E3 Tweak User's Manual

Version 4.7.234 (10/02/2015)

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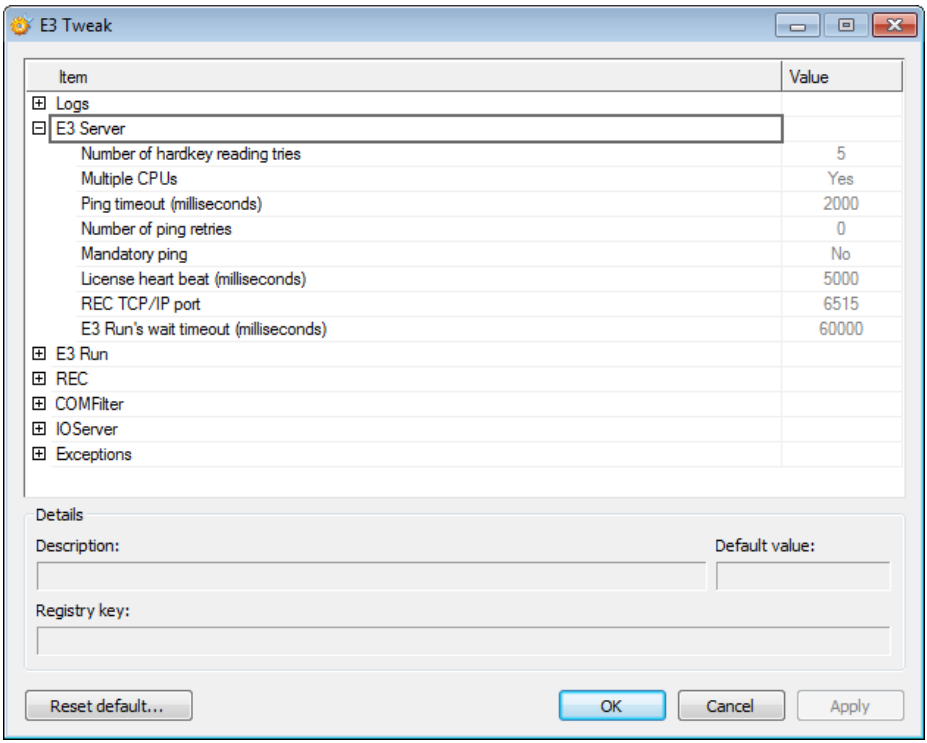
CHAPTER 1

Introduction

E3 Tweak is a tiny and simple tool for advanced E3 configurations. Its main purpose is to introduce a graphical interface for all those settings that, until now, could only be performed by using Windows Registry Editor, directly on Windows Registry.



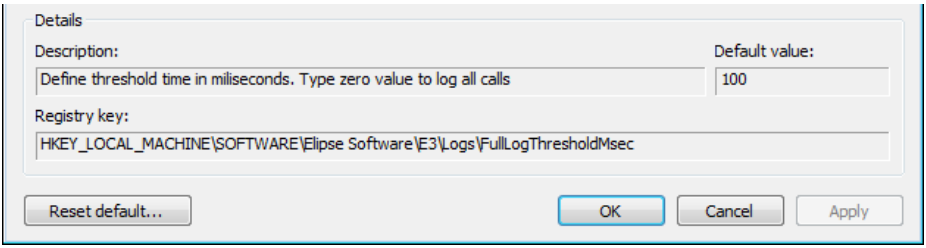
E3 Tweak's main window

CHAPTER 2

How E3 Tweak Works

E3 Tweak is presented on a window with configuration items placed on a list, with their respective values. These items are classified according to the area in which their configurations are performed: **E3 Server**, **E3Run**, **REC**, **Logs**, **COMFilter**, and **IOServer**.

Each configuration item on this list has, in its **Value** column, a Spin Button or Combo Box control. If the existent value on this control is grayed, this means that this key does not exist in Windows Registry. Selecting a new value for the item automatically creates a key in Registry. Description, default value, and Registry key of each selected configuration item are displayed at E3 Tweak's window footer, as seen on the next figure.



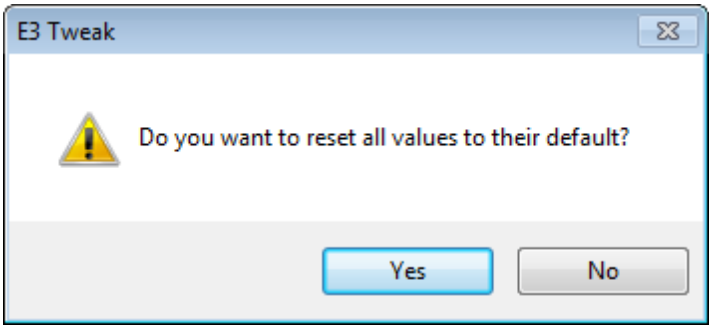
E3 Tweak's main window footer

Items whose values are numerical on **Value** column have a Spin Button control, which allows increasing or decreasing its value. On the other hand, items whose values are **Booleans** have a Combo Box with values **Yes**, **No**, and **Default**. This last value always displays, between parentheses, the default value (**Yes** or **No**) for the selected item. In addition to directly editing values in these fields, it is possible to use the DELETE key to return to default values (in numerical and **Boolean** fields). The space bar allows toggling between **Boolean** fields (**Yes** and **No**), as well as double-clicking an item. Finally, right-clicking an item presents a contextual menu with the **Set to Default** option, which allows returning this item's value to its default.

When selecting one of the configuration items on the list, the window footer automatically updates itself, by displaying the item's description, its default value, and the Registry key that must be modified or created.

On the lower part of E3 Tweak window, there are three options intended to confirm (or not) these configurations. The **Apply** option saves all changes immediately. The **OK** option saves all changes performed and closes E3 Tweak. The **Cancel** option closes E3 Tweak window, without saving any changes. In addition to these options, there is also a **Reset Default** option, which deletes all keys in Windows Registry, getting all items back to their default values. This option requires a confirmation of the operation, which can be undone by clicking **Cancel** on E3 Tweak's main window,

if needed.



Confirmation dialog for resetting to default

Each configuration item is described on the next chapters.

NOTE: E3 Tweak is an application that needs writing privileges on Windows Registry. Therefore, this application requires higher privileges when running on Windows Vista or Windows 7 operating systems.

