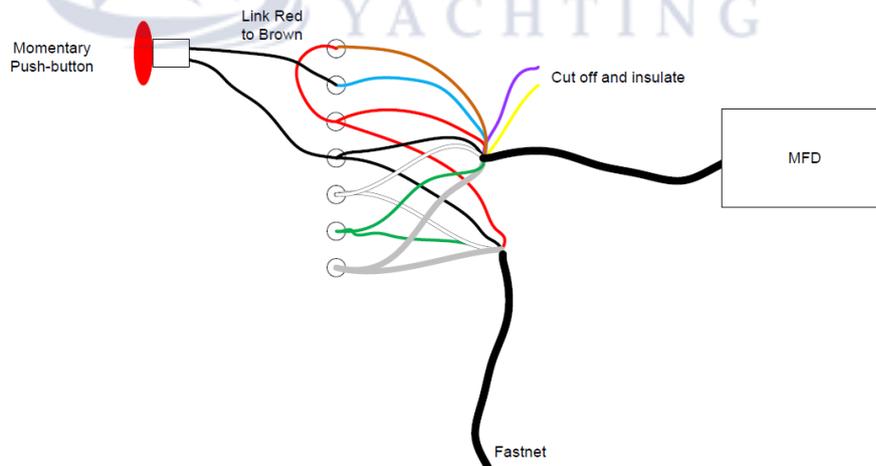
A+T Colour	Function	Comment
Black	0V	*See note below
Red	+V Power	Normally from Fastnet bus
White	Fastnet A	Connect to B&G Fastnet White
Green	Fastnet B	Connect to B&G Fastnet Green
Brown	NMEA0183 in A	Opto-isolated
Blue	NMEA0183 in B	Opto-isolated, Option MOB
Violet	NMEA0183 out A	Option Mini
Yellow	NMEA0183 out B**	Option Mini
Bare	Screen	

\*If the unit is powered from a supply other than the Fastnet power, then the 0V of this power supply should be connected common to the 0V (black wire) of the Fastnet bus. The normal requirements for Fastnet bus apply in that two terminator resistors, each of 100  $\Omega$ , at either end of the network. The resistance measured across green and white with no power should be close to 50  $\Omega$ .

\*\*Do not connect NMEA0183 to Black 0V

### MOB button wiring

The MOB option disables NMEA on the Fastnet display



## Ethernet:

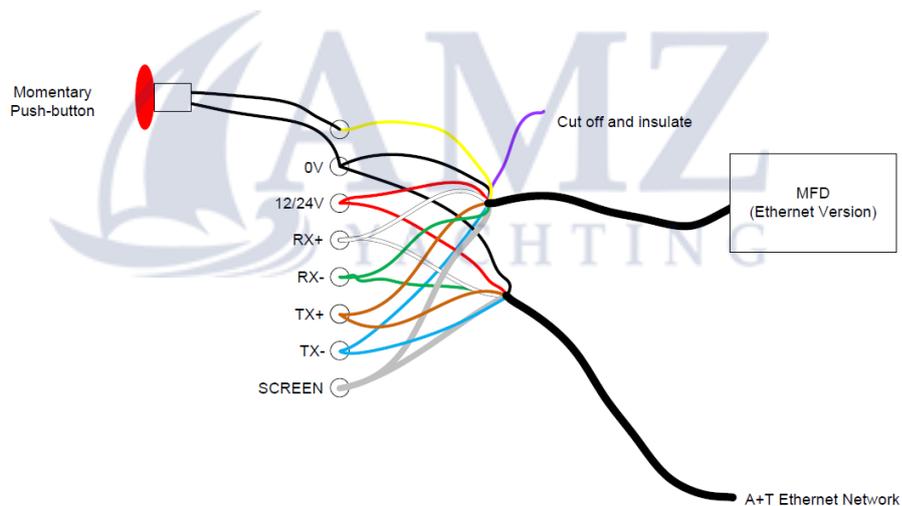
A+T ethernet based systems may use either supplied A+T cable, or industry standard cat5e cable.

