

AVT-418
Multiple Interface
Ethernet Unit

User's Manual

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Revision 'A3'
6 June 2006

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1. INTRODUCTION

This manual covers the AVT-418 Multiple Protocol Interface unit. It provides technical information on using the interface, connections to it, communications with it, and other related information.

The AVT-418 Multiple Protocol Interface supports the following network protocols.

- CAN (Controller Area Network).
 - CAN-B (ISO 11519).
 - CAN-C (ISO 11898).
 - Single Wire CAN (SWC) (SAE J2411) support.
- J1850 VPW
 - GM Class 2 compliant.
- J1850 PWM
 - Ford SCP compliant.
- Keyword Protocol 2000
 - ISO 14230 and ISO 9141.
 - With at least 4 different initialization methods.
- Ford UBP (UART Based Protocol).
- LIN, as Master or Slave, also passive listener.
- KIE mode. K-line Inverted Echo mode. A non-standard protocol that uses the K-line but each transmitted byte is echoed by the recipient inverted.
- GM 8192 UART or ALDL; GM specification XDE-5024H (this is the +12v version).

The **AVT-418-002** package consists of the AVT-418 Multiple Interface board housed in rugged enclosure. An Ethernet patch cord may be available on request, when the unit is ordered. Contact the factory for current information.

The **AVT-418-003** package consists of the AVT-418 Multiple Interface board with mounting brackets. An Ethernet patch cord may be available on request, when the unit is ordered. Contact the factory for current information.

All product documentation is available from our web site, “Product Documents” page.
<http://www.AVT-HQ.com/download.htm>.

Operations in CAN mode are compatible with ISO 11898, J1939, ISO 11512 and other related specifications.

Operations in J1850 VPW mode conform to specification J1850 and GM Class 2 requirements.

Operations in J1850 PWM mode conform to specification J1850 and Ford SCP (Standard Corporate Protocol) requirements.

Operations in UBP mode conform to Ford Motor Company UBP requirements.

Operations in LIN mode conform to the LIN specifications.

The AVT-418 Multiple Interface provides the following functions:

- Isolated electrical interface between the network and the control computer.
- Protocol/data conversion between a vehicle based network and the host computer (via an Ethernet communications link).
- Active network node.
- Passive network traffic monitor.

1.1 Specifications

AVT-418 Multiple Interface (in enclosure)

- Overall size (inches): 7.2 x 6.1 x 2.0
- Weight: 17 oz.
- Operating temperature range: 0 to +70 degrees C.
- +12 volts (nominal) from subject vehicle.
- Input voltage range: +9.0 VDC to +30.0 VDC.
- Power dissipation: 3.5 watts (nominal).

AVT-418 Multiple Interface (OEM board)

- Overall size, board only (inches): 7.2 x 4.7 x 0.8
- Overall size, with mounting brackets (inches): 7.8 x 4.9 x 1.7.
- Weight: 8 oz.
- Operating temperature range: 0 to +70 degrees C.
- +12 volts (nominal) from subject vehicle.
- Input voltage range: +9.0 VDC to +30.0 VDC.
- Power dissipation: 3.5 watts (nominal).

MTBF (Mean Time Between Failure)

- MTBF information has not been discovered for many components used on the AVT-418 Multiple Interface board. The known values follow:
 - ◆ Relays: 500 million operations.
 - ◆ Toggle switch, S1: 40,000 cycles.
 - ◆ DC/DC converter, U32: 4.4 million hours.
 - ◆ DC/DC converter, U39: 1.0 million hours.

1.2 Definitions

The following terms are used in this manual.

- CAN: Controller Area Network.
- CAN-C: Physical layer name for ISO 11898 compliant hardware interface.
- CAN-B: Physical layer name for ISO 11519 compliant hardware interface.

- CRC: Cyclic Redundancy Check.
- DLC: Data Link Controller. [Motorola term, J1850 VPW]
- HBCC: Hosted Bus Controller Chip. [Ford device, J1850 PWM]
- KIE: K-line Inverted Echo (a non-standard protocol).
- KWP: Keyword Protocol 2000 (ISO 14230).
- SCC: Serial Communications Controller. [A dual UART device]
- SCI: Serial Communications Interface. [Motorola term]
- SCP: Standard Corporate Protocol. [Ford Motor Company]
- SWC: Single Wire CAN. [J2411]
- UBP: UART Based Protocol. [Ford Motor Company unique]
- All numbers used in this manual are hexadecimal digits (0 .. 9 and A .. F) and are usually preceded with a dollar sign (\$) for clarity.

2. Connecting & Using

The following sections provide brief connection instructions to get up and running quickly.

2.1 Vehicle Network and Power Connection

The bare minimum required to get the AVT-418 up and running is a connection to an external power supply. On the “Network” connector, P3 (DA-15P connector) pin #4 or #5 are ground and pin #13 is positive power supply.

The external power source should be a nominal +12v (minimum of +9.0v and maximum of +30.0v).

Refer to Section 6.3.6 for detailed information of “Network” connector P3 pin assignments.

2.2 Ethernet Connection

On the front of the AVT-418 is an RJ-45 Ethernet connector. Use an industry standard patch cord to connect the AVT-418 to a 10/100Base-T Ethernet hub. A crossover patch cord may be used to directly connect the AVT-418 to a host computer.

The minimum patch cord to use is:

Cat 5; 2-pair; connected as: transmit data: pins 1 and 2; receive data: pins 3 and 6.

In the upper left and right corners of the RJ-45 connector are two LEDs. They indicate Ethernet operation and activity. Descriptions of the LEDs follow.

- Upper left LED:
 - Solid amber: 10Base-T, half duplex
 - Blinking amber: 10Base-T, half duplex, activity (the blink rate is relatively slow)
 - Solid green: 10Base-T, full duplex
 - Blinking green: 10Base-T, full duplex, activity (the blink rate is relatively slow)

- Upper right LED:
 - Solid amber 100Base-T, half duplex
 - Blinking amber: 100Base-T, half duplex, activity (the blink rate is relatively slow)
 - Solid green: 100Base-T, full duplex
 - Blinking green: 100Base-T, full duplex, activity (the blink rate is relatively slow)

2.3 Communications with the Host Computer

Once the hardware connections have been made, proper operation of the hardware can be observed.

- On the host computer you will need a binary communications program.
- A free copy of our “Hex Terminal” software for Win95/98/NT/2000/XP and similar is available for downloading from our web site at:
 <http://www.AVT-HQ.com/download.htm>
- Turn on the AVT-418 interface unit.
- Observe on the AVT-418 board that the green (power) LED is lit.
- Observe that the red (operations) LED is blinking fast.
- Observe that one of the Ethernet LEDs is lit. They are located immediately above the RJ-45 Ethernet connector. Refer to Section 2.2 for a description of what the LEDs indicate.
- From the communications program request a connection to the AVT-418. The factory default IP address of the AVT-418 is fixed at:
 192.168.1.70
- Communications with the AVT-418 vehicle interface is via port 10001.
- Ensure the connection completes successfully.
- Send the following command to the AVT-418. This is the unit reset command:
 F1 A5
- Observe on the computer that the following is received from the interface:
 91 12 and 92 04 xx.
 This is the ‘mode of operation’ report. \$91 indicates that the message is a ‘board status report’ with one byte to follow. The \$12 indicates the interface is up and running at idle awaiting a mode switch command. The \$92 \$04 \$xx is the firmware version report, where ‘xx’ is the firmware version. Refer to the “Master Commands and Responses” document for complete and up-to-date information.
- **Note:** The AVT Controller software only displays and accepts hex digits; no dollar signs; spaces required between bytes; leading zeros not required.
- If all of this succeeds properly it verifies that the AVT-418 hardware is operational and that an Ethernet connection was completed successfully.

2.4 Ethernet Setup

The Ethernet server portion of the AVT-418 interface can be reconfigured in the field by the user. Basic information is provided here. More information is provided in Appendices “A” and “B” at the end of this document.

Use care when changing the configuration. It is possible to corrupt the setup such that communications with the AVT-418 will be totally nonfunctional.

