3-Diagnostics Services Menu

3- Diagnostics Services Menu

Main Menu Diagnostics Services

The Diagnostics Services menu provides real-time diagnostics about various network and protocol processes running in the RediGate. Options are provided to help diagnose system problems, communication errors, view data obtained from field devices, etc.

Enter **3** at the Main Menu for the Directory Services menu.

```
================ Diagnostic Services ==============
ElecSys(V:5.7.2017-08-24-1000)  Wed Sep  6 19:31:54 2017
RediGate120E : 1 @ 0.0.0.0  REDIGATE  <46247-0002>-SerialNumb
-------------------------------------------
  1) System Status          2) Network Interfaces
  3) Run Time and Loading   4) System Resources
  5) Task Status            6) Task Diags
  7) Channel Status         8) Channel Diags
  9) Rtu Status            10) Rtu Diags
 11) Rtu Clear             12) Slave Diags
 13) IP Route Table        14) Ping Service
 15) RTDB Status           16) RTDB Diags
 17) MQtt Status           18) RTDB Data Dump
 19) Dial Backup          510) Trend a Point
535) View Custom Rpt
                           99) Monitor Diag's

Make selection:
```

Debug Levels

Menu options 6, 8, 10, 12, and 16 are used to enable or disable various RediGate task diagnostics to a certain level of detail. Use option 99 (Monitor Diagnostics) to view the real-time activity based on the task diagnostic levels that have been set. If a certain event in the system occurs which is at or below the current Debug Level for that task, the message will appear in the diagnostics display. Menu option 5 shows the current list of Debug Level for all tasks.

Following is a description of the diagnostic Debug Levels:

- **0 = Fatal Errors** – This is the *least detailed* type of debugging that can be selected. Such an event is fatal to system operation, effectively ending task operation.
- **1 = General Errors –** These are operational or system errors that are not fatal in nature.
- **2 = Status Messages** – (default) These are informational messages which describe important task status changes, etc.
- **3 = Data Displays** – Somewhat more detailed display of protocol message headers or system events.
- **4 = Data Dumps** – This is the *most detailed* level of diagnostic logging. All events relating to the system task are displayed in Monitor Diagnostics when this option is selected. For some tasks, this includes hex dumps of bytes sent or received.

1- System Status

Main Menu Diagnostics Services System Status

View certain system condition of the RediGate operating code, including the Linux build information and current message queues.

Enter **1** for the System Status menu, and press Enter through the following sets of information.

The Message Queues include message queue ID, owner and permissions of the task, and the number of used bytes and messages. For most users, this information is low-level and not too useful, but occasionally it can be informative of problems if one task is taking up a growing number of used bytes, or if the list of message queues continues to grow longer.

```
Make selection: 1

================ System Status ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------

Linux UnitName 3.15.10-00073-ge03f088 #0 PREEMPT Thu Nov 20 10:42:18 CST 2014 armv5tel
```

```
GNU/Linux

Press ENTER to continue


------ Message Queues --------
key        msqid      owner      perms      used-bytes   messages
0x00000290 0          root       666        0            0
0x00002dc8 1409025    user       666        0            0
0x00000bed 720899     root       666        0            0
0x00000bf2 753668     root       666        0            0
0x00000bf6 786437     root       666        0            0
0x00000bfa 819206     root       666        0            0
0x00000bff 851975     root       666        0            0
0x00000c05 884744     root       666        0            0
0x00000c06 917513     root       666        0            0
0x00000c07 950282     root       666        0            0
0x00000c09 983051     root       666        0            0
0x00000c0c 1015820    root       666        0            0
0x00000c0e 1048589    root       666        0            0
0x00000c0f 1081358    root       666        0            0
0x00000c10 1114127    root       666        0            0
0x00000c12 1146896    root       666        0            0
0x00000c14 1179665    root       666        0            0
0x00000c16 1212434    root       666        0            0
0x00000c18 1245203    root       666        0            0
0x00000c19 1277972    root       666        0            0
0x00000c5f 1376277    root       666        0            0
0x00000c1a 1310742    root       666        0            0
0x00000c1b 1343511    root       666        0            0


Press ENTER to continue
```

2- Network Interfaces

Main Menu Diagnostics Services Network Interfaces

View IP addresses of network interfaces and socket status information (Linux commands `ifconfig` and `netstat`).

Enter **2** for Network Interfaces, then enter **Y** to view the socket statuses.

> **NOTE** that in older RediGate tarballs prior to September 2017, this menu only worked if you logged in as 'root' first, then superuser to the user account.

```
Make selection: 2

================ Network Interfaces ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-----------------------------------------------
eth0      Link encap:Ethernet  HWaddr 82:49:22:2B:82:A6
          inet addr:10.63.191.28  Bcast:10.63.255.255  Mask:255.255.0.0
          inet6 addr: fe80::8049:22ff:fe2b:82a6/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:19565659 errors:0 dropped:83411 overruns:0 frame:0
          TX packets:77491 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1376149850 (1.2 GiB)  TX bytes:6030078 (5.7 MiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:412 errors:0 dropped:0 overruns:0 frame:0
          TX packets:412 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:37684 (36.8 KiB)  TX bytes:37684 (36.8 KiB)
```

```
ppp0      Link encap:Point-to-Point Protocol
          inet addr:10.12.0.15  P-t-P:10.12.0.15  Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:11 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:3
          RX bytes:424 (424.0 B)  TX bytes:61 (61.0 B)

Do you want to see Socket Statuses (Y/N) ? y

Press SPACE to page forward...
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0      0 10.63.191.28:22         10.242.3.2:65199        ESTABLISHED
tcp        0      0 :::22                   :::*                    LISTEN
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node Path
unix  14     [ ]         DGRAM                    2214 /dev/log

Press ENTER to continue...
```

3- Run Time and Loading

Main Menu Diagnostics Services – Run Time and Loading

View the amount of time the Linux system has been running (in days and hours:minutes) and the state of processor loading (Linux command `uptime`).

