

# WES/RS232/WESGate Client Interface User's Guide

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# Section 1. Introduction

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## 1-1. Overview

This document describes the operation of the WESgate Client, hereafter referred to as the Client. The Client is a process that runs on a WESstation and its purpose is to communicate with a WESGate server.

The WESGate server is a standard server process. It accepts requests messages from a client and returns response messages. The server is used to gather current process point information, file data, and historical data. For more information about the WESGate server refer to the “WESGate Interface User’s Guide” (U0-8701).

The Client uses the WESGate server to exchange data between two separate WDPF systems. It communicates over a RS-232 serial communication link or a TCP/IP Ethernet link.

An example of a client/server application is a Unit1-Unit2 data link. This application maps process point attributes and values from a group of points on Unit1 to points on Unit2.

The Client accepts request messages from a user interface window program to determine which operation to perform. A separate process exists to receive General Purpose Messages (GPMs) commands from a graphics program and convert these to user interface type request messages.

The Client performs the following functions:

- Periodically request process point data from the WESGate server and map the returned attributes and values to originated process points.
- Transfer a user specified file from the client system to the server system, or from the server system to the client system.
- Gather historical process point data to a file and transfer the file from the client system to the server system.
- Accept requests from a user interface to map process point data, transfer a file, or gather and send history data.

## 1-2. Contents of this Document

This document is organized into the following sections:

**Section 1. Introduction** provides an overview of the WESGate Client.

**Section 2. Hardware Configuration** describes the hardware required for the Client.

**Section 3. Software Configuration** describes the software configuration files for the Client.

**Section 4. Client Functions** describes the data exchange functions of the Client.

**Section 5. Startup and Status** discusses startup and operation of the Client software.

## 1-3. Reference Documents

Additional reference documents that may be useful are listed in [Table 1-1](#).

**Table 1-1. Reference Documents**

<b>Document Number</b>	<b>Title</b>	<b>Description</b>
<a href="#">M0-0003</a>	Self-Test Diagnostics	Describes the self-test diagnostics incorporated in the WDPF system.
<a href="#">U0-0131</a>	Record Types User's Guide	Describes point, system, and algorithm record types, and purpose and use of the records. Memory and performance capabilities for point records are also discussed.
<a href="#">U0-8100</a>	Operator WEstation User's Guide	Describes use of windows for viewing and controlling the current status of plant process control systems.
<a href="#">U0-8200</a>	Engineering WEstation User's Guide	Discusses Engineering WEstation functions (also known as the Software Development Station) for development and maintenance of application and system hardware.
<a href="#">U0-8700</a>	WEStation Data Link Server User's Guide	Describes configuration and operation of the WEstation Data Link Server, the Data Link Manager, and startup and shutdown.
<a href="#">U0-8701</a>	WESGate Interface User's Guide	Describes the operation of the server for this client process.

# Section 2. Hardware Configuration

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## 2-1. Section Overview

This section describes the hardware used by the Client to communicate with a RS-232 WESGate server. The Client and WESGate server are on separate WESstations and communicate through serial ports connected by a NULL Modem cable. The following components are described:

- WESstation with an RS-232 Serial Port ([Section 2-2](#))
- Data Link Server ([Section 2-3](#))
- TCP/IP Communication ([Section 2-4](#))

## 2-2. WEStation with RS-232 Serial Port

The Client software will run on any WEStation with an available RS-232 serial device driver.

A WEStation normally has two serial devices: /dev/ttya and /dev/ttyb. Additional serial devices can be provided by adding communication hardware such as the Central Data serial controller board. The Sun™ Microsystem Serial Parallel Controller card can also be used to supply up to eight additional serial ports to the WEStation.

The Client requires a text editor to create the configuration files that define the point groups and serial port attributes. Any WEStation equipped with a text editor can be used to perform this task (for example, an Engineering WEStation, also known as a Software Development Station).