CHAPTER 3

E3 Server Configuration

This section contains configurations for E3 Server.

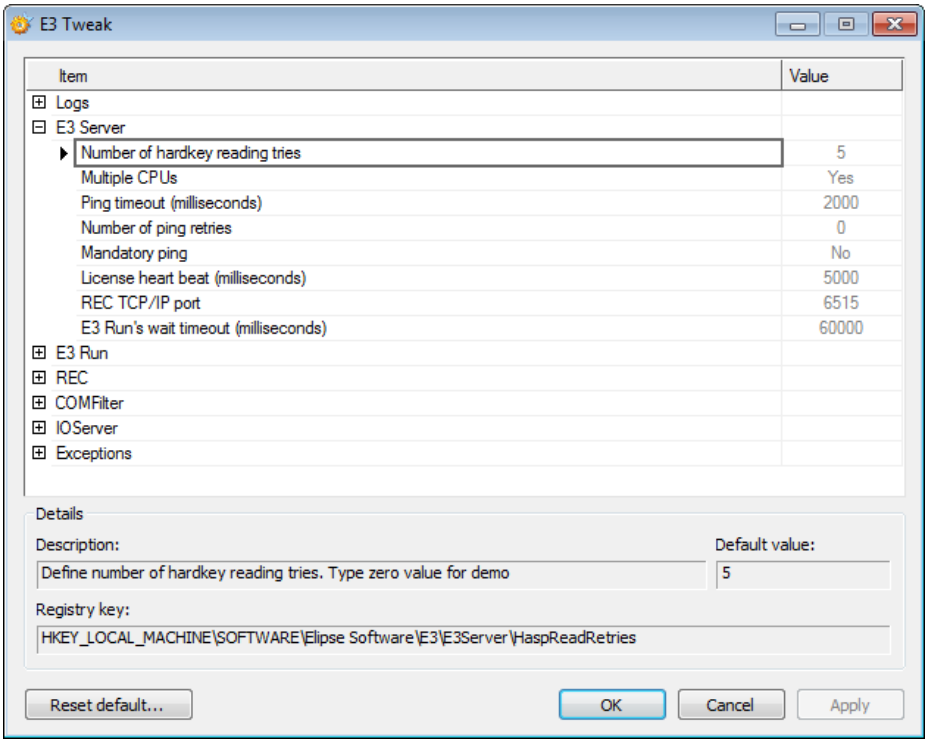
3.1 Define a Number of Hardkey Reading Tries

E3 Server performs a certain number of protection device's reading tries. If this reading is not successful, E3 is then started in **Demo** mode. It is possible to configure the number of HASP's reading tries, performed when E3 Server is started, using E3 Tweak's configuration item **Number of hardkey reading tries**.

If this item is not modified, the application automatically assumes a value of 5 (five). That is, five attempts to find out a protection device are performed, with intervals of at least one second.

If this item is modified, the configured value indicates the number of HASP's reading tries performed by E3 Server. If the configured value is 0 (zero), the **Demo** mode is automatically enabled, whether a HASP driver or a protection device are installed or not.

During the protection device's search time, E3 Server remains unavailable.



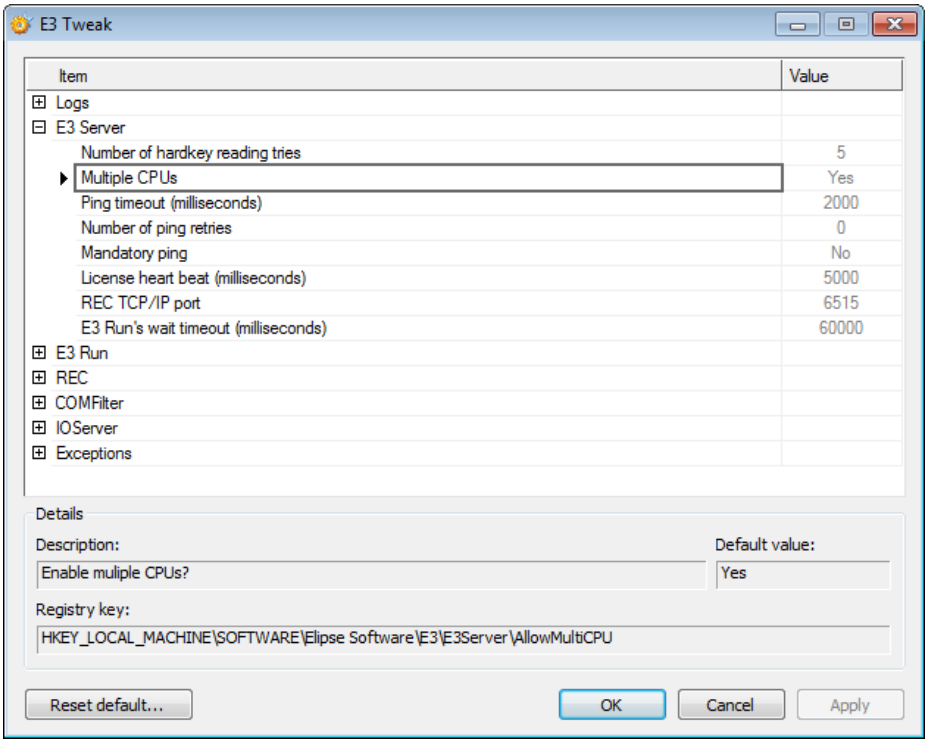
Option to define a number of protection device's reading tries

3.2 Disable Multiple CPUs

In case of biprocessed computers, it is possible to configure an E3 Server to use only the first or all available CPUs on the computer, by using E3 Tweak's configuration item **Multiple CPUs**.

If this item is not modified, the system automatically assumes that E3 Server executes on all CPUs.

If this item is modified, and the answer to question **Enable multiple CPUs?** is **Yes**, E3 Server is enabled to execute on all available CPUs on the computer. A **No** answer enables E3 Server to execute on a single CPU.