Enter **3** for Run Time and Loading.

```
Make selection: 3

================ Run Time ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------

Local_Time    Up_Time   0.0=IDLE =>  1 min 5 min 15 min  <= 1.00=BUSY
----------    -------                -----  -----  ------
 18:47:04 up 11 days, 12:47,  load average: 2.89, 3.35, 3.43

Press ENTER to continue
```

4- System Resources

Main Menu Diagnostics Services System Resources

View the amount of RAM and Flash memory that is used and free (Linux commands `free` and `df`).

Enter **4** for System Resources.

```
Make selection: 4

================ System Resources ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------

System RAM (1k-blocks)
             total         used         free       shared      buffers
Mem:        253988        23296       230692            0            0
-/+ buffers:              23296       230692
Swap:            0            0            0


System FLASH

Filesystem           1K-blocks      Used Available Use% Mounted on
ubi0:rootfs              57476     22804     34672  40% /
```

```
devtmpfs                126872         0    126872   0% /dev
tmpfs                   126992         0    126992   0% /dev/shm
tmpfs                   126992       152    126840   0% /tmp

Press ENTER to continue
```

5- Task Status

Main Menu Diagnostics Services Task Status

View the Debug Level for all running processes in the RediGate code. The Debug Level is used for RediGate task logging and can be set using menu option 6 and others. Real-time diagnostics can be viewed using menu option 99 - Monitor Diagnostics.

Enter **5** for Task Status.

The tasks are numbered sequentially (referred to as "slot numbers"), starting from 0. The name following each task is the mnemonic that appears in the real-time view as events occur.

The word following the task name (Status, Display, Dump, etc.) indicates the current Debug Level of the task (see Debug Levels).

Tasks are marked with All, None, or Some, to indicate whether debugging is enabled/disabled for all or part of the units associated with that task.

```
Make selection: 5

================ Task Status ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
                13 PROCESSES

    0 - WATCHDOG Status  ( All)    7 - CH01XDBM Status  ( All)
    1 - CHANNL00 Status  ( All)    8 - DNPMST01 Status  ( All)
    2 - CHANNL01 Status  ( All)    9 - CHN01SCN Status  ( All)
    3 - CHANNL15 Status  ( All)   10 - CH15XDBM Status  ( All)
    4 - CH00XDBM Status  ( All)   11 - VIRTMS15 Status  ( All)
    5 - DNPMST00 Status  ( All)   12 - CHN15SCN Status  ( All)
    6 - CHN00SCN Status  ( All)
Redisplay (Y/N) ?
```

6- Task Diags

Main Menu Diagnostics Services Task Diags

Set the Debug Level for a process. (You can also set Debug Levels by using option 8 for Master Channel diagnostics, 10 for Field Unit protocol diagnostics, 12 for Slave Channel diagnostics, or 16 for RTDB diagnostics.) Use option 99 - Monitor Diagnostics to observe the real-time diagnostics of each task after setting the Debug Levels.

Enter **6** for Task Diags.

```
Make selection: 6

================ Task Diagnostics ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
                13 PROCESSES

    0 - WATCHDOG Status  ( All)    7 - CH01XDBM Status  ( All)
    1 - CHANNL00 Status  ( All)    8 - DNPMST01 Status  ( All)
    2 - CHANNL01 Status  ( All)    9 - CHN01SCN Status  ( All)
    3 - CHANNL15 Status  ( All)   10 - CH15XDBM Status  ( All)
    4 - CH00XDBM Status  ( All)   11 - VIRTMS15 Status  ( All)
    5 - DNPMST00 Status  ( All)   12 - CHN15SCN Status  ( All)
    6 - CHN00SCN Status  ( All)
Task Slot Number (0 to 12) ? 5
```

First, enter the Task Slot Number from the numbers that are listed. Depending on the task you have selected, you will have to enter a number of other information, starting with the new Debug Level that you wish to enable. **NOTE**: The Debug Level is GLOBAL for this task; i.e., it applies to all units (Node Addresses) associated with this task. If you wish to enable debugging for only one (or more) Field Unit or Node Address on a task, see NOTE below for Enable/Disable.

```
   Task DNPMST00  Status ( All)

Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 or 'S'tats ? 4
```

If prompted, enter a Node Address within the task to which the diagnostics status will be applied. For master protocol tasks, this will be the Field Unit Address of the device being monitored. For other task types, other information will be prompted to identify the scope of the diagnostic level being applied.

```
Enter Node Address for Slot=5 (-1 for all) 1
```

If prompted, enter 1 to enable the diagnostics for the task, or 0 to disable diagnostics for the Node Address (or All).

```
Enter 0=Disable : 1=Enable [Default=1] ? 1
```

Enable/Disable
NOTE: If a task controls multiple Node Addresses (such as Field Units), diagnostics for each Node Address can be enabled or disabled separately. One or more units may have debugging enabled simultaneously—enabling diagnostics for a single unit does not automatically disable diagnostics for all the others.

