



**TELEDYNE
INSTRUMENTS**

Advanced Pollution Instrumentation, Inc
A Teledyne Technologies Company

RS-232 Multidrop Manual Addendum

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TELEDYNE API RS232 MULTI-DROP ADAPTOR

The Teledyne API RS232 Multi-drop Adaptors #01427 (A-series) and #04528 (E-series) provides the user with a simple method of communicating via asynchronous RS232 with multiple Teledyne API instruments using a single host system (computer, modem, DAS or terminal).

Overview of Adaptor Features

1. Dual DB 9 pin connectors - connected in parallel for ease in interconnecting with additional adaptors in network. Will not interrupt communication with other instruments on the network should an instrument be off-line, lose power, or fail. Network connectors may be connected in any order.
2. Standard connectors are DB-9S 9 pin female. Optional dual DB-9P male (#01428-01) or one each male & female (#01428-02) cable assembly can be replaced in the field at any time.
3. Configuration switch DTE/DCE - changes the signal lines at the adaptor to the analyzer as dictated by the host system without the necessity of special wiring cables or "Null MODEM" connectors in most installations.
4. Impedance switch TERM/Hi-Z - inserts a 5K Ω termination when set to the "TERM" position. When set to the "HI-Z" position, impedance is approximately 300K Ω . Only one adaptor in the network should be set to the "TERM" position.

NOTE: If multi-drop network includes non-Teledyne API equipment with multi-drop capability, refer to those manufacturers multi-drop specifications to determine if the "TERM" switch on the Teledyne API multi-drop adaptor should be set and also if the network impedance complies with EIA/TIA-232E, V.28 load specification of 3k Ω to 7k Ω .

Software Setup for RS-232 Multi-Drop (A-series analyzers)

Multi-drop RS-232 support is implemented by extending the standard RS-232 commands to support an ID number. If no ID number is specified, each analyzer will accept the command, as it always has, so that the ID feature is transparent. However, analyzers with identical ID numbers will be in conflict and only the first analyzer in the chain will respond.

For example, if the analyzer ID number is 100, then the following commands will be processed as indicated:

Typical Command	Analyzer Response
t list	Lists test measurements.
t 100 list	Lists test measurements.
t 123 list	Analyzer ignore this command, since ID is wrong.

For all commands, the ID number is the second argument, and is optional. Use the "?" command to obtain a complete list of commands.

In order to use the multi-drop features in a true multi-drop environment, where multiple analyzers share the same RS-232 channel, you will need to make the following changes:

Using a terminal program, issue the command "v rs232_mode=xx", where xx is defined below:

<u>Model</u>	<u>xx</u>
M100	35
M200	35
M100A	43
M200A	43
M300	43
M400	43
M700	43

The software uses the RTS signal from the SBC40 to control the multi-drop interface hardware. The software turns this signal on (logic high) prior to transmitting data, and turns it off within 1 second after the last character has been fully transmitted.

Software Setup for RS-232 Multi-Drop (E-series analyzers)

Every analyzer on the multi-drop chain has to have a unique ID number. Default ID numbers are the analyzer model number:

M100E – ID 100
M200E – ID 200
M300E – ID 300
M400E – ID 400

However, if more than one analyzer of the same model is used, the ID numbers have to be changed accordingly.

To enable multi-drop in the software, follow this command sequence (this example assumes that COM1 is used for multi-drop use):

SETUP – MORE – COMM – COM1 – EDIT mode and select NEXT until

COM1 MULTIDROP MODE appears and then select ON, press ENTER, then 4x EXIT.

The COM1 Mode should now show a number that is 32 higher than before.

If you wish to operate an E-series analyzer in series with older models, keep in mind that the baud rate for all COM ports needs to match. A-series analyzers support a maximum baud rate of 19200 baud, whereas E-series analyzers support up to 115 000 baud. Multi-drop performance may degrade at speeds higher than 19200 baud, particularly if cheap, unshielded cables are used. With short, shielded, good quality cables, the maximum baud rate should work.

Hardware Setup for RS-232 Multi-Drop (E-series analyzers)

Whereas A-series analyzers draw their power from within the analyzer chassis, E-series analyzers can supply 5V DC power directly from the rear panel. The E-series multi-drop option includes a small cable converter with open leads to be connected to the screw terminals of the STATUS output connector on the rear panel. Connect the red wire to the screw terminal labeled + on the STATUS connector and connect the black wire to the terminal labeled G on the same connector. Please refer to Figure 4 for proper connection of a multi-drop option (part # 04528).

CAUTION: Do not reverse the wiring, it will destroy the multi-drop circuitry!

RS-232 Cable Connections

Commonly used DB9 / DB25 cable connections for EIA/TIA-232 and V.24 Asynchronous Interfaces.

