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Configuring to Receive J1850 PWM Messages

Nearly all AVT vehicle network interface units that support J1850 PWM operations use the Motorola HBCC [Hosted Bus Controller Chip].

By using the HBCC, AVT interface units provide a Ford SCP [Standard Corporate Protocol] compliant implementation of J1850 PWM. The AVT interface unit is able to provide several features, including: receive message filtering and passive network monitor.

[Other manufacturers may use J1850 PWM and the AVT interface may or may not work with their implementation.]

The purpose of this document is to describe how to set up the HBCC filtering functions. Background is given to aid in the understanding of how the HBCC is used in AVT products.

Descriptions of a network message refer to the message only.

Do NOT confuse this with the 'packet' that the AVT interface sends to the host. In the 'packet' that the AVT interface sends to the host the first byte is the header byte, the second byte indicates what table entry matched, the third byte and on are the actual network message bytes starting with byte #1 as described below.

Ford SCP message construction

<u>Message byte #</u>	<u>Description</u>
1	Upper nibble is message priority, low number is high priority. Lower nibble is message type (see next table).
2	Destination address, physical or functional.
3	Source address, physical address of the node that transmitted the message.
4 - 11	Message data, if present.
12 (or last byte)	CRC byte.

Ford SCP Message Types

<u>Message Type</u>	<u>Description</u>
0	Function message.
1	Broadcast, a type of functional message.
2	Function query.
3	Function read.
4	Node - to - Node. A physical message.
5	BCC access.

HBCC Receive Filter Operation

- The AVT interface never receives the message it transmits and never forwards that message to the host computer.
- The HBCC will only receive physically addressed messages that match its own node address.
[Node address is default set to \$F1. It can be changed by writing to the Node Address Register. Consult “HBCC Initialization Parameters” for more information.]
- The HBCC will only receive functional messages [types 0, 1, and 2] with function identifiers that match one of the values loaded into the Function Message Lookup Table [FMLT].
- The HBCC will only receive function read messages with function read identifiers that match one of the values loaded into the Function Read Message Lookup Table [FRMLT].

HBCC Configuration Summary

The HBCC has both registers and RAM space. They are separate spaces and should not be confused.

Several registers contain pointers into the RAM space. The values in these registers, the pointers, specify what different areas of RAM are used for.

Function Message Lookup Table

HBCC RAM addresses \$10 up the address indicated in the Function Read Message Lookup Table Pointer [FRMLTP] (register address \$11) comprise the Function Message Lookup Table.

Function Read Message Lookup Table

HBCC RAM addresses from the value in the FRMLTP to the Start of User RAM [SUR] pointer comprise the Function Read Message Lookup Table. *It is strongly recommend that you NOT use the FRMLT unless you really know what you are doing.*

Total Table Size

These two tables, Function Message Lookup Table and Function Read Message Lookup Table, may occupy a maximum of 32 bytes, total.

User RAM

User RAM exists from the SUR pointer to the receive buffer. *It is strongly recommended that you NOT use this area as it may adversely affect operations of the HBCC and the AVT interface.*

HBCC Default Configuration

Consult “HBCC Initialization Parameters” for more information.

All HBCC configuration is volatile and is reset when entering PWM mode or when the HBCC reset command is issued by the host.

- Node address is set to \$F1.
- FRMLTP is set to RAM address \$14.
This means that RAM from \$10 to \$13 is used for the FMLT.
- SUR is set to RAM address \$16.
This means that RAM from \$14 to \$15 is used for FRMLTP.
- The FMLT is initialized to contain diagnostic functional message identifiers:
 - \$5A [in RAM address \$10]
 - \$5B [in RAM address \$11]
 - \$6A [in RAM address \$12]
 - \$6B [in RAM address \$13]
- The FRMLT is initialized to contain two dummy values:
 - \$04 [in RAM address \$14]
 - \$06 [in RAM address \$15]
- The FRMLTP is initialized to:
 - \$14 [in Register address \$11]
- The SUR is initialized to:
 - \$16 [in Register address \$12]

The following page describes how to change the HBCC configuration to receive additional functional messages. Note that the functional identifiers (destination address or addresses) must be known in advance.

Change HBCC Configuration

Assume you want to change the AVT interface to accept additional messages with functional identifiers (destination addresses) of values \$AB, \$3C, and \$8A.

You also want to keep the default values intact.

Perform the following:

Store the desired values in the FMLT

- Write \$AB to HBCC RAM address \$14.
[716/718 command: 83 03 14 AB]
- Write \$3C to HBCC RAM address \$15.
[716/718 command: 83 03 15 3C]
- Write \$8A to HBCC RAM address \$16.
[716/718 command: 83 03 16 8A]

Update the two pointers

- Set the FRMLTP to \$17.
[716/718 command: 83 01 11 17]
- Set the SUR to \$17.
[716/718 command: 83 01 12 17]

HBCC Status

- Node address is still \$F1.
- Will accept functional messages with destination addresses of:
\$5A
\$5B
\$6A
\$6B
\$AB
\$3C
\$8A
- FRMLT is empty. No Function Read messages will be accepted.
[Because FRMLTP and SUR are set to the end of the FMLT.]

Glossary

- J1850 PWM: J1850 is the SAE specification. PWM: Pulse Width Modulation version.
- SCP: Ford Motor Company Standard Corporate Protocol.
- HBCC: Hosted Bus Controller Chip.
- FMLT: Function Message Lookup Table.
- FRMLT: Function Read Message Lookup Table.
- FRMLTP: Function Read Message Lookup Table Pointer.
- SUR: Start of User RAM pointer.
- NAR: Node Address Register.

Numbers

Almost all numbers used in this document (and most AVT documents) are hex digits. Some are explicitly identified as hex digits by using the "\$" sign before the number.

Documents

"HBCC Initialization Parameters" available from our web site; download page; application notes section.

<http://www.avt-hq.com/download.htm>

"Master Commands and Responses" is also available from our web site, same place, as noted above.