### **Note**

An Engineering WEStation provides direct access to the applicable operating system, other drops, and the Westnet II Data Highway. Therefore, it is assumed that the user has a thorough understanding of the functionality of the WDPF systems and the operating system commands before using the Engineering WEStation functions (as described in “Engineering WEStation User’s Guide” (U0-8200)).

## 2-3. Data Link Server

The name Data Link Server (DLS) refers to a WEStation that is running data link subsystems and is connected to the Ethernet Information Highway and the WDPF Westnet II Data Highway. Its purpose is to accept and maintain a communication link from the client (remote computer device). The client uses this link to access information from the WDPF process control system. Process point information can be read from or originated to the Westnet II Data Highway.

The DLS executable files and the configuration files are maintained at the Software Server.

For additional information regarding the WEStation Data Link Server and its general functions, refer to the “WEStation Data Link Server User’s Guide” (U0-8700).

## 2-4. TCP/IP Communication

The executable file **dl\_tcp\_client** is used for TCP/IP communication to a WESGate Server. The **DL.Client.x.DeviceName** parameter is set to a socket number and the **DL.Client.x.RemoteHost** parameter is set to the hostname of the WESGate station. The available socket numbers are 1024 to 5000.

A separate ethernet controller card is normally used to support the connection. When an ethernet controller is added to a WESStation, a `/etc/hostname.aan` file is created to contain the hostname used by the extra controller. This hostname is then added to the `/etc/hosts` file.

# Section 3. Software Configuration

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## 3-1. Section Overview

The Client maps WDPF process point data received from the WESGate server to originated process points. To do this it uses two separate configuration files: the CONFIG.DL configuration file and the CLIENT.GROUP (point group) configuration file (described in [Section 3-3](#) and [Section 3-4](#), respectively). The CONFIG.DL file defines the hardware parameters such as serial device name and baud rate. The CLIENT.GROUP file defines the groups of process points that are mapped.

This section describes the following:

- System Setup ([Section 3-2](#))
- CONFIG.DL File ([Section 3-3](#))
- CLIENT.GROUP File ([Section 3-4](#))
- Executable File ([Section 3-5](#))

## 3-2. System Setup

This section describes the Client directory structure.

### 3-2.1. Directory Structure: for the Interface Software

The directory structure for the Client software is as follows:

The subdirectory **dl** is located under the  $\$(WDPF\_HOME)$  directory. The environment variable,  $\$WDPF\_HOME$ , is defined by the software package. It is usually set to **/usr/wdpf**.

The directory  $\$(WDPF\_HOME)/dl$  contains the following three subdirectories:

- **init**
- **config**
- **bin**

The  $\$(WDPF\_HOME)/dl/init$  directory contains the startup and shutdown script files as follows:

- **startup.dl**
- **start\_datalinks**
- **shutdown.dl**

The  $\$(WDPF\_HOME)/dl/config$  directory contains the configuration and point group files, as follows:

- **CONFIG.DL** (configuration file) - see [Section 3-3](#)
- **CLIENT.GROUP** (point group file) - see [Section 3-4](#)

The  $\$(WDPF\_HOME)/dl/bin$  directory contains the binary executables:

- **dl\_serial\_client** - see [Section 3-5](#)
- **dl\_tcp\_client**
- **dl\_gpm\_handler**

## 3-3. CONFIG.DL File

The Data Link Configuration File (CONFIG.DL) defines the parameters of the data links and the diagnostic points that are used to report the current status of the link. It defines attributes such as point group configuration file name, serial device name, baud rate, number of retries, and communication time-outs.

The CONFIG.DL file also resides on any WESStation that displays the Data Link Server (DLS) Manager. The DLS Manager is a user interface window program that contains a scrolling list of all the data link subsystems on the DLS station. The CONFIG.DL file is used to identify the name of each link and its associated link status point. The DLS Manager uses the status point of each data link subsystem to display its current status. For more information about the DLS Manager and the CONFIG.DL file, refer to the [“WESStation Data Link Server User’s Guide” \(U0-8700\)](#).