For instance, to enable diagnostics for only 3 out of 10 Field Units on a master channel, first Disable diagnostics for "All" units; then select the Task Diagnostics menu multiple times to Enable diagnostics for only certain Field Unit node addresses. The last Debug Level selected applies to **ALL enabled units** controlled by this task.

After entering all information related to the task Debug Level modification, a single line output will indicate the change in status, and the list of tasks will generally be shown again.

```
Setting DNPMST00 to Level Dump

                13 PROCESSES

    0 - WATCHDOG Status  ( All)    7 - CH01XDBM Status  ( All)
    1 - CHANNL00 Status  ( All)    8 - DNPMST01 Status  ( All)
    2 - CHANNL01 Status  ( All)    9 - CHN01SCN Status  ( All)
    3 - CHANNL15 Status  ( All)   10 - CH15XDBM Status  ( All)
    4 - CH00XDBM Status  ( All)   11 - VIRTMS15 Status  ( All)
    5 - DNPMST00 Dump    ( All)   12 - CHN15SCN Status  ( All)
    6 - CHN00SCN Status  ( All)
Task Slot Number (0 to 12) ?
```

Once you have modified the Debug level for all tasks that you wish to change, press Enter to return to the Diagnostics Services menu.

7- Channel Status

Main Menu Diagnostics Services Channel Status

View the status of Master Channels.

Enter **7** for Channel Status. If any Master Channels or Internal Channels are configured in the RediGate, the following information is displayed:

- Master Channel number from configuration
- Master Channel name from configuration
- Current channel status (see Master Channel Status Indications for a list of status values)
- Number of Field Units (RTUs) configured on the channel
- System timestamp of the last event on the channel.

```
Make selection: 7

================ Channel Status ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
```

```
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          w/Errors     1  Sat Dec 11 19:34:32 1999
   1 Channel1          w/Errors     1  Sat Dec 11 19:34:33 1999
  15 Channel15         Normal       1  Tue Nov 30 06:00:02 1999

Redislay (Y/N/D where D is Debug List) ?
```

If you enter 'D' for Debug List, an additional list of FieldUnit statuses will be shown:

- FieldUnit Address from configuration
- FieldUnit Name from configuration
- Status of debugging (enabled or disabled) for the FieldUnit
- Protocol enumeration as it appears in the Task List
- Status (see RTU Status for a list of these indications)

```
Redislay (Y/N/D where D is Debug List) ? d


Enter a Channel Number (0 to 15) ? 0


 Addr Name             Dbg? Protocol Status
----- ---------------- ---- -------- ------
    1 DNP3 Field Unit  ON   DNPMST00 Timeout
Press ENTER
```

Master Channel Status Indications

Values for the Master Channel status are:

- **Good** - Channel is enabled and received response from the last field device polled.
- **No Polls** - No polls are being sent. This may indicate that the Channel has been disabled, all Field Units are disabled, or no polls are configured
- **w/Error** - The channel has received an error sometime since the last time the Channel status was requested. This error may have happened a long time in the past, but if there are no further errors, the next refresh of the Channel status should show Good.
- **Fatal Er** - A fatal error has occurred, which has disabled the operation of the channel.

8- Channel Diags

Main Menu Diagnostics Services Channel Diags

Set the Debug Level for one or more Master Channels. Use option 99 to monitor live diagnostics after setting the Debug Level.

Enter **8** for Channel Diags. Enter the number of the Master Channel or Internal Channel for the FieldUnit that you want to change Debug Level. (See Master Channel Status Indications for a list of status values.)

```
Make selection: 8

================ Channel Diags ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          w/Errors     1  Tue Dec 14 09:37:32 1999
   1 Channel0          w/Errors     1  Tue Dec 14 09:37:31 1999
  15 Channel15         Normal       1  Tue Nov 30 06:00:02 1999

Enter Channel (0 to 15) ? 0
```

Enter the new Debug Level that you wish to enable for this FieldUnit.

```
Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 ? 4
```

Enter the FieldUnit Address to which the diagnostics status will be applied, or -1 to apply this change to all FieldUnits on the channel.

Enter 1 to enable the diagnostics for the FieldUnit, or 0 to disable diagnostics.

```
 Addr Name             Dbg? Protocol Status
----- ---------------- ---- -------- ------
    1 DNP3 Field Unit  ON   DNPMST00 Timeout

Enter RTU Address (-1 for all) ? 1

Enter 0=Disable : 1=Enable [Default=1] ? 1
```

After entering all information related to the task Debug Level modification, a single line output will indicate the change in status, and the list of tasks will generally be shown again.

```
Setting Scan-Rtu 1 to Enable Dump

================ Channel Diags ==============
ElecSys(V:5.7.2017-08-07-1200)  Sun Sep  3 21:17:07 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          w/Errors     1  Tue Dec 14 09:37:57 1999
   1 Channel0          w/Errors     1  Tue Dec 14 09:37:56 1999
  15 Channel15         Normal       1  Tue Nov 30 06:00:02 1999

Enter Channel (0 to 15) ?
```

Once you have modified the Debug level for all FieldUnits that you wish to change, press Enter to return to the Diagnostics Services menu, or enter another channel number.