DB9	DB25	NAME	SYMBOL	FUNCTION
1	8	Data Carrier Detect	DCD	Handshake from DCE
2*	3	Receive Data	RxD	Data from DCE
3*	2	Transmit Data	TxD	Data from DTE
4	20	Data Terminal Ready	DTR	Handshake from DTE
5*	7	Signal Ground	GND	Ground/Return
6	6	Data Set Ready	DSR	Handshake from DCE
7	4	Request to Send	RTS	Handshake from DTE
8	5	Clear to Send	CTS	Handshake from DCE
9	22	Ring Indicator	RI	Handshake from DCE

* Only pins used by API Multi-drop.

NOTE: Generally Asynchronous host equipment only requires the TxD, RxD and GND signals as indicated by the asterisk (*). If your host system requires certain handshake signals, you must wire back those signals to the corresponding handshake response lines. Wire host connectors as shown in the table below:

<u>Host DB25 to M-drop DB9</u>		Signal	<u>Host DB9 to M-drop DB9</u>	
HOST M-DROP_			HOST M-DROP	
2	3	TxD/RxD	2	3
3	2	RxD/TxD	3	2
7	5	GND	5	5
4 to 5	n/c	RTS/CTS	7 to 8	n/c
6 to 20	n/c	DSR/DTR	4 to 6	n/c
8	n/c	DCD	1	n/c
22	n/c	RI	9	n/c