Option to disable multiple CPUs

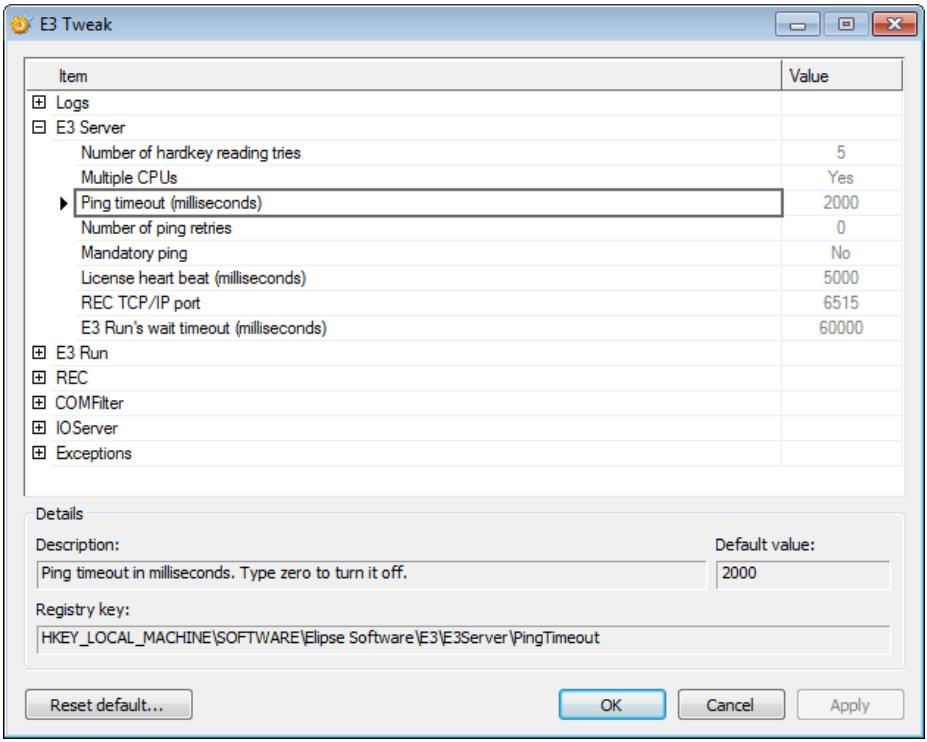
3.3 Define a Ping Timeout

It is possible to force E3 Server to quickly detect remote Viewer disconnections, interrupting data accumulation to send to a Viewer, by using the **Ping timeout (milliseconds)** item.

The value filled in this field indicates a **ping** timeout in milliseconds.

If this item is not modified, it uses a default value of 2000 ms. If this item is modified, and the value is configured as 0 (zero), this **ping** mechanism is turned off.

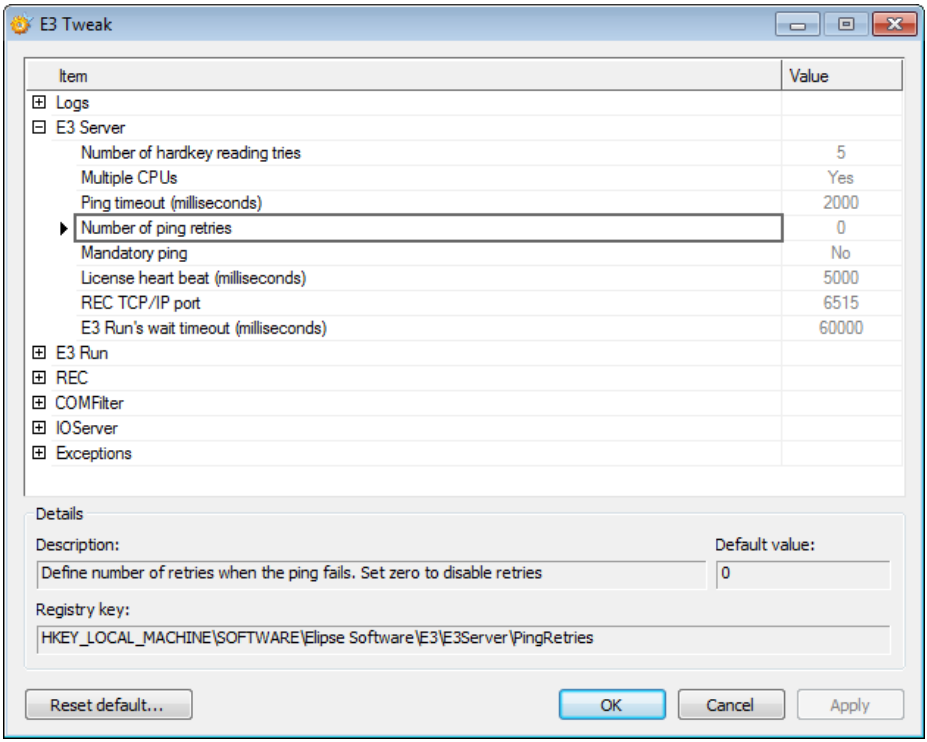
The best configuration is always using the lowest possible value allowed by a network. This enables E3 Server to detect Viewer disconnections on the minimum possible time, avoiding excessive message stacking.



Option to define a ping timeout

3.4 Define Number of Retries in Case of Ping Failure

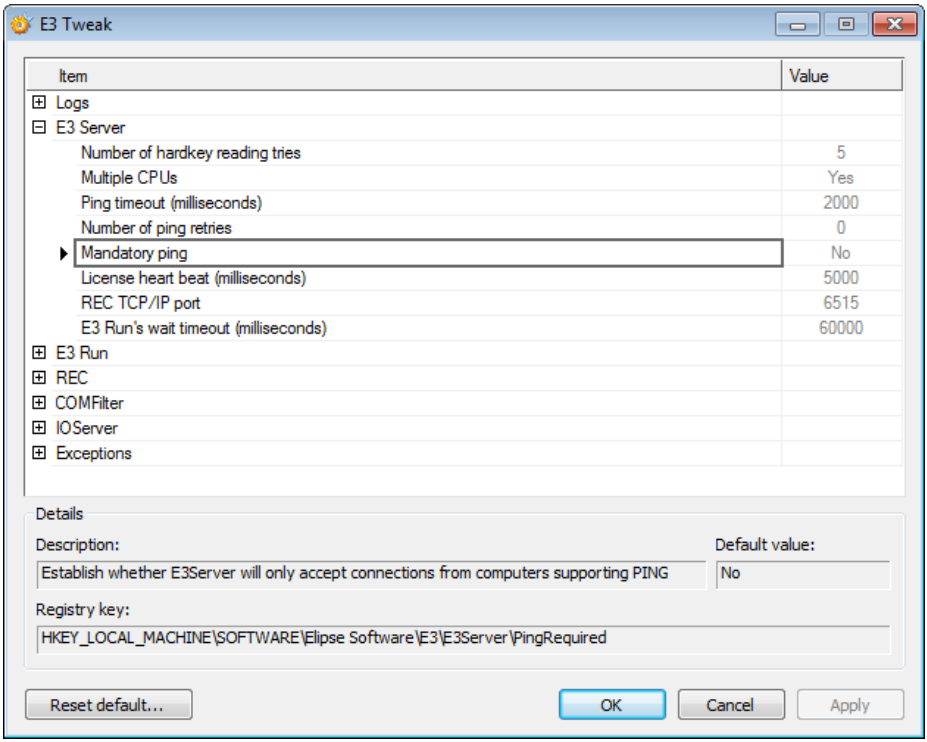
Defines the number of retries in case of failure of a **ping** command. Default value of this option is 0 (zero, no retry is executed). Allowed values for this option are in the range between 1 and 50 retries. For values above the maximum limit, the maximum allowed value is stored.



