SmartBits

Advanced Multiport Performance Tester/Simulator/Analyzer

SmartLib

Message Functions

Programming Library Version 3.05

FEBRUARY 1999

Covering:
HTSetStructure
HTGetStructure
HTSetCommand

Supporting these SmartCards:
ATM
Frame Relay
Ethernet
Fast Ethernet
SmartMetrics Ethernet (L3 and ML)
Gigabit Ethernet

NetCom SYSTEMS

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Contents

Chapter 1: Introduction

This manual documents the Message Functions. They are the newer method of developing with the SmartLib programming library. These functions are used to communicate between the PC and the SmartBits chassis. The card/controller command is contained in the first parameter of the Message Function.

There are a total of three Message Functions, and each one is much like the other, for a more consistent and predictable interface. The Message Functions support many of the Netcom Systems' SmartCards. The applicable cards are listed at the beginning of each card-specific chapter. Also listed, are any parameters that work only with certain cards out of the card family.

A second type of SmartLib functions are the Original functions discussed in the SmartLib *User Guide*.

> NOTE: Use this manual in addition to the general information provided in *SmartLib User Guide (*included in this Software Developer's Kit).

A third type of code contained in SmartLib are the test modules (the SmartLib APIs that interface with the hardware functions (Original/Message Functions). These modules are documented in separate manuals.

Message Functions vs. Original Functions

HTSetStructure, HTGetStructure, and HTSetCommand are designed to take advantage of the speed of the new SmartCard on-board processing. This style of programming also provides a more flexible and expandable architecture with a consistent interface.

The table below shows you whether you can use Original functions, the Message functions, or both. See appropriate sections for specific exceptions about compatibility. Notice that all Ethernet SmartCards can use the original function group *when they are in Traditional (single stream definition) mode.* This allows you to swap cards in the chassis without changing test code.

SmartCard to Function - Table

SmartCards	**Original Functions**	**HTSetStructure, HTGetStructure HTSetCommand**
Layer 2 10/100 Mbps Ethernet	✓	✓
Token Ring	✓	
Gigabit	✓	✓
Layer 3 Ethernet	✓	✓
Multi-Layer (ML-7710)	✓	✓
ATM		✓
Frame Relay		✓

NOTE: Certain parameters and structures work with all cards within a family (e.g., ETH, ATM, FR, etc). Some parameters only work with certain cards. At the beginning of each SmartCard chapter is a description of which parameters go with which card(s).

Important Exceptions

There are three important exceptions to the above table.

- All *upgrade* features on the SX-7410 are accessed by the Message functions. These added features include:
  - Alternate Transmit Stream.
  - Frame Capture Capability.
  - Software Flow Control.
  - Preamble Length Definition.
  - VLAN Tags.

- There is a group of original functions that work with *all* SmartCards. These functions which are documented in the *User Guide* are:
  - HTGetEnhancedStatus get SmartCard status.
  - HTClearPort clear all counters on the card.
  - HTRun set card to iMode (run, step, stop).
  - HGStart start transmitting from a group of cards.
  - HGStop stop transmitting from a group of cards.
  - HGStep send one frame from a group of cards.

- There are two functions which currently work on all SmartCards *except for ATM and Frame Relay*.
  - HTResetPort(iMode, h,s,p), and
  - HGResetPort(iMode)

These will be updated to work with ATM and Frame Relay in the near future.

Understanding Prefixes: HT, HG, and ET

The three functions in this manual are prefaced with "HT" because they interact on a *single card* basis.

In SmartLib, function names are prefixed by either HT, HG, or ET. The HT prefix indicates communication to a single SmartCard, while the HG prefix indicates communication to a Group of SmartCards. The ET functions interact with an SMB or ET-1000 controller.

Understanding Streams

A *Stream* of network traffic is a series of frames transmitted from a source to a destination. To create a stream of traffic:

- A basic frame blueprint is defined.
- The frame is transmitted multiple times so that a stream of traffic is generated.
- For Ethernet and FrameRelay, the frame may be modified so that each frame in the Stream is different.
- With ATM, a Stream is a combination of Stream Structure containing connection parameters, and the Frame structure containing the payload contents.

At this time there are two ways to configure test frames for the generation of test traffic: there is the Traditional Mode and the SmartMetrics Mode. Some SmartCards such as the SX-7210, SX-7410, and TR-8405 support the Traditional Mode exclusively. Cards such as the ML-7710 and L3-6710 support both the SmartMetrics *and* the Traditional mode. Cards such as the WN-3410 and the AT-9015 support the SmartMetrics mode exclusively.

Traditional Traffic

Traditional Mode refers to one method of *generating test traffic*.
In Traditional mode there is only one frame blueprint available per card. This means that in order to simulate more than one stream per card, you must use incrementing or changing patterns within certain fields of the frame blueprint.

For example:

Destination MAC	Source MAC (Incrementing VFD1)	Type	Payload (Defined Background Pattern)	CRC

Traditional Ethernet frame blueprint.

In this example, the VFD1 increments the Source address to create frames seemingly coming from different devices.
Some of the characteristics of Traditional mode are:

- Traffic is based on modifications of a *single* blueprint.
- By using VFD1, VFD2, and VFD3 (Variable Field Definitions) in addition to the background (fill) pattern, a high degree of complexity and control can be accomplished.
- Traffic can be used to test *Layer2 and Layer3* devices.
- Because there is only one frame blueprint per port, information is tracked on a *per-port* basis.
- There is a CRC check on the entire frame.

SmartMetrics Traffic

SmartMetrics Mode refers to a second method of generating test traffic. When a card is in SmartMetrics mode, it supports *many unique frame blueprints*.

> NOTE: Since each frame blueprint is used to generate a different *stream* of test traffic, we call these blueprints "Streams."

Some of the characteristics of SmartMetrics mode are:

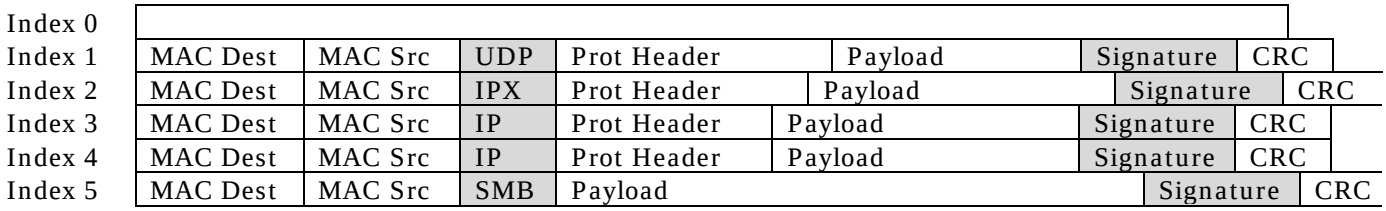
- Unique streams of traffic, generated from *multiple* frame blueprints.
- Information tracking on a per-stream basis (as opposed to a per-port basis).
- A CRC check on the entire frame.

Additional Ethernet and FrameRelay SmartMetrics features are:

- Imbedded Signature fields with information about each frame.
- In-depth latency and sequence information.
- An IP checksum for IP streams.
- Traffic can be used to test *Layer2 and Layer3* and more.

Below is a diagram with an example stream configuration for a single Ethernet SmartCard. Note the multiple frame blueprints, different protocols, and varied frame sizes.

For *Ethernet Only,* set the stream at index 0 to *Inactive*; reserving it as a placeholder for Traditional mode.



Six "Streams" (frame blueprints) on a single SmartMetrics card.

If enabled, the Signature field overwrites 18 bytes of data at the end of the payload. It contains information such as the time stamp, Stream ID, and frame sequence.

Ethernet and FrameRelay cards in SmartMetrics mode support the use of a *Signature* field. This field contains information about the *specific frame*. The information in the Signature field is a powerful feature used by the receiving card to analyze network traffic (Histograms).

ATM Streams / Connections

ATM SmartCards also create multiple streams (multiple frame blueprints) per port. When you create an ATM stream using the `ATM_STREAM` command, you define the connection parameters as well as the type of encapsulation, cell rate, and so forth. The payload of the frames is defined by `ATM_FRAME_DEF`.

Once a stream is defined it has an Stream Index number, based the value of `uiIndex` within the stream structure. This is a value that you control. You can use it to query the SmartCard for information about the *Stream structure*.

If you want to retrieve information about the *connection* of a given stream (such as trigger counts), you must use the *Connection Index* associated with the stream. The Connection Index is not defined in the library. It is a resource allocated by the SmartCard. Because Connection Indexes are assigned by the card as they become available, you must query the card to know which index is associated with a stream. Use ATM_STREAM_DETAIL_INFO to retrieve Connection Indexes.

Example

Below is a snippet (TCL) of code used to retrieve a block of Connection Indexes. A Connection Index is assigned each time a Connection is established. For a valid Connection Index, the card must be queried each time the Stream is connected.

```
##################################################################
##################################################################

struct_new vcc_info ATMVCCInfo
struct_new stream_info ATMStreamDetailedInfo

# Use ATM_STREAM_DETAIL to get the connection index
LIBCMD HTGetStructure $ATM_STREAM_DETAIL_INFO 0 $NUM_STREAMS 0
stream_info 0 $iHub $iSlot $iPort

# Use ATM_VCC_INFO to get the stats
for {set j 0} {$j < $NUM_STREAMS} { incr j} {
  puts "Checking status on Tx Card (Connection Index
$stream_info(status.$j.uiConnIndex))"
  LIBCMD HTGetStructure $ATM_VCC_INFO
$stream_info(status.$j.uiConnIndex) 1 0 vcc_info 0 $iHub $iSlot
$iPort
  puts "Stats for stream $j..."
  # Cell header is decimal by default - force to hex...
  puts "Cell Header [format "%08X"
$vcc_info(status.0.ulCellHeader)]"
  puts "Tx Frame count ==> $vcc_info(status.0.ulTxFrame)"
  puts ""
}

##################################################################
##################################################################
```

ATM SmartCards support independent streams/connections with a wide range of powerful controls. Signature fields and the resultant data analysis via Histograms are not supported (at this time).

VFD Support

VFDs are supported by FrameRelay cards, and Ethernet cards in Traditional mode.
A VFD (Variable Field Definition), is a field that can be manipulated (incremented, decremented, used in chunks, etc.) VFDs are laid over existing information in the field such as the back ground pattern.
➲ Ethernet Only:
In SmartMetrics mode, VFDs are *not* supported at this time. There is one exception, and that is in the SmartBits customizable stream. In the SmartBits customizable stream, VFD3 is used in limited fashion to enter the custom protocol header and payload.
➡ WAN Only:
The FrameRelay cards support VFD1 and VFD2 in the SmartMetrics streams. They support VFD3 in limited fashion where Range is the total number of bytes usable from the VFD3 buffer.

How to:
Work with Ethernet SmartMetrics Streams

This section covers configuring and manipulating SmartMetrics streams for the ML, and L3 SmartCards.
At power-up, the card contains one default stream at index 0. The stream at index 0 is a place-holder for the Traditional mode.

Configuring a Stream, or List of Streams:

Step 1 - Define the background fill pattern (*optional*).
Use `HTFillPattern` or `HGFillPattern` (described in the *SmartLib User Guide*) to define the fill pattern. The default fill pattern is all zeros.

The fill pattern, (or background pattern), is laid into the frame first. All other fields overwrite the fill pattern at various offsets. You can use the fill pattern to put data into the frame in addition to the structure elements that get copied in.

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

A fill pattern of all "A"s.

MAC Dest	MAC Src	Type IP	Protocol Header	Payload AAAAAAAAAAAAAAAAAAAAAAAA	Signature 18 bytes	CRC

Same frame with other fields laid over the fill pattern.

Step 2 - Declare the appropriate structure (or array of structures).
The structure will depend on which L3_DEFINE_n_STREAM you select.

For example:

```
StreamIP MyIPStream;
memset (&MyIPStream, 0, sizeof(MyIPStream));
```

Enter correct values for the structure elements - (not shown).

Step 3 - Create a stream *or a list of streams.*

Use `L3_DEFINE_n_STREAM`.

For example:

```
HTSetStructure(L3_DEFINE_IP_STREAM, 0,0,0, &MyIPStream,
sizeof(StreamIP), iHub,iSlot,iPort);
```

- `HTSetStructure`
  Sends the command to the SmartCard.
- `L3_DEFINE_IP_STREAM`
  Is the command (iType1) that tells the card what to do with the structure.
- `StreamIP`
  Is the structure (*or array of structures*) needed to create IP frames. The card uses your structure definition for the frame blueprint.
- If you want to retrieve Histogram results, enable the Signature field by setting ucTagField to 1.
- `sizeof(StreamIP)`
  Is the size of the structure (* number of elements if an array is used).

NOTE: L3_DEFINE_n_STREAM defines a complete list of streams, and will clear *all previously defined streams.* It also sets the stream at index 0 to inactive, and starts defining streams at index 1.

Some stream elements of note are:

- ucTagField - Must be enabled for Signature fields to be inserted into each test frame. (Signature field data is used to collect Histogram results.)
- VFD3 in the Smartbits Stream is the byte pattern for the customizable frame content.
- ucActive - Sets a stream to active or inactive. Provides a way to skip a stream while leaving the stream index numbers intact.

Using One Stream to Create Many

Use `L3_DEFINE_MULTI_n_STREAMS`.

DEFINE_MULTI creates new streams *based on an existing stream*. The stream index (iType2) is the prototype stream. The count (iType 3) indicates the number of streams that will be created and appended to the existing list.

The values in the Stream structure are *delta* values. A value of 0 maintains the current value of a structure member. A number indicates the amount to increment the value in each additional stream. If the current element value is 1, and a value of 3 is used, the new values would be 4,7,10,13, etc.

NOTE: Do not set index to 0, since this will duplicate the inactive reserved stream.

Modifying a Stream

Use L3_MOD_n_STREAM to change the features of an existing stream at a specified index.
L3_MOD_n_STREAM replaces the entire stream. The structure values here are *not deltas*. To change one or more attributes, a complete structure is sent to the card.
The index value must indicate an existing stream. If the index value does not reference an existing stream, the command is not acted on.

NOTE: Although L3_MOD_n_STREAM can modify the stream at index 0, be sure to modify streams starting at index 1.

Clearing All Streams (Traditional / SmartMetrics mode)

To clear streams, use L3_DEFINE_n_STREAM, and set the structure pointer (pData) to NULL. This will clear all streams except stream 0, which will be set to inactive.
To set the card to Traditional mode (previously called the L2 mode), clear all streams (stream 0 will remain).
To switch the card to SmartMetrics mode, create *one or more* streams starting at index 1.

Sending Traffic

Once the streams are configured, you must start and stop the configured test traffic.
To start and stop test traffic, refer to this group of commands in the User Guide:

- `HGRun / HTRun`
- `HGStart`
- `HGStop`
- `HGStep`

NOTE: Cards with RIP, PING, or ARP enabled will automatically send these frames at specified increments. See `HTLayer3SetAddress` in the User Guide.

Some related commands are: `HGSetGroup`, `HTSeparateHubCommands`, and `HTLayer3SetAddress` (for the optional card address, not the stream address).

Frame Order

Regardless of whether you send a constant stream of traffic, a burst of traffic, or one frame of traffic from each stream, frames are sent in the same order. The first frame from each stream is sent, then the second frame from each stream is sent. The order is from the smallest stream index to the largest, looping back to the smallest. Inactive streams are skipped.

Additional Commands for Stream Manipulation

To do this:	Use this command (iType1)
Modify a single field in a group of streams. This is faster than sending an entire group of structures to the card.	L3_MOD_STREAMS_ARRAY
Increment a single field in a group of streams. This is faster than sending an entire group of structures to the card.	L3_MOD_STREAMS_DELTA
Check how many streams are configured on the SmartCard. The returned value includes the place-holder stream at index 0.	L3_DEFINED_STREAM_COUNT_INFO
Retrieve the stream structure at a specific index.	L3_STREAM_INFO
Setup Address and Gateway information for the card, and specify PING, SNMP, or RIP frame transmission. (See the User Guide.) NOTE: This command sets up the SmartCard *not the test streams*. The IP address must be unique.	HTLayer3SetAddress

Histogram Results

Histograms offer a powerful way to look at test results. These *SmartMetrics* result gatherers distill and analyze information about networks, based on incoming test traffic.
Histograms are now implemented on three of Netcom System's newer SmartCards: ML-7710, L3-6705, and the L3-6710.
As opposed to *Counters* , Histograms do not simply supply the cumulative numbers of events. Histograms provide *relational* information and answer questions such as:

- How many frames were out of order, and for which stream?
- At what points during the test did certain events take place?
- Which streams had Latency issues and how often did they occur?

A single histogram can be enabled on a SmartCard for a given test run. The histogram analyzes the results of the current traffic. At this time, there are five histograms to select from.

The Five Histograms

To obtain SmartMetrics results, you must first enable the desired Histogram on the SmartCard. There are five possible Histograms to select from:

1. **V2_LATENCY (Latency Over Time)** - provides the Average, Maximum, and Minimum latency values for network traffic at specified intervals during the test. The values are the composite result of all streams averaged together. This Histogram would answer this example question: "What was the over-all average latency in the first second?"

This Histogram has a configuration setting. Set the Histogram to analyze data at specified intervals. For example, the Latency measurements during the first nanosecond, during the second, during the third, and so forth.

2. **V2_LATENCY_PER_STREAM (The combination histogram)** - gives you an over-all latency picture per stream. It provides the Minimum, Maximum, and Average latency values over the course of the test (Latency Per Stream). It racks reoccurrence of specific Latency values on a per-stream basis (Latency Distribution). It reports whether frames were received in sequence or not, on a per-stream basis (Sequence Tracking).
3. **LATENCY_DISTRIBUTION (Latency Distribution)** - tracks reoccurrence of specific Latency values on a per-stream basis. This Histogram will let you know, for example, if common latency values are from one to two microseconds and/or the distribution of multiple latency values.

   You can set the ranges of latency values. The latency values can be consecutive as in .4,.5,.6 microseconds, or they can vary as in .2, .5, 1.9.
4. **SEQUENCE (Sequence Tracking)** - reports whether frames were received in sequence or not, on a per-stream basis. It also identifies duplicate and dropped frames.

   The Sequence Tracking algorithm is designed to match an actual TCP stack, and is as follows:

   - ❖ As long as frames are received in sequence, the in sequenced value is incremented.
   - ❖ If a frame is received that is greater than the one expected, the number of missing frames (hole size) is noted, and a variable for the first of the missing frames is set.
   - ❖ Subsequent in-order frames falling after the sequence hole increment the In Sequence counter.
   - ❖ If the frame from the start of the hole is received, the hole-size variable is decremented.
   - ❖ If a frame from the middle of the hole is received, the earlier frames still not received from the sequence hole are counted as Lost. The hole-size variable is decremented, and the start of the hole begins after the received frame. The expected frame continues to be one more than the last frame received in sequence.
   - ❖ If another out-of-sequence frame is received before the previous sequence hole is filled, the Lost variable is incremented by the size of the previous sequence hole. The new hole is then tracked.
   - ❖ If while the new sequence hole is being tracked, a previous out-of-sequence frame arrives, the Duplicate variable is incremented.
   - ❖ The In Sequenced value continues to increment for every frame received in sequence after the current sequence hole.

   For Example:

1,2,3	- Three frames in sequence.
1,2,3,9,10,11,	- Sequence hole five frames. 10,11, in sequence.
1,2,3,9,10,11,4	- Sequence hole is now four frames.
1,2,3,9,10,11,4,15,	- First hole closed, Lost incremented by four.

New hole three frames long.

1,2,3,9,10,11,4,15,5 - Duplicate incremented by one. (5 is counted as a duplicate since the previous hole is no longer tracked).

5. **RAW_TAGS(Bulk Data)** - is a list of statistics on a per-frame basis. It is different from other Histogram results in that the data is not analyzed. Raw Tags gives you access to test data so that you can analyze the information any way you wish.

   Because it generates records on a per-frame basis, Raw Tags creates a large number of records quickly.

Setting up Histograms Step-by-Step

Follow these four steps to setup and retrieve SmartMetrics histogram results.

Step 1 - (Transmit Card)
Histograms depend on information in the *Signature* field. Signature fields are supported by the L3 SmartCards, and must be enabled when a stream is defined.

When creating streams with:
`HTSetStructure` `L3_DEFINE_`*n*`_STREAM`
`L3_DEFINE_MULTI_`*n*`_STREAM`
`L3_MOD_`*n*`_STREAM`

Enable the Signature field by setting `ucTagField =1`.

Step 2 - (Receive Card)
Activate the desired Histogram on the card using:
`HTSetCommand` with `L3_HIST_`*n*. The histogram is now in receive mode until you query it for information or records.

Step 3 - (Receive Card) - Optional
You can clear all previouse records by using the `HTSetCommand` with `L3_HIST_START`.

Step 4 - (Transmit Card)
Start transmitting test traffic using a function such as `HTRun` or `HGRun`. You can send traffic however you wish (Step, Burst, or Constant stream). The port will continue to collect Histogram data until Histogram records or information is retreived.

Step 5 - (Receive Card) Optional
You can find out how many records are on the card by using `HTGetStructure` with `L3_HIST_ACTIVE_TEST_INFO`. This information is useful to know if you may not want to retreive all records.

Step 6 - (Receive Card)
Once test traffic has been sent, retrieve Histogram results using:
HTGetStructure with `L3_HIST_`*`n`*`_INFO`

The number of Histogram records retrieved is determined by:

- The starting record specified by the index (iType2).
- The number of structures defined in pData.

The Histogram records remain on the card until you clear them, select another Histogram, or power off.

Once a Histogram is enabled, it is in receive mode. It will continue to analyze all incoming frames containing signatures until it is queried for information or records.

You can stop the Histogram receive process in two ways:
1. Get Histogram records using: `HTGetStructure` with either `L3_HIST_n_INFO` or `L3_AGGR_n_INFO`.
2. Get information about the Histogram using: `L3_ACTIVE_TEST_INFO`.

Pointer: Remember to allow adequate time after you start the transmit, before you attempt to retrieve Histogram results.

Chapter 2:
Function Concepts

This chapter discusses the three message functions: HTSetStructure, HTGetStructure, and HTSetCommand. It also takes a close look at two common parameters of this group, **iType1** and **pData** (the related structure).

Message Function Overview

The purpose of the three messaging functions, HTSetStructure, HTGetStructure, and HTSetCommand, is simply to pass information between the PC and the SmartBits chassis. *The actual action to be executed on the SmartCard is indicated by the selected iType1 parameter.*

The distinguishing features of the three commands are:

- **HTSetStructure** transmits information to the SmartCard which sets values (with the use of a structure or buffer).
- **HTGetStructure** gets information from the SmartCard (with the use of a structure or buffer).
- **HTSetCommand** transmits information to the SmartCard, usually to affect traffic from the SmartCard port.

Occasionally HTSetCommand may be used to affect values on the SmartCard such to as reset the card, or clear counters. Some HTSetCommand functions also have a related data structure, although this is not common.
To encapsulate: although the messaging functions have important differences, their basic function is simply as a messenger, transmitting values between the PC and the SmartBits chassis.

Similarities

Although the parameters determine what action takes place on the SmartCard, *the syntax of the message functions remains constant*. The syntax of the three functions is also very similar. When you understand the syntax of these three functions, you can use this knowledge to set values, get values, and send commands with all of the newer SmartCards:

- ATM
- Frame Relay
- Gigabit Ethernet
- Layer 3 Ethernet/Fast Ethernet
- Multi-Layer

The Action (iType1) and the Structure

The first parameter in all three of the messenger functions is iType1. This parameter determines the action that will occur on the SmartCard.
Most HTSetStructure and HTGetStructure iType1 parameters use a specific SmartLib structure type. Occasionally, an HTSetCommand itype1 will also use a structure. Often, the name of the iType1 is similar to its associated structure.

Note that an iType1 is a constant, and appears in all uppercase letters. As opposed to its related structure which is mixed case.

A given structure may be used by a number of different iType1. Each iType1 has only one valid structure that it can use, however, the related structure may contain embedded (nested) structures. If an element of a structure is another structure, this manual will display the embedded structure below the related structure definition.

Syntax of the Message Functions

The syntax of the message functions is discussed in detail in this section. Any difference between the functions is noted.
The message functions transmit information between the PC and the SmartCards. This information is used to: configure the SmartCard, get information from the SmartCard, or affect the I/O of the SmartCard port.
(For language-specific usage see the examples in the Usage section below.)

Syntax:

```
int HTSetStructure(int iType1,
    int iType2, int iType3, int iType4,
    void* pData,
    int iLen,
    int iHub, int iSlot, int iPort);

int HTGetStructure(int iType1,
    int iType2, int iType3, int iType4,
    void* pData,
    int iLen,
    int iHub, int iSlot, int iPort);

int HTSetCommand(int iType1,
    int iType2, int iType3, int iType4,
    void* pData,
    int iHub, int iSlot, int iPort);
```

Note: The iLen parameter is not used by HTSetCommand.

How Each Parameter is Used

The three Message Functions have almost identical parameters. Each parameter has a consistent, specific use. Often, some parameters are not used. In this case the value is set to Zero.
Below is a table discussing how each parameter is used.

iType1	**int** This parameter defines what action takes place on the SmartCard. For example, whether settings are modified or copied, whether transmission starts or stops, etc. Many iType1 parameters have an associated data type. For these iType1s, the appropriate data type must be used for the pData parameter. (See pData below.)
iType2	**int** When "index" is indicated for iType2 , pData is a pointer to an *array* of structures, instead of a single structure. In this case, the iType2 variable indexes a location within an array on the SmartCard. If there is no array of structures, the value of iType2 is set to 0 to indicate the array index is not applicable.
iType3	**int** This parameter indicates the number of consecutive array elements to modify, define, or affect. It is often used in conjunction with iType2, where iType3 indicates the number of elements to affect after the index pointer. If there is no array of structures, iType3 is set to 0. This indicates that the element count is not applicable.
iType4	**int** This parameter is not used at this time. Set this parameter to 0 to indicated that iType4 is not applicable.
pData	**void*** This parameter is a pointer to a structure, an array of structures, or a buffer. The related data type is dictated by the iType1. The message functions use a pointer of type *void* to accommodate different data types.
iLen	**int** This parameter is the amount of memory to allocate for the data indicated by pData. ***Note: This parameter is not used by HTSetCommand.***
iHub	**int** This parameter identifies the destination hub where the SmartCard is located. The range is from 0 (first hub) to 15 (sixteenth hub).
iSlot	**int** This parameter identifies the slot where the SmartCard is located. The range is from 0 (first slot in the hub) to 19 (last slot in the hub).
iPort	**int** This parameter identifies the SmartCard port. (On current SmartCards, *Port* is always set to 0.)
Return Value: The return value is >= 0 if the function executed successfully. The return value is < 0 if the function failed. Failure codes are defined in Appendix A.	

Comments:
A given structure can be used by more than one iType1, but each iType1 is associated with a single, specific structure.

Language-Specific Usage

This section contains usage examples for the three message functions. The examples are divided into groups according to programming language.

> Note: The lines in the usage examples below are split up for readability only. To understand each element in a function call, look back to "Syntax of the Message Function" on page 26.

Usage for C/C++

```
HTSetStructure(ATM_CALL_SETUP,
   0, 0, 0,
   (void*) pATMCallSetupParams,
   sizeof(ATMCallSetupParams),
   iHub, iSlot, iPort);
```

```
HTGetStructure(ATM_CONN_INFO,
   iIndex, iCount, 0,
   (void*) pATMConnectionInfo,
   sizeof(ATMConnectionInfo),
   iHub, iSlot, iPort);
```

```
HTSetCommand(ATM_ILMI_REGISTER,
   0, 0, 0,
   NULL
   iHub, iSlot, iPort);
```

Usage for Tcl

```
HTSetStructure $ATM_CALL_SETUP\
   0 0 0\
   pATMCallSetupParams\
   0\
   $iHub $iSlot $iPort\
```

```
HTGetStructure $ATM_CONN_INFO\
   $iIndex $iCount 0\
   pATMConnectionInfo\
   0\
   $iHub $iSlot $iPort\
```

```
HTSetCommand $ATM_ILMI_REGISTER\
   0 0 0\
   ""\
   $iHub $iSlot $iPort\
```

Usage for Visual Basic 3

```
Dim lAddr as Long
lAddr = ETReturnAddress(pATMCallSetupParams)
HTSetStructure ATM_CALL_SETUP,
    0, 0, 0,
    lAddr,
    LenB(pATMCallSetupParams),
    iHub, iSlot, iPort
```

```
Dim lAddr as Long
lAddr = ETReturnAddress(pATMConnectionInfo)
HTGetStructure ATM_CONN_INFO,
    iIndex, iCount, 0,
    lAddress,
    LenB(pATMConnectionInfo),
    iHub, iSlot, iPort
```

```
HTSetCommand ATM_ILMI_REGISTER,
    0, 0, 0,
    0,
    iHub, iSlot, iPort
```

Usage for Visual Basic 5

```
HTSetStructure ATM_CALL_SETUP,
    0, 0, 0,
    pATMCallSetupParams,
    LenB(pATMCallSetupParams),
    iHub, iSlot, iPortiHub,iSlot,iPort)
```

```
HTGetStructure ATM_CONN_INFO,
    iIndex, iCount, 0,
    pATMConnectionInfo,
    LenB(pATMConnectionInfo),
    iHub, iSlot, iPort
```

```
HTSetCommand ATM_ILMI_REGISTER,
    0, 0, 0,
    NULL
    iHub, iSlot, iPort
```

Usage for Delphi

```
HTSetStructure(ATM_CALL_SETUP,
    0, 0, 0,
    @pATMCallSetupParams,
    SizeOf(ATMCallSetupParams),
    iHub, iSlot, iPort);
```

```
HTGetStructure(ATM_CONN_INFO,
    iIndex, iCount, 0,
    @pATMConnectionInfo,
    SizeOf(ATMConnectionInfo),
    iHub, iSlot, iPort);
```

```
HTSetCommand (ATM_ILMI_REGISTER,
    0, 0, 0,
    @NULL,
    iHub, iSlot, iPort);
```

Chapter 3: ATM

This section covers the Message Functions as related to ATM SmartCards. Chapter three covers all ATM related parameters and structures.

> Note: Some structures contain embedded or nested structures. In these cases, the embedded structures are included directly below the related structure.