All Ethernet communications with the AVT-418 use TCP/IP. The factory default device address is listed here as well as the various port numbers, depending on the type of communications to be established.

Note that several different communications sessions are possible with the AVT-418, depending on what is to be accomplished and what port is used. A session can be established with the Ethernet server portion of the AVT-418 interface to change settings such as the Ethernet IP Address. In normal use, an Ethernet session will be opened with the AVT-418 to communicate with the vehicle network.

The Ethernet server on the AVT-418 is the Lantronix “XPort” device. Detailed information about the XPort device, configuration tools, and more can be obtained from our office. Please contact us to request assistance and tools.

2.4.1 Ethernet IP Address

The factory default IP address of the AVT-418 is static and is set to:
192.168.1.70

The factory default net mask setting is: 255.255.255.0
Some AVT-418 units may leave the factory with a setting of: 0.0.0.0.

Depending on the particular network environment in which the AVT-418 is being used, the setting of the net mask may not be important. Rule of thumb: if connected to a busy network, and the AVT-418 is using static IP addressing, set the net mask to 255.255.255.0.

2.4.2 Hardware or MAC Address

The hardware or MAC address of the AVT-418 can be found on the serial number sticker on the RJ-45 connector on the AVT-418. (The RJ-45 connector is actually a Lantronix XPort embedded server device.) The MAC address will start with: “00-20-4A” for Lantronix.

2.4.3 Vehicle Network Interface Port

Communications with the AVT-418 vehicle network interface is via port 10001.

All communications with the AVT-418 vehicle interface is in binary bytes [not ASCII hex]. Refer to Section 5.0 for a description of the ‘packetized’ communications protocol between the AVT-418 and the host computer. All communications with the AVT-418 follow the exact same rules and formats as that of the AVT-718 and other AVT interface equipment.

Refer to our web site for the “Master Commands and Responses” document, Application Engineering notes, and Manual Supplements. They contain detailed information on communications protocol with the AVT-418 and AVT-718, all commands and expected responses, error codes, operational examples, and much more.

All documentation can be found at: <http://www.AVT-HQ.com/download.htm>

2.4.4 Telnet Setup Port

The configuration of the Ethernet portion of the AVT-418 interface can be changed using Telnet via port 9999.

To start a Telnet setup session with the AVT-418 unit perform the following (on a Win98/NT/XP computer):

- Start Menu
- Run
- Type into the command line:
telnet 192.168.1.70 9999
- Click OK
- When the session banner from the AVT-418 is displayed, you must hit ENTER within 5 seconds or else the session will time out and disconnect.

Refer to Appendix “A” at the end of this document for a listing of a Telnet session with an AVT-418. Factory default settings are shown.

2.4.5 Web Page Setup

The configuration of the Ethernet portion of the AVT-418 interface can be changed using a web browser. The setup screen is an HTML web page.

To establish a web page session with the Ethernet portion of the AVT-418 interface, enter the following into the web browser address line: <http://192.168.1.70>

The setup form will appear. The first page is the configuration summary page. Select either “Server Properties” or “Port Properties” to change the configuration. After making changes, select “Update Settings.” The AVT-418 Ethernet server will store the new settings and then reboot. Be sure to wait 1 to 2 minutes for the AVT-418 Ethernet server to complete the reboot before attempting to access the unit with the new settings in-use.

Refer to Appendix “B” at the end of this document for a complete listing of all setup information available when using the AVT-418 Ethernet server configuration web page.

2.5 Ethernet IP Addressing Modes

Three IP addressing modes are available on the Ethernet portion of the AVT-418 unit.

- Static
- DHCP
- ARP

2.5.1 Static IP Addressing

The factory default addressing mode for the AVT-418 is static and the address is set to 192.168.1.70. In static mode the Ethernet address of the AVT-418 is always the same and does not change when power is cycled.

2.5.2 DHCP Addressing

Setting the AVT-418 IP address to 0.0.0.0 will enable DHCP (Dynamic Host Configuration Protocol) function.

In this mode, the AVT-418 will, on power-up, search for a DHCP server. If one is found it will obtain its IP address, gateway address, and subnet mask from the DHCP server.

If a DHCP server is not found, the AVT-418 will then switch to AutoIP addressing, described in the next section.

An AVT-418 IP address of 0.0.1.0 enables DHCP addressing and disables AutoIP addressing.

2.5.3 AutoIP Addressing

“AutoIP is an alternative to DHCP that allows hosts to automatically obtain an IP address in smaller networks that may not have a DHCP server.”

[Quoted from Lantronix XPort User Manual, revision A 3/03, page 3-4.]

AutoIP addressing is only enabled if the AVT-418 IP address is set to 0.0.0.0 and no DHCP server is found.

If, on power-up, the AVT-418 cannot find a DHCP server it will automatically assign itself an AutoIP address (range: 169.254.0.1 to 169.254.255.1). It will then send out an ARP (Address Resolution Protocol) request onto the network to see if any other node already has that address. If no conflict is found, the AVT-418 will use that address until the next power-on reset or reboot.

If an address conflict is found (another node is discovered to already have that address) then the AVT-418 will select another AutoIP address, send out another ARP request. The process will continue until it finds an address that is not being used.

2.6 Reset / Reboot Differences

There are three different types of ‘reset’ used with the AVT-418. There are fundamental differences that the user should be aware of.

2.6.1 Power-On Reset

When the AVT-418 is first powered on the entire unit undergoes a power-on reset. Both the Ethernet server and the vehicle network interface are reset.

2.6.2 Server Reboot

It is possible, via Telnet or web browser, to command a reboot of the AVT-418 Ethernet server. In this case, operations of the vehicle network interface are not affected. Since the Ethernet server is reboot, the TCP/IP connection with the AVT-418 is lost and must be reestablished after the reboot is complete.

2.6.3 Reset Command

When the connected to the vehicle network interface (port 10001) the user can send a reset command (\$F1 \$A5). This command only resets the vehicle network hardware but does not affect the AVT-418 Ethernet server. The Ethernet TCP/IP connection with port 10001 is not affected by the (\$F1 \$A5) reset command.

3. Interface Hardware

The following sections provide a brief description of the hardware implementation of the AVT-418. A block diagram of the AVT-418 Multiple Interface is shown in Figure 1.

Included on the block diagram are all signal assignments and pin numbers for JP1 and P3.

3.1 Introduction

The AVT-418 provides an isolated electrical interface between the control computer and the connected vehicle network. The AVT-418 Interface can be connected directly to a vehicle and derives its operating power from the vehicle. The serial interface to the host computer is electrically isolated from the vehicle electrical and electronic systems. This is done to prevent damage to the host computer due to spikes or surges from the vehicle electrical system. It is not recommended that the control computer be connected directly to the vehicle electrical system.

The AVT-418 Multiple Interface performs the necessary data and protocol conversion functions as well as many other functions that can be enabled or disabled by the user to meet specific application needs.

3.2 Overview

The hardware is structured around a central microcontroller, including on-chip peripherals. The microcontroller utilizes several off-chip peripheral devices: FLASH memory; RAM; FIFO's; serial communications controller (SCC); CAN controller; J1850 VPW DLC device; J1850 PWM HBCC device; and a free running 24-bit microsecond clock.

Also included in the hardware are transceivers for the various network interfaces. These may be unique devices or implementations using discrete components.

3.3 Microcontroller

The heart of the AVT-418 Multiple Interface is the Motorola 68332 microcontroller which contains a CPU32 core. The microcontroller contains 2 Kbytes of on-board RAM as well as a number of peripheral functions (chip select, SCI, SPI, TPU, etc.).

The microcontroller runs at a bus speed of 20.972 MHz.

3.4 FLASH

All operational firmware is contained in a 128 Kbyte FLASH (64 K x 16) device that is socket mounted on the AVT-418 board.

All firmware on the AVT-418 Multiple Interface was developed by and is supported by Advanced Vehicle Technologies, Inc.

