

# Multi-Drop KISS operation

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John Wiseman (G8BPQ) has developed a multi-drop KISS protocol, allowing several TNCs to be connected to a single serial I/O port while operating KISS mode.

To prevent all TNCs from responding to all data from the serial I/O port (called the master), each TNC must have a specific address. This address is contained in the high nibble of the command byte in each KISS frame.

The KISS format is shown in Figure 1.

For multi-drop KISS, the Command byte is modified by changing the first digit of the HEX value listed in Figure 1. As listed, the TNC with address 0 would be addressed. For TNC address 1 the command bytes would be:

\$10 Data to be transmitted  
\$11 Set TNC TXDELAY  
\$12 Set TNC Persistence  
\$13 Set TNC Slottime  
**\$14** Set TXtail  
\$15 Set Full Duplex mode  
\$16 Set Hardware  
\$FF Exit KISS mode

Note that since the \$FF code applies to all units, a single \$FF command byte would cause all TNCs on the serial I/O port to leave KISS mode.

Within any given frame of data, the FEND character can only appear as the opening and closing characters, thus delimiting the frame. If the \$CO value must be sent as data or as an argument to a TNC command (\$x1, \$x2, or \$x3 command byte), then standard KISS transparency must be applied.

The G8BPQ multi-drop KISS has extended the KISS command bytes listed above by adding some new values for the low-order nibble. These additions are:

\$xC Data to be transmitted –  
Acknowledgement required  
\$xE Poll frame (see Polled Mode  
below)

## Acknowledgement Mode

The G8BPQ Acknowledgement Mode is intended mainly for HF operation where data that has been sent to the TNC for

FIGURE 1

BYTE0	FEND	\$C0
BYTE 1	COMMAND BYTE	\$00 – data to be transmitted \$01 – set TNC TXDELAY \$02 – set TNC Persistence \$03 – set TNC Slottime \$04 – set TXtail time \$05 – Full Duplex mode \$06 – Set Hardware \$FF – Exit KISS mode
BYTE 2-N	Data	only if coMMAND byte is 0
BYTE2	Parameters	Only for non-zero COMMAND byte
BYTE N+1	FEND	\$C0

transmission may not actually be transmitted for an extended period of time. When this mode is selected, the master unit would send the special **\$xC** command byte, causing the selected **TNC** to return an acknowledgement when the **frame** has been sent. This allows the master to start his timing parameters (**FRACK**, etc.) at the time the frame actually left the TNC. For instance, if the master wants to send a data frame to TNC with address **5** and wants to use the Acknowledgement Mode, the frame would begin with:

**\$CO \$5C \$aa \$bb data to be transmitted \$CO**

The **\$aa** and **\$bb** in this example are not transmitted, but are returned to the master by the TNC when the **frame** is transmitted. This allows you to sequentially number the frames if you desire, as these two bytes may be any value. When the TNC has transmitted this frame it will send the following back to the master:

**\$CO \$5C \$aa \$bb \$CO**

## Polled Mode

The **G8BPQ** extended **KISS** code also allows a Polled Mode. In this mode, none of the **TNCs** will send any data to the master until the master polls the specific TNC for data. The poll **from** the master consists of the following:

**\$CO \$xE \$CO** where the **x** is the address of the unit

If the addressed TNC has data, that data is sent to the master (only one frame is sent for each poll, even if more are available). If

the addressed **TNC** has no data, the Poll frame is returned to the master (**\$CO \$xE \$CO**).

## Checksum Mode

One final mode now implemented in the **G8BPQ** extended **KISS** protocol is a Checksum Mode. In this mode, data sent between the master and the slave **TNCs** contains a checksum to insure that the data did not get corrupted on the serial I/O line. The checksum is a simple exclusive OR of all data between the opening and closing **FEND** characters. If this data contains any transparency processed data, the **REAL** value is used and not the escaped characters. The checksum is a single byte, and is sent before the closing **FEND**. Checksum may be used in conjunction with any or all of the above modes.

When several **TNCs** are connected to a common RS-232 serial I/O line, the data output from the master (**TXD** on a computer or **RXD** on the Data Engine) and the ground will be directly connected to the **TXD** line and ground of all slave **TNCs**. The **RXD** line from each of the **TNCs** must have a single diode connected with the **ANODE** to the slave TNC and the cathodes all tied together. The cathode side is then connected to the master data input (**RXD** on a computer or **TXD** on the Data Engine).

Since these modes are not directly compatible with "standard" **KISS**, the firmware must provide some method of selecting the various modes of operation. The **Kantronics** implementation of the extended **KISS** has added the commands shown in Figure 2 to select operation.

### FIGURE 2

<b>MYDROP</b>	<b>(0-15)</b>	Specifies the TNC address
<b>CHECKSUM</b>	<b>(ON/OFF)</b>	Enables Checksum Mode
<b>POLLED</b>	<b>(ON/OFF)</b>	Enables Polled Mode
<b>INTERFACE</b>	<b>(TERMINAL/KISS/BPQ)</b>	TERMINAL allows setting parameters KISS implements "standard" KISS BPQ enables the extended BPQ KISS

Note that to use the Acknowledgement Mode, you must have the INTFACE set to BPQ. The acknowledgement will be sent automatically if the command byte is \$xC.

John's implementation of this extended KISS protocol should enhance KISS type operations, especially on HF where timing becomes a particular problem. The ability to "multi-drop" many TNCs from one master (computer or Data Engine) allows multi-port networking nodes from a single serial port on a computer, thus reducing hardware requirements.

The multi-drop (or extended KISS) EPROMS for Kantronics TNCs are available as part of the G8BPQ Data Engine firmware which may be downloaded from the Kantronics BBS at (913) 842-4678. John is preparing multi-drop KISS eprom images for other TNCs and will distribute them along with his standard PC based G8BPQ code. When these other multi-drop KISS eproms become available, they will be included in the Data Engine BPQ distribution.

### KISS Frame



0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	1
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1
0	0	0	0	0	1	1	0
1	1	1	1	1	1	1	1

- \$00 data to be transmitted
- \$01 set TNC TXDELAY
- \$02 set TNC Persistence
- \$03 set TNC Slottime
- \$04 set TXtail time
- \$05 Full Duplex mode
- \$06 Set Hardware
- \$FF Exit KISS mode

### G8BPQ Multi-Drop KISS Additions

0	0	0	0	1	1	0	0
0	0	0	0	1	1	1	0
0	0	0	0	x	x	x	x
0	0	0	1	x	x	x	x
1	1	1	1	x	x	x	x

- \$0C Data to be transmitted – Ack required
  - \$0E Poll frame
  - \$0x TNC address 0
  - \$1x TNC address 1
  - \$Fx TNC address 15
- Where x =  
any KISS  
Command Byte  
(as shown above)

### Checksum Mode