The ATM SmartCards are split into two groups:

- ATM1: AT-9015, AT-9020, AT-9025, AT-9034, AT-9045, AT-9155, AT-9155B
- ATM2: AT-9155C, AT-9622

These ATM commands (iType1s) and related structures work with all ATM SmartCards with these exceptions:

iType1	Works with these cards only.
ATM_CONN_TRIGGER_INFO	ATM2 Types
ATM_CONN_TRIGGER_PARAMS	ATM2 Types
ATM_DS1_E1_LINE_INFO	AT-9015, AT-9020
ATM_DS1_E1_LINE_PARAM	AT-9015, AT-9020
ATM_DS3_E3_LINE_INFO	AT-9034, AT-9045
ATM_DS3_E3_LINE_PARAM	AT-9034, AT-9045
ATM_LINE	AT-9155, AT-9155b, AT-9155C, AT-9622, AT-9025
ATM_SONET_INFO	AT-9155, AT-9155b, AT-9155C, AT-9622, AT-9025
ATM_TRIGGER	ATM1 Types
ATM_TRIGGER_INFO	ATM1 Types

ATM - HTSetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
ATM_CALL_ADDR_LIST	0	0	0	ATMCallAddrList	Set the called addr. for sigtest
ATM_CALL_SETUP	0	0	0	ATMCallSetupParams	Set the traffic desc. for sigtest
ATM_CLASSICAL_IP	0	0	0	ATMClassicalIP	Configure CLIP ARP server info
ATM_CONN_COPY	0	0	0	ATMConnectionCopyParams	Copy connections for sigtest
ATM_CONN_MODIFY	0	0	0	ATMConnectionModify	Fill field of conn. for sigtest
ATM_CONN_MODIFY_ARRAY	0	0	0	ATMConnectionModifyArray	Mod field of conn. for sigtest
ATM_CONN_TRIGGER_PARAMS	0	0	0	ATMConnTriggerParams	Define per conn trigger event
ATM_CONNECTION	0	0	0	ATMConnection	Define a connection for sigtest
ATM_DS1_E1_LINE_PARAM	0	0	0	ATMDS1E1LineParams	Config ATM and PHY for DS1 or E1
ATM_DS3_E3_LINE_PARAM	0	0	0	ATMDS3E3LineParams	Config ATM and PHY for DS3 or E3
ATM_ELAN_DEREGISTER	0	0	0	ATMELANDeregister	Deregister an existing LEC
ATM_ELAN_REGISTER	0	0	0	ATMELANRegister	Define and register and LEC
ATM_FRAME_COPY	0	0	0	ATMFrameCopyReq	Copy Frame params to a given # of streams
ATM_FRAME_DEF	0	0	0	ATMFrameDefinition	Config a new or existing frame
ATM_GLOBAL_TRIGGER_PARAMS	0	0	0	ATMGlobalTrigger	Define global trigger event
ATM_ILMI	0	0	0	ATMILMIParams	Set ILMI timers and ESI
ATM_ILMI_STATIC_REGISTER	0	0	0	ATMILMIStaticParams	Force an ATM address statically
ATM_INCOMING_SVC_METHOD	0	0	0	ATMIncomingSVCMethod	Incoming SVC method
ATM_LINE	0	0	0	ATMLineParams	Physical and ATM layer config
ATM_PER_CONN_BURST	<index>	<count>	0	ATMPerConnBurstCount	Burst count per connection
ATM_PER_PORT_BURST	0	0	0	ATMPerPortBurstCount	Burst count per port
ATM_SCHED_PARAMS	0	0	0	ATMSchedParams	Cell-scheduling method for transmission
ATM_SSCOP	0	0	0	ATMSSCOPParams	Set SSCOP timers and config
ATM_STREAM	0	0	0	ATMStream	Config a new or existing stream
ATM_STREAM_CONTROL	0	0	0	ATMStreamControl	Start, stop, reset, etc a stream
ATM_STREAM_PARAMS_COPY	0	0	0	ATMStreamParamsCopy	Copy Stream params to a given # of streams
ATM_STREAM_PARAMS_COPY	<idex>	<count>	0	ATMStreamParamsModify	
ATM_STREAM_PARAMS_COPY	0	0	0	ATMStreamParamsFill	
ATM_TRIGGER	0	0	0	ATMTrigger	Configure triggers in ATM-1
ATM_UNI	0	0	0	ATMUNIParams	Set UNI timers and version

ATM - HTGetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
ATM_AAL5_INFO	0	0	0	ATMAAL5LayerInfo	Get the AAL5 layer counts
ATM_CARD_CAPABILITY	0	0	0	ATMCardCapabilities	Get card-specific limits
ATM_CARD_INFO	0	0	0	ATMCardInfo	Query card for firmware version
ATM_CARD_TYPE	0	0	0	ATMCardType	Get card rate (model number)
ATM_CLASSICAL_IP_INFO	0	0	0	ATMClassicalIPInfo	CLIP counts and ARP status
ATM_CONN_64_INFO	<index>	<count>	0	ATMConnection64Info	Get 64-bits status of one or many conn
ATM_CONN_64_INFO_SUMMARY	<index>	<count>	0	ATMConnection64InfoSummary	Get 64-bits summary results of sigtest
ATM_CONN_INFO	<index>	<count>	0	ATMConnectionInfo	Get status of one or many conn
ATM_CONN_INFO_SUMMARY	<index>	<count>	0	ATMConnectionInfoSummary	Get summary results of sigtest
ATM_CONN_TRIGGER_INFO	<index>	<count>	0	ATMConnTriggerInfo	Get per conn trigger counts
ATM_DS1_E1_LINE_INFO	0	0	0	ATMDS1E1LineInfo	Get the DS1/E1 alarms and counts
ATM_DS3_E3_LINE_INFO	0	0	0	ATMDS3E3LineInfo	Get the DS3/E3 alarms and counts
ATM_ELAN_INFO	<index>	0	0	ATMELANInfo	Get the ELAN status
ATM_ILMI_INFO	0	0	0	ATMILMIInfo	Get the ILMI status and counts
ATM_LAYER_INFO	0	0	0	ATMLayerInfo	Get the ATM layer counts
ATM_SAAL_INFO	0	0	0	ATMSAALInfo	Get the SAAL status
ATM_SIG_EMUL_INFO	0	0	0	ATMSigEmulatorInfo	Get the signaling emulator stats
ATM_SONET_INFO	0	0	0	ATMSonetLineInfo	Get the SONET alarms and counts
ATM_STREAM_DETAIL_INFO	<index>	<count>	0	ATMStreamDetailedInfo	Get status of one or many streams
ATM_STREAM_SEARCH_INFO	0	0	0	ATMStreamSearchInfo	Return info for matching streams
ATM_TRIGGER_INFO	0	0	0	ATMTriggerInfo	ATM-1:Get trigger count and time
ATM_VCC_INFO	<index>	<count>	0	ATMVCCInfo	Get per VCC counts
ATM_VCDB_LIST_INFO	<index>	<count>	0	ATMVCDBInfo	Get the VC DataBase info

ATM - HTSetCommand Summary

iType1	iType2	iType3	iType4	pData	Description
ATM_CLIP_ESTABLISH_CLIENT	0	0	0	0	
ATM_CLIP_RELEASE_CLIENT	0	0	0	0	
ATM_CONN_PARAMS_COMPLETE	0	0	0	0	Reset the signaling test
ATM_CONN_PARAMS_RESET	0	0	0	0	Reset the signaling test conns
ATM_FRAME_CLEAR	0	0	0	0	De-allocates the "Source" Frame stored in memory
ATM_ILMI_DEREGISTER	0	0	0	0	Deregister an ATM address
ATM_ILMI_REGISTER	0	0	0	0	Register an ATM address
ATM_SAAL_ESTABLISH	0	0	0	0	Establish the SAAL at interface
ATM_SAAL_RELEASE	0	0	0	0	Release the SAAL at interface
ATM_SIG_EMUL_RESET	0	0	0	0	Release all calls from Emulator
ATM_START_SETUP	<index>	<count>	0	ATMStartCardSetupParams	Start a signaling test
ATM_STOP_SETUP	<index>	<count>	0	ATMStopCardSetupParams	Stop a signaling test

ATM - HTSetStructure

iType1	ATM_CALL_ADDR_LIST
Description	Set the called addr. for sigtest
Usage	int HTSetStructure(ATM_CALL_ADDR_LIST, 0, 0, 0, (void*)pATMCallAddrList, sizeof(ATMCallAddrList), iHub, iSlot, iPort) ;
Related Structure	ATMCallAddrList

```
This structure is used to define the called ATM addresses for a
signaling test.

typedef struct   tagATMCallAddrList
{
unsigned short      uiStartAddrIndex;   /* Index of first element   */
unsigned short      uiCount;         /* Number of array elements   */
ATMAddress        atmAddress[ATM_MAX_CALL_ADDRESSES];
/* List of addresses to load   */
} ATMCallAddrList;
```

Comment

iType1	ATM_CALL_SETUP
Description	Set the traffic desc. for sigtest
Usage	int HTSetStructure(ATM_CALL_SETUP, 0, 0, 0, (void*)pATMCallSetupParams, sizeof(ATMCallSetupParams), iHub, iSlot, iPort) ;
Related Structure	ATMCallSetupParams

```
The ATMCallSetupParams structure defines what is signaled by the
signaling test when attempting to make a call setup.  This structure
is only used for the signaling test and should not be used when
attempting to establish an SVC over which data will actually be
sent.
```

```
typedef struct    tagATMCallSetupParams
{
unsigned short   uiCallSetupIndex;      /* The index of the machine */

/* ATM Traffic Descriptor Information Element */
unsigned long   ulFwdTrafficDescriptorType; /* one of ATM_TD from below   */
unsigned long   ulFwdPCR_0;             /* Peak cell rate 0 in cells/sec      */
unsigned long   ulFwdPCR_01;         /* Peak cell rate 0+1 in cells/sec   */
unsigned long   ulFwdSCR_0;             /* Sus cell rate 0 in cells/sec      */
unsigned long   ulFwdSCR_01;         /* Sus cell rate 0+1in cells/sec      */
unsigned long   ulFwdMBS_0;             /* Maximum Burst Size 0 in cells      */
unsigned long   ulFwdMBS_01;         /* Maximum Burst Size 0+1 in cells   */

unsigned long   ulBwdTrafficDescriptorType; /* one of ATM_TD from below   */
unsigned long   ulBwdPCR_0;             /* Peek cell rate 0 in cells/sec      */
unsigned long   ulBwdPCR_01;         /* Peek cell rate 0+1 in cells/sec   */
unsigned long   ulBwdSCR_0;             /* Sus cell rate 0 in cells/sec      */
unsigned long   ulBwdSCR_01;         /* Sus cell rate 0+1in cells/sec      */
unsigned long   ulBwdMBS_0;             /* Maximum Burst Size 0 in cells      */
unsigned long   ulBwdMBS_01;         /* Maximum Burst Size 0+1 in cells   */

/* Quality of Service Information Element */
unsigned char   ucFwdQOS;      /* Forward - one of ATM_QOS values      */
unsigned char   ucBwdQOS;      /* Backward - one of ATM_QOS values      */

/* Broadband Bearer Capability Information Element */
unsigned char   ucBbcClass;         /* One of ATM_B_BC_CLASS values         */
unsigned char   ucBbcTimingReq;   /* One of ATM_B_BC timing values         */
unsigned char   ucBbcTrafficType;   /* One of ATM_B_BC_TYPE values         */
unsigned char   ucBbcSusceptibleToClipping;   /* ATM_B_BC clipping values*/
} ATMCallSetupParams;
```

Comment

iType1	ATM_CLASSICAL_IP
Description	Configure CLIP ARP server info
Usage	int HTSetStructure(ATM_CLASSICAL_IP, 0, 0, 0, (void*)pATMClassicalIP, sizeof(ATMClassicalIP), iHub, iSlot, iPort) ;

Related Structure ATMClassicalIP

```
This structure provides the user with all of the information
necessary to work with a CLIP ARP server.  The ulInterCallGap
specifies the time between successive data direct VCC connection
attempts to another IP client.  This can be an issue when a single
ARP server response is capable of satisfying multiple ARP requests.
Rather than bursting all of the connections to the destination
client at once, the call gap allows the user to slow down the rate
of connection.  If  all connections should be connected as quickly
as possible, then there is nothing that precludes this value from
being 0.
```

```
typedef struct tagATMClassicalIP
{
unsigned char      ucArpServerAtmAddr[20];   /* The server's ATM address   */
unsigned char      ucArpClientIpAddr[4];   /* The card's IP address      */
unsigned long      ulInterArpGap;            /* millisec between ARP retries*/
unsigned long      ulInterCallGap;         /* millisec between data conn's*/
unsigned short      uiArpRetries;            /* Max number of ARP retries   */
} ATMClassicalIP;         /* RFC1577_PARAMS; */
```

Comment

iType1	ATM_CONN_COPY
Description	Copy connections for sigtest
Usage	int HTSetStructure(ATM_CONN_COPY, 0, 0, 0, (void*)pATMConnectionCopyParams, sizeof(ATMConnectionCopyParams), iHub, iSlot, iPort) ;

Related Structure ATMConnectionCopyParams

```
The copy params structure allows a sequence of connections already
configured on the target card to be copied to another range of
connections.  This structure allows the user to copy an existing
range of existing connections to a new range of connections in
preparation for a signaling test.  This parameter is used to bypass
the lengthy downloads which would result from sending all of the
duplicated connection data over the serial port.  This structure
specifies a source connection index which specifies the first
connection to be copied.  This structure defines the first target
destination index of the copy.  Finally, the structure includes the
desired number of connections to copy. The actual number of copies
which will be made may be reduced from the desired if a connection
is attempted to be used as both a source and a destination within the
same command.

 Example 1: ("Normal" operation)
  Source = 1, Dest = 5, Count = 3
     Before                 After
 Index   Configuration   Index   Configuration
   1         A            1         A
   2         B            2         B
   3         C            3         C
   4         D            4         D
   5         E            5         A
   6         F            6         B
   7         G            7         C
   8         H            8         H

Example 2: ("Incorrect" operation)
  Source = 1, Dest = 3, Count = 4
     Before                  After
 Index   Configuration   Index   Configuration
   1         A            1         A
   2         B            2         B
   3         C            3         A
   4         D            4         B
   5         E            5         E
   6         F            6         F
   7         G            7         G
   8         H            8         H

Example 2 fails when the source of a copy is the same as the
destination address of the first copy (3).  In this case only
two connections were copied instead of the requested 4.
```

```
typedef struct tagATMConnectionCopyParams
{
unsigned long ulSrcIndex;   /* The starting source range index   */
unsigned long ulDstIndex;   /* The starting dest range index      */
unsigned long ulCount;      /* The number of conns to copy      */
} ATMConnectionCopyParams;
```

Comment

iType1	ATM_CONN_MODIFY
Description	Fill field of conn. for sigtest
Usage	int HTSetStructure(ATM_CONN_MODIFY, 0, 0, 0, (void*)pATMConnectionModify, sizeof(ATMConnectionModify), iHub, iSlot, iPort) ;

Related Structure ATMConnectionModify

```
The modify connections structure allows a sequence of connections
already configured on the target card to have one of their fields
modified with successively increasing values.  This structure will
modify a particular field of ulCount successive connections with a
constantly changing value.  The parameter identified in ulType
indicates which field of the connection structure is of interest.
The identified field of the connection at uiSrcIndex is taken to be
the starting value for the modify.  The value is increased by
delta and the new value is written into the next connection
(connection number ulSrcIndex+1).  The new value is increased again
by delta and written to the next connection.  This process repeats
until ulCount connections have been written with a new value.  The
field of interest is identified by one of the ATM_CALL_PARAM defines
below.

For Example:
  Source = 3, Count = 3, Delta = 2
     Before            After
 Index   Value       Index   Value
   1      10           1      10
   2       8           2       8
   3       3           3       3
   4      30           4       5
   5      27           5       7
   6      58           6       9
   7      15           7      15
   8      12           8      12
   9       1           9       1
```

```
typedef struct tagATMConnectionModify
{
unsigned long   ulSrcIndex;   /* Conn holds starting field value   */
unsigned long   ulCount;      /* Number of conns to change          */
unsigned long   ulType;      /* Identifies which field to change   */
long            lDelta;      /* Successive increment value         */
} ATMConnectionModify;
```

Comment

iType1	ATM_CONN_MODIFY_ARRAY
Description	Mod field of conn. for sigtest
Usage	int HTSetStructure(ATM_CONN_MODIFY_ARRAY, 0, 0, 0, (void*)pATMConnectionModifyArray, sizeof(ATMConnectionModifyArray), iHub, iSlot, iPort) ;

Related Structure ATMConnectionModifyArray

```
The modify connections array structure allows a sequence of
connections already configured on the target card to have one of
their fields modified with user-supplied data.

This structure will modify a particular field of ulCount successive
connections with user specified values.  The parameter identified in
ulID indicates which field of the connection structure is to be
modified.  ulSourceIndex specifies the index of the first connection
which is modified.  The ulValues array contains the values which
will be placed into the successive connections.

For Example:
  Count = 3, SrcIndex = 2, Values = { 6, 5, 4 }
     Before            After
 Index   Value      Index    Value
   1      10          1       10
   2       8          2        6
   3       3          3        5
   4      30          4        4
   5      27          5       27
   6      58          6       58
   7       9          7        9
   8      12          8       12
   9       1          9        1
```

```
typedef struct tagATMConnectionModifyArray
{
unsigned long      ulSrcIndex;
unsigned long      ulCount;
unsigned long      ulID;
unsigned long      ulArraySize; /* reserved - Currently
it is the same as ulCount */
unsigned long      ulValues[ATM_MAX_ARRAY_DIM];
} ATMConnectionModifyArray;
```

Comment

iType1	ATM_CONN_TRIGGER_PARAMS
Description	Define per conn trigger event
Usage	int HTSetStructure(ATM_CONN_TRIGGER_PARAMS, 0, 0, 0, (void*)pATMConnTriggerParams, sizeof(ATMConnTriggerParams), iHub, iSlot, iPort) ;

Related Structure ATMConnTriggerParams

```
ATMConnTriggerParams allows the user to define a trigger event
pattern to be used for a particular connection.  The per connection
trigger is associated with comparator one.
```

```
typedef struct tagATMConnTriggerParams
{
unsigned short    uiConnIndex;      /* Connection to test   */
unsigned long       ulComp1Pattern;   /* Pattern to test for per conn */
} ATMConnTriggerParams;
```

Comment

iType1	ATM_CONNECTION
Description	Define a connection for sigtest
Usage	int HTSetStructure(ATM_CONNECTION, 0, 0, 0, (void*)pATMConnection, sizeof(ATMConnection), iHub, iSlot, iPort) ;

Related Structure ATMConnection

```
Defines the content of a connection for the signaling test.  This
structure assumes that the ATM address list and the call parameters
for the signaling test have already been defined.  Essentially,
there are three types of signaling tests which can be run: a smooth
test, a bursty test, and a random distribution test.  A signaling
test works by creating a series of machines which will attempt to
establish a connection and teardown a certain number of times as
defined by ulCallCountLimit.  The parameters at the top of the
structure define what is signaled to the DUT when a call connection
is attempted.  The "stop on error" field allows this machine to quit
attempting further calls if one of its previous calls were released
by the switch while a call was proceeding or after a call was
established.  There are three types of initiating timings as
follows:

SMOOTH: The time from a call teardown to a call initiation is
      constant and defined by the ulInterCallGap.

BURSTY: The time from a call teardown to a call initiation is
      initially defined by the ulBurstGap for the first
      ulBurstCount calls and then defined by the
      ulInterCallGap for the remaining calls.

RANDOM: The time from a call teardown to a call initiation is
      calculated between each call to be
      ulInterCallGap + random(ulInterCallGapDelta).

There are also three types of completion timings as follows:
CONST:  The time from a call connection to initiating a call
        teardown is constant and defined by ulCallLength.
        Calls will be torn down at this time independent
        of their current connection state.

CONST_FROM_SETUP: The time from a call setup to initiating a
        call teardown is constant and defined by ulCallLength.
        Calls which are not complete at this point in time
        will be allowed to complete before a new call is
        initiated.

RANDOM: The time from a call connection to initiating a call
        teardown is calculated for each call to be
        ulCallLength + random(ulRandomLengthDelta)
        Calls will be torn down at this time independent
        of their current connection state.
```

```
typedef struct tagATMConnection
{
unsigned long    ulIndex;         /* Connection Number */
unsigned char   ucType;         /* PVC or SVC         */
unsigned char   ucRateClass;   /*CBR, VBR, or UBR */
unsigned long   ulRatePCR;      /*CBR, VBR, UBR Peak Cell Rate   */
unsigned long   ulRateSCR;      /*       VBR Sustainable Cell Rate */
unsigned long   ulRateMBS;      /*       VBR Max Burst Size         */
ATMCellTime      ctCellDelayVar;/*CBR, VBR Cell Delay Variation   */
unsigned long   ulCellHeader;   /* Cell header - for GFC, PT, CLP*/

/* The remaining fields are only significant for SVC connections  */
/* Delay/gap/timer values are specified in 1 microsecond ticks    */

unsigned short   uiCallSetupIndex;/*Corresponding call info index*/
unsigned short   uiAddressIndex;  /*Corresponding ATM addr. index*/

unsigned char   ucCallDistType;  /* One of ATM_CALL_DIST types   */
unsigned char   ucCallLengthType;/*One of ATM_CALL_LENGTH types */

unsigned char   ucStopOnError;   /*Stop on unexpected call release*/
unsigned char   ucLogEvents;   /* Set to 0                        */

unsigned char   ucEnableCellLoadGen;   /* Set to 0                  */

unsigned long   ulCallStartDelay;/*Time from start to first call*/
unsigned long   ulCallCountLimit;/* The no. of calls to attempt */

unsigned long   ulCallLength;    /* Minimum wait before teardown */
/* in microseconds           */
unsigned long   ulRandomLengthDelta;/* The time variation         */

unsigned long   ulInterCallGap;  /* Min wait before initiation  */
unsigned long   ulRandomGapDelta;/* The time variation            */

unsigned long   ulBurstCount;     /* Number of calls to burst      */
unsigned long   ulInterBurstGap; /* Min wait before teardown    */
} ATMConnection;
```

Comment

iType1	ATM_DS1_E1_LINE_PARAM
Description	Config ATM and PHY for DS1 or E1
Usage	int HTSetStructure(ATM_DS1_E1_LINE_PARAM, 0, 0, 0, (void*)pATMDS1E1LineParams, sizeof(ATMDS1E1LineParams), iHub, iSlot, iPort) ;

Related Structure ATMDS1E1LineParams

```
The ATMDS1E1LineParams structure is used to configure the physical
layer and the ATM layer for the following cards : AT-9015, AT-9020.
The following values are valid for each card:

AT-9015:
  ucFramingMode    - ATM_DS 1_CELL_FRAMING or ATM_DS1_PLCP_FRAMING
  ucTxClockSource  - ATM_INTERNAL_CLOCK or ATM_LOOP_TIMED_CLOCK
  ucCellScrambling - 0 (disabled) or 1 (enabled)
  ucHecCoset       - 0 (disabled) or 1 (enabled)
  ucRxErroredCells - ATM_DROP_ERRORED_CELLS or
                     ATM_CORRECT_ERRORED_CELLS or
                ATM_RX_ERRORED_CELLS
  ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                     ATM_LOOPBACK_LOCAL_PHY or
                     ATM_LOOPBACK_REMOTE_PHY
  ucLineBuildout   - ATM_DS1_0_TO_133_BUILDOUT or
                     ATM_DS1_133_TO_266_BUILDOUT or
                     ATM_DS1_266_TO_399_BUILDOUT or
                     ATM_DS1_399_TO_266_BUILDOUT or
                     ATM_DS1_533_TO_655_BUILDOUT or
                     ATM_DS1_N7X5_DB_BUILDOUT or
                     ATM_DS1_N15_DB_BUILDOUT or
                     ATM_DS1_N22X5_DB_BUILDOUT
  ucLineCoding     - ATM_DS1_AMI_ENCODING or
                     ATM_DS1_B8ZS_ENCODING
  ucLineFraming    - ATM_DS1_D4_LINE_FRAMING or
                   ATM_DS1_ESF_LINE_FRAMING
  ucIdleCellHeader - Contains idle cell header without HEC byte

AT-9020:
  ucFramingMode    - ATM_E1_CELL_FRAMING or
                     ATM_E1_PLCP_FRAMING
  ucTxClockSource  - ATM_INTERNAL_CLOCK or ATM_LOOP_TIMED_CLOCK
  ucCellScrambling - 0 (disabled) or 1 (enabled)
  ucHecCoset       - 0 (disabled) or 1 (enabled)
  ucRxErroredCells - ATM_DROP_ERRORED_CELLS or
                     ATM_CORRECT_ERRORED_CELLS or
                     ATM_RX_ERRORED_CELLS
  ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                     ATM_LOOPBACK_LOCAL_PHY or
                     ATM_LOOPBACK_REMOTE_PHY
  ucLineBuildout   - ATM_E1_BUILDOUT or
  ucLineCoding     - ATM_E1_AMI_ENCODING or
                     ATM_E1_HDB3_ENCODING
  ucLineFraming    - 0
  ucIdleCellHeader - Contains idle cell header without HEC byte
```

```
typedef struct tagATMDS1E1LineParams
{
/* Line interface control flags */
unsigned char   ucFramingMode;      /* Physical layer framing     */
unsigned char   ucTxClockSource;  /* Transmit clock source      */
unsigned char   ucCellScrambling; /* Cell Payload Scrambling    */
unsigned char   ucHecCoset;         /* HEC Coset Usage            */
unsigned char   ucRxErroredCells; /* Receive HEC error handling   */
unsigned char   ucLoopbackEnable; /* Loopback mode              */
unsigned char   ucLineBuildout;   /* Pulse shaping for PHY      */
unsigned char   ucLineCoding;     /* Line symbol coding         */
unsigned char   ucLineFraming;    /* Framing format for PHY      */

/* Idle cell definition */
unsigned char   ucIdleCellHeader[4];   /* Idle cell value        */
} ATMDS1E1LineParams;
```

Comment

iType1	ATM_DS3_E3_LINE_PARAM
Description	Config ATM and PHY for DS3 or E3
Usage	int HTSetStructure(ATM_DS3_E3_LINE_PARAM, 0, 0, 0, (void*)pATMDS3E3LineParams, sizeof(ATMDS3E3LineParams), iHub, iSlot, iPort) ;

Related Structure ATMDS3E3LineParams

```
The ATMDS3E3LineParams structure is used to configure the physical
layer and the ATM layer for the following cards : AT-9034, AT-9045.
The following values are valid for each card:

AT-9034:
   ucFramingMode    - ATM_E3_CELL_FRAMING or ATM_E3_PLCP_FRAMING
    ucTxClockSource  - ATM_INTERNAL_CLOCK or ATM_LOOP_TIMED_CLOCK
    ucCellScrambling - 0 (disabled) or 1 (enabled)
    ucHecCoset       - 0 (disabled) or 1 (enabled)
    ucRxErroredCells - ATM_DROP_ERRORED_CELLS or
                       ATM_CORRECT_ERRORED_CELLS or
                       ATM_RX_ERRORED_CELLS
    ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                       ATM_LOOPBACK_LOCAL_PHY or
                       ATM_LOOPBACK_REMOTE_PHY
    ucLineBuildout   - 0
    ucIdleCellHeader - Contains idle cell header without HEC byte

 AT-9045:
   ucFramingMode    - ATM_DS3_CELL_FRAMING or ATM_DS3_PLCP_FRAMING
   ucTxClockSource  - ATM_INTERNAL_CLOCK or ATM_LOOP_TIMED_CLOCK
    ucCellScrambling - 0 (disabled) or 1 (enabled)
    ucHecCoset       - 0 (disabled) or 1 (enabled)
    ucRxErroredCells - ATM_DROP_ERRORED_CELLS or
                       ATM_CORRECT_ERRORED_CELLS or
                       ATM_RX_ERRORED_CELLS
   ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                       ATM_LOOPBACK_LOCAL_PHY or
                       ATM_LOOPBACK_REMOTE_PHY
    ucLineBuildout -   ATM_DS3_SHORT_BUILDOUT or
                      ATM_DS3_LONG_BUILDOUT
    ucIdleCellHeader - Contains idle cell header without HEC byte
```

```
typedef struct tagATMDS3E3LineParams
{
/* Line interface control flags */
unsigned char ucFramingMode;      /* Physical layer framing      */
unsigned char ucTxClockSource;   /* Transmit clock source      */
unsigned char ucCellScrambling;   /* Cell Payload Scrambling      */
unsigned char ucHecCoset;         /* HEC Coset Usage            */
unsigned char ucRxErroredCells;   /*   Receive HEC error handling */
unsigned char ucLoopbackEnable;   /* Loopback mode               */
unsigned char ucLineBuildout;      /* Pulse shaping for PHY      */

/* Idle cell definition */
unsigned char ucIdleCellHeader[4];   /* Idle cell value         */

} ATMDS3E3LineParams;
```

Comment

iType1	ATM_ELAN_DEREGISTER
Description	Deregister an existing LEC
Usage	int HTSetStructure(ATM_ELAN_DEREGISTER, 0, 0, 0, (void*)pATMELANDeregister, sizeof(ATMELANDeregister), iHub, iSlot, iPort) ;
Related Structure	ATMELANDeregister

```
Allows the user to deregister from a specific ELAN.

typedef struct tagATMELANDeregister
{
unsigned char      ucInstance;
} ATMELANDeregister;
```

Comment

iType1	ATM_ELAN_REGISTER
Description	Define and register and LEC
Usage	int HTSetStructure(ATM_ELAN_REGISTER, 0, 0, 0, (void*)pATMELANRegister, sizeof(ATMELANRegister), iHub, iSlot, iPort) ;
Related Structure	ATMELANRegister

```
typedef struct tagATMELANRegister
{
unsigned char      ucInstance;      /* Identifies which ELAN */

/* Join parameters */
unsigned char      ucInitMethod;   /* One of ATM_ELAN_INIT from below   */

/* manual ATM address for direct joins */
ATMAddress         ManualAtmAddr;   /* LES or LECS address if required   */

/* LEC parameters */
unsigned char      ucC2Type;      /* One of ATM_ELAN_TYPE      */
unsigned char      ucC3Mtu;         /* Max Transfer Unit, One of ATM_ELAN_MTU */

/* Target ELAN name (may be NULLified) */
unsigned char      ucC5Name[ATM_MAX_ELAN_NAME];

/* Base MAC address and count */
unsigned char      ucC6MacAddr[6];      /* ELAN MAC address   */
unsigned short      uiC7ControlTimeout;   /* Timeout in seconds, control conn*/
unsigned short      uiC13ArpRetryCount;
unsigned short      uiC20ArpResponseTime;/* Max wait time for ARP response*/
} ATMELANRegister;
```

Comment

iType1	ATM_FRAME_COPY
Description	Copy Frame params to a given # of streams
Usage	int HTSetStructure(ATM_FRAME_COPY, 0, 0, 0, (void*)pATMFrameCopyReq, sizeof(ATMFrameCopyReq), iHub, iSlot, iPort) ;
Related Structure	ATMFrameCopyReq

```
 typedef struct    tagATMFrameCopyReq
{
unsigned short   uiStartStrNum;      /* Stream index of the first stream to be
copied to. */
unsigned short   uiStrCount;         /* The number of streams, which the frame,
stored in memory, is used as a basis for
modification. */
unsigned short   uiNumMods;         /* The number of FrameCopyMod structures
which immediately follow this structure. */
ATMFrameCopyMod ModArray[ATM_MAX_MODS];
} ATMFrameCopyReq;
```

Comment

```
Supported by ATM SmartCard version 2.0 and later.
```

iType1	ATM_FRAME_DEF
Description	Config a new or existing frame
Usage	int HTSetStructure(ATM_FRAME_DEF, 0, 0, 0, (void*)pATMFrameDefinition, sizeof(ATMFrameDefinition), iHub, iSlot, iPort) ;

Related Structure ATMFrameDefinition

```
This structure allows the user to define a frame's contents and to
associate a frame with a particular stream.  When this data is sent
to the card the frame definition will fail if the stream index is
greater than the maximum number of streams supported by our card or
if the stream to which the frame will be bound has not been defined
yet or if the associated stream does exist and the connection is open.
The frame length defines the length of the user data to be segmented
in the aal5 layer.  The custom frame data is placed into the frame
first.  If there is still more data required to complete the frame
then the remaining bytes of the frame are filled with the fill
pattern.  This data structure is intended to be used with the frame
length set equal to or greater than the data length.  If the data
length is greater than the frame length then only the first frame
length bytes of the custom data are used in the definition of the
frame.
For Example:
   uiDataLength = 10
   uiFrameLength = 14
   ucFrameData[] = 0x0102030405060708090A0B0C0D....
   uiFrameFillPattern = 0xABCD
   The defined frame becomes: 0x0102030405060708090AABCDABCD

Example 2:
   uiDataLength = 10
   uiFrameLength = 8
   ucFrameData[] = 0x0102030405060708090A0B0C0D....
   uiFrameFillPattern = 0xABCD
   The defined frame becomes: 0x0102030405060708
```

```
typedef struct tagATMFrameDefinition
{
unsigned short   uiStreamIndex;   /* Stream identifier/index            */
unsigned short   uiFrameLength;   /* The total length of the frame      */
unsigned short   uiDataLength;   /* The length of the custom data      */
unsigned short   uiFrameFillPattern;   /* Fill pattern word            */
unsigned long   ulFrameFlags;   /* Special frame generation flags   */
unsigned char   ucFrameData[2048];   /* Custom frame data            */
} ATMFrameDefinition;
```

Comment

iType1	ATM_GLOBAL_TRIGGER_PARAMS
Description	Define global trigger event
Usage	int HTSetStructure(ATM_GLOBAL_TRIGGER_PARAMS, 0, 0, 0, (void*)pATMGlobalTrigger, sizeof(ATMGlobalTrigger), iHub, iSlot, iPort) ;

Related Structure ATMGlobalTrigger

```
The ATMGlobalTrigger structure defines global trigger conditions
which apply to all received frames.  In ATM-2 the triggers are only
active on the receive side.  Each VCC has its own latency and
trigger counter to facilitate measurement of per connection
statistics.  There are two events which can be defined.  The first
event is associated with comparator two and is a global event.  This
occurrence of this event is tested against all frames received on all
connections.  The second event is defined per connection.  There is
no mask, but each connection may specify a pattern which will be
used to test frames received only on that connection.
```

```
typedef struct tagATMGlobalTrigger
{
/* Trigger control */
unsigned char       ucEnable;         /* Enable triggers         */
unsigned char     ucCompCombo;      /* Comparison combination   */

/* Global Trigger parameters */
unsigned long       ulComp2Pattern;   /* Global event pattern   */

unsigned short    uiComp1Offset;   /* Per conn triggers' pattern offset*/
unsigned short    uiComp2Offset;   /* Global trigger pattern offset      */

unsigned long       ulComp1Mask;      /* Mask bits for per conn event      */
unsigned long     ulComp2Mask;      /* Mask bits for global event         */

} ATMGlobalTrigger;
```

Comment

iType1	ATM_ILMI
Description	Set ILMI timers and ESI
Usage	int HTSetStructure(ATM_ILMI, 0, 0, 0, (void*)pATMILMIParams, sizeof(ATMILMIParams), iHub, iSlot, iPort) ;

Related Structure ATMILMIParams

```
The ATMILMIParams structure is used to indicate to the card what
the desired end system identifier is and what the proper timeout
values are for ILMI.  These are the values which are used by ILMI
to identify to the network what the ATM address of the card will be.
```

```
typedef struct tagATMILMIParams
{
unsigned long   ulColdStartTimer;   /* Timeout time in .01 S resolution   */
unsigned long   ulRegTimeoutTimer;   /* Timeout time in .01 S resolution   */
unsigned char   ucESI[6];         /* End System Identifier */
} ATMILMIParams;
```

Comment

iType1	ATM_ILMI_STATIC_REGISTER
Description	Force an ATM address statically
Usage	int HTSetStructure(ATM_ILMI_STATIC_REGISTER, 0, 0, 0, (void*)pATMILMIStaticParams, sizeof(ATMILMIStaticParams), iHub, iSlot, iPort) ;
Related Structure	ATMILMIStaticParams

```
The following structure is used to specify to the firmware a
particular ATM address to be used.  This function is most frequently
used when connecting to management entities within a switch.

typedef struct tagATMILMIStaticParams
{
ATMAddress      atmAddress;
} ATMILMIStaticParams;
```

Comment

iType1	ATM_INCOMING_SVC_METHOD
Description	Incoming SVC method
Usage	int HTSetStructure(ATM_INCOMING_SVC_METHOD, 0, 0, 0, (void*)pATMIncomingSVCMethod, sizeof(ATMIncomingSVCMethod), iHub, iSlot, iPort) ;
Related Structure	ATMIncomingSVCMethod

```
typedef struct    tagATMIncomingSVCMethod
{
unsigned char   ucReserved[3];
unsigned char   ucMethod;         /* Use one of the following defined below */
} ATMIncomingSVCMethod;
```