The AVT-418 supports the ability to upgrade operational firmware in the field, without requiring the removal/replacement of the FLASH device. Firmware routines exist in the FLASH device to permit updating the AVT-418 operational firmware from the host computer via the Ethernet data link; without requiring the removal/replacement of the FLASH device.

Contact the factory if you want to update the firmware on your AVT-418 unit. We can supply, by e-mail, the firmware file and a program to update the AVT-418 FLASH device. We can provide a Win95/98/NT/2000/XP program for the host computer to update the AVT-418 FLASH device.

3.5 RAM

8 Kbytes (8 K x 8) of RAM are provided by an external RAM device.

3.6 FIFO's

Two high speed hardware FIFO's are used by the microcontroller as buffers for transmit and receive data moving between itself and the host computer. Each FIFO is 2 KBytes deep. One is used for incoming data (from the host) and the other is used for outbound data (to the host).

3.7 SCC

Serial communications with the host computer is provided by one half of the Philips Serial Communications Controller (SCC) device. The SCC is used to implement the standard serial data link, including RTS/CTS hardware handshaking.

The Ethernet server (Lantronix XPort device) is connected to one channel of the serial communications controller. A high speed (230400 baud) data link is used for data communications between the vehicle network interface hardware and the Ethernet server device.

The Ethernet server device and related hardware are located in an electrically isolated section of the AVT-418 board. Signals are coupled through optical isolators and power is supplied by an isolated DC-DC converter.

3.8 CAN

CAN operations are supported by the Intel 82527 CAN Controller device.

Board revision “B” offers three physical layer transceivers; selected by software control:

- CAN-C; ISO 11898; J1939; 2-wire CAN. The Philips 82C250 transceiver is used.
- CAN-B; ISO 11519; 2-wire CAN. The Philips TJA1054 transceiver is used.
- SWC; Single Wire CAN; J2411. The Philips AU5790 transceiver is used.

3.9 J1850 VPW

J1850 VPW operations are supported by the Motorola DLC device (MC68HC56/57/58). Additionally, the AVT-418 supports full GM Class 2 operations (block transfer mode, 4X mode, etc.).

3.10 J1850 PWM

J1850 PWM operations are supported through the use of the Motorola HBCC (Hosted Bus Controller Chip) device. Using this device ensures Ford Motor Company SCP operational compliance. The physical layer transceiver is implemented in discrete components in accordance with Ford Motor Company design specifications.

3.11 KWP 2000

Key Word Protocol (KWP) 2000; ISO 14230; is implemented using the second half of the serial communications controller (SCC). The K-line transceiver and the L-line transmitter are implemented using an Advanced Vehicle Technologies, Inc. proprietary design.

3.12 UBP

Ford’s UART Based Protocol (UBP) is implemented using the microcontroller internal SCI peripheral. The Motorola UART Based Protocol Physical Layer (UPL) transceiver (SC74935DH) is used. Pull-up resistor R51 is factory set for 18.2 Kohms. This resistor may be changed, as required by the user. The UBP firmware was designed to conform to Ford published UBP specifications.

3.13 LIN

Local Interconnect Network (LIN) is implemented using the microcontroller internal SCI peripheral. The UBP transceiver (described above) is used. True compliance with the LIN specification requires that either an external pull-up resistor be used, or pull-up resistor R51 be changed to meet user requirements. The AVT-418, in LIN mode of operations supports both Master and Slave communications on a message by message basis. Additionally, when not commanded to perform as either a Master or a Slave, the AVT-418 passively monitors the network, receives all network traffic, and forwards it all to the host.

3.14 KIE

K-line Inverted Echo (KIE) mode is a non-standard protocol that was developed to meet customer specific requirements. This mode uses the K-line transceiver portion of the AVT-418 board. The operational implementation is firmware only. A brief summary of operation of this mode is that one node transmits a message, one byte at a time. The receiving node echos each received byte, inverted. The transmitting node does not transmit the next byte until it correctly receives the inverted echo. The initialization method is unique as well. Please contact us if you need more information on this mode of operation.

3.15 GM SDM - AOS

This special mode was developed to support the GM SDM-AOS mode according to GM specification CM20324. The firmware to support this mode of operation was included in all general releases starting with version 6.6. However, the AVT-418 must be modified and the AVT-718 “X” board installed to provide the necessary hardware. A modified unit is usually noted as hardware revision “L” and has the AVT-718 “X” board installed. Contact the factory for more information about this mode of operation.

3.16 GM +12 volt 8192 UART or ALDL

This mode was developed and included in firmware release 6.2 and later. It uses the UBP/LIN physical layer. The message protocol is the same as other 8192 UART or ALDL implementations (such as on the AVT-716).

CAUTION:

This is NOT the same as the ‘old’ +5 volt 8192 UART or ALDL signal found on the AVT-716 and early model year GM vehicles. Damage will likely result to the AVT-418 and or the module or vehicle if the AVT-418 is connected to the wrong system.

3.17 Custom Modes

There have been other unique modes of operation developed for various customers. These are usually only found in specific firmware releases. Please contact us if you have a different or unique requirement.

3.18 Microsecond Clock

The AVT-418 utilizes a free running 24-bit microsecond clock for all time related functions. This includes message time stamps and byte and message time intervals in KWP, UBP, and LIN modes; all of which are heavily time dependent for proper operations.

The clock tick interval is 1.0 microsecond. The clock rolls over at \$00 FF FF FF. The rollover interval is 16.777 216 seconds.