The colour codes in the cables are:-

A+T Colour	Cat5e Colour	Function	Comment
Black	White/Blue & Blue	*0V	MOB**
Red	White/Brown & Brown	*+V Power	10-40 VDC
White	White/Green	RX+	
Green	Green	RX-	
Brown	White/Orange	TX+	
Blue	Orange	TX-	
Violet		NMEA0183 out A	Option Mini
Yellow		NMEA0183 out B	Option MOB, Mini
Bare	Screen		

\*The +V and 0v connections use spare wires within cat5e cable. Twist together the White/Brown and Brown pair, and the White/Blue and Blue pair for connection to the +V and 0V terminals.

## MOB button wiring



## **APPENDIX B**

### **Firmware updates**

Ethernet based Displays can be updated from the ATP web-server. See the ATP Manual for instructions.

Fastnet Displays can be updated via Bluetooth.

### **Preparation**

1. Download the Bluetooth Uploader files and the latest version of MFD or PHD firmware from <https://www.aandtstruments.com/support/downloads/>
2. The Bluetooth Uploader VX.XX.zip file contains two files which must be extracted to the same Folder:
  - A+T Uploader VX\_XX.exe
  - InTheHand.Net.Personal.dll
3. Connect to the Displays Bluetooth: there are two processors in the A+T Displays, **Main** and **LCD** and are loaded independently. The software versions are not always compatible so it is important to check release notes on each version and install the correct firmware.

3.1 For connecting to upload **Main** firmware, on the Display buttons:  
**MENU > This Display > Bootload Main CPU**

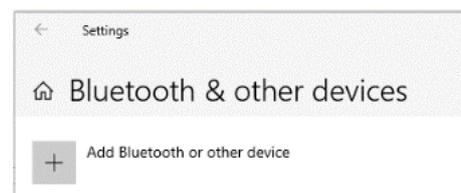
3.2 For connecting to upload **LCD** firmware, on the Display buttons:  
**MENU > This Display > Advanced > Bootload LCD CPU**

4. The Display will show “**Are you sure?**” – do not select either option

The Displays Bluetooth name (serial number) and pairing code (default: 1234) will be displayed.

### **To pair with your Windows 7, 8 or 10 PC:**

1. In Windows 10, select Settings > Devices > Bluetooth & other devices, then select “Add Bluetooth or other device”
2. Select the Display identified by the serial number
3. When requested, enter the PIN: 1234
4. The Display is now connected to your PC over Bluetooth





## Upload new firmware

To upload new firmware follow the procedure in order:

1. Run the A+T Bluetooth Uploader program and click on '**Find unit**'. The target Display will appear in the list of available displays.
2. Select the target Display and click '**Connect**'
3. When prompted, on the Display navigate to **Yes?** under **Are you sure?** and select with the **MENU** button
4. Click OK on the A+T Bluetooth Uploader warning and follow the instructions on the Uploader for opening the update file and uploading to the Display.
5. The firmware will take approximately 5 minutes to upload. You can observe progress on the Uploader.
6. Once uploading is complete the Display will restart.

## Troubleshooting

Should the upload of firmware be interrupted or fail, you may recover the display with the following options:

1. Main CPU bootloader fails: Power the Display down and back up again
2. LCD CPU bootloader fails:
  - 2.1. MFD: Hold the PAGE (top left) button on the Display, then power down and back up, then release
  - 2.2. PHD: Hold the ON (top left) button on the Display, then power down and back up, then release
3. Main CPU bootloader starts but does not proceed: Hold the **DOWN** arrow on the Display, then power down and back up, then release
4. If the firmware in the Main CPU is corrupt and the bootloader is not automatically launching: Hold the **MENU** button on the Display, then power down and back up, then release. This will force the Display into bootload.