If multiple copies of the Client are run, then there must be multiple entries of parameters in CONFIG.DL. The entries should be labeled DL.Client.1, DL.Client.2, etc. The -l n command line argument is used to identify the set of configuration parameters used by the Client.

[Table 3-1](#) defines the parameters in a WESGate Client CONFIG.DL file.

**Table 3-1. WESGate Client Configuration File Parameters**

Parameter	Description	Valid Option	Default
DL.Client.x. DeviceName	Name of the RS-232 serial device	Up to 20 characters i.e /dev/sts/ttyC01	/dev/ttyb
DL.Client.x. BaudRate	Defines the data transmission rate for RS-232 communication	600, 1200, 2400, 4800, 9600, 19200, 38400	9600
DL.Client.x. StopBits	Sets the RS-232 communication stop bits	1 or 2	1
DL.Client.x. Parity	Sets the RS-232 communication parity	0 (None) 1 (Odd) 2 (Even)	0 No Parity
DL.Client.x. CharSize	RS-232 communication character size	7 or 8	8
DL.Client.x. ResponseTimeout	Number of milliseconds to wait for response	Integer	5000

**Table 3-1. WESGate Client Configuration File Parameters (Cont'd)**

<b>Parameter</b>	<b>Description</b>	<b>Valid Option</b>	<b>Default</b>
DL.Client.x. MaxCommErrors	Number of consecutive errors before communication fault is declared.	Integer	5
DL.Client.x. SyslogPriority	Priority of status messages to GMD	3 - 7 where: 3 = error 7 = debug	3
DL.Client.x. PointStatusMask	Determines which point status bits are mapped.	Use 0x0300 to map just quality bits.	0xFFFF
DL.Client.x. LinkName	Used by DLS Manager to display subsystem name	Up to 16 character string	None
DL.Client.x. LocalHost	Defines the local station name	For example, drop160	None
DL.Client.x. PointGroupDefFile	Defines the process point configuration file. i.e CONFIG.GROUP	The point group file must be in the ~/dl/config directory	None. This must be defined.
DL.Client.x. LinkStatusPoint	Defines the status point name	Name of originated PB point	None
DL.Client.x. LastCommPoint	Indicates the date and time of the last successful communication message.	Name of originated analog point	None
DL.Client.x. RestartProcedure	Defines the restart procedure (used by the DLS Manager)	\$WDPF_HOME/ dl/bin/dl_serial_client	None
DL.Client.x. LoopDelayTime	Defines the number of seconds between group value updates.	Integer (0 - 10000)	1
*DL.Client.x. AttributeRefreshCount	Defines the number of group value updates before a attribute update is performed.	Integer	-1
*DL.Client.x. TestMsgFile	When this is defined, the client will write status messages to the specified file. This is used for debug.	file name or stderr	none. Test mode is disabled.

**Table 3-1. WESGate Client Configuration File Parameters (Cont'd)**

<b>Parameter</b>	<b>Description</b>	<b>Valid Option</b>	<b>Default</b>
DL.Client.x. ClientType	This flag defines the type of client; 0 indicates Unit1-Unit2 client, 1 indicates Simulator link client.	integer	0 (Unit1/Unit2)
DL.Client.x. PingSlave	This is used by the TCP/IP Client to send a ping before a socket connect request.	true or false	false
DL.Client.x. RemoteHost	This is used by the TCP/IP Client to identify the WESGate Station.	hostname	none
DL.Client.x. UserInterfaceProc	This is used by the DLS Manager to display the user interface.	\$WDPF_HOME/dl/ bin/dl_groups_ui	none
DL.Client.x. GroupNumberPoint 0	Originated analog point contains the number of the received group mapped to the first originated group.	analog point name	none
DL.Client.x. GroupNumberPoint 1	Originated analog point contains the number of the received group mapped to the second originated group.	analog point name	none
DL.Client.x. GroupNumberPoint 2	Originated analog point contains the number of the received group mapped to the third originated group.	analog point name	none
* - Optional			