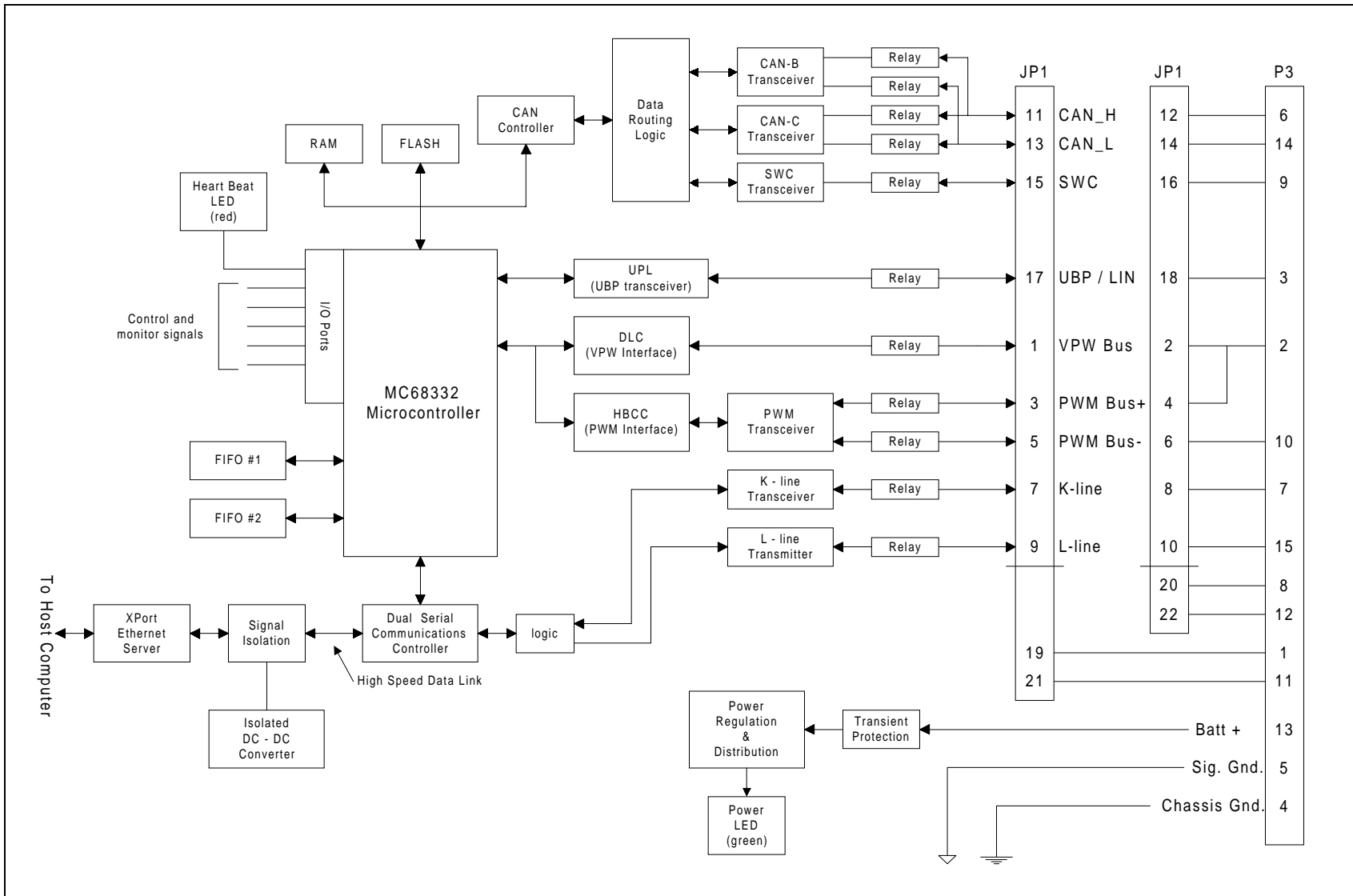


Figure 1 AVT-418 Block Diagram

4. AVT-418 Operation

The following describes the use of the AVT-418 Multiple Interface. It is assumed that:

- The AVT-418 is properly connected to an external vehicle network and to the control computer.
- Appropriate communications application software is installed and running on the host computer.
- Communications between the host computer and AVT-418 have been successfully tested, as described in Section 2.3.

4.1 Indicators

The AVT-418 board has two indicator LED's: one green and one red.

The green LED is connected to the +5 VDC supply for the board and provides a quick indication that power is available for normal operation. If the green LED should fail to light, check the power source from the subject vehicle, and check fuse F3 on the AVT-418 board.

The red LED is a heartbeat indicator. The microcontroller toggles the state of the red LED every 62.5 milliseconds during normal operations.

During FLASH programming mode, the red LED will flash on one second intervals.

If a problem with the microcontroller should occur the red LED will, most likely, go to a full ON or full OFF state. This should be readily apparent and be indicative of an abnormal condition.

There are two LEDs integral to the Ethernet RJ-45 connector. Refer to Section 2.2 for a complete description of those indicators.

4.2 Ethernet

All communications with the host computer, for vehicle network communications is via an Ethernet TCP/IP connection to port 10001. All data are binary bytes.

4.3 Vehicle Networks

All communications between the AVT-418 Interface and the external vehicle network were designed to be in conformance with all relevant standards and specifications.

5. Communications

The structure and protocol of communications between the AVT-418 Multiple Interface and the host computer are stated in the following sections.

5.1.1 Packet Construction

All communications between the AVT-418 and the host computer are accomplished in “packets.”

Packets from the host computer to the AVT-418 are known as Commands.

Packets from the AVT-418 to the host computer are known as Responses.

All data is transferred in packets. The size of each data packet varies depending on the mode of operation. For most modes the packet length is from 1 to 16 bytes (inclusive) but may be as much as 260 bytes in KWP mode and much larger in VPW block transfer mode.

The first byte in each data packet is called the HEADER BYTE and is used to convey information only between the control computer and the AVT-418 Multiple Interface.

The header byte is divided into the upper nibble and lower nibble. The upper nibble indicates what information the data packet is conveying. The lower nibble is the count of the number of bytes that follow the header byte. The meaning of the upper nibble of the header byte depends on which direction the data packet is moving; whether to or from the control computer.

There are occasions where packets between the AVT-418 and the host computer are more than 15 bytes in length. To support these longer packets, two alternate forms have been developed. Refer to Section 5.1.7 of this manual and/or refer to the document “Long Messages - Alternate Header Formats.”

5.1.2 Transmit message format

To transmit a message onto the network, the message must be built by the host computer and then sent to the AVT-418.

The CRC or checksum byte will be automatically calculated and appended onto the message when transmitted. In some operational modes this function can be enabled or disabled by software command.

Any message destined for transmission must be preceded by a byte whose upper nibble is ‘0’ (zero) and lower nibble is the byte count of the message (unless one of the alternate header forms is used). The message bytes then follow immediately.

It is left to the user to determine, to know, and to understand the messaging strategy used on the vehicle network to which the AVT-418 is attached.

5.1.2.1 Transmit Acknowledgment

Each time a message transmission is attempted the interface will issue some kind of transmission acknowledgment. The type and meaning of this transmission acknowledgment is dependent on the mode of operation.

For VPW and KWP modes, the transmit status byte definition is the same as the receive message status byte.

CAN mode does not have a transmit status byte.

PWM does not have a transmit status byte, but the AVT-418 will forward any received acknowledgments to the host computer.

In UBP mode of operation, when a message is transmitted onto the network, the AVT-418 will issue a receive message report to the host, along with a status byte. The AVT-418 will also issue a separate transmit status report.

Some operational modes permit the user to enable or disable the function “Forward messages from this device.” When enabled, the host receives a complete copy of the message just transmitted, with the status bits set accordingly. When disabled, the host receives just the status byte (for example, 01 60).

Refer to the “Master Command and Responses” document for detailed information on each specific mode of operation.

5.1.3 Transmit Message Status Byte Definitions

Refer to the “Master Commands and Responses” document for exact bit definitions of the status byte that accompanies the transmit acknowledgment.

5.1.3.1 Transmit message example

The user has set the AVT-418 to VPW mode.

The user wants to send the following OBD-II query: 68 6A F1 01 00.

The user assembles and sends the following packet to the AVT-418: 05 68 6A F1 01 00.

After the AVT-418 has transmitted the message onto the network, successfully, the user receives the following at the host computer: 01 60

5.1.4 Receive message format

Messages received from the network are assembled into the original byte sequence. The received CRC or checksum is calculated and checked to be equal to the CRC or checksum byte at the end of the received message. The received status byte is updated and the entire packet is sent to the host.

Depending on the mode of operation, the received CRC/checksum byte is discarded or preserved according to command \$52 \$01 \$xx. (In VPW and CAN mode the CRC/checksum byte is always discarded.)

Some modes of operation enforce format checking rules to the received message (even if it was transmitted by the AVT-418). The user should consult the appropriate specifications and related documents for details on the format of messages in specific modes of operation.

Status of all such tests are indicated in the received status byte.

5.1.4.1 Received message time stamping

All modes of operation support received message time stamping. This function is enabled or disabled by the user through the use of the 5x 08 command.

If time stamps are disabled (default setting), then the format of a received message is:

- ◇ Header byte(s); 1 to 3 bytes.
(Depending on the packet size, one of the alternate header formats may be used.)
- ◇ Received status byte; 1 byte.
- ◇ Message bytes ...

If time stamps are enabled, then the format of a received message is:

- ◇ Header byte(s); 1 to 3 bytes.
(Depending on the packet size, one of the alternate header formats may be used.)
- ◇ Time stamp; 4 bytes.
- ◇ Received status byte; 1 byte.
- ◇ Message bytes ...

5.1.4.2 Received message example

As an example the byte sequence \$A7 \$B6 \$C5 plus CRC or checksum byte appears on the network. The message is received by the AVT-418 and the following byte sequence is passed to the host computer: \$04 \$00 \$A7 \$B6 \$C5 (time stamping is disabled).

The byte \$04 indicates that it is a received message and that four bytes follow.

The byte \$00 is the received message status byte and indicates that no errors were found.

(Received message status byte, bit definitions are listed in the next section.)

The message bytes then follow. Note that the CRC or checksum byte is stripped off.

5.1.5 Received Message Status Byte Definitions

The user should consult the “Master Commands and Responses” guide for the most up-to-date listing of the bit definitions for the received message status byte for each mode of operation.

5.1.6 More Examples

To illustrate the construction and decoding of packets between the control computer and the AVT-418 Multiple Interface, several examples are provided.

Example #1: Want to request the current operational mode.