Option to define the number of ping retries

3.5 Define Mandatory Ping

Indicates whether a **ping** is mandatory (a value different from zero) or optional (a value equal to zero or omitted). If a **ping** is mandatory, E3 Server automatically disconnects Viewers and Web Viewers not responding to a **ping** command during connection. Default value of this option is 0 (zero).



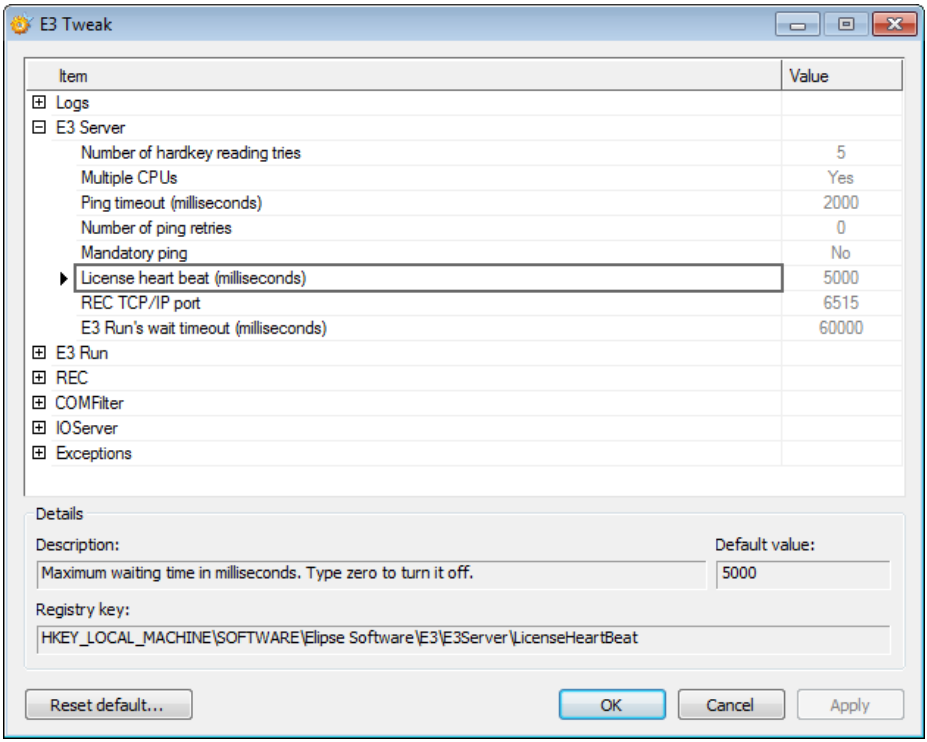
Option to define mandatory ping

3.6 Configure License Heartbeat

During a license connection from server to Viewer, a keep-alive (or heartbeat) is applied by default. If a Viewer remains some time without responding, its connection is automatically closed. A heartbeat time can be configured on the **License heart beat (milliseconds)** item.

The value filled in this field indicates a heartbeat period in milliseconds.

If this value is 0 (zero), heartbeat is turned off. If this value is not changed, then it consideres a default time of five seconds (5000 ms). The maximum time a Viewer can remain without sending a heartbeat (that is, a time-out on server) is always doubled the configured heartbeat time.



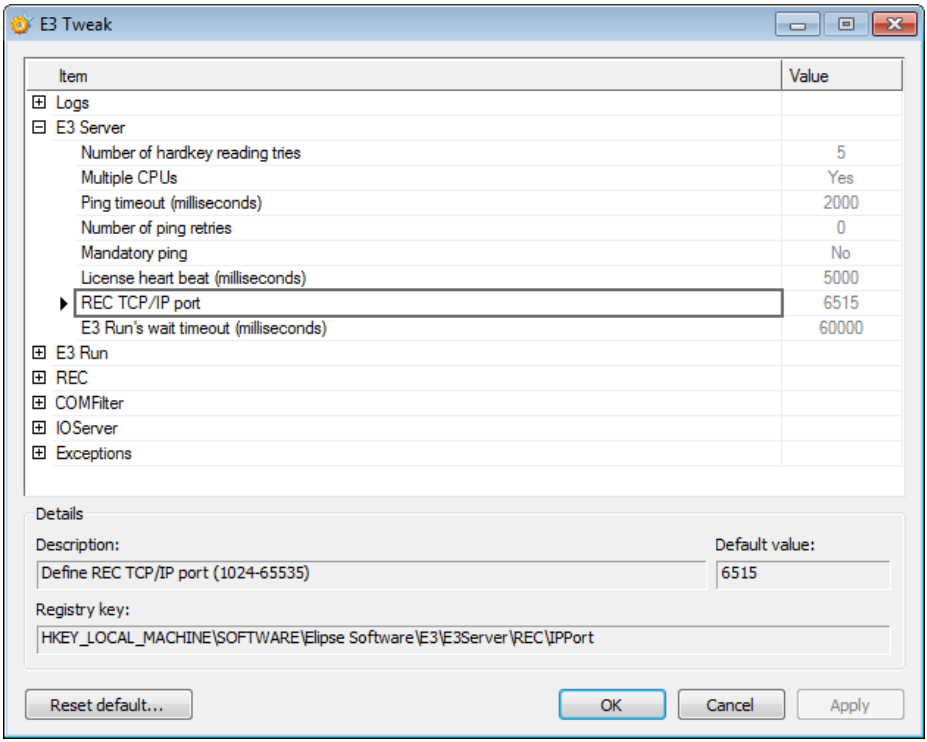
Option to configure license heartbeat

3.7 Configure REC TCP/IP Port

It is possible to configure a port number used by REC, by using the **REC TCP/IP port** item.

