

Rockhound to Earthworm Data Relay

The Rock-to-EW module provides a data relay to the USGS Earthworm software package (<http://folkworm.ceri.memphis.edu/ew-dist>). Rock-to-EW emulates an Earthworm "export_generic" module, providing a TCP/IP listen port for external "import" programs to connect to.

The data-output operation of this module is similar to "export_generic": Messages are queued in a memory based FIFO, and sent to the receiving "import_generic", or similar program, via a TCP connection. If the available bandwidth of the link is lower than the aggregate rate of messages being queued for shipping, the FIFO will eventually overflow. In that case, an error is logged, and the queue becomes circular. That is, if the queue is configured to be N messages long, it will contain the most recent N messages. Two-way heartbeats are used to assure that the link is actually capable of transmitting data. The heartbeats consist of agreed-upon text strings sent at an agreed-upon rate. If a proper heartbeat is not received in time, it is presumed that the link is broken. In this case, Rock-to-EW will log the error, close the connection, and then wait for the import program to reestablish the connection.

The Rock-to-EW module supports simultaneous connections from more than one "import" client. Each connection operates via a separate listen-port number; see the 'ListenPortNums' parameter for configuration details. Having each connection on a separate listen-port number allows the module to keep track of which messages have been delivered to which "import" client.

The optional 'ListenPortAddr' parameter may be used to specify a specific host address or IP to use when binding to the listen port.

When the delivery of a message to an "import" client fails, the module will delay by the 'RetryDelayMS' number of milliseconds before attempting to resend the message.

When the connection to an "import" client is lost and then restored, the module will resume the sending of messages starting with the last unsent message in the queue, provided that the queue has not overflowed and the time elapsed is not greater than the 'DropTimeoutSecs' parameter value.

Messages generated by this module are in the Earthworm TRACEBUF2 format, using the module and installation ID values specified in the 'EwModuleId' and 'EwInstallId' parameters.

The 'ChannelNames' parameter may be used to select which channels are delivered. If any channel-name entries are specified then the channel name for each message must match a given entry, or the message will be discarded. If no channel-name entries are specified then all messages will be delivered. The specified channel-name entries are separated by commas.

During the first 10 seconds after the module starts up, warning and debug messages will be sent to both the console and the "SMARTSLog.txt" log file. After 10 seconds, messages will only be sent to the "SMARTSLog.txt" log file. This is to prevent the

possibility of repetitive console messages interfering with console-command operations (i.e., communications with the ROCKTalk program).

All debug messages are sent to the "SMARTSLog.txt" log file, and the following debug-mask values are supported:

- Debug mask 0x0001 = Debug level 1 (basic debug output)
- Debug mask 0x0002 = Debug level 2 (more debug output)
- Debug mask 0x0004 = Debug level 3 (even more debug output)
- Debug mask 0x0008 = Debug level 4 (verbose, per-message debug output)

Category: DATARELAY

Publishes: Output

Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output
and/or KMITESTRECORDER_Output
and/or DATAINTEGRATOR_Output
and/or CHANNELDATASOURCE_Output

Parameters added to module specific .cfg file:

Earthworm module ID number

Name: EwModuleId

Type: int

Range: 1 to 255

Default: 99

Example: EwModuleId=99

Earthworm installation ID number

Name: EwInstallId

Type: int

Range: 1 to 255

Default: 255

Example: EwInstallId=255

Optional listen-port host address or IP

Name: ListenPortAddr

Type: String

Range: 0 to 128 characters

Default: none

Example: ListenPortAddr=192.168.0.10

List of listen-port numbers (comma-separated)

Name: ListenPortNums

Type: String

Range: 1 to 128 characters

Default: 16005

Example: ListenPortNums=16005,16006,16007

Maximum number of messages in queue (0 = no limit)

Name: MaxQueueSize

Type: int

Range: 0 to 9999999

Default: 100

Example: MaxQueueSize=99

List of channel names to be sent (comma-separated, empty = send all)

Name: ChannelNames

Type: String

Range: 1 to 512 characters

Default: none

Example: ChannelNames=C1,C2

Interval between sent heartbeat messages (seconds)

Name: SendAliveIntvlSecs

Type: int

Range: 0 to 9999

Default: 30

Example: SendAliveIntvlSecs=30

Text of sent heartbeat messages

Name: SendAliveMsgText

Type: String

Range: 0 to 128 characters

Default: alive

Example: SendAliveMsgText=alive

Maximum interval between received heartbeat messages (seconds)

Name: RecvAliveIntvlSecs

Type: int

Range: 0 to 9999

Default: 150

Example: RecvAliveIntvlSecs=150

Expected text of received heartbeat messages

Name: RecvAliveMsgText

Type: String

Range: 0 to 128 characters

Default: alive

Example: RecvAliveMsgText=alive

Retry delay after failed message sends (milliseconds)

Name: RetryDelayMS

Type: int

Range: 0 to 9999999

Default: 2000
Example: RetryDelayMS=2000

Disconnect time after which queuing is dropped (seconds)

Name: DropTimeoutSecs
Type: int
Range: 0 to 9999999
Default: 300
Example: DropTimeoutSecs=300

The Rock-to-EW entries for the Rockhound 'modules.cfg' file are as follows:

Type=RockToEW
Category=DATARELAY
Descr=Rock-to-EW Data Relay
Help=Converts instrument data into a stream of Earthworm TRACEBUF messages, delivered via a TCP/IP port
Subscribes=CHANNELDATASOURCE~Output
Config=EwModuleId|int||99|1|255|0|Earthworm Module ID|Earthworm module ID number
Config=EwInstallId|int||255|1|255|0|Earthworm Install ID|Earthworm installation ID number
Config=ListenPortAddr|String|||0|128||Listen Port Address|Optional listen-port host address or IP
Config=ListenPortNums|String||16005|1|128||Listen Port Numbers|List of listen-port numbers (comma-separated)
Config=MaxQueueSize|int||100|0|9999999|0|Maximum Queue Size|Maximum number of messages in queue (0 = no limit)
Config=ChannelNames|String|||0|512||Channel Names|List of channel names to be sent (comma-separated, empty = send all)
Config=SendAliveIntvlSecs|int||30|0|9999|0|Send Alive Interval (secs)|Interval between sent heartbeat messages (seconds)
Config=SendAliveMsgText|String||alive|0|128||Send Alive Text|Text of sent heartbeat messages
Config=RecvAliveIntvlSecs|int||150|0|9999|0|Receive Alive Interval (secs)|Maximum interval between received heartbeat messages (seconds)
Config=RecvAliveMsgText|String||alive|0|128||Receive Alive Text|Expected text of received heartbeat messages
Config=RetryDelayMS|int||2000|0|9999999|0|Retry Delay (ms)|Retry delay after failed message sends (milliseconds)
Config=DropTimeoutSecs|int||300|0|9999999|0|Drop Timeout (secs)|Disconnect time after which queuing is dropped (seconds)
MaxUses=1