W8735A1005 EnviraCOM™ Serial Adapter

FEATURES

- **Provides access to an EnviraCOM™ Network through any RS-232 serial port.**

- **Uses a standard DB9 connector.**

- **Powered through the EnviraCOM™ bus; no external power source required.**

- **Designed with optical isolation between RS-232 and EnviraCOM™.**

- **Uses true RS-232 signals – universally compatible.**

APPLICATION

The W8735A EnviraCOM™ Serial Adapter provides a host computer, gateway or controller that has an RS-232 DBP port, with local access to an EnviraCOM™ HVAC system. The host provides the application that communicates with the W8735A.

The W8735A EnviraCOM™ Serial Adapter is powered through the EnviraCOM™ connection and is optically isolated for universal compatibility. The W8735A uses EnviraCOM™, a low-cost, wired communications protocol.

EnviraCOM™ products that communicate with the W8735A EnviraCOM™ Serial Adapter include the T8635L Microelectronic Communicating Programmable Thermostat, W8635A,B Equipment Interface Modules, W8703A Damper Interface Module, C7089B Outdoor Sensor, C7835A Discharge Air Temperature Sensor and W8835A Envirazone™ panel.

SPECIFICATIONS

Terminal Designations:

W8735A Terminal Designations	Function
1	To EnviraCOM™ network terminal 1 (data).
2	To EnviraCOM™ network terminal 2 (24 Vac).
3	To EnviraCOM™ network terminal 3 (24 Vac).
Serial	Connect W8735A DB9 connector to host RS-232 serial port using serial cable (not provided with W8735A).

Host Port Configuration:
Baud rate: 19200 bps.
Parity: none.
Data bits: 8.
Stop bits: 1.

LED Description:
The green Light Emitting Diode (LED) on the front of W8735A is used to show EnviraCOM™ Bus activity as follows:

LED blinks rapidly—indicates device is currently transmitting information on communications bus.

LED blinks once—indicates device received and acknowledged a message.

LED on constantly—indicates device failure. Replace device.

LED off constantly—indicates a wiring problem if device is not functioning correctly and there is no LED activity at least once a minute. Check wiring to communications bus terminals 1, 2 and 3.

NOTE: It is normal for LED to blink continuously during startup and discovery.

LED blinks continuously—indicates a wiring problem if device is not functioning correctly and there is a continuous series of LED blinks. Check wiring to communications bus terminals 1, 2 and 3.

Glossary of Terms:
RS-232 – Long-established standard that describes the physical interface and protocol for relatively low-speed serial data communication between computers and related devices. Originally defined by industry trade group, the Electronic Industries Association (EIA), for teletype devices.

Serial – Only one event occurring at a time, contrasted with *parallel*, which means more than one event happening at a time.

DB9 – Standard 9-pin connector. DB9 used on W8735A is a female configuration.

EnviraCOM™ – Three-wire communications protocol used in HVAC products.

Host – Supports the application software. Devices such as a computer, gateway, controller are examples of a host.

HVAC – Heating, Ventilation and Air Conditioning.

Communications Requirements:

Item	Setting
Baud Rate	19,200 bps
Start Bit	1
Stop Bit	1
No. Bits/Byte	8
Parity	None
Handshake	None

Device Functions:
Filter and pass reports from EnviraCOM™ bus to serial communications interface.

Filter and pass change requests and querries from the serial communications interface to the EnviraCOM™ bus.

Serve as a time master after being initialized by RS-232 serial communications interface.

Communications Packet Protocol (between EnviraCOM™ Serial Adapter and host controller/host application interface):

NOTE: W8735A monitors all communications on EnviraCOM™ bus. Any time a *report* EnviraCOM™ message is received, the message is formatted and echoed to the RS-232 communications port.

Received Packets:
The first character transmitted to the RS-232 communications interface is either H, M, or L, which indicates the priority of the received EnviraCOM™ message—High, Medium, or Low.

Next is a space character (0x20) followed by four Message Class characters that correlate the decoded message to the actual message using the EnviraCOM™ Application Layer Specification document.

Next is another space character (0x20) followed by two characters that define the message *instance*. Different messages require/support different *instances* and with *message class,* defines type of message received.

Next is another space character (0x20) followed by an R, Q or C that indicates received message is a *report*, *querry* or *change request*.

NOTE: W8735A passes only *report* type messages from the EnviraCOM™ bus to the RS-232 communications interface.

Another space character (0x20) is followed by two ASCII characters that define the number of bytes in the EnviraCOM™ data bytes field.

NOTE: W8735A supports messages up to eight bytes long. I

The byte count is followed by another space character (0x20). Data bytes consist of two ASCII hexadecimal characters that comprise the eight bits of data in each data byte. Each data byte is terminated with another space character (0x20).

After the last data byte of the message, there is a checksum of two ASCII hexadecimal characters. The checksum can be calculated as follows:

NOTE: This routine calculates a checksum on the string that is passed to it and returns two ASCII characters representing the calculated checksum.

```
Private Function CheckSUM(S As String) As String

Dim Chksum, i As Integer

Select Case (Left$(S, 1))

Case Is = "H"

Chksum = &H80

Case Is = "M"

Chksum = &H40

Case Else

Chksum = 0

End Select

Chksum = Chksum Xor Val("&H" & Mid$(S, 3, 2))

Chksum = Chksum Xor Val("&H" & Mid$(S, 5, 2))

Chksum = Chksum Xor Val("&H" & Mid$(S, 8, 2))
```

```
Select Case (Mid$(S, 11, 1))

Case Is = "C"

Chksum = Chksum Xor &H80

Case Is = "R"

Chksum = Chksum Xor &H40

End Select

i = Val("&H" & Mid$(S, 13, 2))

Chksum = Chksum Xor i

Do

If i <= 0 Then Exit Do

Chksum = Chksum Xor Val("&H" & Mid$(S, 16 + ((i - 1) * 3), 2))

i = i - 1

Loop

CheckSUM = Right$("0" & Hex$(Chksum), 2) & Chr$(13)

End Function
```

In Fig. 1, the checksums associated with Reports are calculated and transmitted by the W8735A.
The checksums associated with Change Requests or Querries are generated and transmitted by the RS-232 device requesting the Change Request or Querry.
The W8735A also transmits different types of *status* messages to the RS-232 serial communications interface.

There are four different *status* messages:
[Reset] - W8735A was just reset (power up).
[Ack] - RS-232 message received contained valid checksum.
[Nak] - RS-232 message received contained invalid checksum.

[Idle] - EnviraCOM™ bus is idle.

[Idle] message is used as an indicator to RS-232 communciations device that any message planned to be transmitted actually was transmitted. Also, any reports associated with the transmitted message were received.
With the speed of the EnviraCOM™ bus and the priority structure of the messages, it may take several seconds from the time a message is queued up to be sent until it is actually sent. Monitoring the serial data stream for the [Idle]message ensures that the queued up message was actually sent.

Transmitted Packets:
Transmitted messages are identical to received messages with the exception of the allowed service type (Report, Change Request or Querry).
Messages transmitted to the RS-232 communications port can be only Change Request or Querry types. Any messages requesting the Report service type sent to the W8735A receive a [Nak] response, and the message is not passed onto the EnviraCOM™ bus.
Upon receipt of a transmitted message, the W8735A determines whether calculated checksum agrees with received checksum ('magenta' colored characters in Fig. 1).
If checksums agree, W8735A responds with [Ack] immediately, and the message is queued up and transmitted in EnviraCOM™ priority order.
If checksums do not agree, W8735A responds with [Nak] immediately, and the message is not queued or transmitted to the EnviraCOM™ bus.

Honeywell