If this item is not modified, the system automatically assumes default port as 6515.

If this item is modified, the configured value indicates a port number used by REC protocol. Values greater than 1024 and up to 65535 can be used. Values equal to or lower than 1024 are reserved. Null or invalid values enable using port 6515.



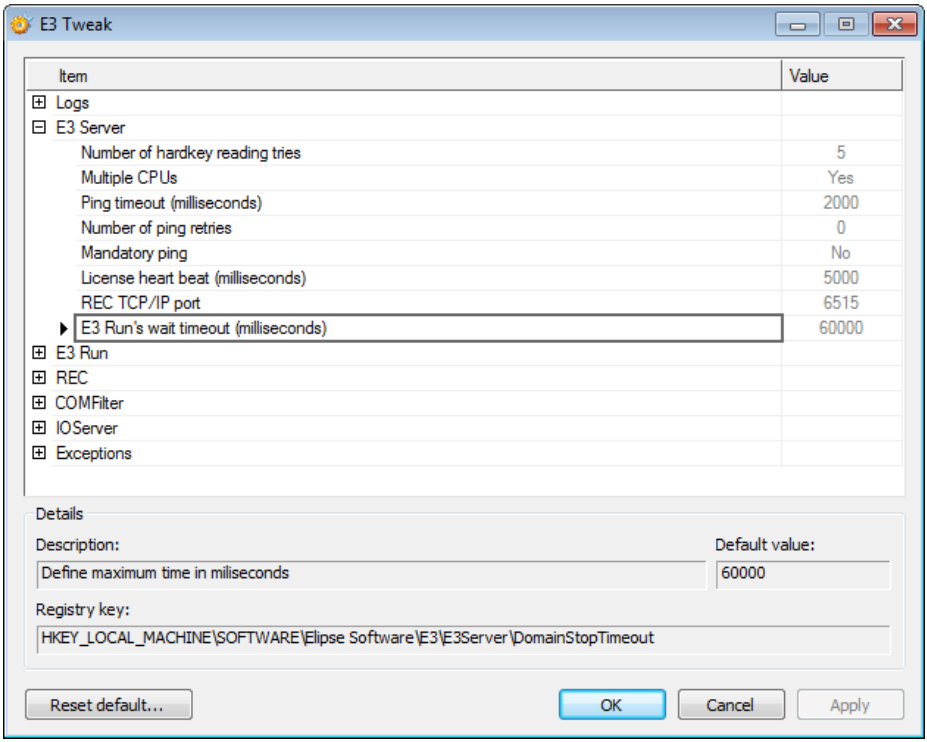
Option to configure REC TCP/IP port

3.8 Define E3Run's Wait Timeout

It is possible to specify the maximum time, in milliseconds, to quit E3Run, by using the **E3Run's wait timeout (milliseconds)** item.

If this item is not modified, the system automatically assumes a value of 60000 ms (one minute).

If this item is modified, the configured value indicates the maximum time, in milliseconds, to stop E3Run. If a value equal to 0 (zero) is informed, then E3Run is immediately stopped.



Option to define E3Run's wait timeout

CHAPTER 4

E3Run Configuration

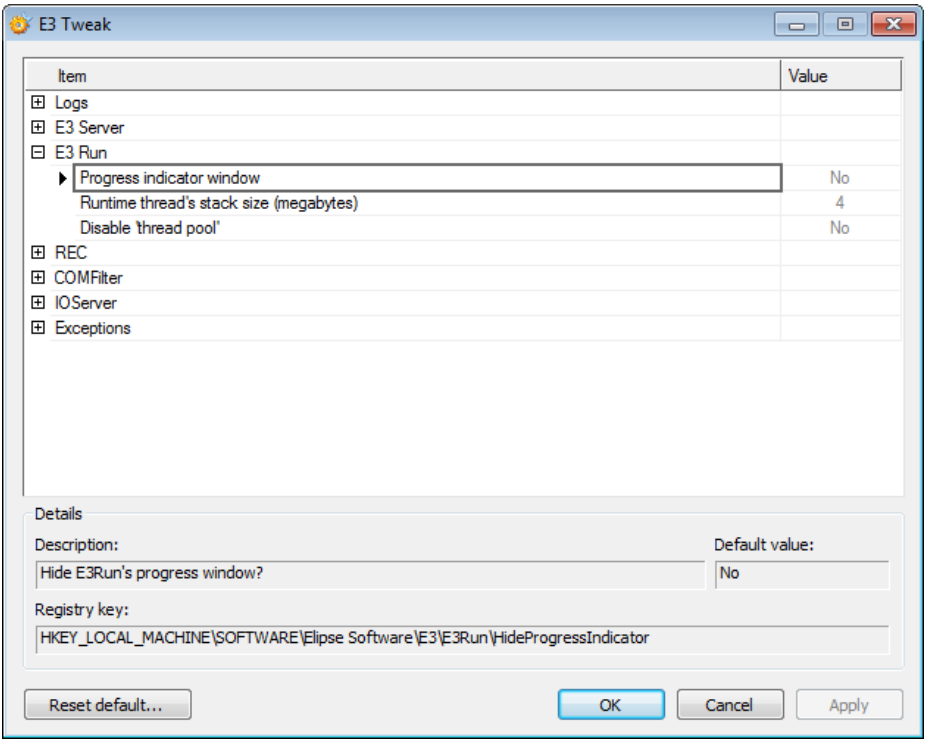
This section contains configurations for E3Run.

4.1 Hide Progress Indicator

It is possible to select between show or hide E3Run progress window, by using the **Progress indicator window** item.

If this item is not modified, the system automatically assumes that this window must be displayed.

If this item is modified, and the answer to question **Hide E3Run's progress window?** is **Yes**, this progress window is hidden. If the answer is **No**, this window is displayed.