Command: D0.

The AVT-418 responds with: 91 14.

The ‘9’ indicates a board status response.

The ‘1’ indicates one byte follows

The ‘14’ indicates UBP mode.

Example #2: want to send a message out on the bus.

Command: 04 32 89 AC 5F.

The AVT-418 responds with: 01 40.

The '0' indicates a received message from the network.

The '1' indicates only one byte follows. The one byte is the received message status byte.

The '40' is the received message status byte with bit 6 only being set.

Bit 6 is set. This means the received message was 'from this device' meaning the AVT-418 unit.

Messages transmitted by the AVT-418 are received by the AVT-418.

They are checked for errors.

Unless otherwise configured, only the status byte is sent to the host

In UBP mode, the AVT-418 will also send the transmission acknowledgment A1 20 which indicates that the message was successfully transmitted.

5.1.7 Alternate Header Formats

There are occasions where packets between the AVT-418 and the host computer are more than 15 bytes in length. To support these longer packets, two alternate forms have been developed. The user may also refer to the document "Long Messages - Alternate Header Formats."

To accommodate long messages, the format for communications between the AVT-418 unit and the host computer has been modified. The host has three methods available for passing a packet to the AVT-418 for transmission onto the vehicle network. All three methods are described here, along with examples.

If the message is 15 bytes or less in length (total) then the 'normal' format may be used.

Normal Format: 0x aa bb cc ...
 x - count of bytes to follow
 aa bb cc ... message bytes.

Example: 05 81 F1 C1 48 9B

If the message is more than 15 bytes but less than 255 bytes in length, alternate format #1 is available using a header byte of \$11.

Alternate format #1: 11 xx aa bb cc ...
 11 - header byte
 xx - count of bytes to follow
 aa bb cc ... message bytes.

If the message is more than 255 bytes in length, alternate format #2 is available using a header byte of \$12.

Alternate format #2: 12 xx yy aa bb cc ...
 12 - header byte
 xx - count of bytes to follow, most significant byte
 yy - count of bytes to follow, least significant byte
 aa bb cc ... message bytes.

These formats are backward compatible and may be used as desired.

For example, the host wants to transmit the following message onto the bus:

A1 B2 C3 D4 E5 F6 A7 B8 C9 DA EB FC AD BE

The following messages from the host to the AVT-418 are all equivalent. The header byte(s) are bold and underlined for clarity.

0E A1 B2 C3 D4 E5 F6 A7 B8 C9 DA EB FC AD BE

11 0E A1 B2 C3 D4 E5 F6 A7 B8 C9 DA EB FC AD BE

12 00 0E A1 B2 C3 D4 E5 F6 A7 B8 C9 DA EB FC AD BE

5.2 VPW Mode

Consult the latest version of the “Master Commands and Responses” document for detailed information on the commands supported by the AVT-418 while in VPW mode of operation.

The latest version of the “Master Commands and Responses” document can be obtained from our web site at: <http://www.AVT-HQ.com/download.htm>

When in VPW mode of operation the interface is always listening to, or monitoring, the external network. All bus traffic is reported to the control computer by the interface. Transmit operations occur only when initiated by the control computer.

5.3 PWM Mode

Consult the latest version of the “Master Commands and Responses” document for detailed information on the commands supported by the AVT-418 while in PWM mode of operation.

The latest version of the “Master Commands and Responses” document can be obtained from our web site at: <http://www.AVT-HQ.com/download.htm>

Operations in PWM mode are quite different than in VPW or UBP modes. There are essentially two modes of operation while PWM mode.

5.3.1 PWM Active Node

One mode is when the AVT-418 is an active node. This is the default mode when PWM mode is entered. As an active node the AVT-418 is capable of receiving and transmitting network messages. Note that only messages destined for the AVT-418 will be received from the network, acknowledged to the network, and forwarded to the host computer. Upon entering PWM mode or resetting the HBCC device the HBCC is set up with node address of \$F1 (for node-to-node messages) and the functional message table is set for OBD-II messages: \$4A, \$4B, \$5A, \$5B. These settings can be altered by the user. Consult the two documents: “HBCC Initialization Parameters” and “HBCC Interrupt Register Definitions” for more details on how to change the configuration of the HBCC.

5.3.2 PWM Passive Network Monitor

A second mode of operation is “network monitor” mode. In this mode the AVT-418 becomes a passive network node and cannot transmit any network messages. The AVT-418 will see all network messages, including acknowledgments, and forward all information to the host computer.

When in PWM mode:

- ◇ Enter “network monitor” mode by sending the command: 83 01 02 16
- ◇ Exit “network monitor” mode by sending the command: 83 01 02 72

5.3.3 PWM “Look Alike”

There exists a “Look Alike” mode for PWM operations. This mode was developed to allow the AVT-418 to ‘mimic’ VPW operations while in PWM mode.

More specifically, an OBD-II query in VPW mode is of the form: 68 6A F1 xx yy
But in PWM mode the same query is of the form: 48 6A xx yy. Note that the priority/type byte is different and the source address byte is missing. The response from the AVT-418 in normal PWM mode includes the CRC byte at the end.

If the AVT-418 is put into PWM mode and “Look Alike” is enabled the user can treat the AVT-418 as if it were in VPW mode (for OBD-II queries). The AVT-418 will change the “68” byte from the host to “48”, the source address byte is stripped out and used to update the HBCC node address, and the CRC byte is stripped from the response message.

Note that the received CRC byte is stripped from the received message when either the CRC byte forwarding is disabled (5x 01 command) or when “Look Alike” mode is enabled (5x 14 command). The user should be aware of the interaction between these two commands.

5.4 KWP Mode

Consult the latest version of the “Master Commands and Responses” document for detailed information on the commands supported by the AVT-418 while in KWP mode of operation.

The latest version of the “Master Commands and Responses” document can be obtained from our web site at: <http://www.AVT-HQ.com/download.htm>

Note: Since the AVT-418 supports operations in Keyword Protocol 2000 mode, it will support ISO 9141 and ISO 9141-2 operations.

Operations in KWP mode are slightly different than in VPW mode.

When first entering KWP mode, the AVT-418 is disconnected from the network (K-line). There are two ways to connect to the network.

1. Conduct a communications initialization with the vehicle. The AVT-418 supports all three methods, as required by the ISO 14230 specification. The three initialization methods are mentioned here. Consult the document “Keyword Protocol 2000 Initialization” for detailed information about each of these initialization sequences.
 - A. CARB mode initialization. This is the mode that should be used for ISO 9141-2 applications; such as OBD-II operations. The command is: \$61 11.
 - B. 5-Baud mode initialization. The command is: \$61 12.
 - C. Fast initialization. The command is: \$6x 13 yy zz ...

Note that following successful initialization of the communications link, the AVT-418 will monitor for transmitted messages. If no transmit activity is sensed within 4.5 seconds the AVT-418 will automatically transmit a Mode 1 PID 0 request (this is an OBD-II query). This is known as the “Keep Alive” message and is used to keep the communications link open or active. The “Keep Alive” message can be changed or disabled by the user.

2. Issue the \$61 04 command. This will shut the K-line relay and connect the AVT-418 unit to the network K-line. Unless changed by the operator (using the 53 03 xx yy command) the AVT-418 defaults to the K-line baud rate of 10.4 kbps. Any network traffic will be received by the AVT-418 unit and forwarded to the host computer.

5.5 CAN Mode

Consult the latest version of the “Master Commands and Responses” document for detailed information on the commands supported by the AVT-418 while in CAN mode of operation.

The latest version of the “Master Commands and Responses” document can be obtained from our web site at: <http://www.AVT-HQ.com/download.htm>

Operations in CAN mode are quite different than any other mode. The user is also referred to the document “A Discussion about CAN” for detailed information on CAN operations and the construction of packets between the AVT-418 and the host computer.

Firmware upgrades for both the AVT-418 and AVT-718 are in progress to allow the AVT-418 and AVT-718 to fully handle all ISO 15765 CAN messages.