Figure 3-1 is an example of a CONFIG.DL file used by the WESGate Client to communicate with a RS232 WESGate server. Comment lines are indicated by semicolons (;). No comments are permitted on the same line as an argument.

```
; Name for link displayed on the DLS Manager
DL.Client.1.LinkName      : Unit1Unit2

; Hostname of Data Link Server WEstation
DL.Client.1.LocalHost    : drop83

; Name of point group configuration file
DL.Client.1.PointGroupDefFile  : U1U2.GROUP

; Priority of status messages sent to GMD
DL.Client.1.SyslogPriority : 3

; Main serial device parameters
DL.Client.1.DeviceName    : /dev/sts/ttyC01
DL.Client.1.BaudRate      : 19200
DL.Client.1.CharSize      : 8
DL.Client.1.StopBits      : 1
; 0 = no parity, 1 = odd, 2 = even
DL.Client.1.Parity        : 0

; Monitored by the DLS Manager to display status
DL.Client.1.LinkStatusPoint  : PB1002A

; Monitored by the DLS Manager to display transmit time
DL.Client.1.LastCommPoint   : AL1002A

; Used by the DLS Manager to restart link process
DL.Client.1.RestartProcedure : $WDPF_HOME/dl/bin/dl_serial_client -l 1

; 0 = Unit1 Unit2, 1 = Simulator link
DL.Client.1.ClientType     : 0

; Time between value update: 5
DL.Client.1.LoopDelayTime  : 1

; Number of loops between attribute update
DL.Client.1.AttributeRefreshCount : 1000

; response timeout in milliseconds
DL.Client.1.ResponseTimeout: 1000

; Declare a communication failure after this many errors.
; This produces a drop fault. The process will try to
; re-establish communication by sending an ENABLE request.
DL.Client.1.MaxCommErrors  : 5

; Write status messages to stderr when enabled
;DL.Client.1.TestMsgFile   stderr
```

**Figure 3-1. Example of CONFIG.DL File**

## 3-4. Client Group File

The CLIENT.GROUP file maps received process points from the server to originated process points on the Client system. The CLIENT.GROUP file resides in the \$WDPF\_HOME/dl/config directory and is specified by the **DL.Client.x.PointGroupDefFile** parameter. (Refer to the “[WEStation Data Link Server User’s Guide](#),” U0-8700, for more information on standard point group parameters.)

The exact same CLIENT.GROUP file is used by the client and the server. The client requests process point data from the server by referencing the group number. The first three groups in the file are the “originated” groups. These groups contain process points on the Client system. The following groups are referred to as the “received” groups. Point data for these groups are read from the server and written to the originated groups.

[Table 3-2](#) defines the parameters in a CLIENT.GROUP file.

**Table 3-2. CLIENT.GROUP File Fields**

Field	Description	Valid Option
name	Group name	16-character string
number	Group number	Integer
originated	Originated process points	True or false

The process point names for each group are listed after the group header information. The first point from a received group is mapped to the first point in an originated group, the second point from the received group is mapped to the second point of the originated group and so on. The point record types between the two groups do not have to match. The client will convert the value to match the originated point. The matching attributes between the two record types are mapped.

The number of points in the two mapped groups also does not have to match. The maximum point group size is 200 points.

An example of a CLIENT.GROUP file is illustrated in [Figure 3-2](#). Comment lines are indicated by (;) and (#).