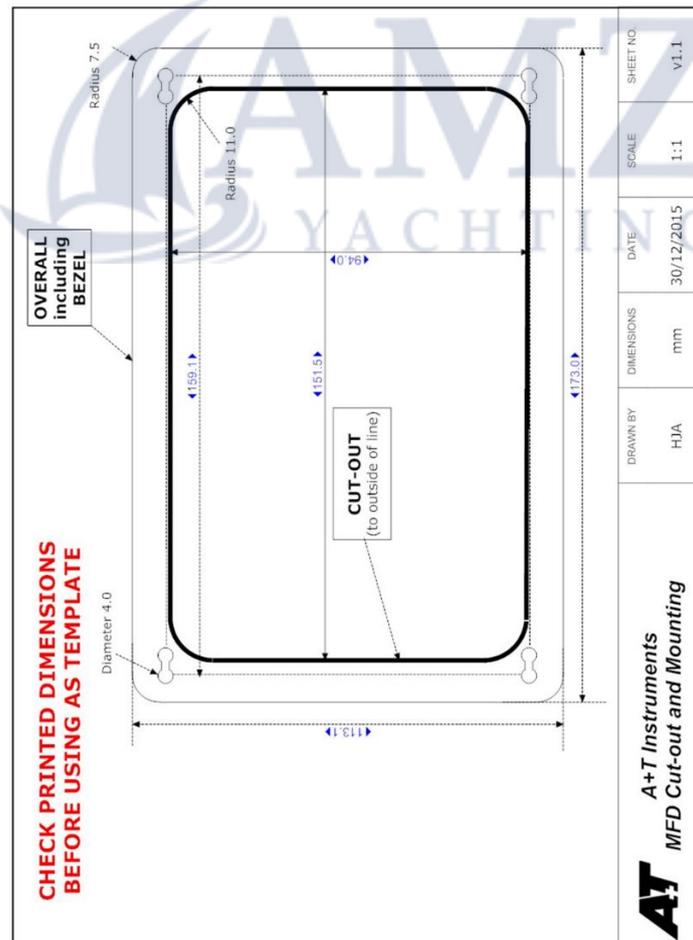
## APPENDIX C

### Mounting the Display

**DO NOT USE Acetone or any alcohol based solvent agents for cleaning. These may damage the plastic materials on the display.**

Recommendations:

- a) A 1mm clearance between the display and the bulkhead cutout
- b) Use the supplied gasket to mount on a clean, flat surface.
- c) Should you require additional waterproofing, or are mounting on a curved surface, use a bead of proprietry **NON-ADHESIVE** sealant instead of the supplied gasket and fasten using small spacers to achieve an even gasket without squeezing all the sealant out of the gap.
  - a. Once the sealant has cured, remove spacers and gently tighten the fastenings to take up on the now formed gasket.
  - b. Clean away any surplus sealant.
- d) **DO NOT OVERTIGHTEN THE FASTENINGS.** Overtightening could lead to distortion of the display body and consequential loss of watertight/airtight integrity or break the glass or the mounting lugs. None of these occurrences are covered by warranty.



## APPENDIX D

### MFD Menu and operation

The keypad is used to control the display.

-  **PAGE** scrolls through user defined pages. Default is one page, but up to eight may be set up.
-  **DPTH**,  **WIND** and  **NAV** toggles through three pre-set pages. You may change a the data in these pages however this will not be saved.
-  **UP** Navigate page, Scroll up
-  **DOWN** Navigate page, Scroll down
-  **RIGHT** Navigate page, Menu Forward
-  **LEFT** Navigate page, Menu Back
-  **MENU** accesses the display menu and ENTER
-  **LIGHTING** scrolls through 4 lighting levels. Press and hold to power down the system, or press once to power back up



### MAIN MENU

The main menu can be accessed from any page by pressing 

### NOTE

When connected to an A+T processor, three rapid presses of the MENU button will activate the MOB alarm

- BLACK menu items are common to all PHDs
- GREY menu items are specific to either Ethernet(\*) or Fastnet(\*\*) Displays ONLY

### MAIN MENU

- ↳ MOB (ATP Processor systems only)
  - ↳ Activate (Sets and broadcasts the MOB alarm)
  - ↳ Silence (Silences the MOB alarm)
  - ↳ Clear (Clears the MOB alarm)
  - ↳ Show MOB (Sets this display to show MOB when activated)
- ↳ Timer & Trip
  - ↳ Timer (Race timer)
  - ↳ Trip Logs