Comment

iType1	ATM_LINE
Description	Physical and ATM layer config
Usage	int HTSetStructure(ATM_LINE, 0, 0, 0, (void*)pATMLineParams, sizeof(ATMLineParams), iHub, iSlot, iPort) ;

Related Structure ATMLineParams

```
The ATMLineParams structure is used to configure the physical layer
and the ATM layer for the following cards: AT-9622, AT-9155, AT-9025.
The following values are valid for each card:

AT-9622:
  ucFramingMode    - ATM_OC12_FRAMING or ATM_STM4_FRAMING
  ucTxClockSource  - ATM_INTERNAL_CLOCK or ATM_LOOP_TIMED_CLOCK
  ucCellScrambling - 0 (disabled) or 1 (enabled)
  ucHecCoset       - 0 (disabled) or 1 (enabled)
  ucRxErroredCells - ATM_DROP_ERRORED_CELLS or
                     ATM_CORRECT_ERRORED_CELLS or
                     ATM_RX_ERRORED_CELLS
  ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                     ATM_LOOPBACK_LOCAL_PHY or
                     ATM_LOOPBACK_REMOTE_PHY
  ucIdleCellHeader - Contains idle cell header without HEC byte

 AT-9155:
  ucFramingMode    - ATM_OC3_FRAMING or ATM_STM1_FRAMING
  ucTxClockSource  - ATM_INTERNAL_CLOCK or ATM_LOOP_TIMED_CLOCK
  ucCellScrambling - 0 (disabled) or 1 (enabled)
  ucHecCoset       - 0 (disabled) or 1 (enabled)
  ucRxErroredCells - ATM_DROP_ERRORED_CELLS or
                     ATM_CORRECT_ERRORED_CELLS or
                     ATM_RX_ERRORED_CELLS
  ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                     ATM_LOOPBACK_LOCAL_PHY or
                     ATM_LOOPBACK_REMOTE_PHY
  ucIdleCellHeader - Contains idle cell header without HEC byte

 AT-9025:
  ucFramingMode    - ATM_25_FRAMING
  ucTxClockSource  - ATM_INTERNAL_CLOCK
  ucCellScrambling - 1 (enabled)
  ucHecCoset       - 1 (enabled)
  ucRxErroredCells - ATM_DROP_ERRORED_CELLS or ATM_RX_ERRORED_CELLS
  ucLoopBackEnable - ATM_LOOPBACK_DISABLED or
                     ATM_LOOPBACK_LOCAL_PHY or
                     ATM_LOOPBACK_REMOTE_PHY
  ucIdleCellHeader - Contains idle cell header without HEC byte
```

```
typedef struct tagATMLineParams
{
/* Line interface control flags */
unsigned char ucFramingMode;      /* Physical layer framing      */
unsigned char ucTxClockSource;   /* Transmit clock source      */
unsigned char ucCellScrambling;   /* Cell Payload Scrambling      */
unsigned char ucHecCoset;         /* HEC Coset Usage            */
unsigned char ucRxErroredCells;   /*   Receive HEC error handling */
unsigned char ucLoopbackEnable;   /* Loopback mode               */

/* Idle cell definition */
unsigned char ucIdleCellHeader[4];   /* Idle cell value         */

} ATMLineParams;
```

Comment

iType1	ATM_PER_CONN_BURST
Description	Burst count per connection
Usage	int HTSetStructure(ATM_PER_CONN_BURST, <index>, <count>, 0, (void*)pATMPerConnBurstCount, sizeof(ATMPerConnBurstCount), iHub, iSlot, iPort) ;
Related Structure	ATMPerConnBurstCount

```
 typedef struct    tagATMPerConnBurstCount
{
unsigned short   uiStartConnIdx;
unsigned short   uiConnCount;
unsigned char   ucFunction;         /* Use one of the following defined below */
unsigned char   ucReserved[3];
unsigned long   ulReserved;
unsigned long   ulFrameBurstSize;   /* from 1 to 2,097,151 */
} ATMPerConnBurstCount;
```

Comment

Supported by ATM SmartCard version 2.0 and later.

iType1	ATM_PER_PORT_BURST
Description	Burst count per port
Usage	int HTSetStructure(ATM_PER_PORT_BURST, 0, 0, 0, (void*)pATMPerPortBurstCount, sizeof(ATMPerPortBurstCount), iHub, iSlot, iPort) ;
Related Structure	ATMPerPortBurstCount

```
 typedef struct    tagATMPerPortBurstCount
{
unsigned char   ucFunction;         /* Use one of the following defined below */
unsigned char   ucReserved[3];
unsigned long   ulReserved;
unsigned long   ulFrameBurstSize;   /* from 1 to 4,294,967,295 ( all 32-bits ) */
} ATMPerPortBurstCount;
```

Comment

Supported by ATM SmartCard version 2.0 and later.

iType1	ATM_SCHED_PARAMS
Description	Cell-scheduling method for transmission
Usage	int HTSetStructure(ATM_SCHED_PARAMS, 0, 0, 0, (void*)pATMSchedParams, sizeof(ATMSchedParams), iHub, iSlot, iPort) ;
Related Structure	ATMSchedParams

```
 typedef struct    tagATMSchedParams
{
unsigned long   ulUtilization;      /* The amount of bandwidth as a percent of
the total line rate.  Percent can range
from 1 -100, inclusive, in steps of 1.
This does not apply to the Early Sched. Type */
unsigned short   uiSchedType;      /* Determines the type of scheduling used the
next time streams are scheduled.  Use one of
the following defined below. */
unsigned short   uiReserved;
unsigned long   ulReserved1;
unsigned long   ulReserved2;
} ATMSchedParams;
```

Comment

```
Supported by ATM SmartCard version 2.0 and later.
```

iType1	ATM_SSCOP
Description	Set SSCOP timers and config
Usage	int HTSetStructure(ATM_SSCOP, 0, 0, 0, (void*)pATMSSCOPParams, sizeof(ATMSSCOPParams), iHub, iSlot, iPort) ;
Related Structure	ATMSSCOPParams

```
Defines Maximum and Timer values for use in configuring the SSCOP
level of the ATM interface.
```

```
typedef struct tagATMSSCOPParams
{
unsigned long   ulMaxCC;
unsigned long   ulMaxPD;
unsigned long   ulMaxStat;
unsigned long   ulMaxReseq;
unsigned long   ulRxWindow;

unsigned long   ulTmrCC;
unsigned long   ulTmrKeepAlive;
unsigned long   ulTmrNoResp;
unsigned long   ulTmrPoll;
unsigned long   ulTmrIdle;
} ATMSSCOPParams;
```

Comment

iType1	ATM_STREAM
Description	Config a new or existing stream
Usage	int HTSetStructure(ATM_STREAM, 0, 0, 0, (void*)pATMStream, sizeof(ATMStream), iHub, iSlot, iPort) ;
Related Structure	ATMStream

The ATMStream structure is used to define what is signaled for a data stream and what the performance of the data stream will be once it is established.

```
typedef struct tagATMStream
{
unsigned short   uiIndex;         /* Stream Index                   */

/* Connection parameters */
unsigned char   ucConnType;      /* use Connection type" defines
STR_CONN_TYPE_PVC
STR_CONN_TYPE_SVC
STR_CONN_TYPE_INCOMING_SVC     */
unsigned char   ucEncapType;   /* NULL, 802.3, 802.5, or RFC 1577
use "encapsulation type" defines
STR_ENCAP_TYPE_NULL
STR_ENCAP_TYPE_LANE_802_3
STR_ENCAP_TYPE_LANE_802_5
STR_ENCAP_TYPE_RFC1577         */

unsigned char   ucGenRateClass;/* use "rate class" defines
STR_RATE_CLASS_CBR
STR_RATE_CLASS_VBR
STR_RATE_CLASS_UBR             */
unsigned long   ulGenPCR;      /* Peak Cell Rate (cells/sec)     */
unsigned long   ulGenSCR;      /* Sustainable Cell Rate (cells/sec) */
unsigned long   ulGenMBS;      /* Maximum Burst Size (cells)       */
ATMCellTime      ctGenCDVT;      /* Cell Delay Variation Tolerance(Time)*/

/*
* Signaled rate parameters
*/
/* ATM Traffic Descriptor Information Element */
/* Forward connection */
unsigned char   ucFwdTdType;   /* one of ATM_TD values (Traffic Desc)   */
unsigned long   ulFwdPCR0;      /* PCR 0 rate (cells/sec)         */
unsigned long   ulFwdPCR01;      /* PCR 0+1 rate (cells/sec)      */
unsigned long   ulFwdSCR0;      /* SCR 0 rate (cells/sec)         */
unsigned long   ulFwdSCR01;      /* SCR 0+1 rate (cells/sec)      */
unsigned long   ulFwdMBS0;      /* MBS 0 (cells)                  */
unsigned long   ulFwdMBS01;      /* MBS 0+1 (cells)               */

/* Backward connection */
unsigned char   ucBwdTdType;   /* one of ATM_TD values (Traffic Desc)   */
unsigned long   ulBwdPCR0;      /* PCR 0 rate (cells/sec)         */
unsigned long   ulBwdPCR01;      /* PCR 0+1 rate (cells/sec)      */
unsigned long   ulBwdSCR0;      /* SCR 0 rate (cells/sec)         */
unsigned long   ulBwdSCR01;      /* SCR 0+1 rate (cells/sec)      */
unsigned long   ulBwdMBS0;      /* MBS 0 (cells)                  */
unsigned long   ulBwdMBS01;      /* MBS 0+1 (cells)               */

/* Quality of Service Information Element */
unsigned char   ucFwdQoS;      /* Forward - one of ATM_QOS values   */
unsigned char   ucBwdQoS;      /* Backward - one of ATM_QOS values   */

/* Broadband Bearer Capability Information Element */
unsigned char   ucBcClass;      /* One of ATM_B_BC_CLASS values   */
unsigned char   ucTimingReq;   /* One of ATM_B_BC timing values   */
unsigned char   ucTrafficType;   /* One of ATM_B_BC_TYPE values   */
unsigned char   ucClipping;      /* One of ATM_B_BC clipping values      */

/* Cell header */
unsigned long   ulCellHeader;   /* Specified for PVC, ignored for SVC   */

/* Destination addresses */
unsigned char   ucDestAtmAddr[20];/* Specified for SVC, ignored PVC*/
unsigned char   ucDestMacAddr[6];   /* Specified for LANE or ignored      */
unsigned char   ucDestIpAddr[4];   /* Specified for CLIP or ignored      */

/* Encapsulation-specific fields */
unsigned char   ucSnapHeader[5];         /* Not Used                     */
unsigned char   ucElanInst;              /* LANE only 0 to LECs - 1      */
} ATMStream;      /* STREAM_PARAMS; */
```

Comment

This structure defines the information elements used in signaling a new connection if it is an SVC and the actual generation characteristics of the stream once a connection is established (SVC or PVC). This structure is not intended to be used by a signaling test, but it is intended to be used for all other applications.

iType1	ATM_STREAM_CONTROL
Description	Start, stop, reset, etc a stream
Usage	int HTSetStructure(ATM_STREAM_CONTROL, 0, 0, 0, (void*)pATMStreamControl, sizeof(ATMStreamControl), iHub, iSlot, iPort) ;

Related Structure ATMStreamControl

```
The ATMStreamControl structure allows the user to perform one action
on a range of streams.  There are five actions which can be
performed.  The basic life of a stream is as follows:  When
initializing in a new application it is best to issue a stream
ATM_STR_ACTION_DISCONNECT and ATM_STR_ACTION_RESET to all possible
streams to remove any previously configured information from the card.
Next,  a frame is defined and bound to a stream.  Then the stream
is bound to a connection using an ATM_STR_ACTION_CONNECT The stream is
then started and stopped as appropriate and it may even be disconnected
and reconnected a number of times depending upon the application.
In the end the stream is stopped and a ATM_STR_ACTION_RESET should
be sent to destroy the stream.
```

```
typedef struct   tagATMStreamControl
{
unsigned char      ucAction;   /* Use one of the following
ATM_STR_ACTION_RESET       Deletes a stream
ATM_STR_ACTION_CONNECT     Initiate a conn for stream xmit
ATM_STR_ACTION_DISCONNECT  Close a conn used for stream xmit
ATM_STR_ACTION_START         Start xmitting data on open conn
ATM_STR_ACTION_STOP         Stop xmitting data on open conn */
unsigned long      ulStreamIndex;   /* First stream in the range      */
unsigned long      ulStreamCount;   /* Subsequent stream count         */
} ATMStreamControl;         /*   STREAM_CONTROL_REQ; */
```

Comment

iType1	ATM_STREAM_PARAMS_COPY
Description	Copy Stream params to a given # of streams
Usage	int HTSetStructure(ATM_STREAM_PARAMS_COPY, 0, 0, 0, (void*)pATMStreamParamsCopy, sizeof(ATMStreamParamsCopy), iHub, iSlot, iPort) ;

Related Structure ATMStreamParamsCopy

```
 typedef struct    tagATMStreamParamsCopy
{
unsigned short   uiSrcStrNum;      /* "Source" stream index. */
unsigned short   uiDstStrNum;      /* Starting stream idx in which the info
of the "Source" Stream is to be copied to. */
unsigned short   uiDstStrCount;      /* The number of streams to be created with the
"Source" Stream's info.  */
unsigned short   uiReserved;
unsigned long   ulReserved;
} ATMStreamParamsCopy;
```

Comment

```
Supported by ATM SmartCard version 2.0 and later.
```

iType1	ATM_STREAM_PARAMS_MODIFY
Description	
Usage	int HTSetStructure (ATM_STREAM_PARAMS_MODIFY (<index>, <count>, 0, (void*)pATMStreamParamsModify, sizeof(ATMStreamParamsModify), iHub, iSlot, iPort) ;
Related Structure	ATMStreamParamsModify

```
 typedef struct    tagATMStreamParamsModify
{
unsigned short   uiStartStrNum;      /* Stream index of the first stream to be modified. */
unsigned short   uiStrCount;         /* The number of streams which are to be modified. */
unsigned short   uiParamItemID;      /* Parameter ID which is to be modified  on all
requested streams - use one of the following
defined below. */
unsigned short   uiParamCount;      /* The number of elements to be specified
for the uiParamItemID value.  This does not
include the parameter size */
unsigned char   ucData[ATM_MAX_ARRAY_DIM]; /* Array contains the number of bytes
specified by the uiParamCount*ParamSize */
} ATMStreamParamsModify;
```

Comment

```
Supported by ATM SmartCard version 2.0 and later.
```

iType1	ATM_STREAM_PARAMS_FILL
Description	
Usage	int HTSetStructure (ATMStreamParamsFill, 0, 0, 0, (void*)pATMStreamParamsFill, sizeof(ATMStreamParamsFill), iHub, iSlot, iPort) ;
Related Structure	ATMStreamParamsFill

```
 typedef struct    tagATMStreamParamsFill
{
unsigned short   uiSrcStrNum;      /* Stream index of the stream whose value for the
desired param is to be used as an initial value
for the fill. */
unsigned short   uiDstStrNum;      /* Stream index of the first stream whose param is
to be filled. */
unsigned short   uiDstStrCount;      /* The number of streams which are to be filled. */
unsigned short   uiParamItemID;      /* Parameter ID which is to be filled on all
requested streams - use one of the following
defined below */
unsigned char   ucDelta[ATM_MAX_DELTA];      /* Successive increment values   */
} ATMStreamParamsFill;
```

Comment

```
Supported by ATM SmartCard version 2.0 and later.
```

iType1	ATM_TRIGGER
Description	Configure triggers in ATM-1
Usage	int HTSetStructure(ATM_TRIGGER, 0, 0, 0, (void*)pATMTrigger, sizeof(ATMTrigger), iHub, iSlot, iPort) ;

Related Structure ATMTrigger

```
The ATMTrigger structure defines the events which are used to fire a
trigger in ATM-1.  There are two types of triggers - frame mode and
cell mode.  In cell mode each cell is tested to see if it matches
the defined event conditions.  In cell mode the offset is specified
in bytes from the start of the cell.  In frame mode the offset is
specified in bytes from the start of the ATM cell payload.  The
header bytes are not included in the offset count at all.  Mask
values determine which bits are compared in the pattern against the
frame.  If the bit in the mask is set then the corresponding bit in
the pattern is tested.  If the bit is zero, then the corresponding
bit is ignored.  The match field causes the trigger to be fired on
either a matching pattern (if match=1) or a non-matching pattern
(if match=0).

ATM-2 Trigger Parameters
Trigger 1 - Per Connection
Trigger 2 - Global
```

```
typedef struct tagATMTrigger
{
/* Trigger control */
unsigned char      ucEnable;         /* Enable/Disable triggers   */
unsigned char      ucMode;            /*   Cell or frame level      */
unsigned char      ucDirection;      /* Transmit or receive      */
unsigned char      ucCompCombo;      /* One of ATM_COMP values   */
unsigned char      ucHeaderNoMatch;   /* Event is a non match of  header   */
unsigned char      ucComp1NoMatch;   /* Event is non match of Comp 1      */
unsigned char      ucComp2NoMatch;   /* Event is non match of Comp 2      */

/* Cell header comparator parameters */
unsigned long      ulHeaderPattern;   /* GFC/VPI/VCI/PT/CLP pattern   */
unsigned long      ulHeaderMask;      /* Bit Mask where 1=test, 0=ignore   */

/* Data comparator parameters */
unsigned short      uiComp1Offset;      /*Offset into frame for pattern test*/
unsigned short      uiComp1Range;      /* Number of bytes to test            */
unsigned char      ucComp1Pattern[6];   /* Pattern to match               */
unsigned char      ucComp1Mask[6];   /* Bit mask for pattern               */

unsigned short      uiComp2Offset;      /*Offset into frame for pattern test*/
unsigned short      uiComp2Range;      /* Number of bytes to test            */
unsigned char      ucComp2Pattern[6];   /* Pattern to match               */
unsigned char      ucComp2Mask[6];   /* Bit mask for pattern               */
} ATMTrigger;   /*   TRIGGER_PARAMS; */
```

Comment

iType1	ATM_UNI
Description	Set UNI timers and version
Usage	int HTSetStructure(ATM_UNI, 0, 0, 0, (void*)pATMUNIParams, sizeof(ATMUNIParams), iHub, iSlot, iPort) ;
Related Structure	ATMUNIParams

```
UNI SIGNALING PARAMS (See ATM Forum UNI 3.X specification for more
info).
```

```
typedef struct tagATMUNIParams
{
unsigned long   ulVer;

unsigned long   ulTmrT303;
unsigned long   ulTmrT308;
unsigned long   ulTmrT310;
unsigned long   ulTmrT313;
unsigned long   ulTmrT322;

unsigned long   ulTmrT398;
unsigned long   ulTmrT399;
unsigned long   ulTmrT309;
unsigned long   ulTmrT316;
unsigned long   ulTmrT317;
unsigned long  ulTmrTeardown;
} ATMUNIParams;
```

Comment

ATM - HTGetStructure

iType1	ATM_AAL5_INFO
Description	Get the AAL5 layer counts
Usage	int HTGetStructure(ATM_AAL5_INFO, 0, 0, 0, (void*)pATMAAL5LayerInfo, sizeof(ATMAAL5LayerInfo), iHub, iSlot, iPort) ;
Related Structure	ATMAAL5LayerInfo

```
The ATMAAL5LayerInfo structure returns all of the counts and rates
associated with the AAL5 layer.
```

```
typedef struct tagATMAAL5LayerInfo
{
unsigned long   ulTimeStamp;      /* Time when the statistics were latched */
unsigned long   ulTxCell;
unsigned long   ulTxFrame;

unsigned long   ulRxCell;
unsigned long   ulRxFrame;
unsigned long   ulRxCRC32Errors;   /* ATM-2 platform only   */
unsigned long   ulRxLengthErrors;   /* ATM-2 platform only   */
} ATMAAL5LayerInfo;
```

Comment

iType1	ATM_CARD_CAPABILITY
Description	Get card-specific limits
Usage	int HTGetStructure(ATM_CARD_CAPABILITY, 0, 0, 0, (void*)pATMCardCapabilities, sizeof(ATMCardCapabilities), iHub, iSlot, iPort) ;

Related Structure ATMCardCapabilities

```
Specific card capabilities are returned in this structure.  This information
can be used to execute code without concern for the specific card model.  It
can also be used, in addition to ATMCardType, to determine the specific card
model revision.
```

```
typedef struct tagATMCardCapabilities
{
unsigned long   ulLineCellRate;         /* Max rate in cells/sec      */
unsigned short   uiMaxStream;            /* Max number of streams      */
unsigned short   uiMaxConnection;         /* Max number of connections   */
unsigned short   uiMaxCalls;              /* Max number of active SVCs   */
unsigned short   uiMaxHostTxBuffer;      /* reserved                    */
unsigned short   uiMaxHostRxBuffer;      /* reserved                    */

unsigned short   uiMaxLaneClients;
unsigned short   uiMaxVPIBits;
unsigned short   uiMaxVCIBits;
unsigned short  uiSupportedFeatures;   /* Use one of the following defined below */
unsigned short  uiMaxRateWithTeardown;
unsigned short  uiMaxRateWithoutTeardown;
/* ushort   uiReserved[3];*/
} ATMCardCapabilities;
```

Comment

iType1	ATM_CARD_INFO
Description	Query card for firmware version
Usage	int HTGetStructure(ATM_CARD_INFO, 0, 0, 0, (void*)pATMCardInfo, sizeof(ATMCardInfo), iHub, iSlot, iPort) ;

Related Structure ATMCardInfo

```
This structure will return the revision information associated with
the firmware, and diagnostic and identification information
associated with the hardware.
The format for the main firmware version, iMainFwVersion, is as follows:

Bit 15:         General release flag: Set: Released, Unset: Beta
Bits 0-14:      Versioning information
Major release:  (ushort & 0x7FFF /100)%10
Minor release:  (ushort & 0x7FFF)%100
Build:          (ushort/1000)&0x1F;

The format for all other version/revision information is:
Major release:  ushort/100
Minor release:  ushort%100

There are no build numbers or release bits associated with these
files.
```

```
typedef struct tagATMCardInfo
{
unsigned short   uiMainFwVersion;      /*Card firmware version*/
unsigned short   uiSarBootFwVersion;
unsigned short   uiSarMainFwVersion;
unsigned short   uiPciFpgaVersion;
unsigned short   uiGapFpgaVersion;
unsigned short   uiBptrgFpgaVersion;

unsigned short   uiAm29240Revision;   /* ATM-1 ONLY   */
unsigned short   uiBt8222Revision;      /* ATM-1 ONLY   */
unsigned short   uiL64363Revision;      /* ATM-1 ONLY   */

unsigned short   uiImageCheck;
unsigned short   uiDiagFlags;
unsigned short   uiProductCode;
} ATMCardInfo;
```

Comment

```
To get the major and minor release values from iMainFwVersion, you must
do a bitwise AND with 7FFF. This removes the most significant bit
the General Release Flag) so that you can interpret the value.
```

iType1	ATM_CARD_TYPE
Description	Get card rate (model number)
Usage	int HTGetStructure(ATM_CARD_TYPE, 0, 0, 0, (void*)pATMCardType, sizeof(ATMCardType), iHub, iSlot, iPort) ;

Related Structure ATMCardType

This structure contains the specified card rate. Use this number to determine the ATM card model.

```
typedef struct tagATMCardType
{
unsigned short uiProductCode;
unsigned short uiReserved[15];
} ATMCardType;
```

Comment

```
Possible values for uiProductCode:
AT9622_PRODUCT_CODE   9622
AT9155_PRODUCT_CODE   9155
AT9045_PRODUCT_CODE   9045
AT9034_PRODUCT_CODE   9034
AT9025_PRODUCT_CODE   9025
AT9020_PRODUCT_CODE   9020
AT9015_PRODUCT_CODE   9015
UNSPEC_PRODUCT_CODE   9000
```

iType1	ATM_CLASSICAL_IP_INFO
Description	CLIP counts and ARP status
Usage	int HTGetStructure(ATM_CLASSICAL_IP_INFO, 0, 0, 0, (void*)pATMClassicalIPInfo, sizeof(ATMClassicalIPInfo), iHub, iSlot, iPort) ;

Related Structure ATMClassicalIPInfo

```
typedef struct tagATMClassicalIPInfo
{
/* ARP server SVC state */
unsigned char   ucSvcCallState;
unsigned char   ucSvcCauseLoc;
unsigned char   ucSvcCauseCode;

unsigned char   ucReserved;

/* Packet counters */
unsigned short   uiArpRequestPackets;
unsigned short   uiArpResponsePackets;
unsigned short   uiInarpRequestPackets;
unsigned short   uiInarpResponsePackets;
} ATMClassicalIPInfo;         /* RFC1577_STATUS; */
```

Comment

iType1	ATM_CONN_64_INFO
Description	Get 64-bits status of one or many conn
Usage	int HTGetStructure(ATM_CONN_64_INFO, <index>, <count>, 0, (void*)pATMConnection64Info, sizeof(ATMConnection64Info), iHub, iSlot, iPort) ;
Related Structure	ATMConnection64Info

```
ATMConnectionInfo summary structure returns the connection
statistics(64-bits) associated with SmartSignaling for all of the connections
in the range requested.
```

```
typedef struct tagATMConnection64Info
{
unsigned long   ulIndex;
unsigned long   ulCount;
ATMConnection64Status status[ATM_MAX_ARRAY_DIM_512];
} ATMConnection64Info;
```

Comment

iType1	ATM_CONN_64_INFO_SUMMARY
Description	Get 64-bits summary results of sigtest
Usage	int HTGetStructure(ATM_CONN_64_INFO_SUMMARY, <index>, <count>, 0, (void*)pATMConnection64InfoSummary, sizeof(ATMConnection64InfoSummary), iHub, iSlot, iPort) ;
Related Structure	ATMConnection64InfoSummary

```
typedef struct tagATMConnection64InfoSummary
{
unsigned long   ulIndex;
unsigned long   ulCount;

unsigned long   ulCallsAttempted;
unsigned long   ulCallsEstablished;
unsigned long   ulCallsFailed;
unsigned long   ulCallsReleasedInError;
unsigned long   ulCallsActive;

U64            ullMinRTSetupLatency;
U64            ullMaxRTSetupLatency;
U64            ullTotRTSetupLatency;
U64            ullMinTeardownAckLatency;
U64            ullMaxTeardownAckLatency;
U64            ullTotTeardownAckLatency;
U64            ullTestDuration;
unsigned long   ulFirstFailedIndex;
unsigned long   ulFirstActiveFailedIndex;
} ATMConnection64InfoSummary;
```

Comment

iType1	ATM_CONN_INFO
Description	Get status of one or many conn
Usage	int HTGetStructure(ATM_CONN_INFO, <index>, <count>, 0, (void*)pATMConnectionInfo, sizeof(ATMConnectionInfo), iHub, iSlot, iPort) ;
Related Structure	ATMConnectionInfo

```
ATMConnectionInfo summary structure returns the connection
statistics associated with SmartSignaling for all of the connections
in the range requested.
```

```
typedef struct tagATMConnectionInfo
{
unsigned long   ulIndex;
unsigned long   ulCount;
ATMConnectionStatus status[ATM_MAX_ARRAY_DIM_512];
} ATMConnectionInfo;
```

Comment

iType1	ATM_CONN_INFO_SUMMARY
Description	Get summary results of sigtest
Usage	int HTGetStructure(ATM_CONN_INFO_SUMMARY, <index>, <count>, 0, (void*)pATMConnectionInfoSummary, sizeof(ATMConnectionInfoSummary), iHub, iSlot, iPort) ;
Related Structure	ATMConnectionInfoSummary

```
typedef struct tagATMConnectionInfoSummary
{
unsigned long   ulIndex;
unsigned long   ulCount;

unsigned long   ulCallsAttempted;
unsigned long   ulCallsEstablished;
unsigned long   ulCallsFailed;
unsigned long   ulCallsReleasedInError;
unsigned long   ulCallsActive;

unsigned long   ulMinRTSetupLatency;
unsigned long   ulMaxRTSetupLatency;
unsigned long   ulTotRTSetupLatency;
unsigned long   ulMinTeardownAckLatency;
unsigned long   ulMaxTeardownAckLatency;
unsigned long   ulTotTeardownAckLatency;
unsigned long   ulTestDuration;
unsigned long   ulFirstFailedIndex;
} ATMConnectionInfoSummary;
```

Comment

iType1	ATM_CONN_TRIGGER_INFO
Description	Get per conn trigger counts
Usage	int HTGetStructure(ATM_CONN_TRIGGER_INFO, <index>, <count>, 0, (void*)pATMConnTriggerInfo, sizeof(ATMConnTriggerInfo), iHub, iSlot, iPort) ;
Related Structure	ATMConnTriggerInfo

```
ATMConnTriggerInfo records transmit and receive trigger counts on a
range of virtual circuit connections.

typedef struct tagATMConnTriggerInfo
{
unsigned short   uiStartConnIndex;
unsigned short   uiConnCount;
ATMConnTriggerStatus status[ATM_MAX_ARRAY_DIM+2]; /* index 0&1 are reserved */
} ATMConnTriggerInfo;
```

Comment

iType1	ATM_DS1_E1_LINE_INFO
Description	Get the DS1/E1 alarms and counts
Usage	int HTGetStructure(ATM_DS1_E1_LINE_INFO, 0, 0, 0, (void*)pATMDS1E1LineInfo, sizeof(ATMDS1E1LineInfo), iHub, iSlot, iPort) ;
Related Structure	ATMDS1E1LineInfo

```
This structure defines the statistics returned by the AT-9015 and
AT-9020 cards. TBD -

typedef struct tagATMDS1E1LineInfo
{
unsigned short   uiAlarmCurrent;
unsigned short   uiAlarmHistory;

unsigned long      ulCodeViolationCount;
unsigned long      ulFrameErrorCount;
unsigned long      ulSyncErrorCount;
unsigned long      ulFebeErrorCount;
unsigned long      ulPlcpOofErrorCount;
unsigned long      ulPlcpFrameErrorCount;
unsigned long      ulPlcpBipErrorCount;
unsigned long      ulPlcpFebeErrorCount;

unsigned long      ulCodeViolationRate;
unsigned long      ulFrameErrorRate;
unsigned long      ulSyncErrorRate;
unsigned long      ulFebeErrorRate;
unsigned long      ulPlcpOofErrorRate;
unsigned long      ulPlcpFrameErrorRate;
unsigned long      ulPlcpBipErrorRate;
unsigned long      ulPlcpFebeErrorRate;
} ATMDS1E1LineInfo;
```

Comment

iType1	ATM_DS3_E3_LINE_INFO
Description	Get the DS3/E3 alarms and counts
Usage	int HTGetStructure(ATM_DS3_E3_LINE_INFO, 0, 0, 0, (void*)pATMDS3E3LineInfo, sizeof(ATMDS3E3LineInfo), iHub, iSlot, iPort) ;

Related Structure ATMDS3E3LineInfo

```
This structure defines the statistics returned by the AT-9034 and
AT-9045 cards.

typedef struct tagATMDS3E3LineInfo
{
unsigned short   uiAlarmCurrent;
unsigned short   uiAlarmHistory;

unsigned long      ulCodeViolationCount;
unsigned long      ulFrameErrorCount;
unsigned long      ulParityErrorCount;
unsigned long      ulCParityErrorCount;
unsigned long      ulFebeErrorCount;
unsigned long      ulFerfErrorCount;
unsigned long      ulPlcpFrameErrorCount;
unsigned long      ulPlcpBipErrorCount;
unsigned long      ulPlcpFebeErrorCount;

unsigned long      ulCodeViolationRate;
unsigned long      ulFrameErrorRate;
unsigned long      ulParityErrorRate;
unsigned long      ulCParityErrorRate;
unsigned long      ulFebeErrorRate;
unsigned long      ulFerfErrorRate;
unsigned long      ulPlcpFrameErrorRate;
unsigned long      ulPlcpBipErrorRate;
unsigned long      ulPlcpFebeErrorRate;
} ATMDS3E3LineInfo;
```

Comment

iType1	ATM_ELAN_INFO
Description	Get the ELAN status
Usage	int HTGetStructure(ATM_ELAN_INFO, <index>, 0, 0, (void*)pATMELANInfo, sizeof(ATMELANInfo), iHub, iSlot, iPort) ;

Related Structure ATMELANInfo

```
typedef struct tagATMELANInfo
{
unsigned char   ucInstance;
unsigned char   ucState;

unsigned char   ucC2Type;
unsigned char   ucC3MTU;
unsigned char   ucC5Name[ATM_MAX_ELAN_NAME];
unsigned short   uiC14LecIndex;

unsigned short   uiCtrlDirectConnIndex;
unsigned short   uiCtrlDistConnIndex;
unsigned short   uiMcastSendConnIndex;
unsigned short   uiMcastFwdConnIndex;

ATMAddress      LesAtmAddr;
ATMAddress      BusAtmAddr;
} ATMELANInfo;
```

Comment

iType1	ATM_ILMI_INFO
Description	Get the ILMI status and counts
Usage	int HTGetStructure(ATM_ILMI_INFO, 0, 0, 0, (void*)pATMILMIInfo, sizeof(ATMILMIInfo), iHub, iSlot, iPort) ;