### 3-4. Client Group File

```
#####
/FILE:          title="Client.GROUP"
# Point Group definition file for a Unit1-Unit2 data link.
# The client periodically requests point data from a received group
# on the server and maps the data to an originated group.
#####
#####
# map received data from the server to this point group
# This is the 1st point group, its index is 0
/GROUP:         name = "orig group 1", # group name
# The group name is displayed on the user interface.

                number = 1,      # group number
                originated = true

# all points are originated
DLX0010A      # COMPRESSOR STATUS
DLX0020C      # SWITCH 1 POSITION
ACX0230B      # LV X AMPS
DIX9393A      # SWITCHER 1 TRIP
DLOB191C      # WINDING TEMP QUALITY
ALV9933C      # XFMR HI SIDE Z AMPS

#####
# map received data from the server to this point group
# This is the 2nd point group, its index is 1
/GROUP:         name = "second group",
                number = 2,      # point group number
                originated = true

DIOR451A
DIOT453C
DIOY191C
DIOPI91D
DIOE191B
AI0C031B
AI0L031C
AI0S031A

#####

/GROUP:         name = "3rd originated",
                number = 3,      # point group number
                originated = true

GPOR392A
GPOT394D
GP0Y322C
```

**Figure 3-2. Example of CLIENT.GROUP File**

```
#####  
# This is the first received group.  
/GROUP:          name = "received grp1",  
                 number = 6,      # point group number  
                 originated = false  
  
# pointname, register, conversion type, gain, offset  
DM0B751A      # COMPRESSOR C STATUS  
DM0B413C      # DESICCANT DRYER C TROUBLE  
DM0B041A      # KK CKT SWITCHER 1 TRIP  
DM0B191C      # DF X WINDING TEMP QUAL  
DM0B491D      # DF Y WINDING TEMP QUAL  
DM0B151B      # PL WINDING TEMP QUAL  
AM0B031B      # XFMR2 HI SIDE Y AMPS  
AM0B031C      # XFMR2 HI SIDE Z AMPS  
  
#####  
# This is the second received group.  
/GROUP:          name = "2nd received",  
                 number = 91      # point group number  
DC0B861A      # DP COMPRESSOR E STATUS  
DC0B833A      # OD DESICCANT DRYER E TROUBLE  
DC0B491A      # DC X WINDING TEMP QUAL  
DC0B951B      # DF Y WINDING TEMP QUAL  
DC0B991C      # GJ WINDING TEMP QUAL  
AC0W231B      # XFMR4 HI SIDE Y AMPS  
AC0W621C      # XFMR4 HI SIDE Z AMPS  
AC0W221A      # XFMR4 TEMPERATURE  
  
#####  
# This is the third received group.  
/GROUP:          name = "3rd received",  
                 number = 23      # point group number  
GP0V861A      #  
GP0V833A      #  
GP0V491A      #  
#####
```

Figure 3-2. Example of CLIENT.GROUP File (Cont'd)

## 3-5. Executable File

The binary executable file **dl\_serial\_client** resides in directory \$WDPF\_HOME/dl/bin. This is used for serial communication. The **dl\_tcp\_client** file is used for TCP/IP communication.

Multiple instances of the executable file can run simultaneously on a single DLS. This allows the WESation to communicate with more than one WESGate server at a time. A group of parameters in the CONFIG.DL file is matched with its corresponding executable file through the use of a command line argument. For example, the executable should be started up as **dl\_serial\_client -l 2** to use the parameters that begin with DL.Client.2.

### 3-5.1. Command Line Arguments

Table 3-3 describes the command line arguments necessary to enable status messages.

**Table 3-3. Command Line Arguments**

Argument	Description	Function
-l subsystem number	Subsystem number	Identifies the subsystem. For example, -l 2 starts the second instance of the subsystem
-t display	HEX display	Displays the messages in HEX on the specified output device
-t menu	Menu test	Prints a menu to the screen for testing and debugging purposes

# Section 4. Client Functions

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## 4-1. Section Overview

This section discusses the communication protocol and the functional operation of the WESGate Client. It is divided into the following sections:

- Communication Protocol ([Section 4-2](#))
- Data Exchange Functions ([Section 4-3](#))

## 4-2. Communication Protocol

The Client supports RS-232 communication with a RS-232 WESGate server and TCP/IP communication with a TCP/IP WESGate server. The WESGate server communication protocol is described in the “[WESGate Interface User’s Guide](#)” ([U0-8701](#)). A NULL Modem serial cable is connected between the RS-232 Client’s WESStation and the server’s WESStation.