Pressing **MENU** while on a user page will enable Page management options:

- ↳ Edit Page
  - ↳ Edits current user PAGE (number of fields and data)
- ↳ Add Page
  - ↳ Adds new PAGE (number of fields and data)
- ↳ Delete Page
  - ↳ Are you sure? No/Yes



- ↳ This Display
  - ↳ Contrast
    - ↳ Increase/decrease contrast
  - ↳ Reverse
    - ↳ Invert display AUTO: reverse video when lighting ON
  - ↳ Lighting Colour
    - ↳ Red or Green
  - ↳ Lighting Level
    - ↳ Tune all lighting levels
  - ↳ NMEA Mode Select
    - ↳ Select the mode for NMEA0183 OUT connections
      1. NMEA
      2. MOB
      3. Mini Display
      4. Loadcell
  - ↳ NMEA (NMEA Mode Select → NMEA)
    - ↳ NMEA Baud Rate
    - ↳ NMEA Tx Sentences Select sentences to transmit
    - ↳ NMEA Out (on/off)
    - ↳ View NMEA Input
  - ↳ Load Cell \*\* (NMEA Mode Select → Load Cell)
    - ↳ LOADCELL CONFIG – see Load Cell user guide
  - ↳ Mini Displays (NMEA Mode Select → Mini Display)
    - ↳ Mini Display Channel Selection
  - ↳ Alarms
    - ↳ DISPLAY ALARMS On/Off Off to never show Alarms on this display
  - ↳ Processor Type \*\*
    - ↳ ATP A+T ATP1 or ATP2
    - ↳ Normal H2000/H3000
    - ↳ Legacy Pre H2000, Hydra
  - ↳ Bootload For Firmware updates
    - ↳ Bootload Main CPU
    - ↳ Advanced
      - ↳ Bootload LCD CPU
  - ↳ Statistics
    - ↳ Displays display system information
  - ↳ Reset
    - ↳ Power-up Reset Restarts display
    - ↳ Factory Reset Reset display to factory default
      - ↳ No/Yes
- ↳ System
  - ↳ Calibration\*\*
  - ↳ Damping\*\*
  - ↳ True/Mag\*\*
  - ↳ Remote Displays
    - ↳ Manage A+T 30/20 and B&G Fastnet 20/20\*\*, 30/30\*\* and 40/40\*\* displays
  - ↳ Change IP Address\*
    - ↳ change the displays IP address
  - ↳ Analogue Meters\*\*
  - ↳ Reset Any Node\*\*
  - ↳ Set Node Address\*\*



↳ Diagnostics

- ↳ Network Test
- ↳ Keyboard Test
- ↳ View Log File
- ↳ Send Log File
- ↳ Data Capture\*\*
- ↳ View Packets
- ↳ Test NMEA\*\*

View Network statistics  
Verify key operation

Via connected PC  
Via connected PC



## APPENDIX E

### PFD Menu and operation

The keypad is used to control the PILOT and the display.

-  **PILOT** starts the Pilot
-  **OFF** stops the Pilot
-  **UP** Navigate page, Scroll UP
-  **DOWN** Navigate page, Scroll DOWN
-  **PORT 10** alter course/rudder 10 deg port
  - Navigate page, Scroll LEFT, Menu Back
-  **STBD 10** alter course/rudder 10 deg stbd
  - Navigate page, scroll RIGHT, Menu Forward
-  **PORT 1**
  - POWER MODE: rudder 10 deg port
  - COURSE MODE : course 1 deg port
-  **STBD 1**
  - POWER MODE adjust rudder 10 deg stbd
  - COURSE MODE adjust course 1 deg stbd
-  **MENU** accesses the display menu and ENTER
-  **LIGHTING** scrolls through 4 lighting levels. Press and hold to power down the display and press once to power back on



### NOTE

When connected to an A+T processor, three rapid presses of the MENU button will activate the MOB alarm