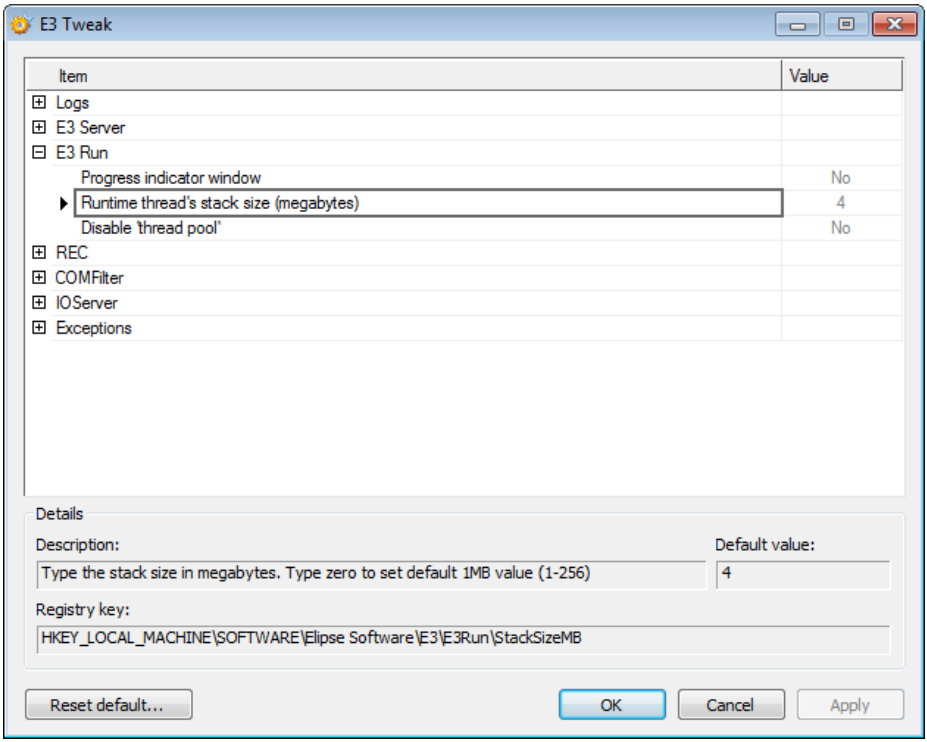


Option to hide progress indicator

4.2 Define Runtime Thread's Stack Size

E3 Server stores function calls in a temporary structure at run time called thread stack and, as functions are processed, they are removed from this stack. Although it is not recommended, the size of this stack can be adjusted using the **Runtime thread's stack size (megabytes)** item. Its edition field must have a numerical value that specifies the size of this stack in megabytes to use.

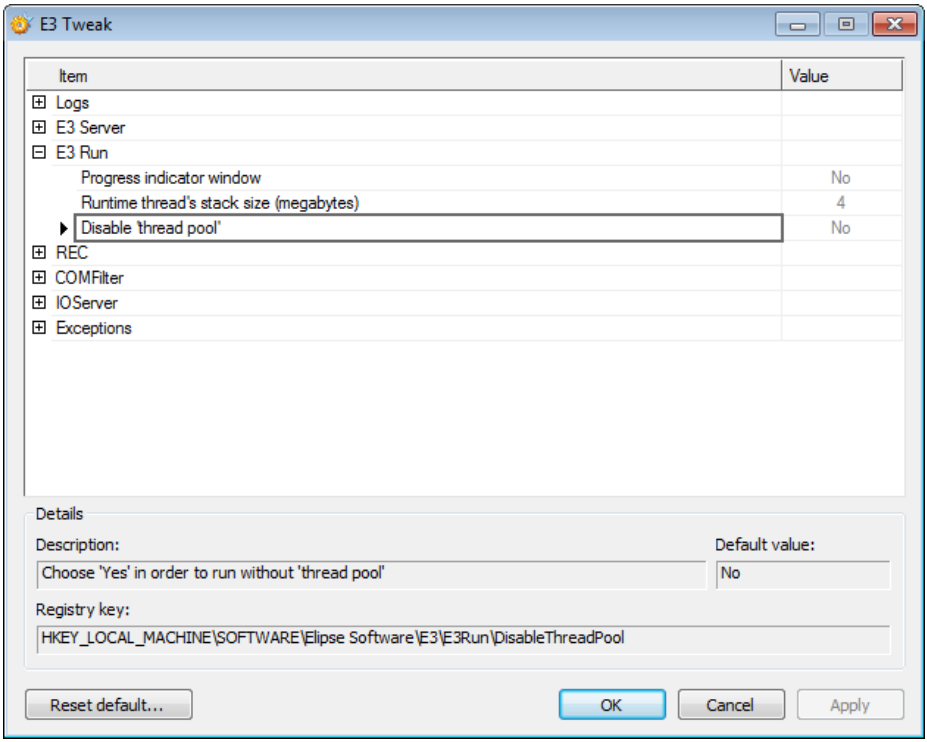
If this item is not modified, the stack value is fixed in four megabytes. In case this item is modified, a value of 0 (zero) is a special value that means Windows default value must be used (1 MB on more recent versions). Values between one and three allow reducing stack size (not recommended). Values higher than 256 are limited to 256.



Option to define runtime thread's stack size

4.3 Disable Thread Pool

Disables E3Run's Thread Pool feature. This option is verified by E3Run only when process starts. E3Run must be restarted if this option changes.



Option to disable Thread Pool

CHAPTER 5

REC Configuration

This section contains configurations for REC protocol.