When the Client first starts it attempts to establish communication with the server. It does this by sending an ENABLE command. The server will return an ACK message if it is able to respond to requests. When the server is enabled the status of the Client on the DLS Manager will change from “on line” to “connected”.

The **DL.Client.x.ResponseTimeout** parameter defines the time (in milliseconds) that the Client will wait for a response before sending a retry. A communication failure is declared after an unsuccessful attempt to send a message. A communication fault is declared after the **DL.Client.x.MaxCommErrors** number of failures. A communication fault causes the Client to attempt to re-establish communication with the server.

## 4-3. Data Exchange Functions

The Client functions are initiated by a user interface program or a GPM command from a graphics program. The user interface programs that control the Client are specific to the application. The user interface for the Unit1-Unit2 link is different from the user interface for the Simulator link.

### 4-3.1. Map Process Point Data

The Client maps point data by requesting the attributes, value and quality of a point group on the WESGate server and writing the returned data to originated process points. The first point in a received group is mapped to the first point in the originated group and so on.

The point groups in the CLIENT.GROUP file are identified by index and group number. The first group has index 0, the second group has index 1 and so on. The first three groups are the originated groups. The points in these groups are originated by the WESStation that is running the Client. The remaining groups in the file are the received groups. The Client requests the current values of these points from the server by group number. The number of points in a group is limited to 200. The number of points in a received and originated group do not have to match.

The Client maps a received group to a originated group by first requesting the attributes of each point in the received group. This is done by sending a Current Attribute Request (message type 32). The returned attributes are written to the originated points. If the record type of the originated and received points do not match then only attributes that are the same are mapped. The returned EU field is written to the originated EU field and so on.

The Client then periodically requests the value and status of the points in the received group and writes the returned value and point status to the corresponding points in the originated group. The Current Point Data request (message type 21) is used to gather point data from the server. This is sent at one second intervals. The **DL.Client.x.PointStatusMask** determines which status bits are mapped. For example, this is set to 0x0300 to map only quality bits. All status bits are mapped by default.

The Client normally maps attributes only once after a group mapping is initialized. The **DL.Client.x.AttributeRefreshCount** parameter is used to cause the Client to update attributes after the given number of value updates. The **DL.Client.x.LoopDelayTime** parameter defines the time delay between value updates.

A user interface program or a GPM request is used to initiate or terminate point mapping from a received group to an originated group. When a group mapping is terminated the points in the originated group are set to BAD quality.

If a Client is identified by the **DL.Client.x.ClientType** parameter as a Unit1-Unit2 client, then it defaults to mapping group 3 to group 0, group 4 to group 1, and group 5 to group 2 at startup. The group mapping can then be changed or disabled by the Unit1-Unit2 user interface program (dl\_groups\_ui).

The process point types can be analog, digital, packed group (GP), or packed group alarm (BN). Refer to [“Record Types User’s Guide” \(U0-0131\)](#) for more information on point types.

### **4-3.2. Transfer Local File to Remote File**

The file transfer subpanel of the user interface allows the user to transfer a file from the client system to the server system. The local file refers to a existing file that is accessible from the WEStation that is running the Client. The remote file is created on the server’s file system.

The user enters the name and directory of the local file and the name and directory of the remote file and then selects the “initiate” button. The Client reads the file and sends a File Write command to the server. The server creates the file in its file system.

### **4-3.3. Transfer Remote File to Local File**

The file transfer subpanel of the user interface allows the user to transfer a file from the server system to the Client system. The local file refers to a file that is accessible from the WEStation that is running the Client. The remote file is a existing file on the server’s file system.