5.6 UBP Mode

Consult the latest version of the “Master Commands and Responses” document for detailed information on the commands supported by the AVT-418 while in UBP mode of operation.

The latest version of the “Master Commands and Responses” document can be obtained from our web site at: <http://www.AVT-HQ.com/download.htm>

Operations in UBP mode are very similar to operations in VPW mode.

Upon entering UBP mode, the AVT-418 will monitor for transmitted messages. If no transmit activity is sensed within 4.5 seconds the AVT-418 will automatically transmit a “Keep Alive” message. The “Keep Alive” message can be changed or disabled by the user.

5.7 Match Function - Message Filtering

A coarse filtering mechanism for messages received from the bus is provided by the AVT-418 Interface unit firmware. *The match function is not applicable to CAN mode of operation.* If the match table is cleared (on power-up, reset, or \$31 \$7B command) all messages received from the network are passed to the host.

When at least one entry is made to the match table, all messages received from the network are checked against the match table. If a match is found the message is passed to the host. If no match is found, the message is discarded, and the host is not notified.

A match table entry is made using the \$32 \$xx \$yy command. The \$xx value is the byte position and the \$yy value is the byte value. This filtering mechanism is more easily explained by example.

It is desired to receive all messages (at the host) where the third byte of the message is equal to \$F1. Send the command \$32 \$03 \$F1 to the AVT-418 interface. To verify the table entry send the command \$30. The response will be \$42 \$03 \$F1. The only network messages passed to the host will now be of the form: \$zz \$xx \$F1 \$... Note that at the host the message will be \$rr \$ss \$zz \$xx \$F1 \$.. where \$rr is the header byte, \$ss is the received message status byte, and the message follows.

The match table can hold ten entries where an entry consists of a byte position and a byte value. The byte position refers to where in the network message the match byte is to be compared. The first byte of the message has a byte position value of one.

Ordering of the match table is not important. All table entries are checked until a match is found or the end of the table is encountered. If a match table entry specifies a byte position that doesn't exist for the message being checked (the message is shorter than the table entry), that table entry is not checked.

Note that the header byte and the received message status byte are not included in the match function nor are these two bytes considered part of the message. When in UBP and ISO modes the byte following the header byte is the received message status byte. When in PWM mode the byte following the header byte is the message number. These bytes are ignored by the match function and are not counted. The very next byte is the first byte of the message and has is byte number one of the message.

5.8 Status and Error Codes

Consult the latest version of the “Commands and Responses” list for a complete list of Status and Error codes supported by the AVT-418.

The latest version of the “Commands and Responses” document can be obtained from our web site at: <http://www.AVT-HQ.com/download.htm>

6. Technical Information

6.1 Reference Documentation

Listed here are Specifications and other documentation related to the AVT-418 and the functions which it performs.

1. SAE J1850. (www.sae.org)
2. SAE J1979.
3. SAE J2411.
4. SAE J1939.
5. ISO 9141.
6. ISO 9141-2.
7. ISO 14230.
8. ISO 11898.
9. ISO 11519.
10. LIN. (www.lin-subbus.org)

6.2 Technical Support

The user may contact Advanced Vehicle Technologies, Inc. for assistance in any of the areas covered here. When requesting assistance please identify yourself, your company, the model number of the unit, and the serial number.

Use of e-mail is preferred. You may also call or send a fax.

Advanced Vehicle Technologies, Inc. is located in Maryland and is open from 0800 hrs. to 1800 hrs. Eastern Time. If calling after hours, please leave a message and we will return your call as quickly as possible.

We can be contacted:

E-mail at:	support@AVT-HQ.com
Voice:	+1-410-798-4038
Fax:	+1-410-798-4308

6.3 AVT-418 Hardware Information

The following sections contain information about the AVT-418 Multiple Interface board.

Information about the enclosure is contained in Section 6.4.

6.3.1 Fuse F1

Fuse F1 on the AVT-418 board is a 500 milliamp fast blow fuse designed to protect the AVT-418 in the event of reverse voltage application or a voltage surge significant enough to trip the input transient voltage suppressor.

The fuse is a Schurter # MSF 125 034.4216

Replacement fuses are available from several sources. For reference, at the time of this writing, replacement fuses were available from:

Allied Electronics order number is: 798-0248.

DigiKey order number is: F863-ND

6.3.2 Jumper JP1

Jumper JP1 is a 22-pin header that permits assignment of signals to the pins of P3.

On revision “G” boards, JP1 is now a 24-pin header. The additional two pins control the selection of the “V-Batt” source to the KWP, UBP, and LIN network pull-up resistors (K-lines). By removing this jumper and then installing a wire jumper (wire wrap, 30 AWG) the user can provide an external or alternate source of power for the network pull-up resistors that is separate from the power source to the AVT-418 unit.

JP1 is numbered such that all odd numbered pins are in one row and all even numbered pins are in the other row.

A diagram of JP1 is shown in Figure 2.

The default configuration for JP1 is the first 9 pin pairs and the last pin pair are jumpered. The resulting configuration is shown in Table 1.

A detailed listing for all pins of JP1 is provided in Table 2.

Refer to the AVT-418 unit block diagram, Figure 1. Included on the block diagram are all signal assignments and pin numbers for JP1 and P3.

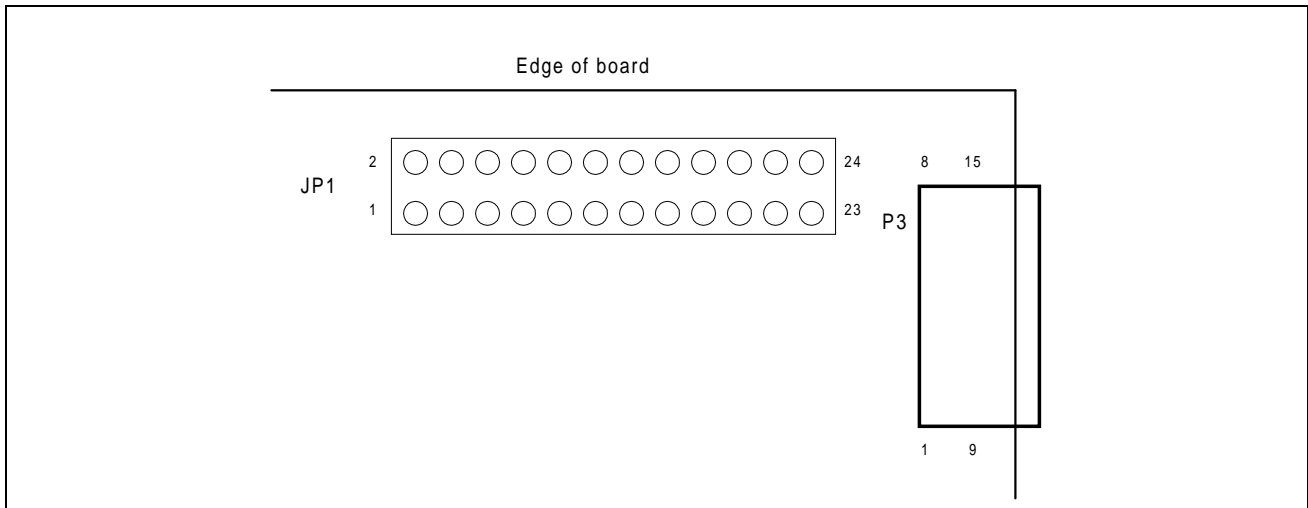


Figure 2 Diagram of JP1

AVT-418 Signal	JP1 pin #		JP1 pin #	P3 pin #
VPW bus	1	jumper	2	2
PWM bus +	3	jumper	4	2
PWM bus -	5	jumper	6	10
K-line	7	jumper	8	7
L-line	9	jumper	10	15
CAN - H	11	jumper	12	6
CAN - L	13	jumper	14	14
SWC	15		16	
<i>UBP / LIN</i>	17		18	
	19		20	
	21		22	
to pull-up resistors on K-line and UB/LIN line	23	jumper	24	protected V-battery from P3 pin 13

Table 1 Default Configuration of JP1

AVT-418 Signal	JP1 pin #		JP1 pin #	P3 pin #
VPW bus	1	jumper	2	2
PWM bus +	3	jumper	4	2
PWM bus -	5	jumper	6	10
K-line	7	jumper	8	7
L-line	9	jumper	10	15
CAN - H	11	jumper	12	6
CAN - L	13	jumper	14	14
SWC	15		16	9
UBP / LIN	17		18	3
<i>P3 pin #1</i>	19		20	8
<i>P3 pin #11</i>	21		22	12
to pull-up resistors on K-line and UBP/LIN line	23	jumper	24	protected V-battery from P3 pin 13

Table 2 Complete Description of JP1

6.3.3 Jumper JP2

Jumper JP2 on the AVT-418 board is not installed and is not used. Do not use JP2.