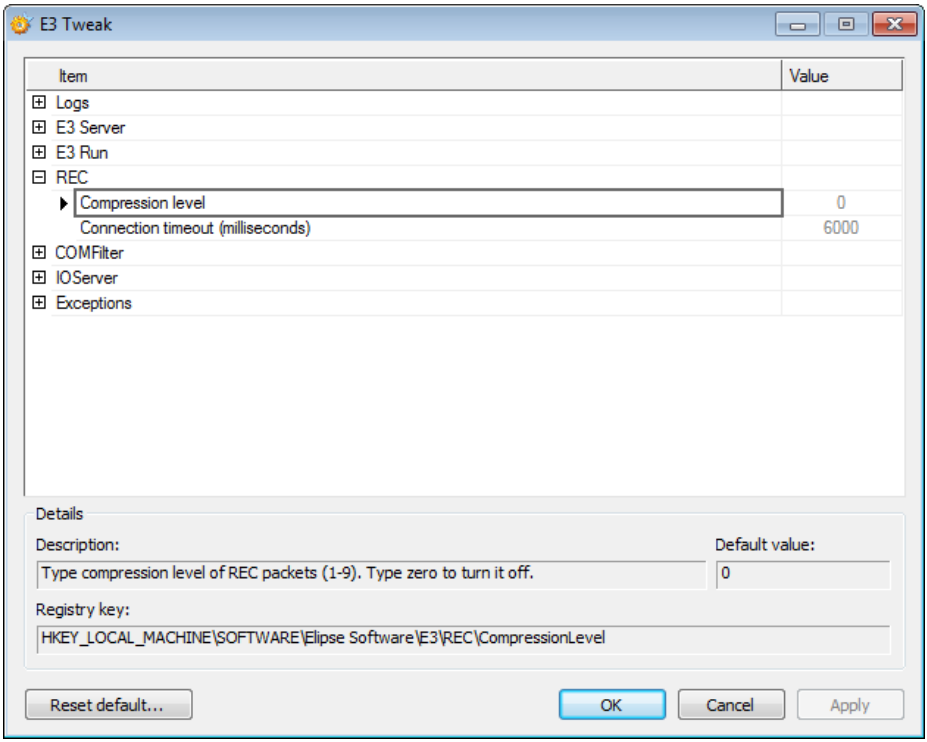
5.1 Define Compression Level

It is possible to enable compression of communication packets using REC between E3 Server, Viewer, and Studio, by using the **Compression level** item.

Default value for this item is 0 (zero). If this item is not modified, the system automatically assumes that compression is disabled.

If this item is modified, any value between one and nine enables compression. Recommended value is 6 (six). Any values outside this range disable REC packet compression.

This configuration is applied only for compression of an E3 Server or a Viewer running on a local machine. E3 Server, as well as Viewer, support packet decompression, regardless of their configurations.



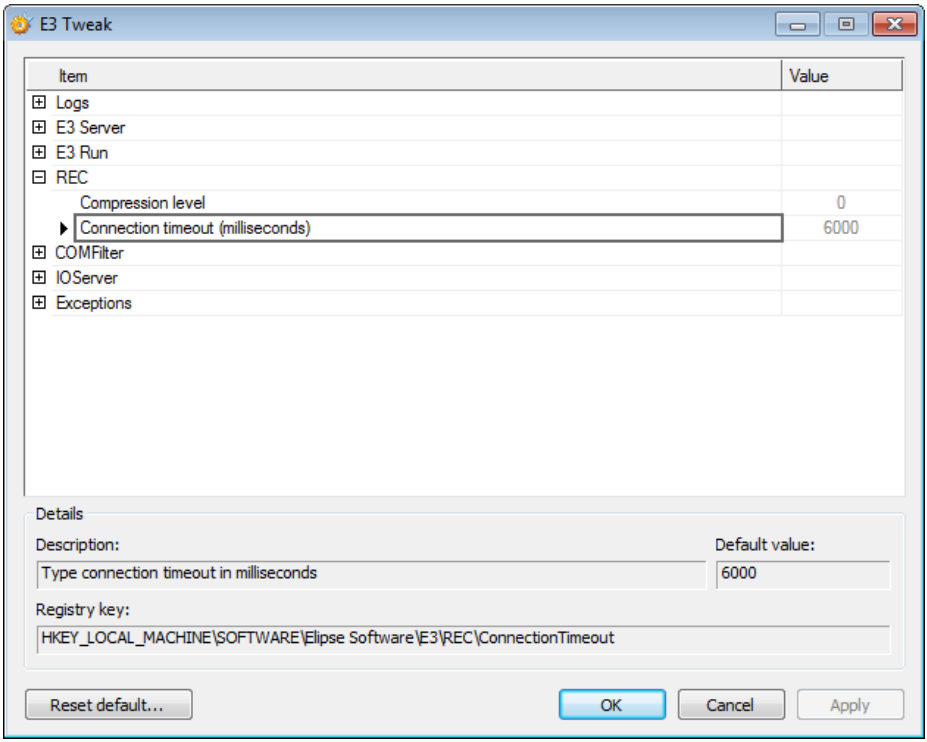
Option to define compression level

5.2 Define Connection Timeout

For situations when an E3 Server is starting and protection device's detection is slow, it is possible to control the maximum time that Studio or E3Admin take to connect to an E3 Server. This is performed by using the **Connection timeout (milliseconds)** item.

The edition field of this item indicates the connection's maximum time, in milliseconds.

When this item is not modified, it assumes a default value of 6000 ms (to allow waiting those 5000 ms that an E3 Server may last by default to detect a protection device).



Option to define connection timeout

NOTE: E3Admin repeatedly tries to connect to E3 Server, except when using a shortcut of type **E3Admin -option**.

CHAPTER 6

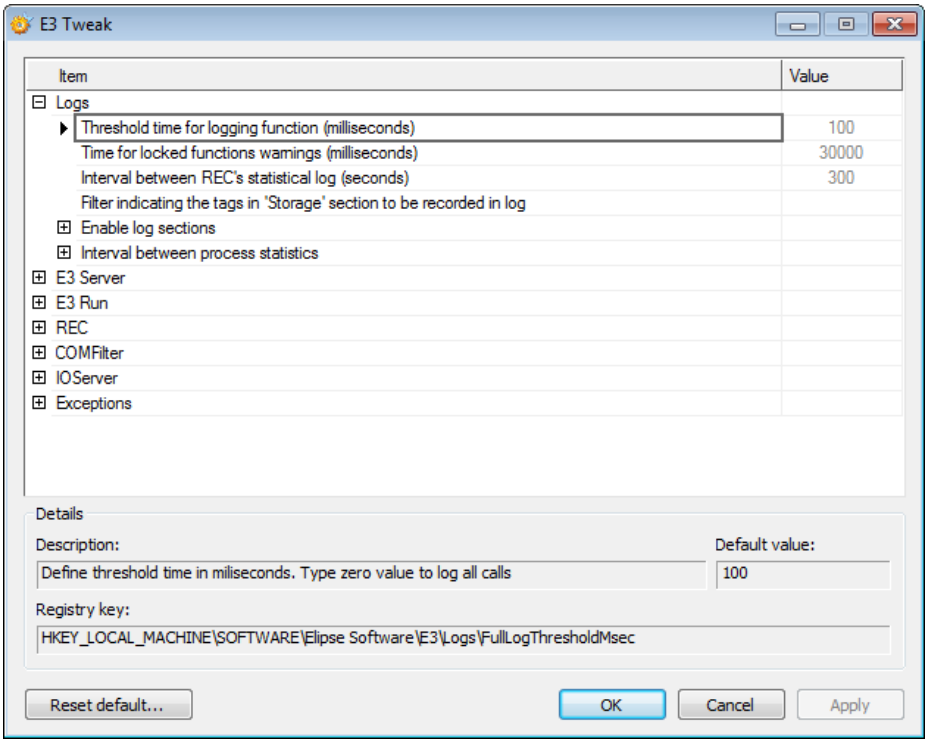
Log Configuration

This section contains configurations for E3 logs.