The user enters the name and directory of the local file and the name and directory of the remote file and then selects the “initiate” button. The Client sends a Read File request to the server. The returned file data is written to the local file name. The local file is created if necessary.

### **4-3.4. Transfer Historical Data to Remote File**

The Client can be requested to gather historical data for a selected point group into a file and send the file to the server. The History Transfer subpanel of the user interface allows the user to enter the start time, number of samples, and interval time of the history request. The user also enters the name and directory of the file on the server where the history data is to reside. When the user selects the “initiate” button, the Client sends a retrieval request for historical snapshot data to the Historical Data and Retrieval Station for the currently selected point group. The returned data is written to a file and the file is sent to the server.

The format of the file is the same as that of the files returned by the HSR Station retrieval library calls. If the selected point group is longer that 16 points then multiple files will be transferred. Each file contains history data for 16 points and a sequence number is appended to the file name.

### 4-3.5. Accept GPM Command to Map Point Data

A graphics program can initiate or change the process point mapping from the server to the Client by sending a GPM command. The Client treats this request the same as a mapping request from the Client user interface.

The **dl\_gpm\_handler** process receives a GPM command from the graphics program and transfers the command to the Client. Since more than one Client can run on a WESStation, the GPM handler uses command line arguments to identify the intended Client. Each GPM contains an index number to identify the Client. The **dl\_gpm\_handler** process is started with the prefix of the CONFIG.DL parameters of the allowed Clients.

For Example, if the process is started like:

```
dl_gpm_handler DL.Client.3 DL.Client.6 DL.Client.1
```

and a GPM was received with an index number of 1 then the command would be transferred to the Client with CONFIG.DL parameter prefix DL.Client.6.

The structure of the GPM command is:

```
typedef struct {  
    unsigned short reserved;    /* unused */  
    unsigned short command;    /* command type */  
    unsigned short datalink;    /* index of datalink 0, 1, 2... */  
    short group1;    /* receive group 1 index */  
    short group2;    /* receive group 2 index */  
    short group3;    /* receive group 3 index */  
} GPM_MESSAGE
```

GPM type 63 is used. The command field is set to 1 to initiate the groups. It is set to 2 to terminate the groups. The group1, group2, group3 fields contain the index into the point group of the received point group to be mapped to an originated group. A value of -1 causes no point group to be mapped.

# Section 5. Startup and Status

---

## 5-1. Section Overview

This section discusses the Client startup and status operations. It is divided into the following sections:

- Startup ([Section 5-2](#))
- Client Status ([Section 5-3](#))
- Shutdown ([Section 5-4](#))

## 5-2. Startup

The Client is started when the WEstation is booted. It can also be restarted by using the Query/Download function at an Operator WEstation. Refer to “Engineering WEstation User’s Guide” (U0-8200) for more information on the Query/Download function.

The **startup.dl** file in the \$WDPF\_HOME/dl/init directory is configured to start the Client. This script file is executed when the station boots up and when the “restart applications” Query/Download button is selected.

The \$WDPF\_HOME and \$WDPF\_PDIR environments variable should be set before starting the software. (These are mentioned here for verification purposes only. No new environment variables need to be set for this software.)

The Client can also be started and shutdown by using the DLS Manager. The **DL.Client.x.RestartProcedure** parameter enables the “startup” and “shutdown” buttons on the DLS Manager.

## 5-3. Client Status

Diagnostic capabilities of the Client software include the following:

- Link status process points
- Configuration parameters that enable error and status messages to be sent to the screen or to a specified output file.
- Drop fault report that identifies an error.

### 5-3.1. Link Status Points

#### Link Status Point

The status of the Client is indicated by the value of a packed digital (PB) point which is broadcast on the WDPF highway. This point is an originated point on the WEstation and must be specified in the CONFIG.DL file in the **DL.Client.x.LinkStatusPoint** parameter. If no point is specified in the CONFIG.DL file then this feature is disabled. This point is used by the DLS Manager to display the status of the data link.

