



**97-016 REV B  
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## **CONNECTING THE API MODEL 800 TO AN API MULTI-DROP SYSTEM.**

### **I. SCOPE:**

This procedure will assist customers in successfully attaching the API Model 800 HC analyzer to an API multi-drop system.

### **II. TOOLS NEEDED:**

A. 1. A 9 pin male to 25 pin female RS-232 adapter and a 9 pin male to 9 pin male cable.

OR:

2. A 25 pin female to 25 pin female RS-232 adapter, a 25 pin male to 9 pin male cable, and a 9 pin male to 9 pin male adapter.

B. API Model 800 modified for API multi-drop.

C. API multi-drop box.

D. PC or compatible computer.

### **III. HARDWARE CONNECTION:**

If you're using the cable/adapter listed in A.1 above, the connection is as follows:

A. Remove power from the M800.

B. Connect the multi-drop box 2 pin power plug to the 2 pin power plug on the rear of the M800.

C. Connect the 25 pin female end of the adapter to the M800 25 pin RS-232 connector.

D. Connect the ribbon cable connector on the multi-drop box to the 9 pin connector on the adapter attached to the M800.

E. Skip to step Z.

If you're using the cable/adapters listed in A.2 above, the connection is as follows:

A. Remove power from the M800.

B. Connect the multi-drop box 2 pin power plug to the 2 pin power plug on the rear of the M800.

C. Connect the 25 pin to 25 pin adapter to the 25 pin RS-232 connector on the M800.

D. Connect the 25 pin end of the cable to the adapter on the M800.

E. Connect the 9 pin to 9 pin adapter to the 9 pin end of the cable.

F. Connect the ribbon cable connector on the multi-drop box to the 9 pin to 9 pin adapter on the M800.

- G. Connect one end of the 9 pin to 9 pin cable to the multi-drop box for the M800. Connect the other end of this cable to the last multi-drop box on the multi-drop line.
- H. Ensure that every multi-drop box on the multi-drop line has the switch set to "Open" except for the M800 which must have its box set to "Terminate".

IV. HARDWARE DESCRIPTION:

Multi-drop RS-232 support for the API instruments is implemented by imbedding a unique Machine ID number for each of the analyzers on the multi-drop line.

The

M800 analyzer is the exception to this protocol.

In order to understand how the M800 interfaces with the API multi-drop system it is important to understand the following points:

1. An ID is only required if more than one instrument speaks the same "language":  
I.E. The M800 does not use the same protocol and command format as the other API analyzers, so any M800 commands sent on the multi-drop line will be ignored by the other API analyzer regardless of whether they have a machine ID or not. This means that the M800 does not require a machine ID. By the same token, the commands sent to an API analyzer other than the M800 will be ignored by the M800.
2. Some instruments, (such as the API M800) use a DB25 connector as opposed to the DB9 connector used on the other API instruments, (and most PC's). Therefore, a 9 pin to 25 pin adapter is necessary to connect the M800 to the multi-drop box. A cable with 9 pins on one end and 25 on the other is generally used to bridge this gap, but there are other adapters available.
3. The necessity of an adapter for converting 9 pin to 25 pin (and vice versa) brings another set of troubles into the mix. These come in the form of "gender incompatibility problems. Connectors are either male or female. Cables and adapters must be purchased which will address the connectors properly with respect to gender. Look carefully before purchasing equipment! The "Tools" list above will guide you in purchasing the correct adapters and cables for a successful connection of the M800 to the multi-drop line.

V. SOFTWARE:

Data transmission for the M800 is in the format 2400:N:8:1 where 2400 is the baud rate, N means No Parity, 8 is the number of data bits and 1 is the number of stop bits.

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Once connection is established, the M800 needs to be “polled” in order to retrieve data from it. Polling is the process of sending a “request for data” string to the M800. The M800 will respond to the poll by sending a data string. The string of characters required by the M800 for polling is as follows:

**ESC C 01H R.**

**NOTE: The middle character is the hexadecimal number 1, not the keyboard character “1”. This can be transmitted by simultaneously holding down the CTRL and SHIFT keys while typing the letter “A” on the keyboard. The raw Hexidecimal for the above command would be: \$1B, \$43, \$01, \$52. Once this string is received by the M800 it will respond with a string in the following format:**

stx, v1, v2, v3, v4, v5, v6, v7, v8, v9, v10, v11, v12, v13, v14, v15, v16, v17, v18, v19, v20, v21, v22, v23, v24, v25, v26, etx, chk

where:

stx	=	ASCII STX character	v15	=	CAL.LEV.NMH
v1	=	ST.MET (PPM)	v16	=	REF.LEV.MET
v2	=	ST.NMH (PPM)	v17	=	REF.LEV.NMH
v3	=	MR RATE (MIN)	v18	=	MET (PPM)
v4	=	CAL.RATE (H)	v19	=	NMH (PPM)
v5	=	MET.AL (PPM)	v20	=	Instrument Status
v6	=	NMH.AL (PPM)	v21	=	DAY
v7	=	CAL.LEV.MET	v22	=	MONTH
v8	=	CAL.LEV.NMH	v23	=	YEAR
v9	=	RANGE (PPM)	v24	=	HOUR
v10	=	REACT.TEMP	v25	=	MINUTES
v11	=	DET.TEMP	v26	=	SECONDS
v12	=	ELECT.LEVEL	etx	=	ASCII ETX charac.
v13	=	ZERO.LEVEL	chk	=	checksum
v14	=	CAL.LEV.MET			

Note: v20 indicates the instrument status as follows:

v20 = 1	warm up
v20 = 2	flame ignition
v20 = 3	preconditioning
v20 = 4	zero calibration
v20 = 5	standard methane calibration
v20 = 6	standard non-methane calibration
v20 = 7	methane reference measuring
v20 = 8	non-methane measuring

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Some values have been coded as follows:

Variable	Value	Name	Value
v4	1	CAL.RATE (H)	NO
v9	1	RANGE (PPM)	10
v9	2	RANGE (PPM)	20
v9	3	RANGE (PPM)	100

You can modify parameters by sending the instrument the command string:

**ESC C \$01 W** followed by a string containing all of the parameter values in the format:

v1, v2,...v9 cr

where:

v1 = ST.MET (PPM)  
v2 = ST.NMH (PPM)  
v3 = MR.RATE (MIN)  
v4 = CAL.RATE (H)  
v5 = MET.AL (PPM)  
v6 = NMH.AL (PPM)  
v7 = CAL.LEV.MET  
v8 = CAL.LEV.NMH  
v9 = RANGE (PPM)  
cf = carriage return