Related Structure ATMILMIInfo

```
typedef struct tagATMILMIInfo
{
unsigned char   ucState;

unsigned short   uiColdStarts;
unsigned short   uiGoodPackets;
unsigned short   uiBadPackets;
unsigned short   uiSentPackets;

ATMAddress      RegAddr;
} ATMILMIInfo;
```

Comment

iType1	ATM_LAYER_INFO
Description	Get the ATM layer counts
Usage	int HTGetStructure(ATM_LAYER_INFO, 0, 0, 0, (void*)pATMLayerInfo, sizeof(ATMLayerInfo), iHub, iSlot, iPort) ;

Related Structure ATMLayerInfo

```
The ATMLayerInfo structure returns all of the counts and rates
associated with the ATM layer.

typedef struct tagATMLayerInfo
{
U64            ullTxCell;
unsigned long   ulTxCellRate;

U64            ullRxCell;
unsigned long   ulRxCellRate;
U64            ullRxHecCorrErrors;
unsigned long   ulRxHecCorrErrorsRate;
U64            ullRxHecUncorrErrors;
unsigned long   ulRxHecUncorrErrorsRate;
} ATMLayerInfo;
```

Comment

iType1	ATM_SAAL_INFO
Description	Get the SAAL status
Usage	int HTGetStructure(ATM_SAAL_INFO, 0, 0, 0, (void*)pATMSAALInfo, sizeof(ATMSAALInfo), iHub, iSlot, iPort) ;

Related Structure ATMSAALInfo

```
typedef struct tagATMSAALInfo
{
unsigned char   ucSscopState;
unsigned char   ucSaalState;

unsigned long   ulVtSendState;   /*ITU-T Recommendation Q.2110 p17 (pp16-22) */
unsigned long   ulVtPollSend;
unsigned long   ulVtMaxSend;
unsigned long   ulVtPollData;

unsigned long   ulVrRxState;
unsigned long   ulVrHighestExpected;
unsigned long   ulVrMaxReceive;
} ATMSAALInfo;
```

Comment

iType1	ATM_SIG_EMUL_INFO
Description	Get the signaling emulator stats
Usage	int HTGetStructure(ATM_SIG_EMUL_INFO, 0, 0, 0, (void*)pATMSigEmulatorInfo, sizeof(ATMSigEmulatorInfo), iHub, iSlot, iPort) ;
Related Structure	ATMSigEmulatorInfo

```
typedef struct tagATMSigEmulatorInfo
{
unsigned long   ulCallsHandled;
unsigned long   ulCallsProgressing;
unsigned long   ulCallsActive;
} ATMSigEmulatorInfo;
```

Comment

iType1	ATM_SONET_INFO
Description	Get the SONET alarms and counts
Usage	int HTGetStructure(ATM_SONET_INFO, 0, 0, 0, (void*)pATMSonetLineInfo, sizeof(ATMSonetLineInfo), iHub, iSlot, iPort) ;
Related Structure	ATMSonetLineInfo

```
This structure defines the statistics returned by the AT-9025 and
AT-9155 cards.
```

```
typedef struct tagATMSonetLineInfo
{
/* Alarm conditions   */
unsigned short   uiAlarmCurrent;   /* All alarms currently active         */
unsigned short   uiAlarmHistory;   /* All alarms since last counter clear   */

/* Error counts since last counter clear   */
unsigned long   ulSectionBip8;      /* Section Bit Interleaved Parity      */
unsigned long   ulLineBip24;      /* Line Bit Interleaved Parity         */
unsigned long   ulLineFebe;         /* Line Far End Block Error            */
unsigned long   ulPathBip8;         /* Path Bit Interleaved Parity         */
unsigned long   ulPathFebe;         /* Path Far End Block Error            */

/* Current error rates in events per second   */
unsigned short   uiSectionBip8Rate;
unsigned short   uiLineBip24Rate;
unsigned short   uiLineFebeRate;
unsigned short   uiPathBip8Rate;
unsigned short   uiPathFebeRate;
} ATMSonetLineInfo;
```

Comment

iType1	ATM_STREAM_DETAIL_INFO
Description	Get status of one or many streams
Usage	int HTGetStructure(ATM_STREAM_DETAIL_INFO, <index>, <count>, 0, (void*)pATMStreamDetailedInfo, sizeof(ATMStreamDetailedInfo), iHub, iSlot, iPort) ;
Related Structure	ATMStreamDetailedInfo

```
ATMStreamDetailed info allows the user to get a range of indices
for detailed status.
```

```
typedef struct tagATMStreamDetailedInfo
{
unsigned short            uiStartIndex;
unsigned short            uiCount;
ATMStreamDetailedStatus status[ATM_MAX_ARRAY_DIM];
} ATMStreamDetailedInfo;
```

Comment

iType1	ATM_STREAM_SEARCH_INFO
Description	Return info for matching streams
Usage	int HTGetStructure(ATM_STREAM_SEARCH_INFO, 0, 0, 0, (void*)pATMStreamSearchInfo, sizeof(ATMStreamSearchInfo), iHub, iSlot, iPort) ;
Related Structure	ATMStreamSearchInfo

```
typedef struct tagATMStreamSearchInfo
{
unsigned short   uiStartIndex;
unsigned short   uiCount;
unsigned short   uiReturnItemId;
/*   unsigned short   uiReturnItemSize; */
unsigned long   ulItem[1024];
} ATMStreamSearchInfo;              /* STREAM_SEARCH_HDR; */
```

Comment

iType1	ATM_TRIGGER_INFO
Description	ATM-1:Get trigger count and time
Usage	int HTGetStructure(ATM_TRIGGER_INFO, 0, 0, 0, (void*)pATMTriggerInfo, sizeof(ATMTriggerInfo), iHub, iSlot, iPort) ;
Related Structure	ATMTriggerInfo

```
The ATMTriggerInfo structure contains the time of the firing of the
first trigger since the last clear counters and the number of
trigger fires since the last clear counters. Used with ATM-1 only.
```

```
typedef struct tagATMTriggerInfo
{
unsigned long   ulTrigger;   /* Trigger event counter         */
unsigned long   ulLatency;   /* Latency until first trigger fired   */
} ATMTriggerInfo;         /* TRIGGER_STATS; */
```

Comment

iType1	ATM_VCC_INFO
Description	Get per VCC counts
Usage	int HTGetStructure(ATM_VCC_INFO, <index>, <count>, 0, (void*)pATMVCCInfo, sizeof(ATMVCCInfo), iHub, iSlot, iPort) ;
Related Structure	ATMVCCInfo

```
ATMVCCInfo records transmit and receive counts on a range of virtual
circuit connections.
```

```
typedef struct tagATMVCCInfo
{
unsigned short   uiIndex;
unsigned short   uiCount;
ATMVCCIStatus   status[ATM_MAX_ARRAY_DIM+2]; /* index 0 and 1 are reserved */
} ATMVCCInfo;      /* VCC_STATS_HDR; */
```

Comment

iType1	ATM_VCDB_LIST_INFO
Description	Get the VC DataBase info
Usage	int HTGetStructure(ATM_VCDB_LIST_INFO, <index>, <count>, 0, (void*)pATMVCDBInfo, sizeof(ATMVCDBInfo), iHub, iSlot, iPort) ;
Related Structure	ATMVCDBInfo

```
typedef struct      tagATMVCDBInfo
{
unsigned long      ulStartEntryNum;  /* Starting index */
unsigned char      ucEntryState;      /* Of the state that we want to retrieve */
unsigned char      ucReserved[3];
unsigned long      ulEntryCount;       /* Number of entries to retrieves */
ATMVCDBEntryRtvl  status[ATM_MAX_ARRAY_DIM_512];
}   ATMVCDBInfo;
```

Comment

ATM - HTSetCommand

iType1	ATM_CLIP_ESTABLISH_CLIENT
Description	
Usage	int HTSetCommand(ATM_CLIP_ESTABLISH_CLIENT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ATM_CLIP_RELEASE_CLIENT
Description	
Usage	int HTSetCommand(ATM_CLIP_RELEASE_CLIENT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ATM_CONN_PARAMS_COMPLETE
Description	Reset the signaling test
Usage	int HTSetCommand(ATM_CONN_PARAMS_COMPLETE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ATM_CONN_PARAMS_RESET
Description	Reset the signaling test conns
Usage	int HTSetCommand(ATM_CONN_PARAMS_RESET, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_FRAME_CLEAR
Description	De-allocates the "Source" Frame stored in memory
Usage	int HTSetCommand(ATM_FRAME_CLEAR, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_ILMI_DEREGISTER
Description	Deregister an ATM address
Usage	int HTSetCommand(ATM_ILMI_DEREGISTER, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_ILMI_REGISTER
Description	Register an ATM address
Usage	int HTSetCommand(ATM_ILMI_REGISTER, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_SAAL_ESTABLISH
Description	Establish the SAAL at interface
Usage	int HTSetCommand(ATM_SAAL_ESTABLISH, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_SAAL_RELEASE
Description	Release the SAAL at interface
Usage	int HTSetCommand(ATM_SAAL_RELEASE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_SIG_EMUL_RESET
Description	Release all calls from Emulator
Usage	int HTSetCommand(ATM_SIG_EMUL_RESET, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	ATM_START_SETUP
Description	Start a signaling test
Usage	int HTSetCommand(ATM_START_SETUP, <index>, <count>, 0, (void*)pATMStartCardSetupParams, iHub, iSlot, iPort) ;
Related Structure	ATMStartCardSetupParams

The following structure may be used to begin the signaling test on a few of the connections already established on the card. The user can use this structure to start a signaling test using a specific range of connections. Another way to start the test is to use the Start or Group Start feature which starts all configured connections.

```
typedef struct tagATMStartCardSetupParams
{
unsigned long      ulConnIndex;/* The first index for the test         */
unsigned long      ulCount;      /* The subsequent indices for the test   */
} ATMStartCardSetupParams;
```

Comment

iType1	ATM_STOP_SETUP
Description	Stop a signaling test
Usage	int HTSetCommand(ATM_STOP_SETUP, <index>, <count>, 0, (void*)pATMStopCardSetupParams, iHub, iSlot, iPort) ;

Related Structure ATMStopCardSetupParams

```
The following structure may be used to stop the signaling test on a
few of the connections already established on the card.  Another way
to stop the test is to use the Stop or Group Stop feature which
starts all configured connections.  The ucStopNewCalls will prevent
any more additional calls from being initiated while the test is
being stopped, and the ucTeardownCalls will not only stop new calls,
but tear down the existing calls as well.

typedef struct tagATMStopCardSetupParams
{
unsigned long      ulConnIndex;   /* First index to stop         */
unsigned long      ulCount;         /* Subsequent indices to stop   */

unsigned char      ucStopNewCalls;      /* Stop new outgoing calls      */
unsigned char      ucStopCellLoadGen;   /* Set to 1                     */
unsigned char      ucTeardownCalls;      /* Stop and teardown the calls*/
} ATMStopCardSetupParams;
```

Comment

Chapter 4:
10/100 MB Ethernet

This new set of Message Function paramaters is for 10 MB and 100 MB Ethernet SmartCards. These same actions can also be acheived using the Original commands of the User Guide. The ETH_ paramaters and structures can be used with this group of SmartCards:

ST-6405, ST-6410, SX-7210, SX-7410, and the ML-7710.

The exceptions are paramaters affecting MII registers which can not be used with ST-6405 and ST-6410 SmartCards. These iType1paramaters include:

ETH_WRITE_MII

ETH_FIND_MII_INFO

ETH_READ_MII_INFO

ETH - HTSetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
ETH_COLLISION	0	0	0	ETHCollision	setup collision mode
ETH_FILL_PATTERN	0	0	0	UChar	set background pattern, using an array of unsigned chars
ETH_LATENCY	0	0	0	ETHLatency	setup latency test parameters
ETH_TRANSMIT	0	0	0	ETHTransmit	setup transmit parameters
ETH_TRIGGER	0	0	0	ETHTrigger	setup triggers
ETH_WRITE_MII	0	0	0	ETHMII	write to a MII Address/Register

ETH - HTGetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
ETH_CARD_INFO	0	0	0	ETHCardInfo	get information about a card
ETH_COUNTER_INFO	0	0	0	ETHCounterInfo	get counters
ETH_ENHANCED_COUNTER_INFO	0	0	0	ETHEnhancedCounterInfo	get additional counters
ETH_ENHANCED_STATUS_INFO	0	0	0	ETHEnhancedStatusInfo	get status information
ETH_FIND_MII_ADDR_INFO	0	0	0	ETHMIIInfo	find first MII PHY address with a legal device
ETH_LATENCY_INFO	0	0	0	ETHLatencyInfo	get latency measurement report
ETH_READ_MII_INFO	0	0	0	ETHMIIInfo	read a specific MII address/reg; iType2 = PHY Address iType3 = Register

ETH - HTSetCommand Summary

iType1	iType2	iType3	iType4	pData	Description
ETH_CLEAR_PORT	0	0	0	0	clear counters
ETH_RESET_PORT	0	0	0	0	reset the card to a default condition; iType2 = reset type
ETH_SELECT_RECEIVE	0	0	0	0	select port for receive data
ETH_SELECT_TRANSMIT	0	0	0	0	select port for transmit data iType2 = transmission mode

ETH - HTSetStructure

iType1	ETH_COLLISION
Description	setup collision mode
Usage	int HTSetStructure(ETH_COLLISION, 0, 0, 0, (void*)pETHCollision, sizeof(ETHCollision), iHub, iSlot, iPort) ;
Related Structure	ETHCollision

```
This structure sets up the collision mode for an ethernet card.  The
following constants have been defined:

   uiMode:   COLLISION_OFF      -- collision off
             COLLISION_LONG     -- long collision
             COLLISION_ADJ      -- adjustable collision
             CORP_A             -- collision on receive packet, Port A
             CORP_B             -- collision on receive packet, Port B

*************************************************************************
typedef struct tagETHCollision
{
unsigned int uiOffset;      /* offset in bits where collision will take place */
unsigned int uiDuration;   /* duration in bits of the collision */
unsigned int uiCount;      /* specifies the number of consecutive collisions,
up to 1024; 0 = continuous collisions */
unsigned int uiMode;      /* collision mode, see values above */
} ETHCollision;
```

Comment

iType1	ETH_FILL_PATTERN
Description	set background pattern, using an array of unsigned chars
Usage	int HTSetStructure(ETH_FILL_PATTERN, 0, 0, 0, (void*)pUChar, sizeof(UChar), iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ETH_LATENCY
Description	setup latency test parameters
Usage	int HTSetStructure(ETH_LATENCY, 0, 0, 0, (void*)pETHLatency, sizeof(ETHLatency), iHub, iSlot, iPort) ;
Related Structure	ETHLatency

```
This structure sets up an ethernet card for latency measurements.
*****************************************************************************
typedef struct tagETHLatency
{
unsigned short   uiMode;         /* latency mode:
HT_LATENCY_OFF      -- remove the card from latency measurements
HT_LATENCY_RX      -- set the card as a latency receiver
HT_LATENCY_RXTX   -- set the card as a latency receiver and a
latency transmitter
HT_LATENCY_TX      -- set the card as a latency transmitter */
unsigned short    uiRange;         /*   size of the pattern, in bytes */
unsigned short   uiOffset;      /* offset of the pattern, in bits */
unsigned char      ucPattern[12];   /* data pattern that will stop the latency
counter */
} ETHLatency;
```

Comment

iType1	ETH_TRANSMIT
Description	setup transmit parameters
Usage	int HTSetStructure(ETH_TRANSMIT, 0, 0, 0, (void*)pETHTransmit, sizeof(ETHTransmit), iHub, iSlot, iPort) ;
Related Structure	ETHTransmit

```
This structure sets all the basic transmit parameters.  Some of the fields
have constants defined for possible values.
*****************************************************************************
```

```
typedef struct tagETHTransmit
{
unsigned char      ucTransmitMode;      /* transmit mode:
CONTINUOUS_PACKET_MODE
SINGLE_BURST_MODE
MULTI_BURST_MODE
CONTINUOUS_BURST_MODE
ECHO_MODE */
unsigned short   uiDataLength;        /* number of bytes per frame, not
including 4 byte CRC */

unsigned char      ucDuplexMode;         /* duplex mode:
FULLDUPLEX_MODE
HALFDUPLEX_MODE */
unsigned char      ucSpeed;               /* set card speed:
SPEED_10MHZ
SPEED_100MHZ
SPEED_4MHZ
SPEED_16MHZ */
unsigned short   uiCollisionBackoffAggressiveness;   /* wait factor for
backing off from multiple collisions;
uses powers of 2 with this factor */

unsigned long      ulBurstCount;         /* number of frames per burst */
unsigned long      ulMultiBurstCount;   /* number of bursts in multi-burst */

unsigned long      ulInterFrameGap;      /* length of gap between frames;
0 = random gap */
unsigned short   uiInterFrameGapScale;/* units for ulInterFrameGap:
NANO_SCALE
MICRO_SCALE
MILLI_SCALE
0 = bit times */
unsigned long      ulInterBurstGap;      /* length of gap between bursts */
unsigned short   uiInterBurstGapScale;   /* units for ulInterBurstGap, using
values above; 0 = bit times */

unsigned char      ucRandomBackground;   /* 1 = enable, 0 = disable */
unsigned char      ucRandomLength;      /* 1 = enable, 0 = disable */

unsigned char      ucCRCErrors;         /* 1 = enable, 0 = disable */
unsigned char      ucAlignErrors;         /* 1 = enable, 0 = disable */
unsigned char    ucSymbolErrors;      /* 1 = enable, 0 = disable */
unsigned short   uiDribbleBits;       /* number of dribble bits to transmit,
valid from 0 - 7 */

unsigned char      ucVFD1Mode;            /* VFD1 mode:
HVFD_NONE
HVFD_RANDOM
HVFD_INCR
HVFD_DECR
HVFD_STATIC */
unsigned short   uiVFD1Offset;         /* offset in bits */
short            iVFD1Range;            /* size of VFD1 pattern, in bytes,
6 bytes maximum;  negative value
signifies bit size field */
unsigned char      ucVFD1Pattern[6];      /* VFD1 pattern */
unsigned short   uiVFD1CycleCount;      /*   if mode is increment or decrement,
specifies the number of patterns to
generate before repeating */

unsigned short   uiVFD1BlockCount;    /* no. of VFD1 pattern repeats
before next pattern: 1=default*/
/* Only supported by SX-7410  */
```

```
unsigned char      ucVFD2Mode;            /* VFD2 mode, see values above */
unsigned short   uiVFD2Offset;         /* offset in bits */
short            iVFD2Range;            /* size of VFD2 pattern, in bytes,
6 bytes maximum;  negative value
signifies bit size field */
unsigned char      ucVFD2Pattern[6];      /* VFD2 pattern */
unsigned short    uiVFD2CycleCount;      /*   if mode is increment or decrement,
specifies the number of patterns to
generate before repeating */

unsigned short   uiVFD2BlockCount;    /* no. of VFD2 pattern repeats
before next pattern: 1=default*/
/* Only supported by SX-7410  */


unsigned char      ucVFD3Mode;            /* VFD3 mode:
HVFD_NONE
HVFD_ENABLED */
unsigned short   uiVFD3Offset;        /* offset in bits */
unsigned short   uiVFD3Range;           /* size of one VFD3 pattern, in bytes,
up to 2044 byts maximum */
unsigned short   uiVFD3DataCount;      /* size of total VFD3 buffer */

unsigned short   uiVFD3BlockCount;    /* no. of VFD3 pattern repeats
before next pattern: 1=default*/
/* Only supported by SX-7410  */

unsigned char      ucVFD3Buffer[2044];   /* VFD3 data */



unsigned char      ucReserved[64];
} ETHTransmit;
```

Comment

iType1	ETH_TRIGGER
Description	setup triggers
Usage	int HTSetStructure(ETH_TRIGGER, 0, 0, 0, (void*)pETHTrigger, sizeof(ETHTrigger), iHub, iSlot, iPort) ;
Related Structure	ETHTrigger

```
This structure sets up the triggers for an ethernet card.
*********************************************************************
typedef struct tagETHTrigger
{
unsigned char      ucTriggerMode;            /* use ETH_TRIGGER_XXX defines */

unsigned short   uiTrigger1Offset;       /* offset of the trigger pattern,
in bits */
unsigned short   uiTrigger1Range;         /* size of the trigger pattern,
in bytes */
unsigned char      ucTrigger1Pattern[6];   /* pattern for trigger 1 */

unsigned short   uiTrigger2Offset;         /* offset of the trigger pattern,
in bits */
unsigned short   uiTrigger2Range;         /* size of the trigger pattern,
in bytes */
unsigned char      ucTrigger2Pattern[6];   /* pattern for trigger 2 */
} ETHTrigger;
```

Comment

iType1	ETH_WRITE_MII
Description	write to a MII Address/Register
Usage	int HTSetStructure(ETH_WRITE_MII, 0, 0, 0, (void*)pETHMII, sizeof(ETHMII), iHub, iSlot, iPort) ;
Related Structure	ETHMII

```
This structure sets an MII Address/Register for an ethernet card.
*********************************************************************
typedef struct tagETHMII
{
unsigned short   uiAddress;   /*   specific address */
unsigned short   uiRegister;   /* specific register */
unsigned short   uiValue;      /* bit values to write to address/register */
} ETHMII;
```

Comment

ETH - HTGetStructure

iType1	ETH_CARD_INFO
Description	get information about a card
Usage	int HTGetStructure(ETH_CARD_INFO, 0, 0, 0, (void*)pETHCardInfo, sizeof(ETHCardInfo), iHub, iSlot, iPort) ;
Related Structure	ETHCardInfo

```
This structure returns information about an ethernet card.
*********************************************************************
typedef struct tagETHCardInfo
{
unsigned short   uiCardModel;      /* card model:
CM_UNKOWN, CM_NOT_PRESENT,
CM_SE_6205, CM_SC_6305,   CM_ST_6405,   CM_ST_6410,
CM_SX_7205, CM_SX_7405,   CM_SX_7410,   CM_TR_8405,
CM_VG_7605,   CM_L3_6705,   CM_AT_9025,   CM_AT_9155,
CM_AS_9155,   CM_GX_1405,   CM_WN_3405,   CM_AT_9015,
CM_AT_9020,   CM_AT_9034,   CM_AT_9045,   CM_AT_9622,
CM_L3_6710,   CM_SX_7210,   CM_ML_7710 */
char               szCardModel[32];   /* card model identifier string */
char               cPortID;            /* card type character:
'A'   -- 10Mb Ethernet
'F'   -- 10/100Mb Fast Ethernet
'T'   -- 4/16Mb TokenRing
'V'   -- VG/AnyLan
'3'   -- Layer 3 10Mb Ethernet
'G'   -- Gigabit Ethernet
'S'   -- ATM Signaling
'N'   -- Not present */
unsigned short   uiPortType;         /* card type:
CT_ACTIVE, CT_PASSIVE, CT_FASTX, CT_TOKENRING,
CT_VG, CT_L3, CT_ATM, CT_GIGABIT, CT_ATM_SIGNALING,
CT_NOT_PRESENT */
unsigned long      ulPortProperties;   /* card attributes bit values:
CA_SIGNALRATE_100MB   -- 100 MB capable
CA_DUPLEX_FULL         -- Full Duplex capable
CA_DUPLEX_HALF         -- Half Duplex capable
CA_CONNECT_MII         -- MMI connector
CA_CONNECT_TP         -- Twisted Pair connector
CA_CONNECT_BNC         -- BNC connector
CA_CONNECT_AUI         -- AUI connector
CA_CAN_ROUTE         -- Routing capable
CA_VFDRESETCOUNT      -- Resets VFD1 &2 counter
CA_SIGNALRATE_4MB      -- 4 MB capable
CA_SIGNALRATE_16MB   -- 16 MB capable
CA_CAN_COLLIDE         -- Generates collisions
CA_SIGNALRATE_25MB   -- 25 MB capable
CA_SIGNALRATE_155MB   -- 155 MB capable
CA_BUILT_IN_ADDRESS   -- Has a built in address
CA_HAS_DEBUG_MONITOR   -- Allows Debug monitoring
CA_SIGNALRATE_1000MB   -- 1 GB capable
CA_CONNECT_FIBER        -- Fiber optic connector
CA_CAN_CAPTURE         -- Has capture capability
CA_ATM_SIGNALING      -- Performs ATM Signaling */
unsigned long      ulHWVersions[32];   /* card version information */
} ETHCardInfo;
```

Comment

iType1	ETH_COUNTER_INFO
Description	get counters
Usage	int HTGetStructure(ETH_COUNTER_INFO, 0, 0, 0, (void*)pETHCounterInfo, sizeof(ETHCounterInfo), iHub, iSlot, iPort) ;
Related Structure	ETHCounterInfo

This structure returns counter information about an ethernet card.

```
**************************************************************************
typedef struct tagETHCounterInfo
{
unsigned long   ulRxFrames;         /* number of frames received */
unsigned long   ulTxFrames;         /* number of frames transmitted */
unsigned long   ulCollisions;      /* number of collisions */
unsigned long   ulRxTriggers;      /* number of triggers received */
unsigned long   ulRxBytes;         /* number of bytes received */
unsigned long   ulCRCErrors;      /* number of CRC errors received */
unsigned long   ulAlignErrors;      /* number of alignment errors detected */
unsigned long   ulOversize;         /* number of oversize errors detected */
unsigned long   ulUndersize;      /* number of undersize errors detected */
unsigned long   ulRxFrameRate;      /* number of frames received per second */
unsigned long   ulTxFrameRate;      /* number of frames transmitted per second */
unsigned long   ulCRCErrorRate;   /* number of CRC errors received per second */
unsigned long   ulOversizeRate;   /* number of oversize errors per second */
unsigned long   ulUndersizeRate;   /* number of undersize errors per second */
unsigned long   ulCollisionErrorRate;   /* number of collisions per second */
unsigned long   ulAlignErrorRate;   /* number of alignment errors per second */
unsigned long   ulRxTriggerRate;   /* number of triggers received per second */
unsigned long   ulRxByteRate;      /* number of bytes receive per second */
} ETHCounterInfo;
```

Comment

iType1	ETH_ENHANCED_COUNTER_INFO
Description	get additional counters
Usage	int HTGetStructure(ETH_ENHANCED_COUNTER_INFO, 0, 0, 0, (void*)pETHEnhancedCounterInfo, sizeof(ETHEnhancedCounterInfo), iHub, iSlot, iPort) ;
Related Structure	ETHEnhancedCounterInfo

This structure returns additional counter information about an ethernet card.

```
**************************************************************************
typedef struct tagETHEnhancedCounterInfo
{
unsigned int   uiMode;
unsigned int   uiPortType;
unsigned long   ulMask1;
unsigned long   ulMask2;
unsigned long   ulData[64];
} ETHEnhancedCounterInfo;
```

Comment

iType1	ETH_ENHANCED_STATUS_INFO
Description	get status information
Usage	int HTGetStructure(ETH_ENHANCED_STATUS_INFO, 0, 0, 0, (void*)pETHEnhancedStatusInfo, sizeof(ETHEnhancedStatusInfo), iHub, iSlot, iPort) ;
Related Structure	ETHEnhancedStatusInfo

```
This structure returns status information about an ethernet card.
*********************************************************************
typedef struct tagETHEnhancedStatusInfo
{
unsigned long   ulStatus;   /* status bit values:
TR_STATUS_ACCESSED
TR_STATUS_BADSTREAM
TR_STATUS_BURST_MODE
TR_STATUS_BEACONING
TR_STATUS_DEVICE
TR_STATUS_EARLY_TOKEN_RELEASE
TR_STATUS_FULL_DUPLEX
TR_STATUS_16MB
TR_STATUS_RING_ALIVE
TR_STATUS_LATENCY_STABLE
TR_STATUS_TRANSMITTING
GIG_STATUS_LINK
GIG_STATUS_TX_PAUSE
GIG_STATUS_CAPTURED_FRAMES
GIG_STATUS_CAPTURE_STOPPED
FAST7410_STATUS_TX_PAUSE
L3_STATUS_6710
VG_STATUS_MODE
FR_STATUS_LINK_OK
FR_STATUS_GROUP_MEMBER
FR_STATUS_UNI_UP
FR_STATUS_EIA_DSR
FR_STATUS_EIA_CTS
FR_STATUS_EIA_DCD
FR_STATUS_EIA_TM
FR_STATUS_EIA_DTR
FR_STATUS_EIA_RTS
FR_STATUS_EIA_RDL
FR_STATUS_EIA_LLB */
} ETHEnhancedStatusInfo;
```

Comment

iType1	ETH_FIND_MII_ADDR_INFO
Description	find first MII PHY address with a legal device
Usage	int HTGetStructure(ETH_FIND_MII_ADDR_INFO, 0, 0, 0, (void*)pETHMIIInfo, sizeof(ETHMIIInfo), iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ETH_LATENCY_INFO
Description	get latency measurement report
Usage	int HTGetStructure(ETH_LATENCY_INFO, 0, 0, 0, (void*)pETHLatencyInfo, sizeof(ETHLatencyInfo), iHub, iSlot, iPort) ;
Related Structure	ETHLatencyInfo

```
This structure returns the latency measurement for an ethernet card.
*********************************************************************
typedef struct tagETHLatencyInfo
{
unsigned long   ulLatency;   /* latency value for the preceding latency test */
} ETHLatencyInfo;
```

Comment

iType1	ETH_READ_MII_INFO
Description	read a specific MII address/reg; iType2 = PHY Address iType3 = Register
Usage	int HTGetStructure(ETH_READ_MII_INFO, 0, 0, 0, (void*)pETHMIIInfo, sizeof(ETHMIIInfo), iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

ETH - HTSetCommand

iType1	ETH_CLEAR_PORT
Description	clear counters
Usage	int HTSetCommand(ETH_CLEAR_PORT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ETH_RESET_PORT
Description	reset the card to a default condition; iType2 = reset type
Usage	int HTSetCommand(ETH_RESET_PORT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	ETH_SELECT_RECEIVE
Description	select port for receive data
Usage No Related Structure	int HTSetCommand(ETH_SELECT_RECEIVE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
Comment	

iType1	ETH_SELECT_TRANSMIT
Description	select port for transmit data iType2 = transmission mode
Usage No Related Structure	int HTSetCommand(ETH_SELECT_TRANSMIT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
Comment	

Chapter 5:
100 MB Fast Ethernet

This section covers the Message Functions as related to these SmartCards:

- SX-7210
- SX-7410
- ML-7710

This chapter covers all related parameters and structures.
All Fast Ethernet commands (iType1s) and structures work with each of these three cards with this exception: FST_CAPTURE_N is not used with the ML-7710 card. Instead, use L3-CAPTURE_N.
Note that the ML-7710 card can also work with L3 commands, and certain ETH commands and structures as well.

> Note: Some structures contain embedded or nested structures. In these cases, the embeddd structures are included directly below the related structure.