The link status point has a 32-bit value. The current message count, last reported error code, and subsystem status are mapped to this point. Description of each applicable bit is provided below.

- Bits 0 - 7 indicate the link status.
  - 0 = Shutdown
  - 1 = Alive
  - 2 = Enabled
  - 4 = Connected
  - 8 = Backup
- Bits 8 - 15 indicate the error codes.
  - 109 = SHC initialization error
  - 201 = Device initialization error
  - 212 = Received invalid message
  - 213 = Invalid message length
  - 215 = Error in reading the message
  - 223 = Invalid message type
- Bits 16 - 19 are not applicable.
- Bits 20 - 32 indicate the message count.

## Last Communication Point

The last communication point (**DL.Client.x.LastCommPoint**) is an analog point that contains the timestamp of the last transmitted message. The timestamp is the number of seconds since the beginning of the year. This is used by the DLS Manager to display the last communication time. This point can also be used as an activity indicator. The interface is inactive if this point does not change value. This point is set to zero at startup.

### 5-3.2. Error Reporting

The software uses the syslog error logging facility under UNIX®. Error and status messages are sent to the syslog and are reflected on the General Message Display of the Operator Station (since the DLS drop normally does not have a monitor).

For diagnostic purposes, the **dl\_serial\_client** routine can be started from a shell tool. If the **DL.Client.x.TestMsgFile** configuration parameter is defined then error and status messages are written to the specified output file. This feature is used for debugging and is not normally enabled.

The messages displayed depend upon the warning level (priority code) specified by the **DL.Client.x.SyslogPriority** parameter in the CONFIG.DL file. If the priority code is set to 3, then all messages above and including level 3 are displayed. The priority code numbers used by the Client range from 3 to 7; 3 is for error messages and 7 is for debug messages. The various warning levels are listed in [Table 5-1](#).

**Table 5-1. Priority Levels for Error Logging**

Message	Priority Codes	Condition
LOG_EMERG	0	System is unusable
LOG_ALERT	1	Action must be taken immediately
LOG_CRIT	2	Critical conditions
LOG_ERR	3	Error conditions
LOG_WARNING	4	Warning conditions
LOG_NOTICE	5	Normal but significant conditions
LOG_INFO	6	Informational messages
LOG_DEBUG	7	Debug Level messages

### 5-3.3. Drop Fault

If the subsystem detects an unrecoverable error, it declares a drop fault and aborts. (An example of an unrecoverable error is a missing CONFIG.GROUP file.) A drop fault does not affect the other subsystems on the drop.

The drop fault description is shown on the Drop Details Diagram of the system status display. Refer to “[Self-Test Diagnostics](#)” (M0-0003) for more information on drop faults.

The drop fault report consists of the current drop Fault Code, Fault ID, and Fault Parameters 1 and 2. The Fault ID identifies the subsystem (Reliance Interface) and the Fault Parameters identify the failure (SHC error, missing configuration file, communication device failure). The Fault Code for data links is **190**, and the Fault ID for the Client is **8**.

Fault Parameter 1 identifies the device that failed. Fault Parameter 2 is the error code of the device that failed. The possible fault codes are listed in [Table 5-2](#).

**Table 5-2. Drop Fault Parameters**

<b>Fault Parameter 1</b>	<b>Fault Parameter 2</b>	<b>Description</b>
1	0	Missing configuration file
2	0	Serial port error
3	errno.h	System call error
4	spd.h	System point directory error
6	shc_err.h	SHC error
14	0	Unscheduled exit
Note: Fault Code = 190; Fault ID = 8.		

## 5-4. Shutdown

The Client can be shut down using the Data Link Server Manager.

Upon shutdown, the Client sends a Disable request to the server and then sets all the originated points from the CLIENT.GROUP file to Bad quality.

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