9- RTU Status

Main Menu Diagnostics Services RTU Status

List diagnostic information about Circuits and Field Units under a Master Channel.

Enter **9** for RTU Status. Enter the Master Channel number to view Channel, Circuit, and Field Unit status. Or enter **-1** to view the status for units on all channels.

(See Master Channel Status Indications for a list of status values.)

```
================ Rtu Status ==============
ElecSys(V:5.7.2017-08-07-1200)  Mon Aug 14 02:10:12 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          Normal       3  Mon Aug 14 02:10:07 2017
   2 Master Channel    w/Errors     1  Mon Aug 14 02:02:14 2017
  15 Channel15         Normal       1  Mon Aug 14 02:02:14 2017

Enter Channel (0 to 15, -1 for all) ? 0

  -----------------RTU----------------   -----POLL-------  -------ERRORS-------
 Addr Name             Protocol Status     Time     Count  TimOut BadData Frame
----- ---------------- -------- -------- -------- -------- ------ ------- -----
    1 Modbus01         MBMAST00 PollDone 02:10:07        9      2       0    0
    2 Modbus02         MBMAST00 Timeout  02:09:15        0      9       0    0
    3 Modbus03         MBMAST00 Polling  02:09:15        7      2       0    0

Redisplay (Y/N/E where E is Extended Info) ?
```

See Channel Status for details on the Master Channel status information.

All configured Field Units are listed with status, one per line.

- **Addr** – FieldUnit address from configuration
- **Name** – FieldUnit name from configuration
- **Protocol** – Enumeration indicating both the protocol and Master Channel instance number. For example, MBMAST00 refers to Modbus Master protocol on Channel 0. The Protocol enumeration is also used for diagnostic messages in the Monitor Diagnostics log.
- **Status** – Current state of each Field Unit.
    - **PollDone** - Device is in communication and last poll was completed successfully.

    - **Timeout** - Last poll to device timed out with no valid response.
    - **BadData** - Last poll received some data but it was not a correct expected response (including an exception code).
    - **FrameErr** - Last poll received a framing error (possibly part of the message was received but not all – ?? check with John)
    - **Stopped** - Field Unit or Channel is disabled or not being polled
    - **Polling** - Poll has been sent but response not yet received, or a response to one poll has been received but not all polls are completed, so the device status cannot be completely confirmed yet.
    - **No Polls** - No polls have been sent to Field Unit since last restart.
- **Time** – Last time the Field Unit was accessed (started, polled, command sent).
- **Count** – Number of polls which have successfully received a response.
- **TimOut** – Number of polls which have timed out after all configured retries.
- **BadData** – Number of polls which have received a bad data response.
- **Frame** – Number of polls which have received a framing error response.

If the Extended Info option is select by entering **E**, more information is displayed showing the configuration of the various port configurations (Async or Network Circuit).

```
Redisplay (Y/N/E where E is Extended Info) ? e

                                Attempts_Per_Poll
  Add Unit            Dbg Circuit Last Clear  Boot  Type   Port
----- --------------  --- ------- ---- -----  ----  -----  ----
    1 Modbus01         ON CONNECT    1   1.0   1.0 TCP/IP  192.3.1.11:3040
    2 Modbus02         ON CONNECT    4   4.0   4.0 DIRECT  COM02 19200 NONE
    3 Modbus03         ON CONNECT    1   1.0   1.0 TCP/IP  192.3.1.11:3040
Press ENTER...
```

The Address and Field Unit name are the same as above. Other circuit information is given for each device.

- **Dbg** – ON or OFF depending on whether debugging is enabled or disabled for this unit.
- **Circuit** – CONNECT if the configured serial port can be connected to successfully, or DISCONNECT if the port cannot be accessed.
- **Last** – Number of poll attempts on the last poll to either receive a response or time out.
- **Clear** – Average number of poll attempts per poll since the poll counters were last cleared.
- **Boot** – Average number of poll attempts per poll since last reboot.
- **Type** – DIRECT for a serial connection or TCP/IP for a network circuit.
- **Port** – For serial ports, indicate the comm port number, baud rate, and parity (NONE, FULL for hardware handshaking, or TIME for timed RTS handshaking). For TCP/IP ports, indicate the IPaddress:port of the network circuit.

10- RTU Diags

Main Menu Diagnostics Services RTU Diags

Set the Debug Level for diagnostic monitoring of Master Channel protocol messages to a Field Unit. Use option 99 to monitor live diagnostics after setting the Debug Level.

Enter **10** for RTU Diags. Enter the number of the Master Channel or Internal Channel for the FieldUnit that you want to change Debug Level.

(See Master Channel Status Indications for a list of status values.)

```
Make selection: 10

================ Rtu Diags ==============

ElecSys(V:5.7.2017-08-07-1200)  Mon Aug 14 02:10:12 2017
UnitName : 1 @ 192.3.1.10  REDIGATE  <46247-0004>-SerialNumb
-------------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          Normal       3  Mon Aug 14 02:10:07 2017
   2 Master Channel    w/Errors     1  Mon Aug 14 02:02:14 2017
  15 Channel15         Normal       1  Mon Aug 14 02:02:14 2017

Enter Channel (0 to 15, -1 for all) ? 0
```

Enter the new Debug Level that you wish to set for Field Units on this Channel.

