



industrial/wireless/performance

## APPLICATION BULLETIN

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MAS Products and BAMHC

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# B&B BAMHC HANDSHAKE CONTROLLER

## INTRODUCTION

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Multiple Address Systems using MDS X790/X710 “B” code radios or legacy MAS licensed products require your host computer or PLC to provide properly timed keying with RTS to the radio. Most PLCs control RTS correctly but host computers many times do not. This control is purely a function of the host software and is sometimes difficult to achieve.

The important parameters for RTS are:

1. RTS must be asserted at least 10 ms ahead of data transmission. Ideally the host should wait for CTS from the radio.
2. RTS must be dropped after the last complete data byte, and at least 1 ms before the response is initiated (key-up) at the polled RTU. The faster an RTU is capable of responding, the closer to the end of data the host must drop RTS.

Identifying improper timing conditions can be accomplished with a protocol analyzer or a reasonable scope by watching the RS-232 signals. Transmit data must occur at least 10 ms after RTS. (Most simple software oriented line monitors, which run on a PC, are not accurate enough for these determinations.)

## UNIT IDENTIFICATION

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An easy-to-implement, off-the-shelf solution to provide proper handling of RTS can be done with a device called BAMHC (Buffered Asynchronous Modem Handshake Controller) manufactured by B&B Electronics, MDS P/N 01-3948A01. The BAMHC provides hardware handshake control for Radio Frequency and other modems requiring the RTS line to control the transmitter. RS-232, RS-422, or RS-485 data signals at up to 19.2 kbps are supported. The BAMHC raises RTS and buffers up to 160 characters while waiting for the modem to be ready to transmit. The amount of time data is buffered is user-selectable for 5, 10, or 50 ms. Alternatively, the modem’s CTS line can be used to indicate ready to transmit. The BAMHC takes data from the computer on port 1 and hands it off to the radio with the proper RTS-CTS control. The example below shows 9600 8N1 wait for CTS, but selection of other data rates is easily accomplished as described in the BAMHC Data Sheet. The proper settings are:

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SW 1 2 3 4 5 6 7 8  
1 1 0 0 0 0 0 0

1=ON  
0=OFF

## **PRODUCT MODIFICATION**

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The BAMHC off the shelf has pin 12 strapped to ground and pin 25 used for optional power input. Pin 12 on our remote radio is used for sleep mode, and pin 25 is used for an alarm output.

For the BAMHC to work properly with the MDS radio a custom cable can be fabricated for connection between the BAMHC and the radio. Alternatively, minor modifications to the BAMHC can be performed.

### **Option 1 – Cable Fabrication**

1) Acquire two DB25 connectors, 1 male & 1 female, and wiring/cable to connect the two connectors.

2) Wire the connectors as follows:

<u>DB25 Male Connector</u>	<u>DB25 Female Connector</u>
2-----	2 Transmit Data
3-----	3 Receive Data
4-----	4 Request to Send
5-----	5 Clear to Send
7-----	7 Ground
19-----	25 BAMHC Power

3) Carefully pry the BAMHC open with a small screwdriver and set the dip switches for proper operation per the BAMHC data sheet. Reinstall board in enclosure.

### **Option 2 – Modify the BAMHC**

Tools required for BAMHC modification:

- 1) Small screwdriver
- 2) Soldering iron
- 3) Scalpel or small razor knife
- 4) Wire stripper

- 5) Kynar or equivalent small-guage wire

#### Modification Instructions

- 1) Carefully pry the BAMHC open with a small screwdriver
- 2) On the DB25 Male connector side, carefully cut the traces connecting to pins 12 and 25.
- 3) Solder a jumper wire from the DB25 Male Connector pin 19 to the DB25 Female connector pin 25. This provides the required power to the BAMHC from the radio.
- 4) Set the dip switches for the proper operation of your system per the BAMHC data sheet.
- 5) Re-install the BAMHC board in the bottom half of the enclosure and then snap the top cover back in place paying attention to the proper markings. The end reading 'To Modem RS-232' should be on the DB25 male connector end.

For more information, contact MDS Technical Services at [techsupport@microwavedata.com](mailto:techsupport@microwavedata.com), or by phone at +1-585-241-5510.

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