FST - HTSetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
FST_ALTERNATE_TX	0	0	0	FSTAlternateTx	Setup the Alt Tx stream
FST_CAPTURE_PARAMS	0	0	0	FSTCaptureParams	Set capture filters and controls
FST_CONTROL_AUX	0	0	0	FSTControlAux	Set Flow Control and Preamble Len
FST_VLAN	0	0	0	FSTVLAN	Send VLAN tag information

FST - HTGetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
FST_CAPTURE_COUNT_INFO	0	0	0	FSTCaptureCountInfo	Get the number of captured frames
FST_CAPTURE_DATA_INFO	0	0	0	FSTCaptureDataInfo	Get captured frame data
FST_CAPTURE_INFO	<index>	<count>	0	FSTCaptureInfo	Get info about captured frames

FST - HTSetStructure

iType1	FST_ALTERNATE_TX
Description	Setup the Alt Tx stream
Usage	int HTSetStructure(FST_ALTERNATE_TX, 0, 0, 0, (void*)pFSTAlternateTx, sizeof(FSTAlternateTx), iHub, iSlot, iPort) ;
Related Structure	FSTAlternateTx

```
Used to control the Alternate Transmit stream. This stream will be
sent out after a number of normal Layer 2 frames have been sent.
```

```
typedef struct tagFSTAlternateTx
{
unsigned char  ucEnabled;            /* 1 = enable, 0 = disable    */
unsigned char    ucCRCErrors;         /* 1 = enable, 0 = disable    */
unsigned char    ucErrorSymbol;      /* 1 = enable, 0 = disable    */
unsigned char    ucDribble;            /* 1 = enable, 0 = disable    */
unsigned long    ulAlternateCount;   /* no. normal frames between  */
/* each alternate frame       */
unsigned short uiDataLength;         /* length of data in bytes    */
unsigned char    ucData[2048];         /* the background data buffer */
} FSTAlternateTx;
```

Comment

iType1	FST_CAPTURE_PARAMS
Description	Set capture filters and controls
Usage	int HTSetStructure(FST_CAPTURE_PARAMS, 0, 0, 0, (void*)pFSTCaptureParams, sizeof(FSTCaptureParams), iHub, iSlot, iPort) ;
Related Structure	FSTCaptureParams

```
Configure the Capture engine to capture the correct frames.
```

```
typedef struct tagFSTCaptureParams
{
unsigned char   ucCRCErrors;      /* 1 = enable, 0 = disable    */
unsigned char   ucOnTrigger;      /* 1 = enable, 0 = disable    */
unsigned char  ucFilterMode;      /* 1 = capture filtered frames*/
/* 0 = capture all frames     */
unsigned char   ucStartStopOnConditionXMode;/* 1 = stop on cond.*/
/* 0 = start on condition     */
unsigned char   uc64BytesOnly;      /* 1 = enable, 0 = disable    */
unsigned char   ucLast64Bytes;      /* 1 = last 64 bytes,         */
/* 0 = first 64 bytes         */
unsigned char   ucCollisions;      /* 1 = enable, 0 = disable    */
unsigned char   ucStartStop;      /* 1 = start capture,         */
/* 0 = stop capture           */
} FSTCaptureParams;
```

Comment

```
Enabling ucFilterMode will cause the fast ethernet card to only
capture 64 bytes, even if uc64BytesOnly is disabled.

*************************************************************************
```

iType1	FST_CONTROL_AUX
Description	Set Flow Control and Preamble Len
Usage	int HTSetStructure(FST_CONTROL_AUX, 0, 0, 0, (void*)pFSTControlAux, sizeof(FSTControlAux), iHub, iSlot, iPort) ;
Related Structure	FSTControlAux

```
Auxiliary control parameters to enable flow control pause frames and to set
the preamble length.
```

```
typedef struct tagFSTControlAux
{
unsigned char   ucFlowControlPause;   /* 1 = enable, 0 = disable */
unsigned char   ucPreambleLen;         /* preamble length in bits */
/* (valid: 16, 32, 48, 64) */
/* ML-7710 has a fixed preamble*/
/* so for this card, set to 0  */
} FSTControlAux;
```

Comment

iType1	FST_VLAN
Description	Send VLAN tag information
Usage	int HTSetStructure(FST_VLAN, 0, 0, 0, (void*)pFSTVLAN, sizeof(FSTVLAN), iHub, iSlot, iPort) ;
Related Structure	FSTVLAN

```
Enables and configures all Virtual LAN header values.
```

```
typedef struct tagFSTVLAN
{
unsigned char  ucVLANEnable;       /* 1 = enable, 0 = disable    */
unsigned short uiTPID;     /* VLAN type (2 bytes)                */
unsigned char  ucPRI;      /* user priority 0-7 (3 bits)         */
/* use VLAN_PRI_XXX definitions       */
unsigned char  ucCFI;      /* 1=RIF present, 0=RIF absent (1 bit)*/
/* use VLAN_CFI_XXX definitions       */
unsigned short uiVID;      /* VLAN ID (12 bits)                  */
} FSTVLAN;
```

Comment

FST - HTGetStructure

iType1	FST_CAPTURE_COUNT_INFO
Description	Get the number of captured frames
Usage	int HTGetStructure(FST_CAPTURE_COUNT_INFO, 0, 0, 0, (void*)pFSTCaptureCountInfo, sizeof(FSTCaptureCountInfo), iHub, iSlot, iPort) ;
Related Structure	FSTCaptureCountInfo

```
Provides a structure in which to get how many frames have
been captured on this SmartCard.
```

```
typedef struct tagFSTCaptureCountInfo
{
unsigned long   ulCaptureCount;   /* number of captured packets */
} FSTCaptureCountInfo;
```

Comment

iType1	FST_CAPTURE_DATA_INFO
Description	Get captured frame data
Usage	int HTGetStructure(FST_CAPTURE_DATA_INFO, 0, 0, 0, (void*)pFSTCaptureDataInfo, sizeof(FSTCaptureDataInfo), iHub, iSlot, iPort) ;
Related Structure	FSTCaptureDataInfo

```
Used to retrieve the data of the frame which has been captured.
```

```
typedef struct tagFSTCaptureDataInfo
{
unsigned long   ulFrameNum;         /* frame number (input) */
unsigned char   ucData[2048];
} FSTCaptureDataInfo;
```

Comment

iType1	FST_CAPTURE_INFO
Description	Get info about captured frames
Usage	int HTGetStructure(FST_CAPTURE_INFO, <index>, <count>, 0, (void*)pFSTCaptureInfo, sizeof(FSTCaptureInfo), iHub, iSlot, iPort) ;
Related Structure	FSTCaptureInfo

```
typedef struct tagFSTCaptureInfo
{
FSTCaptureFrameInfo   FrameInfo[FST_MAX_CAPTURE_FRAMES];
} FSTCaptureInfo;
```

Comment

Chapter 6:
Gigabit Ethernet

GIG - HTSetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
GIG_STRUC_ALT_TX	0	0	0	GIGAltTransmit	setup alternate transmit
GIG_STRUC_AUTO_FIBER_NEGOTIATE	0	0	0	GIGAutoFiberNegotiate	setup AutoFiber Negotiation
GIG_STRUC_BG1	0	0	0	UChar	set background pattern for alternate frame, using an array of unsigned chars
GIG_STRUC_BG2	0	0	0	UChar	background pattern for periodic frame, using an array of unsigned chars
GIG_STRUC_CAPTURE_SETUP	0	0	0	GIGCaptureSetup	setup capture
GIG_STRUC_FILL_PATTERN	0	0	0	UChar	set main background pattern,
GIG_STRUC_TRIGGER	0	0	0	GIGTrigger	setup triggers
GIG_STRUC_TX	0	0	0	GIGTransmit	setup transmit
GIG_STRUC_VFD3	0	0	0	UChar	set VFD3 data,

GIG - HTGetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
GIG_STRUC_CAP_COUNT_INFO	0	0	0	GIGCaptureCountInfo	get number of frames captured
GIG_STRUC_CAP_DATA_INFO	0	0	0	GIGCaptureDataInfo	get a frame's captured data
GIG_STRUC_CAP_INFO	<index>	<count>	0	GIGCaptureInfo	get info about captured frames
GIG_STRUC_CARD_INFO	0	0	0	GIGCardInfo	get card information
GIG_STRUC_COUNTER_INFO	0	0	0	GIGCounterInfo	get counter information
GIG_STRUC_IMAGE_VERSIONS	0	0	0	GIGVersions	
GIG_STRUC_RATE_INFO	0	0	0	GIGRateInfo	get rate information

GIG - HTSetStructure

iType1	GIG_STRUC_ALT_TX
Description	setup alternate transmit
Usage	int HTSetStructure(GIG_STRUC_ALT_TX, 0, 0, 0, (void*)pGIGAltTransmit, sizeof(GIGAltTransmit), iHub, iSlot, iPort) ;
Related Structure	GIGAltTransmit

```
This structure sets some additional transmit parameters,
specifically to enable the alternate and periodic frames and to
enable PAUSE frame recognition.  Note that the periodic frame will
begin transmitting as soon as this structure is sent with ucEnableBG2
set to 1.  It will continue transmitting with the periodic rate set
by the GIGTransmit structure (ulBG2Frequency field) until the
GIGAltTransmit structure is sent again with ucEnableBG2 set to 0.

*****************************************************************************
typedef struct tagGIGAltTransmit
{
unsigned char   ucEnableSS1;     /* reserved: 0 = default  */
unsigned char   ucEnableSS2;     /* reserved: 0 = default  */
unsigned char   ucEnableBG1;     /* enable alternate frame
(0 = default) */
unsigned char   ucEnableBG2;     /* enable periodic frame
(0 = default) */
unsigned char   ucEnableHoldoff; /* enable PAUSE frame recognition
(0 = default) */
unsigned char   ucReserved[3];   /* reserved: 0 = default  */
} GIGAltTransmit;
```

Comment

iType1	GIG_STRUC_AUTO_FIBER_NEGOTIATE
Description	setup AutoFiber Negotiation
Usage	int HTSetStructure(GIG_STRUC_AUTO_FIBER_NEGOTIATE, 0, 0, 0, (void*)pGIGAutoFiberNegotiate, sizeof(GIGAutoFiberNegotiate), iHub, iSlot, iPort) ;
Related Structure	GIGAutoFiberNegotiate

```
typedef struct tagGIGAutoFiberNegotiate
{
unsigned char   ucMode;      /* 1 = enable auto-negotiation,
0 = disable (0 = default) */
unsigned char   ucRestart;   /* 1 = restart auto-negotiation,
0 = do not restart (0 = default) */
unsigned short  uiLinkConfiguration; /* reserved
-- use the uiLinkConfiguration field
in GIGTransmit (0 = default) */
unsigned char  ucEnableCCode;/* 1 = Use C Code (uiLinkConfiguration)
for negotiation, 0 = or not
(0 = default) */
unsigned char  ucReserved[7];/* reserved -- not currently in use
(0 = default) */
} GIGAutoFiberNegotiate;
```

Comment

iType1	GIG_STRUC_BG1
Description	set background pattern for alternate frame, using an array of unsigned chars
Usage	int HTSetStructure(GIG_STRUC_BG1, 0, 0, 0, (void*)pUChar, sizeof(UChar), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	GIG_STRUC_BG2
Description	background pattern for periodic frame, using an array of unsigned chars
Usage	int HTSetStructure(GIG_STRUC_BG2, 0, 0, 0, (void*)pUChar, sizeof(UChar), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	GIG_STRUC_CAPTURE_SETUP
Description	setup capture
Usage	int HTSetStructure(GIG_STRUC_CAPTURE_SETUP, 0, 0, 0, (void*)pGIGCaptureSetup, sizeof(GIGCaptureSetup), iHub, iSlot, iPort) ;

Related Structure GIGCaptureSetup

```
This structure sets the capture parameters.  If ucFilterMode is
enabled, the card will only capture frames with CRC errors, Rx
triggers, Tx triggers, or RC errors, as determined by the
ucCRCErrors, ucRxTriggers, ucTxTriggers, and ucRCErrors fields,
respectively.  If ucStartStopOnConditionMode is enabled, the card
will START capturing upon receiving a frame meeting the conditions
determined by the first four parameters (ucCRCErrors, etc).  If
it is disabled, the card will STOP capturing upon receiving a frame
meeting those conditions.  If ucFilterMode is disabled, the card
will capture all frames (up to a maximum of 2048). Use the
ucStartStop field to start or stop capturing frames. Capture must
be stopped before examining any captured data.

*****************************************************************
typedef struct tagGIGCaptureSetup
{
unsigned char ucCRCErrors;  /* 1 = enable, 0 = disable: 0=default*/
unsigned char ucRxTrigger;  /* 1 = enable, 0 = disable: 0=default*/
unsigned char ucTxTrigger;  /* 1 = enable, 0 = disable: 0=default*/
unsigned char ucRCErrors;   /* 1 = enable, 0 = disable: 0=default*/
unsigned char ucFilterMode; /* 1 = capture filtered frames,
0 = capture all frames: 0=default */
unsigned char ucStartStopOnConditionMode; /* 1 = start on condition
0 = stop on condition
(0 = default)       */
unsigned char uc64BytesOnly;/* 1 = enable, 0 = disable: 0=default*/
unsigned char ucLast64Bytes;/* 1=last 64 bytes, 0 = first 64 bytes
(0=default)                 */
unsigned char ucStartStop;  /* 1=start capture, 0 = stop capture
(0=default)                 */
} GIGCaptureSetup;
```

Comment

```
The gigabit card hardware imposes a limitation on capturing trigger
frames.  When capturing trigger frames only (ucFilterMode = 1, and
ucRxTrigger = 1 or ucTxTrigger = 1) the interframe gap must be at
least 128ns.  If the gap is set to the gigabit card minimum of 96ns,
the card will capture the frame following the trigger frame instead.
Also, enabling ucFilterMode will cause the gigabit card to only capture
64 bytes, even if uc64BytesOnly is disabled.

*********************************************************************
```

iType1	GIG_STRUC_FILL_PATTERN
Description	set main background pattern,
Usage	int HTSetStructure(GIG_STRUC_FILL_PATTERN, 0, 0, 0, (void*)pUChar, sizeof(UChar), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	GIG_STRUC_TRIGGER
Description	setup triggers
Usage	int HTSetStructure(GIG_STRUC_TRIGGER, 0, 0, 0, (void*)pGIGTrigger, sizeof(GIGTrigger), iHub, iSlot, iPort) ;
Related Structure	GIGTrigger

```
This structure sets up the triggers for a gigabit card.  This
structure is similar to the HTTrigger function.  The ucTriggerMode
field can be set to specify what combination of triggers must occur to
create a trigger event.

*****************************************************************************
typedef struct tagGIGTrigger
{
unsigned char ucTrigger1Mode;    /* reserved - not currently in use
(0 = default) */
unsigned char ucTrigger1Range;   /* range of trigger 1 (in bytes)
(0 = default) */
unsigned short uiTrigger1Offset; /* offset of trigger 1 (in bits)
(0 = default) */
unsigned char ucTrigger1Data[8]; /* trigger 1 data (0 = default) */
unsigned char ucTrigger1Mask[8]; /* trigger 1 mask
(0xFF = defaults) */

unsigned char ucTrigger2Mode;    /* reserved - not currently in use
(0 = default) */
unsigned char ucTrigger2Range;   /* range of trigger 2 (in bytes)
(0 = default) */
unsigned short uiTrigger2Offset; /* offset of trigger 2 (in bits)
(0 = default) */
unsigned char ucTrigger2Data[8]; /* trigger 2 data (0 = default) */
unsigned char ucTrigger2Mask[8]; /* trigger 2 mask
(0xFF = default) */

unsigned char ucTriggerMode;     /* use trigger combination defines
(GIG_TRIGGER1_ONLY = default)*/
unsigned char ucReserved;        /* reserved - not currently in use
(0 = default) */
} GIGTrigger;
```

Comment

iType1	GIG_STRUC_TX
Description	setup transmit
Usage	int HTSetStructure(GIG_STRUC_TX, 0, 0, 0, (void*)pGIGTransmit, sizeof(GIGTransmit), iHub, iSlot, iPort) ;
Related Structure	GIGTransmit

```
This structure sets all the basic transmit parameters for the
gigabit card, including the VFDs.  References to "Main" frame
refer to the standard frame (as determined by the transmit
parameters); references to the "BG1" frame refer to the alternate
frame; and references to the "BG2" frame refer to the periodic
frame.  Background data must be set using GIG_STRUC_FILL_PATTERN,
GIG_STRUC_BG1, and GIG_STRUC_BG2, all with arrays of unsigned
chars, for the main frame, alternate frame, and periodic frame,
respectively.  Also, while the VFD3 parameters are set in the
GIGTransmit structure, the VFD3 data itself is set using
GIG_STRUC_VFD3 with an array of unsigned chars.

*****************************************************************
typedef struct tagGIGTransmit
{
unsigned short uiMainLength;    /* length of main packet (bytes)
(60 = default) */
unsigned char  ucPreambleByteLength;   /* preamble length (bytes)
(8 = default) */
unsigned char  ucFramesPerCarrier;     /* reserved, forced to 1
(1 = default) */
unsigned long  ulGap;                  /* interframe gap (ns)
(96 = default) */

unsigned char  ucMainRandomBackground; /* 1 = enable, 0 = disable
(0 = default) */
unsigned char  ucBG1RandomBackground;  /* 1 = enable, 0 = disable
(0 = default) */
unsigned char  ucBG2RandomBackground;  /* 1 = enable, 0 = disable
(0 = default) */
unsigned char  ucSS1RandomBackground;  /* 1 = enable, 0 = disable
(0 = default) */
unsigned char  ucSS2RandomBackground;  /* 1 = enable, 0 = disable
(0 = default) */


unsigned char  ucMainCRCError;/*1 = enable, 0 = disable:0=default*/
unsigned char  ucBG1CRCError;/*1 = enable, 0 = disable: 0=default*/
unsigned char  ucBG2CRCError;/*1 = enable, 0 = disable: 0=default*/
unsigned char  ucSS1CRCError;/*1 = enable, 0 = disable: 0=default*/
unsigned char  ucSS2CRCError;/*1 = enable, 0 = disable: 0=default*/

unsigned char  ucJabberCount;  /* for each unit, add 8K bytes to
simulate jabber (0 = default) */
unsigned char  ucLoopback;     /* 1 = enable, 0 = disable
(0 = default) */
```

```
unsigned long  ulBG1Frequency; /* no. of main frames between each
alternate frame (0 = default) */
unsigned long  ulBG2Frequency; /* gap between periodic frames, in
units of 32ns (0 = default) */

unsigned short uiBG1Length;    /* length of alternate frame (bytes)
(0 = default) */
unsigned short uiBG2Length;    /* length of periodic frame (bytes)
(0 = default) */
unsigned short uiSS1Length;    /* reserved -- not currently in use
(0 = default) */
unsigned short uiSS2Length;    /* reserved -- not currently in use
(0 = default) */

unsigned short uiLinkConfiguration; /* use GIG_AFN_XXX values below
(0x20 = default)*/

unsigned short uiVFD1Offset;   /* bit offset of VFD1: 0=default */
short          iVFD1Range;     /* range of VFD1 (no. of bytes)
(0 = default) */
unsigned char  ucVFD1Mode;     /* see GIG_VFD_XXX definitions
(GIG_VFD_OFF = default) */
unsigned long  ulVFD1CycleCount;/* no. of frames before resetting
to initial VFD1 pattern: 0=default*/
unsigned char  ucVFD1Data[8]; /* initial VFD1 data (0 = default) */
```

```
unsigned short uiVFD2Offset;  /* bit offset of VFD2: 0 = default */
short          iVFD2Range;    /* range of VFD2 (number of bytes)
(0 = default) */
unsigned char  ucVFD2Mode;    /* see GIG_VFD_XXX definitions
(GIG_VFD_OFF = default) */
unsigned long  ulVFD2CycleCount; /* no. of frames before resetting
to initial VFD2 pattern: 0=default*/
unsigned char  ucVFD2Data[8]; /* initial VFD2 data: 0=default */

unsigned short uiVFD3Offset;  /* bit offset of VFD3: 0 = default */
unsigned short uiVFD3Range;   /* range of VFD3 (number of bytes of
VFD3 data per frame) (0 = default) */
unsigned long  ulVFD3Count;   /* no. of frames worth of VFD3 data
(0 = default) */
unsigned char  ucVFD3Mode;    /* see GIG_VFD3_XXX definitions
(GIG_VFD3_OFF = default) */

unsigned char  ucMainBG1Mode; /* reserved -- not currently in use
(0 = default) */

unsigned long  ulBurstCount;      /* number of frames per burst;
when ucTransmitMode is set to
GIG_CONTINUOUS_MODE,
ulBurstCount must be greater
than 0  (1 = default) */
unsigned long  ulMultiburstCount; /* no. of bursts per multi-burst
(1 = default) */
unsigned long  ulInterBurstGap;   /* gap between multi-bursts
(nanoseconds) (0 = default)  */
unsigned char  ucTransmitMode;    /* see GIG_xxx_MODE definitions
(GIG_CONTINUOUS_MODE = default)*/
unsigned char  ucEchoMode;        /* 1 = enable, 0 = disable
(0 = default) */
unsigned char  ucPeriodicGap;     /* gap between main frame and
periodic frame, in increments
of 32ns; valid values from 0 to
7 (0 to 224ns), but less than 3
defaults to 3 (96ns)
(0 = default) */
unsigned char  ucCountRcverrOrOvrsz;/* 0 = count oversized pkt errs
1 = count receive errors
(0 = default) */
unsigned char  ucGapByBitTimesOrByRate;/* 0 = set gap by bit times,
1 = set gap by Tx rate
(0 = default) */
unsigned char  ucRandomLengthEnable;/* 1 = enable random pkt length
0 = disable (0 = default) */

unsigned short  uiVFD1BlockCount; /* no. of VFD1 pattern repeats
before next pattern: 1=default*/
unsigned short  uiVFD2BlockCount; /* no. of VFD2 pattern repeats
before next pattern: 1=default*/
unsigned short  uiVFD3BlockCount; /* no. of VFD3 pattern repeats
before next pattern: 1=default*/
unsigned char   ucExtra[2];    /* reserved -- not currently in use
(0 = default) */
} GIGTransmit;
```

Comment

```
The ulBurstCount field should be set to a value greater than 0 when
ucTransmit mode is set to GIG_CONTINUOUS_MODE.  Otherwise, the ulGap
value will not take effect, and frames will be transmitted with a
minimum gap.  Also, to ensure correct card behavior, the
ucFramesPerCarrier field should be set to 1.

*****************************************************************************
```

iType1	GIG_STRUC_VFD3
Description	set VFD3 data,

Usage	int HTSetStructure(GIG_STRUC_VFD3, 0, 0, 0, (void*)pUChar, sizeof(UChar), iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

GIG - HTGetStructure

iType1	GIG_STRUC_CAP_COUNT_INFO
Description	get number of frames captured
Usage	int HTGetStructure(GIG_STRUC_CAP_COUNT_INFO, 0, 0, 0, (void*)pGIGCaptureCountInfo, sizeof(GIGCaptureCountInfo), iHub, iSlot, iPort) ;
Related Structure	GIGCaptureCountInfo

```
This structure returns the total number of frames captured.

 ***************************************************************************
typedef struct tagGIGCaptureCountInfo
{
unsigned long ulCount; /* no. of captured packets (0 to 2048) */
} GIGCaptureCountInfo;
```

Comment

iType1	GIG_STRUC_CAP_DATA_INFO
Description	get a frame's captured data
Usage	int HTGetStructure(GIG_STRUC_CAP_DATA_INFO, 0, 0, 0, (void*)pGIGCaptureDataInfo, sizeof(GIGCaptureDataInfo), iHub, iSlot, iPort) ;
Related Structure	GIGCaptureDataInfo

```
This structure returns the data of a captured frame.  Only one
frame's data is retrieved by each call.

Set the frame index relative to all captured frames in the ulFrame
field BEFORE calling HTGetStructure.  Then the data for that frame
will be returned in ucData.

***************************************************************************
typedef struct tagGIGCaptureDataInfo
{
unsigned long ulFrame;       /* frame number (input) */
unsigned char  ucData[2048]; /* captured frame data  */
} GIGCaptureDataInfo;
```

Comment

iType1	GIG_STRUC_CAP_INFO

Description	get info about captured frames
Usage	int HTGetStructure(GIG_STRUC_CAP_INFO, <index>, <count>, 0, (void*)pGIGCaptureInfo, sizeof(GIGCaptureInfo), iHub, iSlot, iPort) ;

Related Structure GIGCaptureInfo

```
This structure receives information about captured frames. The
GIGCaptureInfo structure consists of an array of GIGCaptureFrameInfo
structures.  This allows you to receive information about
GIG_MAX_CAPTURE_FRAMES (currently 96) frames.

To use this structure, use HTGetStructure with an iType1 of
GIG_STRUC_CAP_INFO and a pData of a pointer to a
GIGCaptureInfo structure.  Also, iType2 must contain the index of
the first captured frame to get information about, and iType3 must
contain the index of the frame after the last captured frame to get
information about.  The structure will then return with the
FrameInfo array filled with structures describing all the captured
frames within the boundaries specified by iType2 and iType3.  The
FrameInfo structures will give the frame index (relative to all
captured frames), a timestamp, a status indicator, and the length
of the captured frame.  The status field (uiStatus) indicates the
status of the frame based on certain bits being set, as specified
by the GIG_CAP_XXX definitions.  If you perform a bit-wise "AND" (&)
on uiStatus with the status characteristic bit to check, you can
determine whether or not that characteristic applies to that frame.

*************************************************************************
typedef struct tagGIGCaptureInfo
{                       /* GIGCaptureFrameInfo is defined above */
GIGCaptureFrameInfo FrameInfo[GIG_MAX_CAPTURE_FRAMES];
} GIGCaptureInfo;
```

Comment

iType1	GIG_STRUC_CARD_INFO
Description	get card information
Usage	int HTGetStructure(GIG_STRUC_CARD_INFO, 0, 0, 0, (void*)pGIGCardInfo, sizeof(GIGCardInfo), iHub, iSlot, iPort) ;

Related Structure GIGCardInfo

```
This structure returns information about the current state
of the gigabit card.

*************************************************************************
typedef struct tagGIGCardInfo
{
unsigned short uiLinkConfiguration;/* current link configuration */
unsigned long ulLinkStateChanges;  /* no. of link state changes  */
} GIGCardInfo;
```

Comment

iType1	GIG_STRUC_COUNTER_INFO
Description	get counter information
Usage	int HTGetStructure(GIG_STRUC_COUNTER_INFO, 0, 0, 0, (void*)pGIGCounterInfo, sizeof(GIGCounterInfo), iHub, iSlot, iPort) ;
Related Structure	GIGCounterInfo

```
 * This structure returns counter information about the gigabit card.
 *
 ****************************************************************************
typedef struct tagGIGCounterInfo
{
U64           ullTxFrames;   /* no. of transmitted frames        */
U64           ullTxBytes;    /* no. of transmitted bytes         */
U64           ullTxTriggers; /* no. of transmit triggers          */
unsigned long ulTxLatency;   /* Tx latency counter (50ns units)  */
U64           ullRxFrames;   /* no. of received frames           */
U64           ullRxBytes;    /* no. of received bytes            */
U64           ullRxTriggers; /* no. of receive triggers          */
unsigned long ulRxLatency;   /* Rx latency counter (50ns units)  */
U64           ullCRCErrors;  /* no. of frames with CRC errors    */
U64           ullOverSize;   /* no. of oversized frames          */
U64           ullUnderSize;  /* no. of undersized frames         */
} GIGCounterInfo;
```

Comment

iType1	GIG_STRUC_IMAGE_VERSIONS
Description	
Usage	int HTGetStructure(GIG_STRUC_IMAGE_VERSIONS, 0, 0, 0, (void*)pGIGVersions, sizeof(GIGVersions), iHub, iSlot, iPort) ;
Related Structure	GIGVersions

```
typedef struct tagGIGVersions
{
unsigned short  uiFirmwareVersion;
unsigned short  uiTransmitDataVersion;
unsigned short  uiTransmitControlVersion;
unsigned short  uiTransmitLowlevelVersion;
unsigned short  uiReceiveDataVersion;
unsigned short  uiReceiveControlVersion;
unsigned short  uiReceiveLowlevelVersion;
unsigned short  uiBackplaneControlVersion;
unsigned short  uiLinkControlVersion;
unsigned char   ucFirmwareCheck;
unsigned char   ucTransmitDataCheck;
unsigned char   ucTransmitControlCheck;
unsigned char   ucTransmitLowlevelCheck;
unsigned char   ucReceiveDataCheck;
unsigned char   ucReceiveControlCheck;
unsigned char   ucReceiveLowlevelCheck;
unsigned char   ucBackplaneControlCheck;
unsigned char   ucLinkControlCheck;
unsigned char   ucBootVersion;
unsigned char   ucReserved[16];
} GIGVersions;
```

Comment

iType1	GIG_STRUC_RATE_INFO
Description	get rate information
Usage	int HTGetStructure(GIG_STRUC_RATE_INFO, 0, 0, 0, (void*)pGIGRateInfo, sizeof(GIGRateInfo), iHub, iSlot, iPort) ;
Related Structure	GIGRateInfo

```
This structure returns rate counter information about the gigabit card.

 ************************************************************************
typedef struct tagGIGRateInfo
{
unsigned long ulTxFrames;   /* transmitted frames per second     */
unsigned long ulTxBytes;    /* transmitted bytes per second      */
unsigned long ulTxTriggers; /* transmit triggers per second      */
unsigned long ulRxFrames;   /* received frames per second        */
unsigned long ulRxBytes;    /* received bytes per second         */
unsigned long ulRxTriggers; /* receive triggers per second       */
unsigned long ulCRCErrors;  /* frames with CRC errors per second */
unsigned long ulOverSize;   /* oversized frames per second       */
unsigned long ulUnderSize;  /* undersized frames per second      */
} GIGRateInfo;
```

Comment

Chapter 7:

L3 - Ethernet with SmartMetrics

This section covers the Message Functions as related to these SmartCards:

- L3-6705
- L3-6710
- ML-7710

All L3 commands and structures work with each of these cards. This chapter covers all related parameters and structures.

Note that the ML-7710 card can also work with certain FST and ETH commands and structures as well.

For additional information about L3 parameters, see *Test Results with SmartMetrics Histograms* on page 14.

> Note: Some structures contain embedded or nested structures. In these cases, the embeddd structures are included directly below the related structure.

L3 - HTSetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
L3_DEFINE_IP_STREAM	0	0	0	StreamIP	Create a list with one or more IP compliant Tx Streams
L3_DEFINE_IPX_STREAM	0	0	0	StreamIPX	Create a list with one or more IPX compliant Tx Streams
L3_DEFINE_MULTI_IP_STREAM	<index>	<count>	0	StreamIP	Append similar copies of an IP Stream
L3_DEFINE_MULTI_IPX_STREAM	<index>	<count>	0	StreamIPX	Append similar copies of an IPX Stream
L3_DEFINE_MULTI_SMARTBITS_STREAM	<index>	<count>	0	StreamSmartBits	Append similar copies of a SmartBits Stream
L3_DEFINE_MULTI_UDP_STREAM	<index>	<count>	0	StreamUDP	Append similar copies of a UDP Stream
L3_DEFINE_SMARTBITS_STREAM	0	0	0	StreamSmartBits	Create a list with one or more customizable Streams.
L3_DEFINE_UDP_STREAM	0	0	0	StreamUDP	Create a list with one or more UDP compliant Tx Streams
L3_MOD_IP_STREAM	<index>	0	0	StreamIP	Overwrite one IP Stream in the list at a given index
L3_MOD_IPX_STREAM	<index>	0	0	StreamIPX	Overwrite one IPX Stream in the list at a given index
L3_MOD_SMARTBITS_STREAM	<index>	0	0	StreamSmartBits	Overwrite one SmartBits Stream in the list at a given index
L3_MOD_STREAMS_ARRAY	0	0	0	Layer3ModifyStreamArray	Modify a field in a block of streams by overlaying an element from an array
L3_MOD_STREAMS_DELTA	0	0	0	Layer3ModifyStreamDelta	Increment a field in a block of streams by incrementing a base value

L3_MOD_UDP_STREAM	<index>	0	0	StreamUDP	Overwrite one UDP Stream in the list at a given index

L3 - HTGetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
L3_ARP_TIMES_INFO	0	0	0	ULong	Retrieve ARP Times for each Stream in the list
L3_CAPTURE_COUNT_INFO	0	0	0	Layer3CaptureCountInfo	Get the count of captured frames
L3_CAPTURE_PACKET_DATA_INFO	<index>	0	0	Layer3CaptureData	Get the captured frame
L3_DEFINED_STREAM_COUNT_INFO	0	0	0	ULong	retrieve the count of Streams in the list
L3_HIST_ACTIVE_TEST_INFO	0	0	0	Layer3HistActiveTest	Get the number of histogram records, and active histogram
L3_HIST_LATENCY_DISTRIBUTION_INFO	<index>	0	0	Layer3StreamDistributionInfo	Get Latency Distribution histogram results
L3_HIST_RAW_TAGS_INFO	<index>	0	0	Layer3HistTagInfo	Get Raw Tags histogram records
L3_HIST_SEQUENCE_INFO	<index>	0	0	Layer3SequenceInfo	Get Sequence Tracking histogram results
L3_HIST_V2_LATENCY_INFO	<index>	0	0	Layer3LongLatencyInfo	Get Latency over Time histogram results
L3_HIST_V2_LATENCY_PER_STREAM_INFO	<index>	0	0	Layer3StreamLongLatencyInfo	Get combination histogram results - Latency Dist, Lat. Per Stream, Sequence.
L3_STREAM_INFO	<index>	0	0	StreamSmartBits	retrieve Streams setup information in the Streams list
L3_TX_ADDRESS_INFO	0	0	0	Layer3Address	SmartCard device address information

L3 - HTSetCommand Summary

iType1	iType2	iType3	iType4	pData	Description
L3_CAPTURE_ALL_TYPE	0	0	0	0	Capture all frames received
L3_CAPTURE_BAD_TYPE	0	0	0	0	Capture errors frames only
L3_CAPTURE_OFF_TYPE	0	0	0	0	Turn Capture off
L3_CAPTURE_TRIGGERS_TYPE	0	0	0	0	Capture Trigger frames only
L3_HIST_LATENCY_DISTRIBUTION	0	0	0	Layer3HistDistribution	Get Latency Distribution histogram results
L3_HIST_RAW_TAGS	0	0	0	0	Get Raw Tags histogram records
L3_HIST_SEQUENCE	0	0	0	0	Get Sequence Tracking histogram results
L3_HIST_START	0	0	0	0	Clear Histogram records/Histogram remains in Receive state.
L3_HIST_V2_LATENCY	0	0	0	Layer3HistLatency	Get Latency over Time histogram results
L3_HIST_V2_LATENCY_PER_STREAM	0	0	0	Layer3V2HistDistribution	Get combination histogram results - Latency Dist, Lat. Per Stream, Sequence.
L3_START_ARPS	0	0	0	0	Begin ARP exchange on all defined Streams

L3 - HTSetStructure

iType1	L3_DEFINE_IP_STREAM
Description	Create a list with one or more IP compliant Tx Streams
Usage	int HTSetStructure(L3_DEFINE_IP_STREAM, 0, 0, 0, (void*)pStreamIP, sizeof(StreamIP), iHub, iSlot, iPort) ;
Related Structure	StreamIP

```
This structure is used to define IP compliant Streams.

The IP checksum is automatically calculated using
the supplied header fields and inserted into the IP header.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamIP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IP       */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */

/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/
unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/
unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/

unsigned char   ucTagField;      /* 0 = off, 1 = insert Signature */
/* field into each frame       */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned char  Protocol;         /* 4=IP on the IP assigned list */
unsigned char  extra[17];         /* reserved                    */
unsigned short uiActualSequenceNumber;   /* Actual Sequence number       */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamIP;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_DEFINE_IPX_STREAM
Description	Create a list with one or more IPX compliant Tx Streams
Usage	int HTSetStructure(L3_DEFINE_IPX_STREAM, 0, 0, 0, (void*)pStreamIPX, sizeof(StreamIPX), iHub, iSlot, iPort) ;
Related Structure	StreamIPX

```
This structure is used to define IPX compliant Streams.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamIPX
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IPX      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */

/*************************************************************
*                                                            *
*  For ETHERNET cards, VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char   DestinationMAC[6];   /* the Stream's Dest MAC addr*/
unsigned char   SourceMAC[6];   /* the Stream's Source MAC addr */
unsigned short  IPXlen;         /* Length field in the IPX hdr  */
unsigned char   IPXhop;         /* Hop field in the IPX hdr     */
unsigned char   IPXtype;         /* IPX type field in the IPX hdr*/
unsigned char   IPXdst[4];      /* Dest ID in the IPX hdr       */
unsigned char   IPXdstHost[6];   /* Dest host in the IPX hdr     */
unsigned short  IPXdstSocket;   /* Dest Socket in the IPX hdr   */
unsigned char   IPXsrc[4];      /* Source ID in the IPX hdr     */
unsigned char   IPXsrcHost[6];   /* Source host in the IPX hdr   */
unsigned short  IPXsrcSocket;   /* Source socket in the IPX hdr */
unsigned char   extra[24];      /* reserved */
} StreamIPX;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_DEFINE_MULTI_IP_STREAM
Description	Append similar copies of an IP Stream
Usage	int HTSetStructure(L3_DEFINE_MULTI_IP_STREAM, <index>, <count>, 0, (void*)pStreamIP, sizeof(StreamIP), iHub, iSlot, iPort) ;
Related Structure	StreamIP

```
This structure is used to define IP compliant Streams.

The IP checksum is automatically calculated using
the supplied header fields and inserted into the IP header.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamIP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IP       */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert Signature */
/* field into each frame       */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned char  Protocol;         /* 4=IP on the IP assigned list */
unsigned char  extra[17];         /* reserved                    */
unsigned short uiActualSequenceNumber;   /* Actual Sequence number       */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamIP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	L3_DEFINE_MULTI_IPX_STREAM
Description	Append similar copies of an IPX Stream
Usage	int HTSetStructure(L3_DEFINE_MULTI_IPX_STREAM, <index>, <count>, 0, (void*)pStreamIPX, sizeof(StreamIPX), iHub, iSlot, iPort) ;
Related Structure	StreamIPX

```
This structure is used to define IPX compliant Streams.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamIPX
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IPX      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */

/*************************************************************
*                                                            *
*  For ETHERNET cards, VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char   DestinationMAC[6];   /* the Stream's Dest MAC addr*/
unsigned char   SourceMAC[6];   /* the Stream's Source MAC addr */
unsigned short  IPXlen;         /* Length field in the IPX hdr  */
unsigned char   IPXhop;         /* Hop field in the IPX hdr     */
unsigned char   IPXtype;         /* IPX type field in the IPX hdr*/
unsigned char   IPXdst[4];      /* Dest ID in the IPX hdr       */
unsigned char   IPXdstHost[6];   /* Dest host in the IPX hdr     */
unsigned short  IPXdstSocket;   /* Dest Socket in the IPX hdr   */
unsigned char   IPXsrc[4];      /* Source ID in the IPX hdr     */
unsigned char   IPXsrcHost[6];   /* Source host in the IPX hdr   */
unsigned short  IPXsrcSocket;   /* Source socket in the IPX hdr */
unsigned char   extra[24];      /* reserved */
} StreamIPX;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_DEFINE_MULTI_SMARTBITS_STREAM
Description	Append similar copies of a SmartBits Stream
Usage	int HTSetStructure(L3_DEFINE_MULTI_SMARTBITS_STREAM, <index>, <count>, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;
Related Structure	StreamSmartBits

```
This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                    */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                    */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_DEFINE_MULTI_UDP_STREAM
Description	Append similar copies of a UDP Stream
Usage	int HTSetStructure(L3_DEFINE_MULTI_UDP_STREAM, <index>, <count>, 0, (void*)pStreamUDP, sizeof(StreamUDP), iHub, iSlot, iPort) ;
Related Structure	StreamUDP

```
This structure is used to define UDP compliant Streams.