NOTE: the Debug Level applies to **all** Field Units of the same protocol under this Master Channel. (To see diagnostics for only some Field Units on a channel, you must disable diagnostics on the other units.)

```
Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
```

```
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 ? 4
```

Enter the FieldUnit Address to enable at the above diagnostics level, or -1 for all FieldUnits on the channel.

Enter 1 to enable the diagnostics for the FieldUnit(s), or 0 to disable diagnostics.

```
Enter RTU Address (-1 for all) ? 1

Enter 0=Disable : 1=Enable [Default=1] ? 1
```

After entering all information related to the task Debug Level modification, a single line output will indicate the change in status, and the list of tasks will generally be shown again.

```
Setting Prot-Rtu 1 to Enable Dump


Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 ?
```

Once you have modified the Debug level for all FieldUnits on this channel that you wish to change, press Enter to return to the Diagnostics Services menu.

11- Rtu Clear

Main Menu Diagnostics Services RTU Clear

Clear polling statistics for a Field Unit, or all Field Units on a Master Channel.

Enter **11** for Rtu Clear. Enter the Master Channel number, and either clear statistics all devices or enter the unit address to clear.

```
Make selection: 11

================ Rtu Clear ==============
ElecSys(V:5.7.2017-08-24-1000)  Mon Dec  6 05:15:36 1999
DNPMastTest : 1 @ 10.63.191.28  REDIGATE-400  <38258-0025>-SerialNumb
-------------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          Normal       1  Mon Dec  6 05:15:33 1999
   1 Channel0          Normal       1  Mon Dec  6 05:15:34 1999
  15 Channel15         Normal       1  Tue Nov 30 06:00:02 1999

Enter Channel (0 to 15) ? 0


Clear All Rtus (Y/N) ? n

  -----------------RTU----------------   -----POLL-------  -------ERRORS-------
 Addr Name             Protocol Status     Time     Count  TimOut BadData Frame
----- ---------------- -------- -------- -------- -------- ------ ------- -----
    1 DNP3 Field Unit  DNPMST00 PollDone 05:15:39   111713     30       0    0
Enter Rtu to Clear ? 1

Clearing Rtu 1 Status Counters


Clear All Rtus (Y/N) ?
```

12- Slave Diags

Main Menu Diagnostics Services Slave Diags

Set the Debug Level for a Slave Channel, or view statistics on a Slave Channel.

Enter **12** for Slave Diags. Enter the enumeration, starting from 0, for the Slave Channel you wish to view or set.

Slave Channels are identified with a short name plus the numeric instance number of the task. Network Slave Channels may either end with a 'd' (for the listening socket) or a number (for an active socket connection). Examples:

- DNPSLAV0 = DNP Async Slave Channel, instance number 0
- MBNSL00d = Modbus Network Slave Channel 'daemon' (listening socket), instance number 0. This is the task that waits for incoming connections, and then spawns a separate task handling the active socket connection. If you set the Debug Level for this task, then any future connections to the socket will inherit the same Debug Level.
- MBNSL001 = Modbus Network Slave Channel (active socket connection #1), instance number 0. Many device protocol servers allow multiple simultaneous sockets to the same port. If you set the Debug Level for this task, it only applies to the current host connection to the socket. Once the socket connection is closed, the 'daemon' process controls the Debug Level of future connections.

```
Make selection: 12

================ Slave Status/Diagnostics ==============
ElecSys(V:5.7.2017-08-30-1300)  Mon Dec  6 05:18:07 1999
powirv : 1 @ 10.63.191.29  ZEUS-3.12 <Use System Serv Option-123>
-------------------------------------------
    0 - DNPSLAV0 Status  ( All)    1 - DNPSLAV1 Status  ( All)
    2 - DNPSLAV2 Status  ( All)    3 - DNPSLAV3 Status  ( All)
    4 - MBNSL00d Status  ( All)    5 - MBNSL001 Status  ( All)

Task Slot Number (0 to 4) ? 0

   Task DNPSLAV0   Status ( All)

Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)
```

If you enter 'S' for Status instead of a Debug Level, the statistics for the Slave Channel will be displayed: polls received, responses sent, time of last poll, number of configured Slave Attach units, Slave address number, Channel/RTU of the attachment, and other information about the Slave Channel.

```
Debug Level 0-4 or 'S'tatus ? s


Slave Status

  Poll Received=3559767
  Response Sent=49964436
  Last Poll   @ Mon Dec  6 05:18:13 2016
  Numb Attachments=1

  SlaveID=1    From: Chan=15 Rtu=3
  Serial Port COM0 @ 0 baud

Press ENTER

================ Slave Status/Diagnostics ==============
ElecSys(V:5.7.2017-08-30-1300)  Mon Dec  6 05:18:18 1999
powirv : 1 @ 10.63.191.29  ZEUS-3.12 <Use System Serv Option-123>
-------------------------------------------
    0 - DNPSLAV0 Status  ( All)    1 - DNPSLAV1 Status  ( All)
    2 - DNPSLAV2 Status  ( All)    3 - DNPSLAV3 Status  ( All)
    4 - MBNSL00d Status  ( All)    5 - MBNSL001 Status  ( All)
```