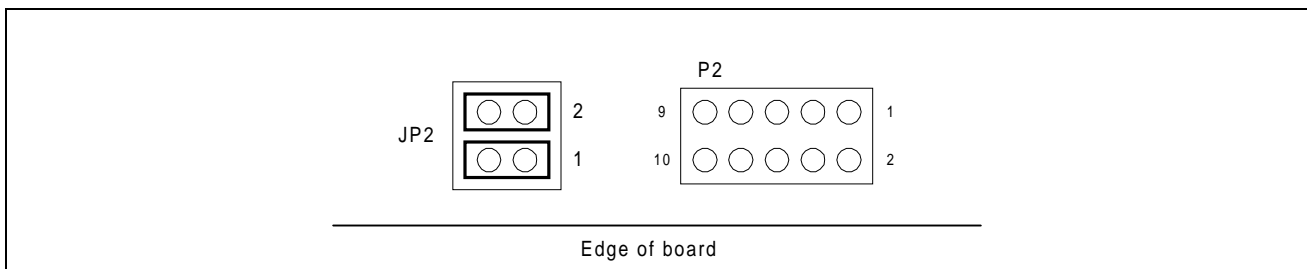


Figure 3 Diagram of JP2

6.3.4 Connector P1

Connector P1 exists on the AVT-418 board to support development, test, and debugging operations. It may not be installed. **Do not connect anything to P1.**

6.3.5 Connector P2

Connector P2 contains all unused microcontroller pins, I/O ports, TPU ports, etc. It may not be installed. **Do not connect anything to P2.**

6.3.6 Connector P3

Connector P3 on the AVT-418 board is a DA-15P connector and will mate to any industry standard DA-15S connector. It can be connected to a vehicle OBD-II connector through an optional OBD-II cable (AVT order number 101-002).

When the AVT-418 board is installed in the enclosure, P3 is labeled: “VEHICLE NETWORK.”

CAUTION

The user should be aware of possible signal conflicts between the AVT-418 and the vehicle J1979 (OBD-II) connector.

Damage may result to either or both the AVT-418 and the vehicle if improper signals are connected.

The AVT-418 supports more protocols than called out in the OBD-II specification (SAE J1979). As such the user should exercise extreme caution when connecting the AVT-418 directly to a vehicle. Additionally, only some of the 16 pins on the OBD-II connector are assigned known signals. All other pins are used by the manufacturer at will.

There may be signal conflicts that could result in damage to the AVT-418 and/or vehicle. It is for this reason that JP1 is available on the AVT-418 board - the user can change the signal to pin configuration on the AVT-418 to match the vehicle signal pin-out on the OBD-II connector.

Refer to Section 6.3.2 for additional information about JP1.

Refer to the AVT-418 unit block diagram, Figure 1. Included on the block diagram are all signal assignments and pin numbers for JP1 and P3.

<u>P3 Pin #</u>	<u>Where to</u>	<u>Description</u>	<u>OBD-II Connector</u> [using AVT OBD-II cable]
1	JP1 pin 19		
2	JP1 pin 2 JP1 pin 4		J1850 bus +
3	JP1 pin 18		
4	<i>ground plane</i>	Ground	Ground
5	<i>ground plane</i>	Ground	Ground
6	JP1 pin 12		
7	JP1 pin 8		K-line
8	JP1 pin 20		
9	JP1 pin 16		
10	JP1 pin 6		J1850 bus -
11	JP1 pin 21		
12	JP1 pin 22		
13	<i>power input protection circuit</i>	+V-battery	+V-battery
14	JP1 pin 14		
15	JP1 pin 10		L-line

Table 3 Connector P3

6.3.7 Ethernet Connection

When the AVT-418 board is installed in the enclosure, the RJ-45 jack is labeled: “ETHERNET.”

With reference to the RJ-45 jack on the AVT-418 board, the following pins are used:

- Pin #1: TX+ (out).
- Pin #2: TX- (out).
- Pin #3: RX+ (in).
- Pin #6: RX- (in).
- All other pins are “not used.”

6.4 AVT-418 Enclosure

The AVT-418 enclosure is easily opened to permit access to the jumpers on JP1 and fuse F1.

To open the enclosure, turn it upside down. Remove the two recessed screws holding the top and bottom half together. Carefully pull the halves apart. The end plates will remain attached to the AVT-418 board.

To reassemble, carefully install the AVT-418 board (with end plates attached) into one half of the enclosure. Carefully mate the other enclosure half. Install the two screws. Do not over tighten.

7. Company Overview

Advanced Vehicle Technologies, Inc. is dedicated to providing affordable hardware, software, and technical support to the developers and users of vehicle based networks.

AVT, Inc. also offers other vehicle network products including:

- AVT-718 Multiple Interface supports: CAN, J1850 VPW, PWM, KWP2000, UBP, LIN, and more (RS-232/422 unit).
- AVT-931 Dual J1850 Interface (PC/104 form factor).
- AVT-715 Dual J1850 Interface (RS-232/422 unit)
- AVT-716 Multiple Interface supports: J1850 VPW, PWM, ISO 9141, KWP2000, ALDL, CCD (RS-232/422 unit).
- AVT-921 Dual J1850 Interface (an 8-bit ISA board).
- AVT-932 Dual J1850 Interface with Ethernet connectivity (PC/104 form factor).
- AVT-1850-1 J1850 VPW Development System

Consult our web site and/or contact the factory for information on these products and our latest offerings.

The engineering staff at AVT, Inc. is experienced with multiplex bus standards including, but not limited to: J1850 VPW, PWM, ISO-9141, ISO-9141-2, Keyword Protocol 2000, ALDL, CCD, CAN, UBP, LIN, and more. A design engineer is available to provide assistance on the use of any of AVT's products.

AVT engineering staff members are available to provide dedicated engineering support for a customer project. Through a simple contractual arrangement, a customer is able to 'tap' into AVT's knowledge and experience.

Information on any of the products or engineering support that Advanced Vehicle Technologies can provide is available by calling, faxing, or writing.

Advanced Vehicle Technologies, Inc.
1509 Manor View Road, Davidsonville, MD 21035
410-798-4038 (voice)
410-798-4308 (fax)

Home Page: <http://www.AVT-HQ.com>
e-mail: support@AVT-HQ.com

Revision Record:

- A1: Original release.
- A2: Updated Appendix A.
Updated Appendix B.

A3: Added GM ALDL note and updated Appendix A.

8. Appendix A

A Telnet listing of the factory default settings for an AVT-418 unit is provided here:

Select option "0" to change the server settings:

- IP Address; default: 192.168.1.70.
- Gateway IP Address; not used.
- Netmask. The factory default is:
8 host bits [255.255.255.0]
or
32 host bits [0.0.0.0]
- Telnet configuration password; not used.

Select option "9" to save the new settings, exit, and reboot.

It is not recommended that Channel 1 configuration be changed.

=====

To start a TELNET session

From the START menu, select run, enter this command:

```
telnet 192.168.1.70 9999
```

"telnet" is the application name.

"192.168.1.70" is the IP address of the AVT-418 XPort module.

"9999" is the port the "telnet" application will connect to.

As soon as the session starts you have 5 seconds to hit <Enter> or else the connection will timeout and you will have to start again.