The IP checksums are automatically calculated using
the supplied field value and inserted into the frame.

The UDP checksum is set to 0, and so is not calculated..

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamUDP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_UDP      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                     */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                     */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                    */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned short UDPSrc;            /* UDP Source Port              */
unsigned short UDPDest;         /* UDP Dest Port               */
unsigned short UDPLen;            /* UDP Length field             */
unsigned char  extra[12];         /* reserved                     */
unsigned short uiActualSequenceNumber;/* Actual Sequence number */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamUDP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	L3_DEFINE_SMARTBITS_STREAM
Description	Create a list with one or more customizable Streams.
Usage	int HTSetStructure(L3_DEFINE_SMARTBITS_STREAM, 0, 0, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;
Related Structure	StreamSmartBits

This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
/*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                    */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                    */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_DEFINE_UDP_STREAM
Description	Create a list with one or more UDP compliant Tx Streams
Usage	int HTSetStructure(L3_DEFINE_UDP_STREAM, 0, 0, 0, (void*)pStreamUDP, sizeof(StreamUDP), iHub, iSlot, iPort) ;
Related Structure	StreamUDP

```
This structure is used to define UDP compliant Streams.

The IP checksums are automatically calculated using
the supplied field value and inserted into the frame.

The UDP checksum is set to 0, and so is not calculated..

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamUDP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_UDP      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                     */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                     */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                    */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned short UDPSrc;            /* UDP Source Port              */
unsigned short UDPDest;         /* UDP Dest Port               */
unsigned short UDPLen;            /* UDP Length field             */
unsigned char  extra[12];         /* reserved                     */
unsigned short uiActualSequenceNumber;/* Actual Sequence number */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamUDP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	L3_MOD_IP_STREAM
Description	Overwrite one IP Stream in the list at a given index
Usage	int HTSetStructure(L3_MOD_IP_STREAM, <index>, 0, 0, (void*)pStreamIP, sizeof(StreamIP), iHub, iSlot, iPort) ;
Related Structure	StreamIP

This structure is used to define IP compliant Streams.

The IP checksum is automatically calculated using
the supplied header fields and inserted into the IP header.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

```
typedef struct tagStreamIP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IP       */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert Signature */
/* field into each frame       */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned char  Protocol;         /* 4=IP on the IP assigned list */
unsigned char  extra[17];         /* reserved                    */
unsigned short uiActualSequenceNumber;   /* Actual Sequence number       */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamIP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	L3_MOD_IPX_STREAM
Description	Overwrite one IPX Stream in the list at a given index
Usage	int HTSetStructure(L3_MOD_IPX_STREAM, <index>, 0, 0, (void*)pStreamIPX, sizeof(StreamIPX), iHub, iSlot, iPort) ;

Related Structure StreamIPX

```
This structure is used to define IPX compliant Streams.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamIPX
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IPX      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */

/*************************************************************
*                                                            *
*  For ETHERNET cards, VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char   DestinationMAC[6];   /* the Stream's Dest MAC addr*/
unsigned char   SourceMAC[6];   /* the Stream's Source MAC addr */
unsigned short  IPXlen;         /* Length field in the IPX hdr  */
unsigned char   IPXhop;         /* Hop field in the IPX hdr     */
unsigned char   IPXtype;         /* IPX type field in the IPX hdr*/
unsigned char   IPXdst[4];      /* Dest ID in the IPX hdr       */
unsigned char   IPXdstHost[6];   /* Dest host in the IPX hdr     */
unsigned short  IPXdstSocket;   /* Dest Socket in the IPX hdr   */
unsigned char   IPXsrc[4];      /* Source ID in the IPX hdr     */
unsigned char   IPXsrcHost[6];   /* Source host in the IPX hdr   */
unsigned short  IPXsrcSocket;   /* Source socket in the IPX hdr */
unsigned char   extra[24];      /* reserved */
} StreamIPX;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_MOD_SMARTBITS_STREAM
Description	Overwrite one SmartBits Stream in the list at a given index
Usage	int HTSetStructure(L3_MOD_SMARTBITS_STREAM, <index>, 0, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;
Related Structure	StreamSmartBits

```
This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
/*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                    */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                    */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_MOD_STREAMS_ARRAY
Description	Modify a field in a block of streams by overlaying an element from an array
Usage	int HTSetStructure(L3_MOD_STREAMS_ARRAY, 0, 0, 0, (void*)pLayer3ModifyStreamArray, sizeof(Layer3ModifyStreamArray), iHub, iSlot, iPort) ;
Related Structure	Layer3ModifyStreamArray

```
For use with IP and UDP streams only.

This structure is used to OVERWRITE up to four bytes of a specified
field in a block of Streams already defined on the SmartCard.

* Identify the first stream to be modified (ulIndex).
* The total number of streams to be modified is calculated by the
  number of array elements to use, multiplied by the number of times
  in a row each element will be repeated: (ulCount * ulFieldRepeat).
* The byte patterns are defined in the elements of ulData[] array.
  Each pattern is four bytes long. One full pattern per stream is
  written into the specified field from the least significant bit.
* The field to be modified is specified by ulField. The accepted
  field values are listed below. If the field is smaller than four
  bytes, fewer than four bytes will be overwritten.


  NOTE:  For MAC addresses, the least significant four bytes are
  overwritten. Since the count starts with 0, that would mean bytes
  2,3,4, and 5 are overwritten.


L3MS_FIELD_DMAC      0    Dest MAC address
L3MS_FIELD_SMAC      1   Source MAC address
L3MS_FIELD_TTL           2   Time to Live field
L3MS_FIELD_ISEQNUM   3    Initial Sequence Number field
L3MS_FIELD_DIP         4    Dest IP address
L3MS_FIELD_SIP         5    Source IP address
L3MS_FIELD_NETMASK   6    The Netmask field
L3MS_FIELD_GATEWAY   7    First Gateway addr in the Stream struct
L3MS_FIELD_SPRT      8    Source port number
L3MS_FIELD_DPRT      9    Dest port number
L3MS_FIELD_FRAMELEN   10
L3MS_FIELD_DIPA      11    First dest IP addr in the Stream struct
L3MS_FIELD_DIPB      12    Second dest IP addr in the Stream struc
L3MS_FIELD_DIPC      13    Third dest IP addr in the Stream struc
L3MS_FIELD_DIPD      14
L3MS_FIELD_SIPA      15    First source IP addr in the Stream struc
L3MS_FIELD_SIPB      16    Second source IP addr in the Stream struc
L3MS_FIELD_SIPC      17    Third source IP addr in the Stream struc
L3MS_FIELD_SIPD      18
L3MS_FIELD_GATEWAYA   19    Second Gateway addr in the Stream struc
L3MS_FIELD_GATEWAYB   20    Third Gateway addr in the Stream struc
L3MS_FIELD_GATEWAYC   21    Fourth Gateway addr in the Stream struc
L3MS_FIELD_GATEWAYD   22
```

```
   Example 1:

     ulIndex = 2 (start here)
     ulCount = 3 (total number of patterns to use)
     ulField = L3MS_FIELD_TTL (Time to Live field)
     ulFieldCount = 4 (no. of patterns (elements) to use from array)
     ulFieldRepeat = 2 (number of times to repeat pattern)
     ulData [5] [7] [99] [100] (pattern definitions)

    (Total fields changed ulCount * ulFieldRepeat = 6)

        Before                  After
    Index  TTL-Value     Index  TTL-Value
      1      1             1       1
      2      1             2       5
      3      1             3       5
      4      1             4       7
      5      1             5       7
      6      1             6       99
      7      1             7       99
      8      1             8       1
      9      1             9       1
     10      1            10       1

Example 2:

     ulIndex = 2 (start here)
     ulCount = 4 (total number of patterns to use)
     ulField = L3MS_FIELD_TTL (Time to Live field)
     ulFieldCount = 2 (no. of patterns (elements) to use from array)
     ulFieldRepeat = 2 (number of times to repeat pattern)
     ulData [5] [7] [99] [100] (pattern definitions)

     (Total fields changed ulCount * ulFieldRepeat = 8)

        Before                  After
    Index  TTL-Value     Index  TTL-Value
      1      1             1       1
      2      1             2       5
      3      1             3       5
      4      1             4       7
      5      1             5       7
      6      1             6       5
      7      1             7       5
      8      1             8       7
      9      1             9       7
     10      1            10       1
```

```
typedef struct tagLayer3ModifyStreamArray
{
unsigned long ulIndex; /* Index of the first stream to modify  */
unsigned long ulCount; /* The total number of patterns to use  */
/* If ulCount is larger than ulFieldCount, */
/* patterns will be repeated.           */

unsigned long ulField; /* Field in the stream structure to mod */
/* See L3MS_FIELD_n defines             */

unsigned long ulFieldCount;
/* Number of patterns/elements to use   */
/* from ulData[] array                  */

unsigned long ulFieldRepeat;
/* number of times each pattern will be  */
/* repeated in a row.                    */
/* ulFieldRepeat = 1 does the same thing */
/* as ulFieldRepeat = 0                  */

unsigned long ulData[L3_MODIFY_STREAM_ARRAY_SIZE];
/* Array of 1,2, or 4 byte patterns/elements */
/* that will be overlaid (right justified)   */
/* in the Field   */
} Layer3ModifyStreamArray;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_MOD_STREAMS_DELTA
Description	Increment a field in a block of streams by incrementing a base value
Usage	int HTSetStructure(L3_MOD_STREAMS_DELTA, 0, 0, 0, (void*)pLayer3ModifyStreamDelta, sizeof(Layer3ModifyStreamDelta), iHub, iSlot, iPort) ;

Related Structure Layer3ModifyStreamDelta

```
  For use with IP and UDP streams only.

This structure is used to INCREMENT one particular field in a block of
Streams already defined on the SmartCard. The first field is used as
base and is not incremented. The following fields are incremented based
on the first field.

* Identify the stream to use as base. (ulIndex).
* The total number of streams to be modified is calculated by the
  number incremented values, multiplied by the number of times
  in a row each value is repeated: (ulCount * ulFieldRepeat).
  The base is included in this number as a delta of 0.
* The amount to increment each field is defined by ulDelta.
* The field to be modified is specified by ulField. The legal
  field values are listed below.


L3MS_FIELD_DMAC      0    Dest MAC address
L3MS_FIELD_SMAC      1   Source MAC address
L3MS_FIELD_TTL           2   Time to Live field
L3MS_FIELD_ISEQNUM   3    Initial Sequence Number field
L3MS_FIELD_DIP         4    Dest IP address
L3MS_FIELD_SIP         5    Source IP address
L3MS_FIELD_NETMASK   6    The Netmask field
L3MS_FIELD_GATEWAY   7    First Gateway addr in the Stream struct
L3MS_FIELD_SPRT      8    Source port number
L3MS_FIELD_DPRT      9    Dest port number
L3MS_FIELD_FRAMELEN   10
L3MS_FIELD_DIPA      11    First dest IP addr in the Stream struct
L3MS_FIELD_DIPB      12    Second dest IP addr in the Stream struc
L3MS_FIELD_DIPC      13    Third dest IP addr in the Stream struc
L3MS_FIELD_DIPD      14
L3MS_FIELD_SIPA      15    First source IP addr in the Stream struc
L3MS_FIELD_SIPB      16    Second source IP addr in the Stream struc
L3MS_FIELD_SIPC      17    Third source IP addr in the Stream struc
L3MS_FIELD_SIPD      18
L3MS_FIELD_GATEWAYA   19    Second Gateway addr in the Stream struc
L3MS_FIELD_GATEWAYB   20    Third Gateway addr in the Stream struc
L3MS_FIELD_GATEWAYC   21    Fourth Gateway addr in the Stream struc
L3MS_FIELD_GATEWAYD   22
```

```
   Example 1:

     ulIndex = 2 (base stream )
     ulCount = 3 (total number of incremented values to use)
     ulField = L3MS_FIELD_TTL/TimeToLive (field in structure to increment)
     ulFieldRepeat = 2 (number of times to repeat an incremented value)
     ulDelta = 3 (amount to increment the field)

    (Total fields changed ulCount * ulFieldRepeat = 6)

        Before                  After
    Index TTL-Value     Index    TTL-Value
      1      1             1       1
      2      1             2       1 (base value)
      3      1             3       1 (repeat base twice)
      4      1             4       4 (increment base by 3)
      5      1             5       4 (repeat)
      6      1             6       7 (increment previous no by 3)
      7      1             7       7 (repeat)
      8      1             8       1
      9      1             9       1
     10      1            10       1

Example 2:

     ulIndex = 2 (base stream )
     ulCount = 3 (total number of incremented values to use)
     ulField = L3MS_FIELD_TTL/TimeToLive (field in structure to increment)
     ulFieldRepeat = 2 (number of times to repeat an incremented value)
     ulDelta = 3 (amount to increment the field)

    (Total fields changed ulCount * ulFieldRepeat = 6)
    (Difference between example 1 and 2 - initial field Values)

        Before                  After
    Index TTL-Value     Index    TTL-Value
      1      1             1       1
      2      2             2       2 (base value)
      3      2             3       2 (repeat base twice)
      4      2             4       5 (increment base by 3)
      5      10            5       5 (repeat)
      6      10            6       8 (increment previous no by 3)
      7      10            7       8 (repeat)
      8      10            8       10
      9      10            9       10
     10      10            10      10
```

```
typedef struct tagLayer3ModifyStreamDelta
{
unsigned long ulIndex; /* The stream to use as a base.          */
/* This stream is not incremented.       */
/* The next one is incremented, unless    */
/* ulFieldRepeat is greater then 1       */

unsigned long ulCount; /* The number of different increment     */
/* values to use.                        */

unsigned long ulField; /* Field in the stream structure to mod  */
/* See L3MS_FIELD_n defines              */

unsigned long ulFieldRepeat;
/* Number of times each value will be    */
/* repeated in a row.                    */
/* ulFieldRepeat = 1 does the same thing */
/* as ulFieldRepeat = 0                  */


unsigned long ulDelta; /* The amount to increment the field     */

} Layer3ModifyStreamDelta;
```

Comment

This command/iType1 is supported by the ML-7710 SmartCard, firmware version 1.06 and later only.

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	L3_MOD_UDP_STREAM
Description	Overwrite one UDP Stream in the list at a given index
Usage	int HTSetStructure(L3_MOD_UDP_STREAM, <index>, 0, 0, (void*)pStreamUDP, sizeof(StreamUDP), iHub, iSlot, iPort) ;

Related Structure StreamUDP

This structure is used to define UDP compliant Streams.

The IP checksums are automatically calculated using
the supplied field value and inserted into the frame.

The UDP checksum is set to 0, and so is not calculated..

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE: The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.

```
typedef struct tagStreamUDP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_UDP      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                     */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                     */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                    */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned short UDPSrc;            /* UDP Source Port              */
unsigned short UDPDest;         /* UDP Dest Port               */
unsigned short UDPLen;            /* UDP Length field             */
unsigned char  extra[12];         /* reserved                     */
unsigned short uiActualSequenceNumber;/* Actual Sequence number */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamUDP;
```

Comment

```
For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.
```

L3 - HTGetStructure

iType1	L3_ARP_TIMES_INFO
Description	Retrieve ARP Times for each Stream in the list
Usage	int HTGetStructure(L3_ARP_TIMES_INFO, 0, 0, 0, (void*)pULong, sizeof(ULong), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	L3_CAPTURE_COUNT_INFO
Description	Get the count of captured frames
Usage	int HTGetStructure(L3_CAPTURE_COUNT_INFO, 0, 0, 0, (void*)pLayer3CaptureCountInfo, sizeof(Layer3CaptureCountInfo), iHub, iSlot, iPort) ;
Related Structure	Layer3CaptureCountInfo

```
A simple structure which returns the number of
frames which are in the capture buffer.
```

```
typedef struct tagLayer3CaptureCountInfo
{
unsigned long ulCount;    /* count of frames in Capture buffer */
} Layer3CaptureCountInfo;
```

Comment

iType1	L3_CAPTURE_PACKET_DATA_INFO
Description	Get the captured frame
Usage	int HTGetStructure(L3_CAPTURE_PACKET_DATA_INFO, <index>, 0, 0, (void*)pLayer3CaptureData, sizeof(Layer3CaptureData), iHub, iSlot, iPort) ;
Related Structure	Layer3CaptureData

```
Layer3CaptureData is used to retrieve a captured frame from the
capture buffer. The length of the frame is given in uiLength,
and the captured frame data is put in cData.
```

```
typedef struct tagLayer3CaptureData
{
unsigned short uiLength;   /* the number of bytes in cData which represent the captured frame */
char cData[2048];            /* the captured frame data */
} Layer3CaptureData;
```

Comment

iType1	L3_DEFINED_STREAM_COUNT_INFO
Description	retrieve the count of Streams in the list
Usage	int HTGetStructure(L3_DEFINED_STREAM_COUNT_INFO, 0, 0, 0, (void*)pULong, sizeof(ULong), iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	L3_HIST_ACTIVE_TEST_INFO
Description	Get the number of histogram records, and active histogram
Usage	int HTGetStructure(L3_HIST_ACTIVE_TEST_INFO, 0, 0, 0, (void*)pLayer3HistActiveTest, sizeof(Layer3HistActiveTest), iHub, iSlot, iPort) ;
Related Structure	Layer3HistActiveTest

```
Used to retrieve the total number of records generated by the active histogram
on the specified port.

It also reports which histogram is active.

Histogram records cease to be generated when:
*  Information is retrieved from the port using L3_HIST_ACTIVE_TEST_INFO.
*  Frames with signatures are no longer received.
*  Histogram records are retrieved from the port.
```

```
typedef struct tagLayer3HistActiveTest
{
unsigned long ulTest;
unsigned long ulRecords;
} Layer3HistActiveTest;
```

Comment

```
For related commands and detailed instructions for
Histogram results, see Chapter 1 of the Message Functions
manual.
```

iType1	L3_HIST_LATENCY_DISTRIBUTION_INFO
Description	Get Latency Distribution histogram results
Usage	int HTGetStructure(L3_HIST_LATENCY_DISTRIBUTION_INFO, <index>, 0, 0, (void*)pLayer3StreamDistributionInfo, sizeof(Layer3StreamDistributionInfo), iHub, iSlot, iPort) ;

Related Structure Layer3StreamDistributionInfo

```
Contains Latency Distribution histogram results.

Latency Distribution tracks how many frames fall within a given
latency range. There are 16 configurable ranges in units of
.1 microseconds.

Example Values
--------------
If uiInterval[0] is set to 1, it tracks frames with a latency
value of 0 to .1 us. If the next interval is 10, the range is
from .2 us to 1 us.

Mechanics
---------
When a frame is received, the latency is calculated from the timestamp
in the signature field. The correct ulFrame[i] is incremented by one. A
separate record containing the 16 different range tallies is generated
for each stream.

Resolution and accuracy
-----------------------
One unit is .1 microsecond - 100ns (one clock tick).

For a pair of 10Mbit ports accuracy is plus or minus .2 microseconds (.2 us).
For a pair of 10/100Mbit ports transmitting at 100Mbits, accuracy is plus or minus .2 us.
For a pair of 10/100Mbit ports transmitting at 10Mbits, accuracy is plus or minus .4 us.
For 10/100Mbit ports transmitting to a 10Mbit port, accuracy is plus or minus .3 us.

Setting Resolution (different structure)
----------------------------------------
To set the distribution intervals, use L3_HIST_LATENCY_DISTRIBUTION.
This iType1 uses the Layer3HistDistribution structure, where
uiInterval[16] contains the different latency ranges.
```

```
typedef struct tagLayer3StreamDistributionInfo
{
unsigned long ulStream;     /* a unique Stream identifier        */
unsigned long ulFrames[16]; /* Contains the number of frames     */
/* with the specified latency range, */
/* for 16 different ranges.          */
} Layer3StreamDistributionInfo;
```

Comment

```
For related commands and detailed instructions for
Histogram results, see Chapter 1 of the Message Functions
manual.
```

iType1	L3_HIST_RAW_TAGS_INFO
Description	Get Raw Tags histogram records
Usage	int HTGetStructure(L3_HIST_RAW_TAGS_INFO, <index>, 0, 0, (void*)pLayer3HistTagInfo, sizeof(Layer3HistTagInfo), iHub, iSlot, iPort) ;

Related Structure Layer3HistTagInfo

```
Contains the signature field information for the Raw Tags histogram.

A separate record in generated for each SmartBits test frame (containing
a signature)received at this port.
```

```
typedef struct tagLayer3HistTagInfo
{
unsigned long ulStream;      /* a unique Stream identifier       */
unsigned long ulSequence;    /* frame serial number              */
unsigned long ulTransmitTime;/* timestamp of when this frame     */
/* left its SmartBits port          */
unsigned long ulReceiveTime; /* timestamp of when this frame was */
/* received by this SmartBits port  */
} Layer3HistTagInfo;
```

Comment

```
For related commands and detailed instructions for
Histogram results, see Chapter 1 of the Message Functions
manual.
```

iType1	L3_HIST_SEQUENCE_INFO
Description	Get Sequence Tracking histogram results
Usage	int HTGetStructure(L3_HIST_SEQUENCE_INFO, <index>, 0, 0, (void*)pLayer3SequenceInfo, sizeof(Layer3SequenceInfo), iHub, iSlot, iPort) ;
Related Structure	Layer3SequenceInfo

```
Contains Sequence Tracking histogram results.

Sequence Tracking counts the number of frames per stream that are:
*  In sequence
*  Duplicate
*  Lost

A separate record is generated for each test stream received
by the specified port.

Sequence is tracked using the signature field embedded in each
test frame.

The Sequence Tracking algorithm is as follows:
-----------------------------------------------
*  As long as frames are received in sequence, the ulSequenced
   value is incremented.
*  If a frame is received that is greater than the one expected,
   the number of missing frames (hole size) is noted, and a variable
   for the   first of the missing frames is set.
*  Subsequent in-order frames falling after the sequence hole
   increment the ulSequence counter.
*  If the frame from the start of the hole is received, the hole-size
   variable is decremented.
*  If a frame from the middle of the hole is received, the earlier
   frames still not received from the sequence hole are counted as
   lost (ulLost).   The hole-size variable is decremented, and the
   start of the hole begins after the received frame. The expected
   frame continues to be one more than the last frame received in
   sequence.


*  If another out-of-sequence frame is received before the previous
   sequence hole is filled, ulLost is incremented by the size of
   the previous sequence hole. The new hole is then tracked.
*  If while the new sequence hole is being tracked, a previous
   out-of-sequence frame arrives, ulDuplicate is incremented.

*  The ulSequenced value continues to increment for every frame
   received in sequence after the current sequence hole.


 For Example:

1,2,3               - Three frames in sequence.
1,2,3,9,10,11,      - Sequence hole five frames. 10,11, in sequence.
1,2,3,9,10,11,4     - Sequence hole is now four frames.
1,2,3,9,10,11,4,15, - First hole closed, ulLost incremented by four.
                      New hole three frames long.
1,2,3,9,10,11,4,15,5 - ulDuplicate incremented by one. (5 is counted
                       as a duplicate since the previous hole is
                       no longer tracked).
```

```
typedef struct tagLayer3SequenceInfo
{
unsigned long ulStream;   /* Stream identifier for this record   */
unsigned long ulFrames;   /* no. of frames rcvd for this Stream  */
unsigned long ulSequenced;/* no. of frames rcvd in sequence      */
unsigned long ulDuplicate;/* no. of frames duplicated            */
unsigned long ulLost;     /* no. of frames that broke the        */
/* sequence and were either never rcvd,*/
/* or not received before another out- */
/* of-sequence frame was noted.        */
} Layer3SequenceInfo;
```

Comment

```
For related commands and detailed instructions for
Histogram results, see Chapter 1 of the Message Functions
manual.
```

iType1	L3_HIST_V2_LATENCY_INFO
Description	Get Latency over Time histogram results
Usage	int HTGetStructure(L3_HIST_V2_LATENCY_INFO, <index>, 0, 0, (void*)pLayer3LongLatencyInfo, sizeof(Layer3LongLatencyInfo), iHub, iSlot, iPort) ;

Related Structure Layer3LongLatencyInfo

```
Contains Latency Over Time histogram results.

Provides the Minimum, Maximum, and Sum of Latency values for frames
received during specified intervals. The values are the composite
results of all streams averaged together.

Setting the interval
--------------------
On the Rx port, use the Layer3HistLatency structure and
specify the ulInterval. This value determines how often latency
values are compared.

One Interval unit is 1 millisecond.

The Latency measurements of, Minimum, Maximum, and Average Latency are
calculated to the nearest .1 microsecond.


Example
---------------
If ulInterval is set to 10:
The first Min, Max, and Sum latency value is for the first ten
microseconds. The second Min, Max, and Sum latency value is for the
second ten microseconds, and so on.

Latency values are calculated from the timestamp in the signature
field embedded within each test frame.

The average latency for each time interval can be calculated by
dividing the total latency by the number of frames.
```

```
typedef struct tagLayer3LongLatencyInfo
{
unsigned long ulMinimum;   /* min frame latency in .1 microseconds */
unsigned long ulMaximum;   /* max frame latency in .1 microseconds */
U64           u64Total;    /* sum of all latencies .1 microseconds */
unsigned long ulFrames;    /* frames with signature fields (tags),  */
/* received in this interval.           */
} Layer3LongLatencyInfo;
```

Comment

```
For related commands and detailed instructions for
Histogram results, see Chapter 1 of the Message Functions
manual.
```

iType1	L3_HIST_V2_LATENCY_PER_STREAM_INFO
Description	Get combination histogram results - Latency Dist, Lat. Per Stream, Sequence.
Usage	int HTGetStructure(L3_HIST_V2_LATENCY_PER_STREAM_INFO, <index>, 0, 0, (void*)pLayer3StreamLongLatencyInfo, sizeof(Layer3StreamLongLatencyInfo), iHub, iSlot, iPort) ;

Related Structure Layer3StreamLongLatencyInfo

```
Contains results from a combination histogram, V2 Latency Per Stream.

This histogram tracks:
1.) Latency Per Stream (Min, Max, Average)
2.) Sequenc Tracking
3.) Latency Distribution.

One record is generated for each stream received. Statisics
are tracked using the signature field embedded within each test
frame.

To specify this histogram, use  L3_HIST_V2_LATENCY_PER_STREAM.

Latency Resolution and accuracy
-------------------------------
One unit is .1 microsecond / 100ns (one clock tick).

* For a pair of 10Mbit ports, accuracy is plus or minus .2 us.
* For a pair of 10/100Mbit ports transmitting at 100Mbits, accuracy is
  plus or minus .2 us.
* For a pair of 10/100Mbit ports transmitting at 10Mbits, accuracy is
  plus or minus .4 us.
* For 10/100Mbit ports transmitting to a 10Mbit port, accuracy is
  plus or minus .3 us.


Latency Per Stream Info.
********************************
Latency Per Stream finds the Sum, Min, and Max latency value for each
stream over the duration of the test.


Sequence Tracking Info.
*******************************
Sequence Tracking counts the number of frames per stream that are:
*  Out of sequence
*  Duplicate
*  Lost

A separate record is generated for each test stream received
by the specified port.
```

```
The Sequence Tracking algorithm is as follows:
----------------------------------------------
*  As long as frames are received in sequence, the ulSequenced
   value is incremented.
*  If a frame is received that is greater than the one expected,
   the number of missing frames (hole size) is noted, and a variable
   for the   first of the missing frames is set.
*  Subsequent in-order frames falling after the sequence hole
   increment the ulSequence counter.
*  If the frame from the start of the hole is received, the hole-size
   variable is decremented.
*  If a frame from the middle of the hole is received, the earlier
   frames still not received from the sequence hole are counted as
   lost (ulLost).   The hole-size variable is decremented, and the
   start of the hole begins after the received frame. The expected
   frame continues to be one more than the last frame received in
   sequence.


*  If another out-of-sequence frame is received before the previous
   sequence hole is filled, ulLost is incremented by the size of
   the previous sequence hole. The new hole is then tracked.
*  If while the new sequence hole is being tracked, a previous
   out-of-sequence frame arrives, ulDuplicate is incremented.

*  The ulSequenced value continues to increment for every frame
   received in sequence after the current sequence hole.


 For Example:

1,2,3                - Three frames in sequence.
1,2,3,9,10,11,       - Sequence hole five frames. 10,11, in sequence
1,2,3,9,10,11,4      - Sequence hole is now four frames.
1,2,3,9,10,11,4,15,  - First hole closed, ulLost incremented by four.
                       New hole three frames long.
1,2,3,9,10,11,4,15,5 - ulDuplicate incremented by one. (5 is counted
                       as a duplicate since the previous hole is
                       no longer tracked).




Latency Distribution Info.
******************************
Latency Distribution tracks the number of frames with a latency that
falls within a given range. (There are 16 configurable ranges).

Example Values
--------------
If ulInterval[0] is set to 1, it tracks frames with a latency
value of 0 to .1 us. If the next interval is 10, the range is
from .2us to 1us.

Mechanics
---------
When a frame is received, correct ulFrame[i] is incremented by one. A
separate record containing the 16 different range tallies is generated
for each stream.
```

```
typedef struct tagLayer3StreamLongLatencyInfo
{
unsigned long ulStream;     /* a unique Stream Identifier        */

/* Latency Per Stream info.          */
U64           u64Total;     /* sum of latencies for this Stream  */
unsigned long ulMinimum;    /* min frame latency for this Stream */
unsigned long ulMaximum;    /* max frame latency for this Stream */

/* Sequenc Tracking info.              */
unsigned long ulTotalFrames;/* total frames rcvd for this Stream   */
unsigned long ulSequenced;  /* no. frames rcvd in sequence         */
/* MC only >> 1st timestamp rcvd for group stream */
unsigned long ulDuplicate;  /* no. of frames duplicated            */
/* MC only >> last timestamp rcvd for group stream */
unsigned long ulLost;       /* no. frames that broke the           */
/* sequence and were either never rcvd,*/
/* or not received before another out- */
/* of-sequence frame was noted.        */
/* currently unused for MC             */

/* Latency Distribution info.        */
unsigned long ulFrames[16]; /* Contains the number of frames     */
/* with the specified latency range, */
/* for 16 different ranges .         */

} Layer3StreamLongLatencyInfo;
```

Comment

```
For related commands and detailed instructions for
Histogram results, see Chapter 1 of the Message Functions
manual.