However, if you enter a Debug Level (0 to 4) and enter '1' to Enable, the Debug Level of the Slave Channel will be configured. Use option 99 to monitor live diagnostics after setting the Debug Level.

```
Task Slot Number (0 to 4) ? 0

   Task DNPSLAV0   Status ( All)

Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
```

```
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 or 'S'tatus ? 4

Enter 0=Disable : 1=Enable [Default=1] ? 1

Setting DNPSLAV0 to Level Dump

================ Slave Status/Diagnostics ==============
ElecSys(V:5.7.2017-08-30-1300)  Mon Dec  6 05:18:48 1999
powirv : 1 @ 10.63.191.29  ZEUS-3.12 <Use System Serv Option-123>
-----------------------------------------
    0 - DNPSLAV0 Dump    ( All)    1 - DNPSLAV1 Status  ( All)
    2 - DNPSLAV2 Status  ( All)    3 - DNPSLAV3 Status  ( All)
    4 - MBNSL00d Status  ( All)    5 - MBNSL001 Status  ( All)

Task Slot Number (0 to 4) ?
```

When you are finished setting the Debug Levels, press Enter to return to the Diagnostics Menu.

13- IP Route Table

Main Menu Diagnostics Services IP Route Table

Show the network routing (Linux '`route`' command).

Enter **13** for IP Route Table. The rows containing a "G" under "Flags" are gateway/router entries, and the Gateway with Destination address "0.0.0.0" is the default gateway. Note also the "Iface" (Interface) column, which indicates the Ethernet or other network interface the addresses apply to. The "Genmask" (subnet mask) column, combined with the Destination address, identifies the range of addresses defined for the route entry.

> **NOTE** that in older RediGate tarballs prior to September 2017, this menu only worked if you logged in as 'root' first, then superuser to the user account.

```
Make selection: 13

================ Route Table ==============
ElecSys(V:5.7.2017-08-24-1000)  Mon Dec 20 05:07:14 1999
DNPMastTest : 1 @ 10.63.191.28  REDIGATE-400  <38258-0025>-SerialNumb
-----------------------------------------
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.63.255.128   0.0.0.0         UG    0      0        0 eth0
10.53.47.0      0.0.0.0         255.255.255.0   U     0      0        0 eth3
10.63.0.0       0.0.0.0         255.255.0.0     U     0      0        0 eth0
192.168.1.0     0.0.0.0         255.255.255.0   U     0      0        0 eth1


Press ENTER to continue
```

14- Ping Service

Main Menu Diagnostics Services Ping Service

Ping a network address from the RediGate (Linux '`ping`' command).

Enter **14** for Ping Service. Enter the destination address of a device to ping (IPv4 address or DNS name). When finished with the ping, press Control-C to stop the pings and see the ping statistics.

To get a ping response, the destination address must be reachable from the RediGate using its current routing configuration and not prevented by firewall rules (RediGate or other network devices). To ping a named server instead of IP address, the RediGate must have DNS configured (explicit DNS configuration if using Ethernet, or through the DNS setting on a cellular PPP network).

```
Make selection: 14

================ Ping Services ==============
ElecSys(V:5.7.2017-08-24-1000)  Mon Dec 20 05:22:35 1999
```

```
DNPMastTest : 1 @ 10.63.191.28  REDIGATE-400  <38258-0025>-SerialNumb
-----------------------------------------
Enter Host to Ping (IP-Addr or Name) 10.63.191.29

!!!! Press CTRL-C to stop pinging !!!!

PING 10.63.191.29 (10.63.191.29): 56 data bytes
64 bytes from 10.63.191.29: seq=0 ttl=64 time=2.360 ms
64 bytes from 10.63.191.29: seq=1 ttl=64 time=1.295 ms
64 bytes from 10.63.191.29: seq=2 ttl=64 time=1.293 ms
^C
--- 10.63.191.29 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 1.293/1.649/2.360 ms
```

15- RTDB Status

Main Menu Diagnostics Services RTDB Status

View status of a Real-time Database.

Enter **15** for RTDB Status.

```
Make selection: 15

================ RTDB Status ==============
ElecSys(V:5.7.2017-08-24-1000)  Mon Dec 20 05:40:14 1999
DNPMastTest : 1 @ 10.63.191.28  REDIGATE-400  <38258-0025>-SerialNumb
-----------------------------------------

Chan Addrs Unit              Dbg    Time     Wrote To  NumWrite  RBE(0) RBE(1)
---- ----- ---------------- --- ----------- --------  --------  ------ ------
   0     1 DNP3 Field Unit   ON  1 00:00:00        0         0       0      0
   1     1 DNP3 Field Unit   ON 30 00:01:04    40001         1       0      0
  15     3 Virtual           ON  1 00:00:00        0         0       0      0

Redisplay (Y/N) ?
```

The information included in this display is:

- **Chan** - Channel number from configuration
- **Addrs** - FieldUnit address from configuration
- **Unit** - FieldUnit name from configuration
- **Dbg** - whether debugging of RTDB diagnostics is enabled or disabled for this FieldUnit
- **Time** - Time of last point update in RTDB
- **Write To** - Starting register address of last RTDB point update in the RTDB
- **NumWrite** - Number of points written to the database on the last point update.
- **RBE(0), RBE(1)** - Number of points in the RTDB that have flags set for RBE-0 or RBE-1 (RBE-2 and RBE-3 are not shown).