After you hit <Enter> The overall configuration of the AVT-418 XPort module will scroll by very quickly. You will then get the main menu, shown here:

Change Setup:

```
0 Server
1 Channel 1
3 E-mail
5 Expert
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit      Your choice ?
```

If you do not make a selection, but instead just hit <Enter> the AVT-418 XPort module will display the full unit configuration. An example listing is below (3 sections down).

=====

At the menu prompt, select "0" and hit <Enter>.

You can walk thru the Server settings.
The recommended and factory settings are shown in parentheses, as shown here.

You should only need to change the IP Address and Netmask settings.
(Hint: do not enter leading zeros for the IP address. Enter it as 192.168.1.70)

IP Address : (192) .(168) .(001) .(070)
Set Gateway IP Address (N) N
Netmask: Number of Bits for Host Part (0=default) (8)
Change telnet config password (N) N

=====

At the menu prompt, select "1" and hit <Enter>.
You can walk thru the Channel 1 settings.
The recommended and factory settings are shown in parentheses, as shown here.

We strongly recommend that you use these settings and do not change them.

Change Setup:
0 Server
1 Channel 1
3 E-mail
5 Expert
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

Baudrate (230400) ?
I/F Mode (4C) ?
Flow (02) ?
Port No (10001) ?
ConnectMode (C0) ?
Remote IP Address : (000) .(000) .(000) .(000)
Remote Port (0) ?
DisConnMode (00) ?
FlushMode (00) ?
DisConnTime (00:00) ?:
SendChar 1 (00) ?
SendChar 2 (00) ?

=====

When done changing the IP Address, and possibly verifying the Server and Channel 1 settings, do not forget to select <9> from the menu to save the settings.

When you select <9> and hit <Enter> the AVT-418 XPort will save the configuration and reboot - that will terminate the telnet session.

Wait at least 20 seconds for the AVT-418 XPort unit to finish saving and rebooting before trying to establish a connection to the AVT-418 unit.

=====

At the menu prompt, do not make a selection, just hit <Enter>.
The XPort will display the full configuration, as shown here.

Change Setup:
0 Server
1 Channel 1
3 E-mail
5 Expert
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

*** basic parameters
Hardware: Ethernet TPI
IP addr 192.168.1.70, no gateway set, netmask 255.255.255.000

*** Security
SNMP is enabled
SNMP Community Name: public
Telnet Setup is enabled
TFTP Download is enabled
Port 77FEh is enabled
Web Server is enabled
ECHO is disabled
Enhanced Password is disabled
Port 77F0h is enabled

*** Channel 1
Baudrate 230400, I/F Mode 4C, Flow 02
Port 10001
Remote IP Adr: --- none ---, Port 00000
Connect Mode : C0
Disconn Mode : 00
Flush Mode : 00

*** Expert
TCP Keepalive : 45s
ARP cache timeout: 600s
High CPU performance: disabled
Monitor Mode @ bootup : enabled
HTTP Port Number : 80
SMTP Port Number : 25

***** E-mail *****
Mail server: 0.0.0.0
Unit :
Domain :
Recipient 1:
Recipient 2:

*** Trigger 1
Serial Sequence: 00,00
CP1: X
CP2: X
CP3: X
Message :
Priority: L
Min. notification interval: 1 s

Re-notification interval : 0 s

*** Trigger 2

Serial Sequence: 00,00

CP1: X

CP2: X

CP3: X

Message :

Priority: L

Min. notification interval: 1 s

Re-notification interval : 0 s

*** Trigger 3

Serial Sequence: 00,00

CP1: X

CP2: X

CP3: X

Message :

Priority: L

Min. notification interval: 1 s

Re-notification interval : 0 s

=====

9. Appendix B

A listing of the AVT-418 Ethernet server, setup web page, factory default settings are provided in this appendix. [Please see the notes at the end of this Section.]

To log into the AVT-418 Ethernet server to view and/or change the configuration, use a web browser and enter the following address: <http://192.168.1.70> (the factory default address)

The first web page to come up is the “Port Properties” page. It is not recommended that changes be made to this page.

Factory default configuration information for the first three “Menu” buttons on the left hand side is provided below. The buttons are “Unit Configuration”, “Server Properties”, and “Port Properties”.

The “Unit Configuration” page displays unit configuration only. No changes can be made from this page.

If it is necessary to change any operational parameters, go to the appropriate page, change the parameters, and then save them by selecting “Update Settings”. The AVT-418 Ethernet server will save the new parameters and then reboot. It takes about 1 minute for the AVT-418 Ethernet server to complete a reboot and return to normal operations, with the new parameters in-use.

Unit Configuration Page

Select the button “Unit Configuration” to view current configuration of the AVT-418 Ethernet server. No changes are permitted from this page. Factory default settings are shown here.

Server Configuration

Product:	XPort Device Server		
Model:	Ethernet 1 Channel		
Firmware version:	V1.50		
Hardware Address:	This is the so-called "MAC" address. It is unique to each AVT-418 Ethernet server device.		
IP Address:	192.168.1.70		
Subnet Mask:	0.0.0.0	or	255.255.255.0
Gateway Address:	0.0.0.0		

Port Configuration

Local Port Number:	10001
Remote Port Number:	[blank]
Serial Port Speed:	230400
Flow Control:	02
Interface Mode:	4C
Connect Mode:	C0
Disconnect Mode:	00
Flush Mode:	00
Pack Control:	00
UDP Datagram Type:	[Not used]

Server Properties Page

Select the button "Server Properties" to view and change the AVT-418 Ethernet server properties. Factory default settings are shown here.

Server Properties

IP Address:	192.168.1.70		
Subnet Mask:	0.0.0.0	or	255.255.255.0
Gateway Address:	0.0.0.0		
High Performance:	Disable	[this field may not exist]	
Telnet Password:	XXXX	[none assigned]	

Port Properties Page

Select the button "Port Properties" to view and change the AVT-418 Ethernet server communications port properties. Factory default settings are shown here.
[It is NOT recommended that changes be made to these parameters.]

Serial Port Settings

Serial Protocol:	RS232
Speed:	230400
Character Size:	8
Parity:	None
Stopbit:	1

Flow Control: CTS/RTS (Hardware)

Connect Mode Settings

UDP Datagram Mode: Disable
UDP Datagram Type: [blank]
Incoming Connection: Accept unconditional
Response: Nothing (quiet)
Startup: No Active Connection Startup

Dedicated Connection

Remote IP Address: [blank]
Remote Port: [blank]
Local Port: 10001

Flush Mode Input Buffer (Line to Network)

On Active Connection: Disable
On Passive Connection: Disable
At Time To Disconnect: Disable

Flush Mode Input Buffer (Network to Line)

On Active Connection: Disable
On Passive Connection: Disable
At Time To Disconnect: Disable

Packing Algorithm

Packing Algorithm: Disable
Idle Time: Force Transmit 12 ms
Trailing Characters: None
Send Immediate After Sendchars: Disable
Sendchar Define 2-Byte Sequence: Disable
Send Character 01: 00
Send Character 02: 00

Additional Settings

Disconnect Mode: Ignore DTR
Check for CTRL-D to Disconnect: Disable
Port Password: Disable
Telnet Mode: Disable
Inactivity Timeout: Enable
Inactivity Timer: 0:0
Port Password: [blank]

Notes:

I tried several different versions of web browsers to try and access the web page of the AVT-418 Ethernet server. Only one worked. Your results may differ.

It is easy to identify when a browser doesn't work. The server configuration page may load, but the selection buttons on the left hand side have no affect on the display.

In my testing, only Netscape version 7.0 worked. However, if I loaded the page, left the page, and then try to load the page again, the load was corrupted. It was necessary to completely shutdown Netscape (thus closing the Java background task manager) before launching Netscape again, and logging into the AVT-418 Ethernet server.

I tried these browsers and they did not work:

- Internet Explorer version 4.0
- Internet Explorer version 5.50
- Internet Explorer version 6.0
- Netscape version 4.7.

For my tests the host operating system was MS-Windows98SE.
I have not tried any other operating systems.