This structure contains an embedded structure.
```

iType1	L3_STREAM_INFO
Description	Retrieves information about a Stream at the specified index.
Usage	int HTGetStructure(L3_STREAM_INFO, <index>, 0, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;

Related Structure StreamSmartBits

```
This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
/*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

NOTE: This will also get information about the place-holder stream at index 0.

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	L3_TX_ADDRESS_INFO
Description	SmartCard device address information
Usage	int HTGetStructure(L3_TX_ADDRESS_INFO, 0, 0, 0, (void*)pLayer3Address, sizeof(Layer3Address), iHub, iSlot, iPort) ;
Related Structure	Layer3Address

```
This structure is used to set the CARD address, as
opposed to the stream address. It also sets other
L3 information that allows the card to send PING,
SNMP, RIP, and ARP frames.

Once set, these frames are transmitted automatically
at the specified interval.

To enable these frames, set iControl to:
L3_CTRL_ARP_RESPONSES            0x01
L3_CTRL_PING_RESPONSES            0x02
L3_CTRL_SNMP_OR_RIP_RESPONSES      0x04
```

```
typedef struct tagLayer3Address
{
unsigned char szMACAddress[6];/* sets MAC addr of this SmartCard */
unsigned char IP[4];          /* sets IP addr of this SmartCard  */
unsigned char Netmask[4];     /* sets Netmask for this SmartCard */
unsigned char Gateway[4];     /* sets Gateway addr for this Card */
unsigned char PingTargetAddress[4];
/* the address where PINGs are sent*/

int iControl;                 /* use L3_CTRL_ defines below     */
/* enables PING, ARP, SNMP or RIP */

int iPingTime;                /* in seconds - 0 disables */
int iSNMPTime;                /* in seconds - 0 disables */
int iRIPTime;                 /* in seconds - 0 disables */

int iGeneralIPResponse;       /* obsolete */

} Layer3Address;
```

Comment

L3 - HTSetCommand

iType1	L3_CAPTURE_ALL_TYPE
Description	Capture all frames received
Usage	int HTSetCommand(L3_CAPTURE_ALL_TYPE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	L3_CAPTURE_BAD_TYPE
Description	Capture errors frames only
Usage	int HTSetCommand(L3_CAPTURE_BAD_TYPE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	L3_CAPTURE_OFF_TYPE
Description	Turn Capture off
Usage	int HTSetCommand(L3_CAPTURE_OFF_TYPE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	L3_CAPTURE_TRIGGERS_TYPE
Description	Capture Trigger frames only
Usage	int HTSetCommand(L3_CAPTURE_TRIGGERS_TYPE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	L3_HIST_LATENCY_DISTRIBUTION
Description	Get Latency Distribution histogram results
Usage	int HTSetCommand(L3_HIST_LATENCY_DISTRIBUTION, 0, 0, 0, (void*)pLayer3HistDistribution, iHub, iSlot, iPort) ;
Related Structure	Layer3HistDistribution

```
Defines the time interval ranges used in the 16-bit version
of the Latency Distribution histogram. The maximum latency it
can track is 6.5 milliseconds.

NOTE: For 32 bit Latency Distribution tracking (with latency
tracking up to 429.4 seconds) use the combination histogram
set by L3_HIST_V2_LATENCY_PER_STREAM.


Latency Distribution tracks how many frames fall within a given
latency range. There are 16 configurable ranges in units of
.1 microseconds.

Example Values
--------------
If uiInterval[0] is set to 1, it tracks frames with a latency
value of 0 to .1 us. If the next interval is 10, the range is
from .2us to 1us.

Mechanics
---------
When a frame is received, the latency is calculated from the timestamp
in the signature field. The correct ulFrame[i] is incremented by one. A
separate record containing the 16 different range tallies is generated
for each stream.

Resolution and accuracy
-----------------------
One unit is .1 microsecond (one clock tick).

For a pair of 10Mbit ports accuracy is plus or minus .2 us.
For a pair of 10/100Mbit ports transmitting at 100Mbits, accuracy is plus or minus .2 us.
For a pair of 10/100Mbit ports transmitting at 10Mbits, accuracy is plus or minus .4 us.
For 10/100Mbit ports transmitting to a 10Mbit port, accuracy is plus or minus .3 us.

Results for this histogram are retrieved using the
Layer3StreamDistributionInfo structure.
```

```
typedef struct tagLayer3HistDistribution
{
unsigned short uiInterval[16];        /* 1 = 100 nanoseconds */
} Layer3HistDistribution;
```

Comment

iType1	L3_HIST_RAW_TAGS
Description	Get Raw Tags histogram records
Usage	int HTSetCommand(L3_HIST_RAW_TAGS, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

No Related Structure

Comment

iType1	L3_HIST_SEQUENCE
Description	Get Sequence Tracking histogram results
Usage	int HTSetCommand(L3_HIST_SEQUENCE, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

No Related Structure

Comment

iType1	L3_HIST_START
Description	Clear Histogram records/Histogram remains in Receive state.
Usage	int HTSetCommand(L3_HIST_START, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	L3_HIST_V2_LATENCY
Description	Get Latency over Time histogram results
Usage	int HTSetCommand(L3_HIST_V2_LATENCY, 0, 0, 0, (void*)pLayer3HistLatency, iHub, iSlot, iPort) ;
Related Structure	Layer3HistLatency

```
Used to setup time intervals for the Latency Over Time histogram.
This structure is used with L3_HIST_V2_LATENCY.

The Latency Over Time histogram provides the Minimum, Maximum, and
Average Latency for all streams at specified intervals.

ulInterval is the interval that latency values are checked. For
example, if ulInterval is 2, latency values are calculated every
200 nanoseconds (.2us).

Latency Resolution and accuracy
-------------------------------
One unit is .1 microsecond / 100ns (one clock tick).

* For a pair of 10Mbit ports, accuracy is plus or minus .2 us.
* For a pair of 10/100Mbit ports transmitting at 100Mbits, accuracy is
  plus or minus .2 us.
* For a pair of 10/100Mbit ports transmitting at 10Mbits, accuracy is
  plus or minus .4 us.
* For 10/100Mbit ports transmitting to a 10Mbit port, accuracy is
  plus or minus .3 us.

Results are retrieved using the Layer3LongLatencyInfo structure.
```

```
typedef struct tagLayer3HistLatency
{
unsigned long ulInterval;      /* 1 = 1 millisecond */
} Layer3HistLatency;
```

Comment

iType1	L3_HIST_V2_LATENCY_PER_STREAM
Description	Get combination histogram results - Latency Dist, Lat. Per Stream, Sequence.
Usage	int HTSetCommand(L3_HIST_V2_LATENCY_PER_STREAM, 0, 0, 0, (void*)pLayer3V2HistDistribution, iHub, iSlot, iPort) ;

Related Structure Layer3V2HistDistribution

```
Defines the time interval ranges used in the combination histogram
specified by L3_HIST_V2_LATENCY_PER_STREAM. The maximum latency it
can track is 429.4 seconds.

Latency Distribution tracks how many frames have a latency that falls
within a given range. There are 16 configurable ranges in units of
.1 microseconds.

Example Values
--------------
If ulInterval[0] is set to 1, it tracks frames with a latency
value of 0 to .1 us. If the next interval is 10, the range is
from .2us to 1us.

Mechanics
---------
When a frame is received, the latency is calculated from the timestamp
in the signature field. The correct ulFrame[i] is incremented by one. A
separate record containing the 16 different range tallies is generated
for each stream.

Resolution and accuracy
-----------------------
One unit is .1 microsecond (one clock tick).

For a pair of 10Mbit ports accuracy is plus or minus .2 us.
For a pair of 10/100Mbit ports transmitting at 100Mbits, accuracy is plus or minus .2 us.
For a pair of 10/100Mbit ports transmitting at 10Mbits, accuracy is plus or minus .4 us.
For a 10/100Mbit port transmitting to a 10Mbit port, accuracy is plus or minus .3 us.

Results for this histogram are retrieved using the
Layer3StreamDistributionInfo structure.
```

```
typedef struct tagLayer3V2HistDistribution
{
unsigned long ulInterval[16];        /* 1 = 100 nanoseconds */
} Layer3V2HistDistribution;
```

Comment

iType1	L3_START_ARPS
Description	Begin ARP exchange on all defined Streams
Usage	int HTSetCommand(L3_START_ARPS, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

No Related Structure

Comment

Chapter 8:
Frame Relay

This section covers the Message Functions as Frame Relay SmartCards. This Chapter covers the Frame Relay parameters and structures.

> Note: Some structures contain embedded or nested structures. In these cases, the embeddd structures are included directly below the related structure.

These commands (iType1s) and related structures work with both WN-3405 and the WN-3415 SmartCards with these exceptions:
FR_LINE works only with WN-3405.
FR_T1E1_LINE works only with WN-3415.

FR - HTSetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
FR_CARD_CFG	0	0	0	FRCardCfg	Config global card params
FR_DEFINE_IP_STREAM	0	0	0	StreamIP	Define an IP stream
FR_DEFINE_SMARTBITS_STREAM	0	0	0	StreamSmartBits	raw stream
FR_DEFINE_UDP_STREAM	0	0	0	StreamUDP	Define a UDP stream
FR_DUP_PVC	<index>	<count>	0	FRPvcTableEntry	Duplicate an existing PVC config
FR_DUP_STREAM	<index>	<count>	0	StreamSmartBits	reserved - duplicate streams
FR_FILL_PATTERN	0	0	0	UChar	Config global background fill pattern
FR_HIST_LATENCY_DISTRIBUTION	0	0	0	Layer3HistDistribution	
FR_HIST_SEQUENCE	0	0	0	0	
FR_HIST_V2_LATENCY	0	0	0	Layer3HistLatency	
FR_HIST_V2_LATENCY_PER_STREAM	0	0	0	Layer3V2HistDistribution	
FR_IP_SUBNET_DEREG	0	0	0	FRIPSubnetDeRegister	Remove a new or existing IP subnet addr
FR_IP_SUBNET_REG	0	0	0	FRIPSubnetRegister	Config a new or existing IP subnet addr
FR_LINE	0	0	0	FRLineCfg	Config physical layer
FR_LMI	0	0	0	FRLmiCfg	Config LMP signaling timers, counter and mode
FR_MOD_UDP_STREAM	<index>	<count>	0	StreamUDP	reserved
FR_PVC	0	0	0	FRPvcTableEntry	Config a new or existing PVC
FR_PVC_CTRL	0	0	0	FRPvcControl	Control a single PVC : disable/enable
FR_PVC_STREAM_MAP_CFG	0	0	0	FRPvcStrmMapCfg	Config per stream PVC related params
FR_STRM_CTRL	0	0	0	FRStreamControl	Control a stream: disable/enable, generate errs etc
FR_T1E1_LINE	0	0	0	FRT1E1LineCfg	Config T1E1 physical layer
FR_TRIGGER	0	0	0	FRTriggerCfg	Config global tx and receive triggers

FR - HTGetStructure Summary

iType1	iType2	iType3	iType4	pData	Description
FR_AGGR_LATENCY_DISTRIBUTION_INFO	0	0	0	Layer3StreamDistributionInfo	Get Full Latency Distribution histogram results
FR_AGGR_SEQUENCE_INFO	0	0	0	Layer3SequenceInfo	Get Sequence Tracking histogram results
FR_AGGR_V2_LATENCY_INFO	0	0	0	Layer3LongLatencyInfo	Get 32-bit Latency over Time histogram results
FR_AGGR_V2_LATENCY_PER_STREAM_INFO	0	0	0	Layer3StreamLongLatencyInfo	Get 32-bit Latency Distribution and Per Stream histogram results
FR_CARD_VERSION_INFO	0	0	0	FRVersionInfo	Get card firmware versions
FR_DEFINED_STREAM_COUNT_INFO	0	0	0	ULong	
FR_HIST_ACTIVE_TEST_INFO	0	0	0	Layer3HistActiveTest	
FR_HIST_LATENCY_DISTRIBUTION_INFO	<index>	<count>	0	Layer3StreamDistributionInfo	
FR_HIST_SEQUENCE_INFO	<index>	<count>	0	Layer3SequenceInfo	
FR_HIST_TYPE_INFO	0	0	0	0	Get histogram result data
FR_HIST_V2_LATENCY_INFO	<index>	<count>	0	Layer3LongLatencyInfo	
FR_HIST_V2_LATENCY_PER_STREAM_INFO	<index>	<count>	0	Layer3StreamLongLatencyInfo	
FR_IP_STREAM_INFO	<index>	0	0	StreamIP	Get IP stream config info.
FR_LINK_INFO	0	0	0	FRLinkInfo	Get link statistics counters
FR_LINK_STATUS_INFO	0	0	0	FRLinkStatusInfo	Get link status
FR_LMI_INFO	0	0	0	FRLmiInfo	Get LMP statistics counters
FR_PVC_INFO	<index>	0	0	FRPvcMainInfo	Get per-PVC statistics counters
FR_PVC_STATUS_INFO	<index>	0	0	FRPVCStatusInfo	Get PVC status for all 1024 PVCs
FR_SMARTBITS_STREAM_INFO	<index>	0	0	StreamSmartBits	Get raw stream config info.
FR_T1E1_LINE_INFO	0	0	0	FRT1E1LineInfo	Get T1E1 physical layer info

FR - HTSetCommand Summary

iType1	iType2	iType3	iType4	pData	Description
FR_CLEAR_COUNTERS_CMD	0	0	0	0	Clear all statistic counters
FR_COMMIT_CFG	0	0	0	0	Commit PVC, stream and IP subnet config.
FR_DISABLE_PORT	0	0	0	0	Disable WAN port
FR_ENABLE_PORT	0	0	0	0	Enable WAN port
FR_GROUP_MEMBER_CMD	0	0	0	0	Set card to be a member of group
FR_GROUP_START_CMD	0	0	0	0	Start transmission if belong to group
FR_GROUP_STEP_CMD	0	0	0	0	Send one frame if belong to group
FR_GROUP_STOP_CMD	0	0	0	0	Stop transmission if belong to group
FR_NON_GROUP_CMD	0	0	0	0	unset card from group
FR_PVC_DELETE_ALL	0	0	0	0	Delete all existing PVCs
FR_SET_START_CFG	0	0	0	0	Start PVC, stream and IP subnet addr. config
FR_START_CMD	0	0	0	0	Start transmission
FR_STEP_CMD	0	0	0	0	Sent one frame
FR_STOP_CMD	0	0	0	0	Stop transmission
FR_STREAM_DELETE_ALL	0	0	0	0	Delete all existing streams

FR - HTSetStructure

iType1	FR_CARD_CFG
Description	Config global card params
Usage	int HTSetStructure(FR_CARD_CFG, 0, 0, 0, (void*)pFRCardCfg, sizeof(FRCardCfg), iHub, iSlot, iPort) ;
Related Structure	FRCardCfg

```
This structure sets the transmit mode, histogram type, latency
scale and protocol frames for the card. All local IP addresses
can be set here, but IP subnet registering structure should be
used.

Note that protocol frames are restarted every time this
structure is received. Transmit traffic will continue. The new
transmit mode will become effective when test traffic is restarted.

Card configuration is stored in non-volatile memory.

 ************************************************************************
typedef struct tagFRCardCfg
{
unsigned long ulMultiBurstCnt;  /* Number of bursts to repeat */
unsigned long ulBurstCnt;       /* Number of frames per burst */
unsigned long ulInterBurstGap;  /* Number of Flags between bursts*/
unsigned long ulTransmitMode;   /* Transmit mode */
/* FR_TX_CONTINUOUS  or FR_TX_SINGLE_BURST or */
/* FR_TX_MULTI_BURST or FR_TX_CONTINUOUS_MULTI_BURST */

unsigned char ucCardNum;        /* card number */

unsigned char ucGroupMember;    /* boolean TRUE: group member */

unsigned char ucMACAddress[6];  /* Ethernet MAC address for card:
for bridging only */
unsigned char ucIPAddress[4];   /* IP addr of card if IP routing */
unsigned char ucNetmask[4];     /* IP netmask */
unsigned char ucDefaultGateway[4];    /* IP default gateway addr */
unsigned char ucPingTargetAddress[4]; /* Ping target IP addr.    */

unsigned char ucLatencyScaling; /* Time scale for histogram
latency test */
/* TBD */
unsigned char ucHistogramType;  /* Histogram type */
/* HIST_OFF or HIST_SEQ_TRACK or HIST_LAT_TIME or */
/* HIST_LAT_STREAM or HIST_LAT_DISTRIBUTION or   */
/* HIST_RAW_TAGS or HIST_LONG_LAT_TIME or */
/* HIST_LONG_LAT_STREAM */

/* Async/signaling frames control */
unsigned char ucLmiOn;          /* OBSOLETE */
unsigned char ucSnmpFrames;     /* 1 = send periodic SNMP frame */
unsigned char ucProtocolFrames;/* 1 = send periodic RIP frame */
unsigned char ucPingFrames;     /* 1 = send ping frame */

/* Async frames timer config */
unsigned char ucRipPeriod;      /* RIP frame cycle in second  */
unsigned char ucSnmpPeriod;     /* SNMP frame cycle in second */
unsigned char ucPingPeriod;     /* PING frame cycle in second */

unsigned char ucGeneralIPResponse; /* TRUE: reply to ALL ARP req.
/* not destined to card IP or stream source IP addr */
unsigned char ucEncapType;   /* Default RFC-1490 encapsulation
type for card */
/* FR_NO_ENCAP or      */
/* FR_RFC1490_BRIDGED_SNAP or  */
/* FR_RFC1490_RTD_NLPID or     */

unsigned char ucReserved[17];
} FRCardCfg; /* FR_CARD_CFG_PARAM_T; */
```

Comment

iType1	FR_DEFINE_IP_STREAM
Description	Define an IP stream
Usage	int HTSetStructure(FR_DEFINE_IP_STREAM, 0, 0, 0, (void*)pStreamIP, sizeof(StreamIP), iHub, iSlot, iPort) ;
Related Structure	StreamIP

```
This structure is used to define IP compliant Streams.

The IP checksum is automatically calculated using
the supplied header fields and inserted into the IP header.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamIP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IP       */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert Signature */
/* field into each frame       */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned char  Protocol;         /* 4=IP on the IP assigned list */
unsigned char  extra[17];         /* reserved                    */
unsigned short uiActualSequenceNumber;   /* Actual Sequence number       */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamIP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	FR_DEFINE_SMARTBITS_STREAM
Description	raw stream
Usage	int HTSetStructure(FR_DEFINE_SMARTBITS_STREAM, 0, 0, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;

Related Structure StreamSmartBits

```
This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
/*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                    */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                    */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	FR_DEFINE_UDP_STREAM
Description	Define a UDP stream
Usage	int HTSetStructure(FR_DEFINE_UDP_STREAM, 0, 0, 0, (void*)pStreamUDP, sizeof(StreamUDP), iHub, iSlot, iPort) ;
Related Structure	StreamUDP

```
This structure is used to define UDP compliant Streams.

The IP checksums are automatically calculated using
the supplied field value and inserted into the frame.

The UDP checksum is set to 0, and so is not calculated..

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamUDP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_UDP      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                     */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                     */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                    */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned short UDPSrc;            /* UDP Source Port              */
unsigned short UDPDest;         /* UDP Dest Port               */
unsigned short UDPLen;            /* UDP Length field             */
unsigned char  extra[12];         /* reserved                     */
unsigned short uiActualSequenceNumber;/* Actual Sequence number */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamUDP;
```

Comment

```
For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.
```

iType1	FR_DUP_PVC
Description	Duplicate an existing PVC config
Usage	int HTSetStructure(FR_DUP_PVC, <index>, <count>, 0, (void*)pFRPvcTableEntry, sizeof(FRPvcTableEntry), iHub, iSlot, iPort) ;
Related Structure	FRPvcTableEntry

```
Since the WAN firmware does not allow the deletion of a single PVC,
a new PVC configuration setup requires a FR_PVC_DELETE_ALL command
to remove all old PVCs. All test traffic is automatically stopped.
Then PVC configuration command is used to add/modify a PVC
configuration. If a PVC is modified, test traffic is immediately
stopped. However, adding a PVC does not stop test traffic. In
other words, the PVC won't be used until test traffic is started
next time after a COMMIT CONFIGURATION  command. When a PVC is
added/modified, it will appear as a new and inactive PVC when UNI
mode is DCE, as an active PVC when UNI is disabled and as a
configured PVC when UNI mode is DTE. The link status will not be
affected.

If ulDLCI exists, the PVC is overwritten with the new configuration.
```

```
typedef struct tagFRPvcTableEntry
{
unsigned long  ulCIR;        /* Committed Info. Rate in bps */
unsigned short uiDLCI;       /* Local DLCI number: 1-1022 */
unsigned short uiFrameSize;  /* OBSOLETE */
unsigned long  ulBc;         /* reserved - Committed burst size
in kbits */
unsigned long  ulAccessRate; /* reserved - Physical Access Rate.
NA for F/R */
unsigned long  ulBe;         /* reserved - Excess Burst size
in kbits */
unsigned short uiFrameRate;  /* Frame rate per seconds */
unsigned short uiStreamCount;/* OBSOLETE: No. configured streams */
unsigned short uiIPSubnetId; /* IP subnet ID:
If not defined, set to FR_IPSUBNET_NOT_DEFINED
otherwise set to 0 - FR_MAX_IPSUBNET_ID */
unsigned char   ucReserved[12];
} FRPvcTableEntry; /* FR_PVC_CFG_TBL_ENT_T; */
```

Comment

iType1	FR_DUP_STREAM
Description	reserved - duplicate streams
Usage	int HTSetStructure(FR_DUP_STREAM, <index>, <count>, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;
Related Structure	StreamSmartBits

```
This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
/*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	FR_FILL_PATTERN
Description	Config global background fill pattern
Usage	int HTSetStructure(FR_FILL_PATTERN, 0, 0, 0, (void*)pUChar, sizeof(UChar), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_HIST_LATENCY_DISTRIBUTION
Description	
Usage	int HTSetStructure(FR_HIST_LATENCY_DISTRIBUTION, 0, 0, 0, (void*)pLayer3HistDistribution, sizeof(Layer3HistDistribution), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_HIST_SEQUENCE
Description	
Usage	int HTSetStructure(FR_HIST_SEQUENCE, 0, 0, 0, NULL, 0, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_HIST_V2_LATENCY
Description	
Usage	int HTSetStructure(FR_HIST_V2_LATENCY, 0, 0, 0, (void*)pLayer3HistLatency, sizeof(Layer3HistLatency), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_HIST_V2_LATENCY_PER_STREAM
Description	
Usage	int HTSetStructure(FR_HIST_V2_LATENCY_PER_STREAM, 0, 0, 0, (void*)pLayer3V2HistDistribution, sizeof(Layer3V2HistDistribution), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_IP_SUBNET_DEREG
Description	Remove a new or existing IP subnet addr
Usage	int HTSetStructure(FR_IP_SUBNET_DEREG, 0, 0, 0, (void*)pFRIPSubnetDeRegister, sizeof(FRIPSubnetDeRegister), iHub, iSlot, iPort) ;
Related Structure	FRIPSubnetDeRegister

```
This structure is used to register and de-register IP subnets for
the line. One or more PVC can belong to the same IP subnet. So,
up to FR_MAX_IPSUBNET_ID IP subnets can be registered for each
WAN card, with one PVC for each IP subnet. In each register
structure, one or more IP subnets can be defined, with the first short word indicating the number of IP subnets to follow.
In
each de-register structure, the number of IP subnets to de-register and the
starting IP subnet ID must be provided. The IP subnet ID ranges from
0 to FR_MAX_IPSUBNET_ID.

Example:

To register two IP subnet addresses, 192.100.1.1 and 192.100.2.1
with netmask of 255.255.255.0 and default gateway of 192.100.2.2

      byte      content
       0         00
       1         02
       2         192    beginning of first IP subnet
       3         100
       4         001
       5         001
       6         255
       7         255
       8         255
       9         000
       10        192
       11        100
       12        002
       13        002
       14        192     beginning of second IP subnet
       15        100
       16        002
       17        001
       18        255
       19        255
       20        255
       21        000
       22        192
       23        100
       24        002
       25        002

typedef struct tagFRIPSubnetDeRegister
{
unsigned short   uiSubnetCount; /* No. of subnets to delete */
unsigned short   uiIPSubnetId;  /* Starting IP subnet ID */
} FRIPSubnetDeRegister;
```

Comment

iType1	FR_IP_SUBNET_REG
Description	Config a new or existing IP subnet addr
Usage	int HTSetStructure(FR_IP_SUBNET_REG, 0, 0, 0, (void*)pFRIPSubnetRegister, sizeof(FRIPSubnetRegister), iHub, iSlot, iPort) ;
Related Structure	FRIPSubnetRegister

```
typedef struct tagFRIPSubnetRegister
{
unsigned short   uiIPSubnetId;  /* ID starting as 0 */
unsigned char    ucIPAddress[4];/* Local IP addr for this subnet */
unsigned char    ucNetmask[4];  /* Local network mask */
unsigned char    ucDefaultGateway[4]; /* Default gateway */
} FRIPSubnetRegister;
```

Comment

iType1	FR_LINE
Description	Config physical layer
Usage	int HTSetStructure(FR_LINE, 0, 0, 0, (void*)pFRLineCfg, sizeof(FRLineCfg), iHub, iSlot, iPort) ;

Related Structure FRLineCfg

```
Line configurations cause the line to be restarted. The new
parameters are stored in non-volatile memory. The line is brought
down for only a short duration (much less than 1 second). If
the line is disabled, it will remain so.

NOTE: Currently, an interface with physical DTE interface
MUST use external clocking whereas a DCE MUST use internal
clocking. This limitation will be removed in the near future.

 ***************************************************************************
typedef struct tagFRLineCfg
{
unsigned long ulSpeed;    /* Line speed in bps as defined by
FR_LINE_SPEED_XXX above             */
unsigned long ulProgBits; /* reserved - MUST BE SET TO 0         */
/* The Program Bit Pattern (21-25 bits) from   */
/* BitCalc utility for programming the ICD-2053*/
/* Clock Chip driving the HDLC controller for  */
/* line speeds of 56K-8Mega Bits Per Sec.      */

unsigned long ulProgBitsLen; /* reserved - MUST BE SET TO 0      */
/* Length of the above program bit pattern  */
/* BitCalc utility */

unsigned char ucLineMode; /* line physical mode */
/* FR_CARD_DTE or FR_CARD_DCE */
unsigned char ucClocking; /* clocking type */
/* FR_CARD_CLK_EXTERNAL or FR_CARD_CLK_INTERNAL */

unsigned char ucClkPolarity; /* clock edge for tx data */
/* FR_CLK_RISING_EDGE or FR_CLK_FALLING_EDGE */
unsigned char ucEncoding; /* tx/rx data encoding */
/* FR_NRZ_ENCODE or FR_NRZI_ENCODE */
unsigned char ucGapCtl;   /* min. # of interFrame flags */
/* MIN. GAP VALUE or greater */
unsigned char ucLoopbackOn;    /* 1 = on or 0 off */
unsigned char ucCrcOff;        /* 1 = CRC off */
unsigned char ucUseCRC32;      /* 1 = CRC32, 0 = CRC16 */
unsigned char ucDataUnchanged; /* 1 = no zero insertion,
0 = zero insertion */
/* set indicate to turn on/detect signal */
unsigned char ucDsrOn;    /* DCE */
unsigned char ucCtsOn;    /* DCE */
unsigned char ucDcdOn;    /* DCE */
unsigned char ucTmOn;     /* DCE */
unsigned char ucDtrOn;    /* DTE */
unsigned char ucRtsOn;    /* DTE */
unsigned char ucRdlOn;    /* DTE : reserved */
unsigned char ucLlbOn;    /* DTE : reserved */

unsigned char ucRxClocking; /* clocking type  - applies only */
/* if ucLineMode,above, is set to FR_CARD_DCE */
/* FR_CARD_CLK_EXTERNAL (use pin 113 Tx) */
/* or FR_CARD_CLK_INTERNAL */
unsigned char ucRxClkPolarity; /* clock edge for tx data */
/* FR_CLK_RISING_EDGE or FR_CLK_FALLING_EDGE */
/* if unsure, try FR_CLK_FALLING_EDGE */
unsigned char ucReserved[13];
} FRLineCfg;   /* FR_LINE_CFG_PARAM_T; */
```

Comment

iType1	FR_LMI
Description	Config LMP signaling timers, counter and mode
Usage	int HTSetStructure(FR_LMI, 0, 0, 0, (void*)pFRLmiCfg, sizeof(FRLmiCfg), iHub, iSlot, iPort) ;

Related Structure FRLmiCfg

```
typedef struct tagFRLmiCfg
{
unsigned char ucLinkManagement; /* LMP protocol version */
unsigned char ucUNIMode;        /* UNI mode */
unsigned char ucNN1;    /* n391/nN1 : DTE Full Polling Cycle */
unsigned char ucNN2;    /* NA */
unsigned char ucNN3;    /* n393/nN3 : Monitor events count */
unsigned char ucNN4;    /* NA */
unsigned char ucNT1;    /* T391/nT1 :
DTE Link Integrity Verification Timer (secs) */
unsigned char ucNT2;    /* T392/nT2:
DCE Polling Verification Timer (secs) */
unsigned char ucNT3;    /* NA */
} FRLmiCfg;   /* FR_LMI_CFG_PARAMS_T; */
```

Comment

iType1	FR_MOD_UDP_STREAM
Description	reserved
Usage	int HTSetStructure(FR_MOD_UDP_STREAM, <index>, <count>, 0, (void*)pStreamUDP, sizeof(StreamUDP), iHub, iSlot, iPort) ;

Related Structure StreamUDP

```
This structure is used to define UDP compliant Streams.

The IP checksums are automatically calculated using
the supplied field value and inserted into the frame.

The UDP checksum is set to 0, and so is not calculated..

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).

NOTE:  The Signature field is 18 bytes long, and laid into the frame
just before the CRC. Use caution when defining the frame length
so that the Signature does not overwrite important data.
```

```
typedef struct tagStreamUDP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_UDP      */

unsigned char   ucRandomLength;   /* Reserved                     */


unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                     */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                     */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                    */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert signature */
/* field into each frame         */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned short UDPSrc;            /* UDP Source Port              */
unsigned short UDPDest;         /* UDP Dest Port               */
unsigned short UDPLen;            /* UDP Length field             */
unsigned char  extra[12];         /* reserved                     */
unsigned short uiActualSequenceNumber;/* Actual Sequence number */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamUDP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	FR_PVC
Description	Config a new or existing PVC
Usage	int HTSetStructure(FR_PVC, 0, 0, 0, (void*)pFRPvcTableEntry, sizeof(FRPvcTableEntry), iHub, iSlot, iPort) ;

Related Structure FRPvcTableEntry

Since the WAN firmware does not allow the deletion of a single PVC,
a new PVC configuration setup requires a FR_PVC_DELETE_ALL command
to remove all old PVCs. All test traffic is automatically stopped.
Then PVC configuration command is used to add/modify a PVC
configuration. If a PVC is modified, test traffic is immediately
stopped. However, adding a PVC does not stop test traffic. In
other words, the PVC won't be used until test traffic is started
next time after a COMMIT CONFIGURATION command. When a PVC is
added/modified, it will appear as a new and inactive PVC when UNI
mode is DCE, as an active PVC when UNI is disabled and as a
configured PVC when UNI mode is DTE. The link status will not be
affected.