16- RTDB Diags

Main Menu Diagnostics Services RTDB Diags

Set the Debug Level for read and write access of the Real-time Database (RTDB) for a Field Unit.

Enter **16** for RTDB Diags. Enter the Master Channel number of the channel containing the RTDB to diagnose.

```
Make selection: 16

================ RTDB Diags ==============
ElecSys(V:5.7.2017-08-24-1000)  Tue Dec 21 03:54:15 1999
DNPMastTest : 1 @ 10.63.191.28  REDIGATE-400  <38258-0025>-SerialNumb
-----------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          w/Errors     1  Tue Dec 21 03:54:12 1999
   1 Channel0          w/Errors     1  Tue Dec 21 03:54:15 1999
  15 Channel15         Normal       1  Tue Nov 30 06:00:02 1999

Enter Channel (0 to 15) ? 0
```

Enter the new Debug Level that you wish to enable for the RTDB on this Master Channel.

NOTE: the Debug Level applies to **all** enabled Field Units under this Master Channel. (To see diagnostics for only some Field Units on a channel, you must disable diagnostics on the other units.)

```
Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 ? 4
```

Enter the FieldUnit (RTU) Address to which the diagnostics status will be applied, or -1 to apply this change to all FieldUnits on the channel.

Enter 1 to enable the diagnostics for the FieldUnit RTDB, or 0 to disable diagnostics.

```
  -----------------RTU----------------   -----POLL-------  -------ERRORS-------
 Addr Name             Protocol Status     Time     Count  TimOut BadData Frame
----- ---------------- -------- -------- -------- -------- ------ ------- -----
    1 DNP3 Field Unit  DNPMST00 Timeout  03:54:19        0 391487       0    0

Enter RTU Address (-1 for all) ? 1

Enter 0=Disable : 1=Enable [Default=1] ? 1

Setting RTDB-Rtu 1 to Enable Dump

Press ENTER


Valid Debug Level:
0 - Fatal Errors    (Ending)
1 - General Errors  (Error)
2 - Status Messages (Status)
3 - Data Display    (Display)
4 - Data Dump       (Dump)

Debug Level 0-4 ?
```

When you are finished setting Debug Levels for the RTDBs on this Master Channel, press Enter to return to the Diagnostics Menu.

17- MQTT Status

Main Menu Diagnostics Services MQtt Status

View status of the current MQTT connection. This menu shows diagnostics for any MQClient and MQClientExtra (instance 0 and 1 = MQidspX0 and MQidspX1) processes configured in the RediGate.

Enter **17** for MQTT Status. If MQTT is configured in the RediGate, the following information will be displayed:

- ConnectState – "Connected" if the MQTT socket is currently established with the server.
- Broker IP Addr – Address and port number, if connected to an MQTT server. If using a TLS-encrypted tunnel, this will typically be configured as a localhost (127.0.0.1) type address. If directly connected, the actual IP address of the server will be shown. If the connection to a server is not made, the address will show 0.0.0.0.
- Number Connects, Bytes & Messages Received/Sent, QOS – Number of MQTT connections that have been made and the amount of data transferred since the last restart of the RediGate.
- Last Send/Recv Time and Topic – Time and topic name

```
Make selection: 17

================ MQtt Client(s) Status ==============
ElecSys(V:5.7.2017-08-24-1000)  Mon Dec 20 05:40:14 2016
DNPMastTest : 1 @ 10.63.191.28  REDIGATE-400  <38258-0025>-SerialNumb
-------------------------------------------
ConnectState    : Connected
Broker IP Addr  : 127.0.0.1 - 8883
Number Connects : 20
Bytes Received  : 205
Bytes Sent      : 80121
Messages Receive: 43
Messages Sent   : 26026
QOS-0 Sent      : 472
```

```
QOS-1 Sent      : 0
QOS-2 Sent      : 0
Last Send Time  : 12/20/2016  05:39:49
Last Recv Time  : 12/20/2016  01:54:35
Last Recv Topic : sys/GroupID/RediGate/FieldUnit1
Last Sent Topic : RBE/GroupID/RediGate/Channel/FieldUnit1

MQidspX0 was not found...
MQidspX1 was not found...
Redisplay (y/n)?
```

18- RTDB Data Dump

Main Menu Diagnostics Services RTDB Data Dump

View the current contents of registers in the Real-time Database. This allows a user to view the last-known value of any point in an RTDB that may have been obtained through Master Channel polling or other sources of data.

Enter **18** for RTDB Data Dump. Enter the Master Channel number and RTU Address of the RTDB to view registers.

```
Make selection: 18

================ RTDB Dump ==============
ElecSys(V:5.7.2017-10-25-1700)  Mon Nov  6 18:19:21 2017
UnitName : 1 @ 192.3.1.10  REDIGATE-400  <38258-0025>-SerialNumb
-------------------------------------------
Chan Name              Status    Rtus Time
==== ==============    ========  ==== ==================
   0 Channel0          Normal       2  Mon Nov  6 18:19:19 2017
  15 Channel15         Normal       1  Mon Nov  6 18:18:14 2017


Enter Channel Number ? 0

  -----------------RTU----------------   -----POLL-------  -------ERRORS-------
 Addr Name             Protocol Status     Time     Count  TimOut BadData Frame
----- ---------------- -------- -------- -------- -------- ------ ------- -----
    2 Modbus02         MBMAST00 Timeout  18:19:14        0      4       0    0
    3 Modbus03         MBMAST00 PollDone 18:19:22      384      0       0    0
Enter Rtu Address 3
```