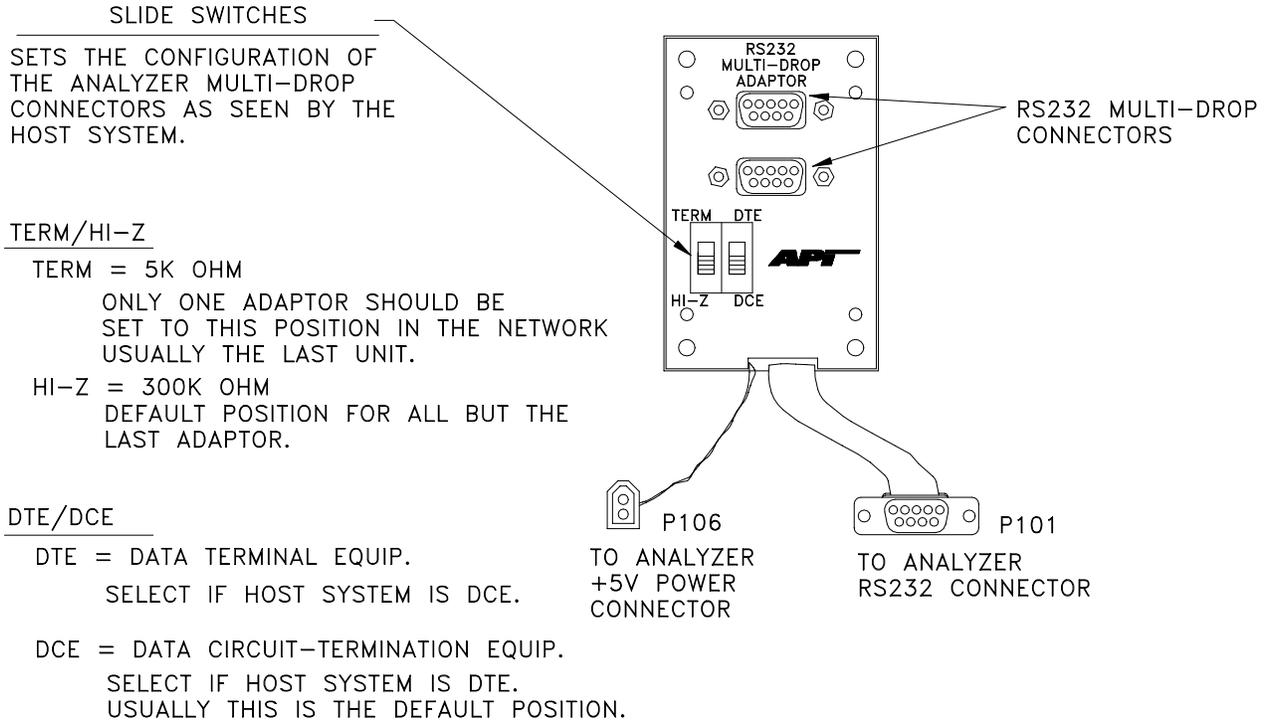


Figure 1: Multi-drop adaptor

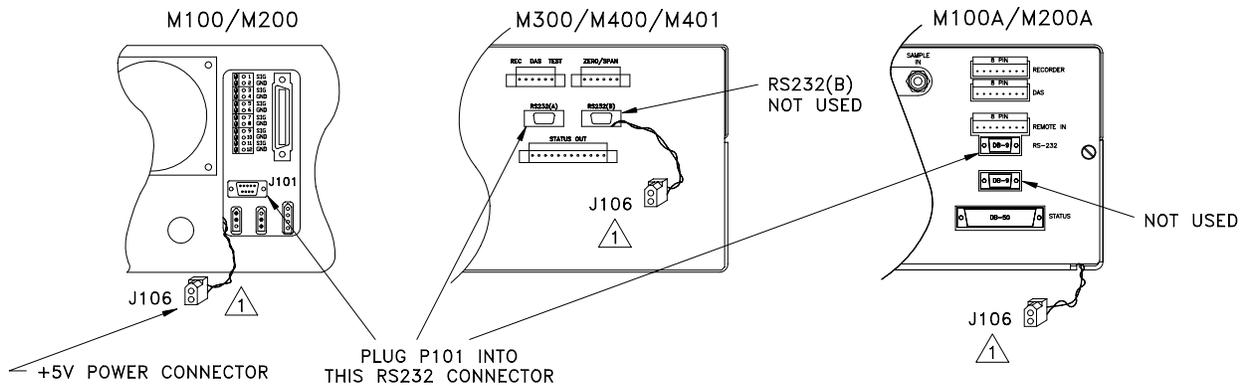


Figure 2- A-series rear panel RS-232 connections

Connect the multi-drop power cable to the + terminal (+5V, red wire) and G terminal (ground, black wire). DO NOT REVERSE WIRING !

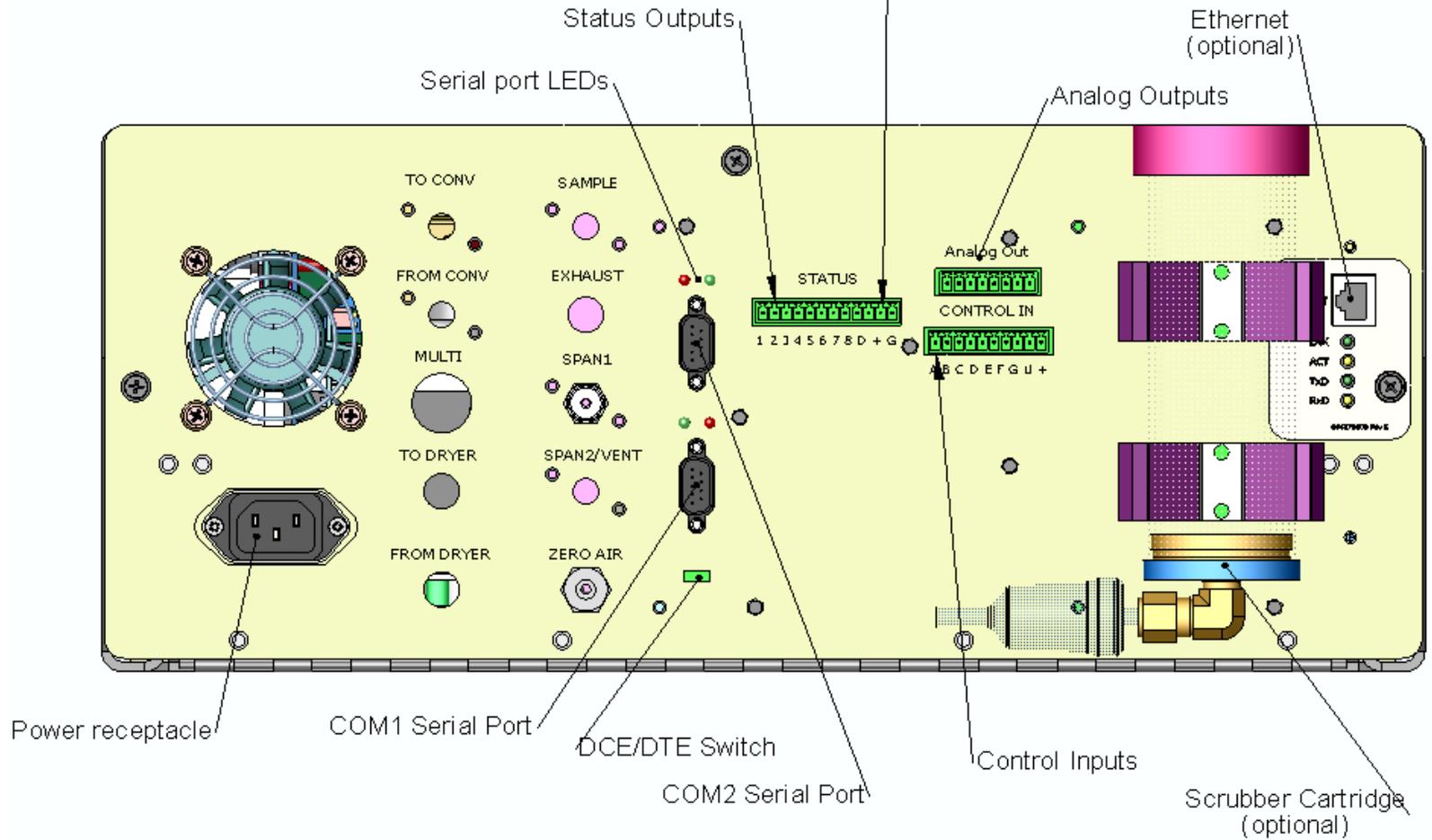


Figure 4: E-series rear panel with connections for multi-drop option