If ulDLCI exists, the PVC is overwritten with the new configuration.

```
typedef struct tagFRPvcTableEntry
{
unsigned long  ulCIR;        /* Committed Info. Rate in bps */
unsigned short uiDLCI;       /* Local DLCI number: 1-1022 */
unsigned short uiFrameSize;  /* OBSOLETE */
unsigned long  ulBc;         /* reserved - Committed burst size
in kbits */
unsigned long  ulAccessRate; /* reserved - Physical Access Rate.
NA for F/R */
unsigned long  ulBe;         /* reserved - Excess Burst size
in kbits */
unsigned short uiFrameRate;  /* Frame rate per seconds */
unsigned short uiStreamCount;/* OBSOLETE: No. configured streams */
unsigned short uiIPSubnetId; /* IP subnet ID:
If not defined, set to FR_IPSUBNET_NOT_DEFINED
otherwise set to 0 - FR_MAX_IPSUBNET_ID */
unsigned char   ucReserved[12];
} FRPvcTableEntry; /* FR_PVC_CFG_TBL_ENT_T; */
```

Comment

iType1	FR_PVC_CTRL
Description	Control a single PVC : disable/enable
Usage	int HTSetStructure(FR_PVC_CTRL, 0, 0, 0, (void*)pFRPvcControl, sizeof(FRPvcControl), iHub, iSlot, iPort) ;
Related Structure	FRPvcControl

```
typedef  struct tagFRPvcControl
{
unsigned short  uiDLCI;     /* PVC dlci number */
unsigned char   ucEnable;   /* 1 = enable; 0 = disable */
unsigned char   ucReserved[3];
unsigned long   ulReserved[4];
} FRPvcControl;  /* FR_PVC_CTL_T; */
```

Comment

iType1	FR_PVC_STREAM_MAP_CFG
Description	Config per stream PVC related params
Usage	int HTSetStructure(FR_PVC_STREAM_MAP_CFG, 0, 0, 0, (void*)pFRPvcStrmMapCfg, sizeof(FRPvcStrmMapCfg), iHub, iSlot, iPort) ;

Related Structure FRPvcStrmMapCfg

```
Since the WAN firmware does not allow the deletion of a single
stream, a new stream configuration setup requires a
FR_STREAM_DELETE_ALL command to remove all existing streams.
All test traffic is automatically stopped. Then Stream
Configuration command is used to add/modify a stream configuration.
Test traffic will continue. However, some of the stream parameters
like protocol type change will not go into effect until test
traffic is restarted again. Note that the new stream will not be
included in test traffic until test traffic is restarted.

After the usual stream configuration is done. More stream
parameters related to WAN is configured for each stream using
the FRPvcStramMapCfg structure. It is used to determine length
of global background fill to use, FCS and ABORT error insertion,
to set FECN, BECN, DE and CR bit in the Q.922 header for frame
relay, and also the RFC1490 encap type. Note also it is not
recommended to mix bridging and routing encap on the same PVC.

EITHER USE ALL BRIGDGING OR ALL ROUTING FORMAT. RAW ENCAP CAN
ALWAYS BE COMBINED WITH BRIDGEING AND ROUTING.

A streamID must exist when a mapping structure is used. Otherwise
it has no effect. A utStreamID of FR_STREAMID_NOT_DEFINED must be
used if a new stream configuration is used. However, ulSteamID MUST
be set to the proper ID.

 ***************************************************************************
typedef struct tagFRPvcStrmMapCfg
{
unsigned long  ulStreamId;
unsigned short uiDLCI;
unsigned short uiVfdState;       /* reserved */
unsigned short uiBgFillLen;
/* number of bytes to copy to frame from background field */
unsigned short uiMinFrameSize;/*reserved - if Random Frame size  */
unsigned short uiMaxFrameSize;/*reserved - is enabled for stream */
unsigned char  ucFcsError;  /* 1 = cause FCS error */
unsigned char  ucAbortFlag; /* 1 = gen abort flag following frame*/
unsigned char  ucEncapType; /* RFC encap. type for this PVC */
unsigned char  ucCR;  /* 1=set CR bit on all frames in stream */
unsigned char  ucFECN;/* 1=set FECN bit on all frames in stream */
unsigned char  ucBECN;/* 1=set BECN bit for all frames in stream */
unsigned char  ucDE;  /* 1=set DE bit on all frames in stream */
unsigned char  ucReserved1;
unsigned char  ucEncapHeader[MAX_ENCAPHEADER_LEN];
/* reserved -Starting from xfr header + RFC1490 */
unsigned char  ucReserved[12];
} FRPvcStrmMapCfg; /* FR_PVC_STREAM_MAP_CFG_T; */
```

Comment

iType1	FR_STRM_CTRL
Description	Control a stream: disable/enable, generate errs etc
Usage	int HTSetStructure(FR_STRM_CTRL, 0, 0, 0, (void*)pFRStreamControl, sizeof(FRStreamControl), iHub, iSlot, iPort) ;
Related Structure	FRStreamControl

```
typedef  struct tagFRStreamControl
{
unsigned long   ulStreamId;  /* stream ID */
unsigned char   ucEnable;    /* 1 = enable; 0 = disable */
unsigned char   ucFcsErr;    /* 1 = cause FCS error */
unsigned char   ucAbortFlag; /* 1 = generate abort flag
following frame */
unsigned char   ucReserved;
unsigned long   ulReserved[4];
} FRStreamControl;  /* FR_STREAM_CTL_T; */
```

Comment

iType1	FR_T1E1_LINE
Description	Config T1E1 physical layer
Usage	int HTSetStructure(FR_T1E1_LINE, 0, 0, 0, (void*)pFRT1E1LineCfg, sizeof(FRT1E1LineCfg), iHub, iSlot, iPort) ;
Related Structure	FRT1E1LineCfg

```
typedef struct tagFRT1E1LineCfg
{
unsigned char   ucLineMode;         /* line physical mode */
unsigned char   ucClocking;         /* Tx clocking type */
unsigned char   ucDataEncoding;      /* NRZ v.s. NRZI */
unsigned char   ucGapCtl;         /* # of interFrame flags */
unsigned char   ucCrcOff;         /* boolean - TRUE : CRC off */
unsigned char   ucUseCRC32;       /* boolean - TRUE : CRC32 */
unsigned char   ucDataUnchanged;   /* boolean */
/* Set Indicates Rcv DataIn Unchanged
(No Zero deletion or Crc check) */

/* Line interface control flags */
unsigned char   ucLoopbackEnable;   /* Loopback mode              */
unsigned char   ucLineBuildout;      /* Pulse shaping for PHY      */
unsigned char   ucLineCoding;      /* Line symbol coding         */
unsigned char   ucLineFraming;      /* Framing format for PHY      */
unsigned char   ucChannels[32];      /* T1-24, E1-32 channels, 0: not selected */
/*
* The following fields are reserved and should
* be set to 0 in any download.
*/
unsigned char   ucReserved[9];
} FRT1E1LineCfg;
```

Comment

iType1	FR_TRIGGER
Description	Config global tx and receive triggers
Usage	int HTSetStructure(FR_TRIGGER, 0, 0, 0, (void*)pFRTriggerCfg, sizeof(FRTriggerCfg), iHub, iSlot, iPort) ;
Related Structure	FRTriggerCfg

```
typedef struct tagFRTriggerCfg
{
unsigned char  ucEnable;    /* Enable/disable triggers */
unsigned char  ucDirection; /* Tx or Rx - currently used for both*/
unsigned char  ucCompCombo; /* Trigger types: one of FR_TRIG_COMP*/
unsigned char  ucReserved1;

unsigned short uiTrig1Offset;     /* Offset into frame for pattern
test in bytes */
unsigned short uiTrig1Range;      /* Number of bytes to match */
unsigned char  ucTrig1Pattern[6]; /* Pattern to match */
unsigned char  ucTrig1Mask[6];    /* Bit mask for pattern */

unsigned short uiTrig2Offset;     /* Offset into frame for pattern
test in byte */
unsigned short uiTrig2Range;      /* Number of bytes to match */
unsigned char  ucTrig2Pattern[6]; /* Pattern to match */
unsigned char  ucTrig2Mask[6];    /* Bit mask for pattern */

unsigned char  ucReserved[20];
} FRTriggerCfg; /* FR_TRIG_PARAM_T; */
```

Comment

FR - HTGetStructure

iType1	FR_AGGR_LATENCY_DISTRIBUTION_INFO
Description	Get Full Latency Distribution histogram results
Usage	int HTGetStructure(FR_AGGR_LATENCY_DISTRIBUTION_INFO, 0, 0, 0, (void*)pLayer3StreamDistributionInfo, sizeof(Layer3StreamDistributionInfo), iHub, iSlot, iPort) ;

No Related Structure

Comment

iType1	FR_AGGR_SEQUENCE_INFO
Description	Get Sequence Tracking histogram results
Usage	int HTGetStructure(FR_AGGR_SEQUENCE_INFO, 0, 0, 0, (void*)pLayer3SequenceInfo, sizeof(Layer3SequenceInfo), iHub, iSlot, iPort) ;

No Related Structure

Comment

iType1	FR_AGGR_V2_LATENCY_INFO
Description	Get 32-bit Latency over Time histogram results
Usage	int HTGetStructure(FR_AGGR_V2_LATENCY_INFO, 0, 0, 0, (void*)pLayer3LongLatencyInfo, sizeof(Layer3LongLatencyInfo), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_AGGR_V2_LATENCY_PER_STREAM_INFO
Description	Get 32-bit Latency Distribution and Per Stream histogram results
Usage	int HTGetStructure(FR_AGGR_V2_LATENCY_PER_STREAM_INFO, 0, 0, 0, (void*)pLayer3StreamLongLatencyInfo, sizeof(Layer3StreamLongLatencyInfo), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_CARD_VERSION_INFO
Description	Get card firmware versions
Usage	int HTGetStructure(FR_CARD_VERSION_INFO, 0, 0, 0, (void*)pFRVersionInfo, sizeof(FRVersionInfo), iHub, iSlot, iPort) ;

Related Structure FRVersionInfo

```
This structure will return the revision information
associated with the firmware, and diagnostic and
identification information associated with the hardware.
The format of the version information for the main firmware
version is as follows:

  Bit 15: TBD - General release flag: Set: Released, Unset: Beta

  Bits 0-14: Versioning information

  Major release:  (ushort/100)%10
  Minor release:  ushort%100
  Build:          (ushort/1000)&0x1F;


typedef struct tagFRVersionInfo
{
unsigned short     uiMainFwVersion; /* firmware version number */
unsigned short     uiBootFwVersion; /* reserved */
unsigned short     uiFpgaVersion; /* reserved */
} FRVersionInfo;   /* FR_WANS_IDENTS_T; */
```

Comment

iType1	FR_DEFINED_STREAM_COUNT_INFO
Description	
Usage No Related Structure	int HTGetStructure(FR_DEFINED_STREAM_COUNT_INFO, 0, 0, 0, (void*)pULong, sizeof(ULong), iHub, iSlot, iPort) ;
Comment	

iType1	FR_HIST_ACTIVE_TEST_INFO
Description	
Usage No Related Structure	int HTGetStructure(FR_HIST_ACTIVE_TEST_INFO, 0, 0, 0, (void*)pLayer3HistActiveTest, sizeof(Layer3HistActiveTest), iHub, iSlot, iPort) ;
Comment	

iType1	FR_HIST_LATENCY_DISTRIBUTION_INFO
Description	
Usage No Related Structure	int HTGetStructure(FR_HIST_LATENCY_DISTRIBUTION_INFO, <index>, <count>, 0, (void*)pLayer3StreamDistributionInfo, sizeof(Layer3StreamDistributionInfo), iHub, iSlot, iPort) ;
Comment	

iType1	FR_HIST_SEQUENCE_INFO
Description	
Usage No Related Structure	int HTGetStructure(FR_HIST_SEQUENCE_INFO, <index>, <count>, 0, (void*)pLayer3SequenceInfo, sizeof(Layer3SequenceInfo), iHub, iSlot, iPort) ;
Comment	

iType1	FR_HIST_TYPE_INFO
Description	Get histogram result data
Usage	int HTGetStructure(FR_HIST_TYPE_INFO, 0, 0, 0, NULL, 0, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_HIST_V2_LATENCY_INFO
Description	
Usage	int HTGetStructure(FR_HIST_V2_LATENCY_INFO, <index>, <count>, 0, (void*)pLayer3LongLatencyInfo, sizeof(Layer3LongLatencyInfo), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_HIST_V2_LATENCY_PER_STREAM_INFO
Description	
Usage	int HTGetStructure(FR_HIST_V2_LATENCY_PER_STREAM_INFO, <index>, <count>, 0, (void*)pLayer3StreamLongLatencyInfo, sizeof(Layer3StreamLongLatencyInfo), iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_IP_STREAM_INFO
Description	Get IP stream config info.
Usage	int HTGetStructure(FR_IP_STREAM_INFO, <index>, 0, 0, (void*)pStreamIP, sizeof(StreamIP), iHub, iSlot, iPort) ;
Related Structure	StreamIP

```
This structure is used to define IP compliant Streams.

The IP checksum is automatically calculated using
the supplied header fields and inserted into the IP header.

A Netcom Systems Signature field, used for Histogram results, is
inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamIP
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_IP       */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1, VFD2, and VFD3 structure members    *
* are reserved for later use. Set to 0.                      *
*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/


unsigned short  uiVFD3Offset;   /* in bytes                   */
unsigned short  uiVFD3Range;      /* in bytes                    */
unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */

/*************************************************************/


unsigned char   ucTagField;      /* 0 = off, 1 = insert Signature */
/* field into each frame       */

unsigned char  DestinationMAC[6];/* the Stream's Dest MAC addr  */
unsigned char  SourceMAC[6];      /* the Stream's Source MAC addr */
unsigned char  TypeOfService;   /* */
unsigned char  TimeToLive;      /* number of "hops" until frame */
/* will be dropped */
unsigned short InitialSequenceNumber;   /* Initial sequence number*/
unsigned char  DestinationIP[4];/* Dest IP addr(e.g. 192.100.5.3) */
unsigned char  SourceIP[4];      /* Src IP addr (e.g. 192.100.5.4) */
unsigned char  Netmask[4];      /* Network Mask (e.g. 255.255.0.0)*/
unsigned char  Gateway[4];      /* Gateway addr (e.g. 192.100.1.1)*/
unsigned char  Protocol;         /* 4=IP on the IP assigned list */
unsigned char  extra[17];         /* reserved                    */
unsigned short uiActualSequenceNumber;   /* Actual Sequence number       */
unsigned long  ulARPStart;      /* Return value for the Time of */
/* the last ARP initiated       */
unsigned long  ulARPEnd;         /* Return value for the Time of */
/* the last ARP completed       */
unsigned long  ulARPGap;         /* The Time between ARPs        */
} StreamIP;
```

Comment

For related commands and instructions about
working with Streams, see Chapter 1 of the
Message Functions manual.

iType1	FR_LINK_INFO
Description	Get link statistics counters
Usage	int HTGetStructure(FR_LINK_INFO, 0, 0, 0, (void*)pFRLinkInfo, sizeof(FRLinkInfo), iHub, iSlot, iPort) ;
Related Structure	FRLinkInfo

```
Counter values reflects counts since last cleared.

Link statistics are returned as in the link statistics
structure. All ARP, INARP, PING, RIP and SNMP frames are
considered as stack frames for transmission purpose. All frames
with errors are counted in the receive byte count, but not in the
receive frame count. LMI is not counted in the link statistics.
However, all ARP, RIP, SNMP and PING are counted in link receive
statistics. So ARP and PING are counted on the link receive
statistics  and separately in their own counters. Furthermore,
DE bit, FECN and BECN are counted on top of the regular statistics.
```

```
typedef struct  tagFRLinkInfo
{
unsigned long  ulTimestamp;      /* timestamp of last rate update*/
unsigned long  ulRxFrameRate;    /* Rate Rx frames */
unsigned long  ulRxByteRate;     /* Rate Rx bytes */
unsigned long  ulRxFcsErrRate;   /* Rate Rx frames with FCS error*/
unsigned long  ulRxTriggerRate;  /* Rate Rx Trigger Match */
unsigned long  ulRxAbortRate;    /* Rate Rx Abort frames */
unsigned long  ulRxInvLenErrRate;/* Rate Rx Invalid Length frames*/
unsigned long  ulRxNonOctetAlignedErrRate; /* Rate of Non-octet
alignment error frames */
unsigned long  ulRxOverflowErrRate;/* Rate Rx overflow err frames*/

unsigned long  ulRxFrames;       /* Count Rx frames */
unsigned long  ulRxBytes;        /* Count Rx bytes */
unsigned long  ulRxFcs_err;      /* Count Rx FCS errors */
unsigned long  ulRxTrigger;      /* Count Rx Trigger Match Count */
unsigned long  ulRxAbort;        /* Count Rx Invalid length frms */
unsigned long  ulRxInvLenErr;    /* Count Rx invalid length error*/
unsigned long  ulRxNonOctetAlignedErr;/* Count Rx non-oct alignment
error frames */
unsigned long  ulRxOverflowErr;  /* Count Rx overflow error */

unsigned long  ulRxIdleSeq;      /* No. Rx Idle sequence */
unsigned long  ulRxDeFrames;   /* No. Rx frames with DE bit set  */
unsigned long  ulRxBECNCount;  /* No. Rx frames with BECN bit set*/
unsigned long  ulRxFECNCount;  /* No. Rx frames with FECN bit set*/
unsigned long  ulRxInvalidPVC; /* No. Rx frames with
unconfigured PVC  */
unsigned long  ulRxTrigLatency;/* First Rx Trig Match Time(100ns)*/

unsigned long  ulRxTags;   /* Rx frames with Netcom signature tag*/
unsigned long  ulRxStack;  /* Rx frames destined for local IP addr
or source IP addr. in stream */
unsigned long  ulRxInvARPReq;    /* Rx Inverse ARP frame */
unsigned long  ulRxARPReq;       /* RX ARP request frame */
unsigned long  ulRxARPReply;     /* RX ARP reply frame */

unsigned long  ulRxPingReq;      /* Rx ICMP PING command */
unsigned long  ulRxPingReply;    /* Rx ICMP PING response */

unsigned long  ulTxFrameRate;    /* Rate Tx frames */
unsigned long  ulTxByteRate;     /* Rate Tx bytes */
unsigned long  ulTxFcsErrRate;   /* Rate Tx FCS error */
unsigned long  ulTxAbortRate;    /* Rate Tx abort error */
unsigned long  ulTxTriggerRate;  /* Rate Tx trigger match */

unsigned long  ulTxFrames;       /* Count Tx frames */
unsigned long  ulTxBytes;        /* Count Tx bytes */
unsigned long  ulTxFcsErr;       /* Count Tx FCS error */
unsigned long  ulTxAbort;        /* Count Tx Abort */
unsigned long  ulTxTrigger;      /* Count Tx trigger match */

unsigned long  ulTxDeFrames;     /* Count Tx DE bit set */
unsigned long  ulTxBECNFrames;   /* Count Tx BECN bit set */
unsigned long  ulTxFECNFrames;   /* Count Tx FECN bit set */

unsigned long  ulTxTrigLatency;  /* Trigger 1st Match Time(100ns)*/

unsigned long  ulTxStack;        /* non-test frames originating
from CARD for ICMP, PING, etc */
unsigned long  ulTxInvARPReq;    /* Count Tx Inverse ARP request */
unsigned long  ulTxARPReq;       /* Count Tx ARP request */
unsigned long  ulTxARPReply;     /* Count Tx ARP reply */
unsigned long  ulTxPingReq;      /* Count Tx PING (ICMP) request */
unsigned long  ulTxPingReply;    /* Count Tx PING (ICMP) reply */

unsigned long  ulReserved[20];
} FRLinkInfo;   /* FR_LINK_STATS_T; */
```

Comment

iType1	FR_LINK_STATUS_INFO
Description	Get link status
Usage	int HTGetStructure(FR_LINK_STATUS_INFO, 0, 0, 0, (void*)pFRLinkStatusInfo, sizeof(FRLinkStatusInfo), iHub, iSlot, iPort) ;
Related Structure	FRLinkStatusInfo

```
This structure is used to retrieve physical line info. such as
external clock line speed.

*****************************************************************************
typedef struct tagFRLinkStatusInfo
{
unsigned long  ulSpeed;    /* actual line speed in kbps for both
DTE and DCE */
unsigned long  ulReserved[19];
} FRLinkStatusInfo;  /* FR_LINE_STATUS_T; */
```

Comment

iType1	FR_LMI_INFO
Description	Get LMP statistics counters
Usage	int HTGetStructure(FR_LMI_INFO, 0, 0, 0, (void*)pFRLmiInfo, sizeof(FRLmiInfo), iHub, iSlot, iPort) ;
Related Structure	FRLmiInfo

```
typedef struct tagFRLmiInfo
{
unsigned long ulConfiguredPvc;  /* No. configured PVC */
unsigned long ulActivePvc;      /* No. active PVC */
unsigned long ulInactivePvc;    /* No. disable PVC */
unsigned long ulDisabledPvc;    /* No. disable PVC */

unsigned long ulTxStatusReq;     /* No. STATUS ENQUIRY sent */
unsigned long ulTxStatusMsg;     /* No. STATUS MESSAGE sent */
unsigned long ulTxFullStatusReq; /* No. FULL STATUS ENQUIRY sent */
unsigned long ulTxFullStatusMsg; /* No. FULL STATUS MESSAGE sent */
unsigned long ulTxStatusUpdate;  /* reserved */

unsigned long ulRxStatusReq;     /* No. STATUS ENQUIRY received  */
unsigned long ulRxStatusMsg;     /* No. STATUS MESSAGE received  */
unsigned long ulRxFullStatusReq; /* No. FULL STATUS ENQUIRY Rcvd */
unsigned long ulRxFullStatusMsg; /* No. FULL STATUS MESSAGE Rcvd */
unsigned long ulRxStatusUpdate;  /* No. STATUS UPDATE MESSAGE Rcvd*/

unsigned long ulPvcCongestion;   /* reserved */
unsigned long ulNewPvc;          /* No. new PVCs */
unsigned long ulPvcDeleted;      /* No. deleted PVCs */
unsigned long ulPvcDeactivated;  /* No. timers PVC deactivated */
unsigned long ulMulticastIe;     /* reserved */
unsigned long ulInvalidFrame;    /* No. invalid LMP frames Rcvd */

unsigned long ulReserved[3];
} FRLmiInfo;   /* FR_LMI_STATS_T; */
```

Comment

iType1	FR_PVC_INFO
Description	Get per-PVC statistics counters
Usage	int HTGetStructure(FR_PVC_INFO, <index>, 0, 0, (void*)pFRPvcMainInfo, sizeof(FRPvcMainInfo), iHub, iSlot, iPort) ;
Related Structure	FRPvcMainInfo

```
typedef struct tagFRPvcMainInfo
{
unsigned short  uiPadding;
unsigned short  uiDLCI;

unsigned long  ulTxFrameRate;    /* Rate Tx frames */
unsigned long  ulTxByteRate;     /* Rate Tx bytes */
unsigned long  ulTxFrames;       /* Total Tx frames */
unsigned long  ulTxBytes;        /* Total Tx bytes */
unsigned long  ulTxDeFrames;     /* Tx frames with DE bit set */
unsigned long  ulTotFECNsSent;   /* Tx frames with FECN bit set */
unsigned long  ulTotBECNsSent;   /* Tx frames with BECN bit set */
unsigned long  ulTxFcsErr;       /* Tx Frames with  FCS error */
unsigned long  ulTxAbort;        /* Tx Frames set to abort */

unsigned long  ulRxFrameRate;    /* Rate Rx frames */
unsigned long  ulRxByteRate;     /* Rate Rx bytes */
unsigned long  ulRxFrames;       /* Cumulative Total Rx frames */
unsigned long  ulRxBytes;        /* Cumulative Total Rx bytes */
unsigned long  ulRxDeFrames;     /* Rx frames with DE bit set */
unsigned long  ulFECN;           /* Rx frames with FECN bit set */
unsigned long  ulBECN;           /* Rx frames with BECN bit set */

unsigned long  ulReserved[4];
} FRPvcMainInfo;    /* FR_PVC_MAIN_STATS_T; */
```

Comment

iType1	FR_PVC_STATUS_INFO
Description	Get PVC status for all 1024 PVCs
Usage	int HTGetStructure(FR_PVC_STATUS_INFO, <index>, 0, 0, (void*)pFRPVCStatusInfo, sizeof(FRPVCStatusInfo), iHub, iSlot, iPort) ;

Related Structure FRPVCStatusInfo

```
PVC status is returned in an array of bitmap starting with PVC 0
to PVC 1022 bit  = 1 indicates ACTIVE, CONFIGURED or ENABLED.
The application can request one, two or three groups of PVC
status values in that order.

The status values are stored in three separate contiguous
bitmaps with length equal to one, two or three times
FR_PVC_STATUS_BITMAP_LEN.

Example bit map of 128 bytes for DLCI 17 active/configured/enabled

 *               BIT MAP
 *
 *               MSB           LSB
 *  byte 0       0 0 0 0 0 0 0 0
 *  byte 1       0 0 0 0 0 0 0 0
 *  byte 2       0 1 0 0 0 0 0 0      DLCI 17 active
 *   ...
 *   ...
 *  byte 127     0 0 0 0 0 0 0 0
 *
 *  byte 128     0 0 0 0 0 0 0 0
 *  byte 129     0 0 0 0 0 0 0 0
 *  byte 130     0 1 0 0 0 0 0 0      DLCI 17 configured
 *   ...
 *   ...
 *  byte 255     0 0 0 0 0 0 0 0
 *
 *  byte 256     0 0 0 0 0 0 0 0
 *  byte 257     0 0 0 0 0 0 0 0
 *  byte 258     0 1 0 0 0 0 0 0      DLCI 17 enabled
 *   ...
 *   ...
 *  byte 383     0 0 0 0 0 0 0 0
```

```
typedef struct tagFRPVCStatusInfo
{
unsigned char ucBitMap[FR_MAX_STATUS_BITMAP_LEN];
} FRPVCStatusInfo;
```

Comment

iType1	FR_SMARTBITS_STREAM_INFO
Description	Get raw stream config info.
Usage	int HTGetStructure(FR_SMARTBITS_STREAM_INFO, <index>, 0, 0, (void*)pStreamSmartBits, sizeof(StreamSmartBits), iHub, iSlot, iPort) ;
Related Structure	StreamSmartBits

```
This structure is used to create customized streams.

The Background Fill Pattern and the ProtocolHeader[] can be used
in combination to construct highly customized frames.

Use HTFillPattern to specify the background pattern.
Then define the ProtocolHeader array. This array (of up-to 64 bytes)
is used similarly to VFD3. It overwrites the background pattern at the
specified offset and range.
(ucVFD3Enable must be set to HVFD_ENABLED).

A Netcom Systems Signature field, used for Histogram results,
is inserted at the end of the payload if ucTagField is enabled
(set to 1).
```

```
typedef struct tagStreamSmartBits
{
unsigned char   ucActive;         /* 1=Enable Stream, 0=Disable Stream */
unsigned char   ucProtocolType;   /* use STREAM_PROTOCOL_SMARTBITS */

unsigned char   ucRandomLength;   /* Reserved                     */

unsigned char   ucRandomData;   /* 1 = Random Data, 0 = use the */
/* cards background pattern     */
/* not available on Frame Relay */
unsigned short  uiFrameLength;   /* frame length not counting CRC*/
/* 0 - 2048 for Ethernet        */
/* 0 - 8196 for Frame Relay     */


/*************************************************************
*                                                            *
*  For ETHERNET, cards VFD1 and VFD2 structure members are    *
*  reserved for later use. Set to 0.                         *
/*************************************************************/

unsigned short  uiVFD1Offset;   /* in bits                    */
unsigned char   ucVFD1Range;      /* in bits                     */
unsigned char   ucVFD1Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,        */
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD1PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD1StartVal[6];/*the initial VFD byte pattern*/

unsigned short  uiVFD2Offset;   /* in bits                    */
unsigned char   ucVFD2Range;      /* in bits                     */
unsigned char   ucVFD2Pattern;   /* HVFD_ENABLED, HVFD_STATIC,   */
/* HVFD_INCR, HVFD_DECR,*/
/* HVFD_RANDOM, HVFD_NONE       */
unsigned long   ulVFD2PatternCount;/* from 0(off) to 16,777,215 */
/* number to incr. or decr.     */
/* through when using inc or    */
/* dec pattern                  */
unsigned char   ucVFD2StartVal[6];/*the initial VFD byte pattern*/
/*************************************************************/



unsigned short  uiVFD3Offset;   /* in bytes                   */

unsigned short  uiVFD3Range;      /* in bytes; Number of elements */
/* to use from ProtocolHeader   */
/* No elements are used beyond  */
/* the single specified range.   */

unsigned char   ucVFD3Enable;   /* HVFD_ENABLED, HVFD_NONE      */



unsigned char   ucTagField;      /* 0 = off, 1 = insert signature*/
/* field into each frame        */


unsigned char   ProtocolHeader[64];/* Defines up to 64 bytes used as VFD3*/

} StreamSmartBits;
```

Comment

For related commands and instructions about working with Streams, see Chapter 1 of the Message Functions manual.

iType1	FR_T1E1_LINE_INFO
Description	Get T1E1 physical layer info
Usage	int HTGetStructure(FR_T1E1_LINE_INFO, 0, 0, 0, (void*)pFRT1E1LineInfo, sizeof(FRT1E1LineInfo), iHub, iSlot, iPort) ;
Related Structure	FRT1E1LineInfo

```
typedef struct tagFRT1E1LineInfo
{
unsigned short uiAlarmCurrent;
unsigned short uiAlarmHistory;

unsigned long   ulCodeVviolationC;
unsigned long   ulFrameErrorC;              /* SEF errors */
unsigned long   ulSyncErrorC;

unsigned long   ulCodeViolationR;
unsigned long   ulFrameErrorR;
unsigned long   ulSyncErrorR;
unsigned long   reserve[4];
} FRT1E1LineInfo;
```

Comment

FR - HTSetCommand

iType1	FR_CLEAR_COUNTERS_CMD
Description	Clear all statistic counters
Usage	int HTSetCommand(FR_CLEAR_COUNTERS_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	FR_COMMIT_CFG
Description	Commit PVC, stream and IP subnet config.
Usage	int HTSetCommand(FR_COMMIT_CFG, 0, 0, 0, NULL, iHub, iSlot, iPort) ;

```
No Related Structure
```

Comment

iType1	FR_DISABLE_PORT
Description	Disable WAN port
Usage	int HTSetCommand(FR_DISABLE_PORT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_ENABLE_PORT
Description	Enable WAN port
Usage	int HTSetCommand(FR_ENABLE_PORT, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_GROUP_MEMBER_CMD
Description	Set card to be a member of group
Usage	int HTSetCommand(FR_GROUP_MEMBER_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_GROUP_START_CMD
Description	Start transmission if belong to group
Usage	int HTSetCommand(FR_GROUP_START_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_GROUP_STEP_CMD
Description	Send one frame if belong to group
Usage	int HTSetCommand(FR_GROUP_STEP_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_GROUP_STOP_CMD
Description	Stop transmission if belong to group
Usage	int HTSetCommand(FR_GROUP_STOP_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_NON_GROUP_CMD
Description	unset card from group
Usage	int HTSetCommand(FR_NON_GROUP_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_PVC_DELETE_ALL
Description	Delete all existing PVCs
Usage	int HTSetCommand(FR_PVC_DELETE_ALL, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_SET_START_CFG
Description	Start PVC, stream and IP subnet addr. config
Usage	int HTSetCommand(FR_SET_START_CFG, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_START_CMD
Description	Start transmission
Usage	int HTSetCommand(FR_START_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_STEP_CMD
Description	Sent one frame
Usage	int HTSetCommand(FR_STEP_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_STOP_CMD
Description	Stop transmission
Usage	int HTSetCommand(FR_STOP_CMD, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

iType1	FR_STREAM_DELETE_ALL
Description	Delete all existing streams
Usage	int HTSetCommand(FR_STREAM_DELETE_ALL, 0, 0, 0, NULL, iHub, iSlot, iPort) ;
No Related Structure	
Comment	

Appendix A:
Obsolete and Removed Commands

This section contains a list of commands (iType1 parameters) that are not supported in SmartLib 3.05. At this time, these commands have been removed *from the documentation only*.

Implemented in Later Release

These commands were prematurely documented. They will appear in the documentation once their functions are fully implemented. They do still exist in the header files.

L3_AGGR_LATENCY_DISTRIBUTION_INFO
L3_AGGR_RAW_TAGS_INFO
L3_AGGR_SEQUENCY_INFO
L3_AGGR_V2_LATENCY_INFO
L3_AGGR_V2_LATENCY_PER_STREAM_INFO

Obsolete

These commands were replaced with commands that support larger latency values. They are removed from the documentation only, and continue to function in SmartLib with *no changes necessary to existing code.*

L3_AGGR_LATENCY_INFO	(Substitute: L3_AGGR_V2_LATENCY_INFO when released.)
L3_AGGR_LATENCY_PER_STREAM_INFO	(Substitute: L3_AGGR_V2_LATENCY_PER_STREAM_INFO when released.)
L3_HIST_LATENCY_INFO	(Substitute: L3_HIST_V2_LATENCY_INFO.)
L3_HIST_LATENCY_PER_STREAM_INFO	(Substitute: L3_V2_LATENCY_PER_STREAM_INFO)
L3_HIST_LATENCY	(Substitute: L3_HIST_V2_LATENCY.)
L3_HIST_LATENCY_PER_STREAM	(Substitute: L3_V2_LATENCY_PER_STREAM, a combination histogram that includes Latency Per Stream.)
L3_HIST_LATENCY_PRECISION	(Not needed with new V2 Latency Histograms.)

Not Supported

These commands are not supported by the current Netcom Systems firmware. Prototype work was inadvertently included in the documentation. At this time, there are no plans to release the following commands. We regret any inconvenience this oversight might have caused you.

FR_802_3_STREAM_INFO
FR_ARP_STREAM_INFO
FR_CAP_CNT_INFO
FR_DEFINE_802_3_STREAM
FR_DEFINE_ARP_STREAM
FR_HIST_DATA_TYPE_INFO
FR_HIST_LATENCY_INFO

FR_HIST_LATENCY_PER_STREAM_INFO
FR_HIST_SUMMARY_INFO
FR_HIST_TYPE_INFO
FR_INPUT_MSG_CMD
FR_RESET_CARD_CMD
FR_SET_RELEASE_CAP_CNT
FR_VFD3_BUFFER
L3_CAPTURE_SPECIAL_TYPE
L3_DEFINE_802_3_STREAM
L3_DEFINE_MULTI_802_3_STREAM
L3_DEFINE_MULTI_UDPDHCP_STREAM
L3_DEFINE_UDPDHCP_STREAM
L3_MOD_802_3_STREAM
L3_MOD_UDPDHCP_STREAM
L3_DHCP_EXT_INFO
L3_DHCP_INFO
L3_DHCP_STATE_INFO
L3_DHCP_STATS_INFO
L3_DHCP_FORCE_EXCHANGE_DONE
L3_DHCP_INITIATE_REQUEST_AND_DECLINE
L3_DHCP_REBOOT_CURRENT_LEASE
L3_DHCP_RELEASE_CURRENT_LEASE
L3_DHCP_RENEW_CURRENT_LEASE
L3_DHCP_START_DISCOVER