- BLACK menu items are common to all PHDs
- GREY menu items are specific to either Ethernet(\*) or Fastnet(\*\*) Displays ONLY

### MAIN MENU

- ↳ MOB
  - ↳ Activate (ATP Processor systems only) Sets and broadcasts the MOB alarm
  - ↳ Silence Silences the MOB alarm
  - ↳ Clear Clears the MOB alarm
  - ↳ Show MOB Sets this display to show MOB when activated
- ↳ Pilot Mode
  - ↳ Compass
  - ↳ Apparent Wind\*\* B&G Pilot systems ONLY
  - ↳ True Wind\*\* B&G Pilot systems ONLY
  - ↳ Navigator\*\* B&G Pilot systems ONLY
  - ↳ Power Steer

- ↳ Instruments\*\*
  - ↳ Displays 4 Instrument data pages. Scroll LEFT or RIGHT to step through pages.
  - ↳ When Pilot is ON and Instruments are selected
    - You may change the data in any field. Scroll UP or DOWN then navigate to the field you wish to edit and press MENU.
    - These changes will be saved to your display.
- ↳ Pilot Precision\*\* B&G Pilot system ONLY
  - ↳ Normal
  - ↳ Economy
  - ↳ Downwind
  - ↳ Performance 1
  - ↳ Performance 2
  - ↳ Performance 3
  - ↳ Performance 4
- ↳ Pilot Commission\*\* B&G Pilot system ONLY
  - ↳ Dockside
    - ↳ Pilot Main Setup
    - ↳ Pilot Rudder Setup
  - ↳ Sea Trial
  - ↳ Advanced
- ↳ This Display
  - ↳ Contrast
    - ↳ Increase/decrease contrast
  - ↳ Reverse
    - ↳ Invert display AUTO: reverse video when lighting ON
  - ↳ Lighting Colour
    - ↳ Red or Green
  - ↳ Lighting Level
    - ↳ Tune all lighting levels
  - ↳ Network Lighting
    - ↳ On/Off
  - ↳ NMEA Mode Select\*\*
    - ↳ Select the mode for NMEA0183 OUT connections
      1. NMEA
      2. MOB
      3. OFF
  - ↳ NMEA\*\* NMEA Mode Select ► NMEA ONLY
    - ↳ NMEA Baud Rate
    - ↳ NMEA Tx Sentences Select sentences to transmit
    - ↳ NMEA Out (on/off)
    - ↳ View NMEA Input
  - ↳ Alarms\*\*
    - ↳ On/Off Off to never show Alarms on this display
  - ↳ Processor Type\*\*
    - ↳ ATP A+T ATP1 or ATP2
    - ↳ Normal H2000/H3000
    - ↳ Legacy Pre H2000, Hydra
  - ↳ Bootload\*\*
    - ↳ Bootload Main CPU
    - ↳ Advanced
      - ↳ Bootload LCD CPU
  - ↳ IP Address\*
    - ↳ Set the IP address of the display
  - ↳ Statistics
    - ↳ Displays display system information



- ↳ **Reset**
  - ↳ Power-up Reset\*\*  
Restarts display
  - ↳ **Factory Reset**  
Reset display to factory default
    - ↳ No/Yes
- ↳ **System\*\***
  - ↳ Calibration
  - ↳ Damping
  - ↳ True/Mag
    - ↳ Sets system compass mode
  - ↳ Remote Displays
    - ↳ Manage A+T 30/20 and B&G Fastnet 20/20, 30/30 and 40/40 displays
  - ↳ Analogue Meters
    - ↳ Configuration
    - ↳ Scale
  - ↳ Reset Any Node
  - ↳ Set Node Address
- ↳ **Diagnostics**
  - ↳ Network Test  
View Network statistics
  - ↳ Keyboard Test  
Verify key operation
  - ↳ View Log File
  - ↳ Send Log File\*\*  
Via connected PC
  - ↳ Data Capture\*\*  
Via connected PC
  - ↳ View Packets\*\*  
Via connected PC
  - ↳ Test NMEA\*\*  
Via connected PC