The RTDB configuration is then shown for the Channel and RTU address. Enter the Starting Point Address and the Point Count of registers to display. Make sure that the quantity requested doesn't exceed the number of available registers.

```
 Data Type    Count  Address
 ----------   -----  -------
 BOOLEAN         10        1
 BOOLEAN         10    10001
 SINT16           5    30001
 UINT16           5    40001
 UINT32           5    41001
 REAL32           5    42001
 STRING-32        5    43001
 STRING-256       5    44001

Enter Starting Point Address 1


Enter Point Count (1 to 125 or only 16 STRING-256) 50
```

After entering the Point Count, the register values will be displayed in hexadecimal format.

```
Data type is Boolean (HEXADECIMAL)
  1)- 01 00 00 01 00 00 01 00
  9)- 01 00 00 00 01 00 01 01
10007)- 00 01 00 01 0001 ffec 7fff f060
30005)- ffff 000a 00c8 0bb8 9c40 ffff 00002710 00030d40
41003)- 002dc6c0 02625a00 7fffffff 3f800000 c1a00000 40490fdb cc189680 5cde0b6b
43001)- 00656e6f 006f7774 65726874 72756f66 34333231 00454e4f 004f5754 45524854
44004)- 52554f46 45564946
```

Enter **Y** (Yes) to refresh the display of the register values or **N** (No) to exit the display.

Enter **F** to display the RTDB values formatted according to the data type configured for each register. In the example below, the following registers are shown:

Registers	Data Type
1-10, 10001-10010	Boolean
30001-5	SINT16SINT16S
40001-5	UINT16
41001-5	UINT32
42001-5	REAL32
43001-5	STRING32
44001-5	STRING256

```
Redisplay (Y/N/F/H/B/O/A where F=Formatted, H=Hex, B=Bin O=Online A=Auto) ? f

Data type is Boolean (FORMATTED)
  1)-   ON  OFF  OFF   ON  OFF  OFF   ON  OFF
  9)-   ON  OFF  OFF  OFF   ON  OFF   ON   ON
10007)-  OFF   ON  OFF   ON      1    -20  32767  -4000
30005)-     -1    10   200  3000 40000 65535
41001)-        10000       200000      3000000     40000000   2147483647
42001)-      1.00000     -20.0000      3.14159 -4.00000e+07  5.00000e+17
43001)- <one                            > <two                            >
     )- <three                          > <four                           >
     )- <12345678901234567890123456789O1 >
44001)- <ONE>
 <TWO>
 <THREE>
 <FOUR>
 <FIVE>
```

Enter **H** (Hex) to show the values as hexadecimal again. Enter **B** (Binary) to show Boolean registers as "1" or "0".

Enter **O** (Online) to show the quality flag of each register.

```
Redisplay (Y/N/F/H/B/O/A where F=Formatted, H=Hex, B=Bin O=Online A=Auto) ? o

Data type is Boolean (ONLINE/offline)
  1)- ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE
  9)- offline offline ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE
10007)- ONLINE ONLINE offline offline ONLINE ONLINE ONLINE ONLINE
30005)- ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE
41003)- ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE
43001)- ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE ONLINE
44004)- ONLINE ONLINE
```

Enter **A** (Auto) to automatically refresh the values of the RTDB registers using the current display format. Enter a number of Seconds for how often to redisplay.

```
Redisplay (Y/N/F/H/B/O/A where F=Formatted, H=Hex, B=Bin O=Online A=Auto) ? a
Enter Number of Seconds between updates (1 to 60) 3

Data type is Boolean (FORMATTED)    11/7/2017 1:06:36
  1)-   ON  OFF  OFF   ON  OFF  OFF   ON  OFF
  9)-   ON  OFF  OFF  OFF   ON  OFF   ON   ON
10007)-  OFF   ON  OFF   ON      1    -20  32767  -4000
30005)-     -1    10   200  3000 40000 65535
41001)-        10000       200000      3000000     40000000   2147483647
42001)-      1.00000     -20.0000      3.14159 -4.00000e+07  5.00000e+17
43001)- <one                            > <two                            >
     )- <three                          > <four                           >
     )- <12345678901234567890123456789O1 >
44001)- <ONE>
 <TWO>
 <THREE>
```

> *<FOUR>*
> *<FIVE>*

Enter any of the other letter options to stop the automatic RTDB display.

Press Enter once or twice to exit the RTDB Dump menu to get back to the Diagnostics Menu.

19- Dial Backup

This is a legacy menu for the DialBackup task, which is currently not supported in the RediGate.

99- Monitor Diagnostics

Main Menu Diagnostics Services Monitor Diagnostics

View the current diagnostic messages generated by the RediGate tasks. The amount of information shown depends on what activity is occurring and the current settings of the Debug Level for each task.

Enter **99** for Monitor Diagnostics.

510- Trend a Point

535- View Custom Rpt

If one or more Custom Report is configured for this RediGate, view the contents of the report. The Custom Report is a pre-defined set of RTDB registers with a tag descriptor. This is a more convenient way to view the values of registers than option 18, and it allows registers that have been defined as read/write to be written to through the user menu.

Enter **535** for View Custom Rpt.