6.1 Define Threshold Time for Full Logging Function

It is possible to define the minimum time to log a function on **Full** logs (functions that last less than this time are not logged). Configuration item is **Threshold time for logging function (milliseconds)**.

When this item is not modified, it assumes the default value of 100 ms. Modify this item and fill in the edition field to attribute a different time value. A value of 0 (zero) forces logging all calls (a very low value may sensitively degrade application's performance).

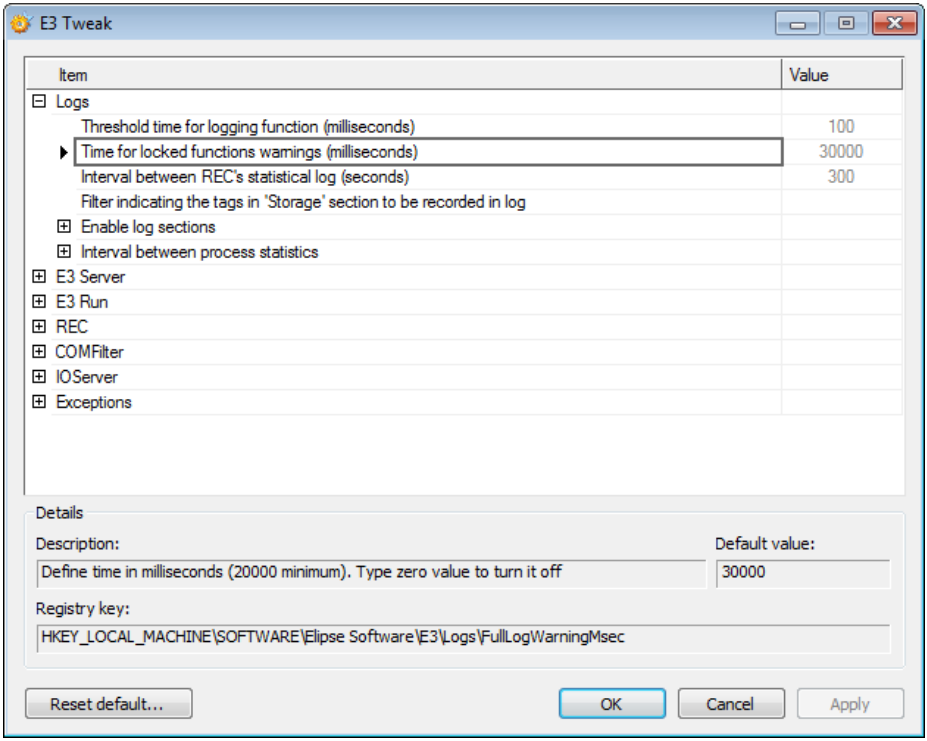


Option to define threshold time for logging function

6.2 Define Time for Locked Functions Warnings

It is possible to define the time (in milliseconds) that a function must be executing so that a warning is generated (**EcoLogWarning**), informing that this function is probably locked. Configuration item is **Time for locked functions warnings (milliseconds)**.

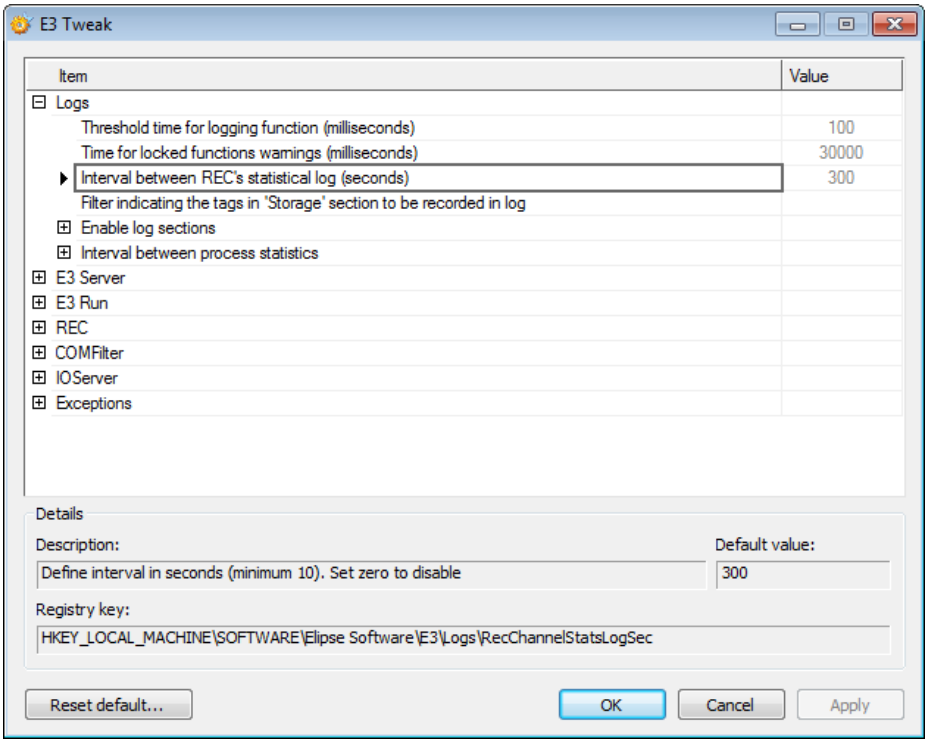
A value of 0 (zero) in this edition field disables this option. If it is not zero, the minimum acceptable value is 20000. When this item is not modified, it assumes a default value of 30000 ms.



Option to define a time for locked functions warnings

6.3 Define Interval Between REC's Statistical Log

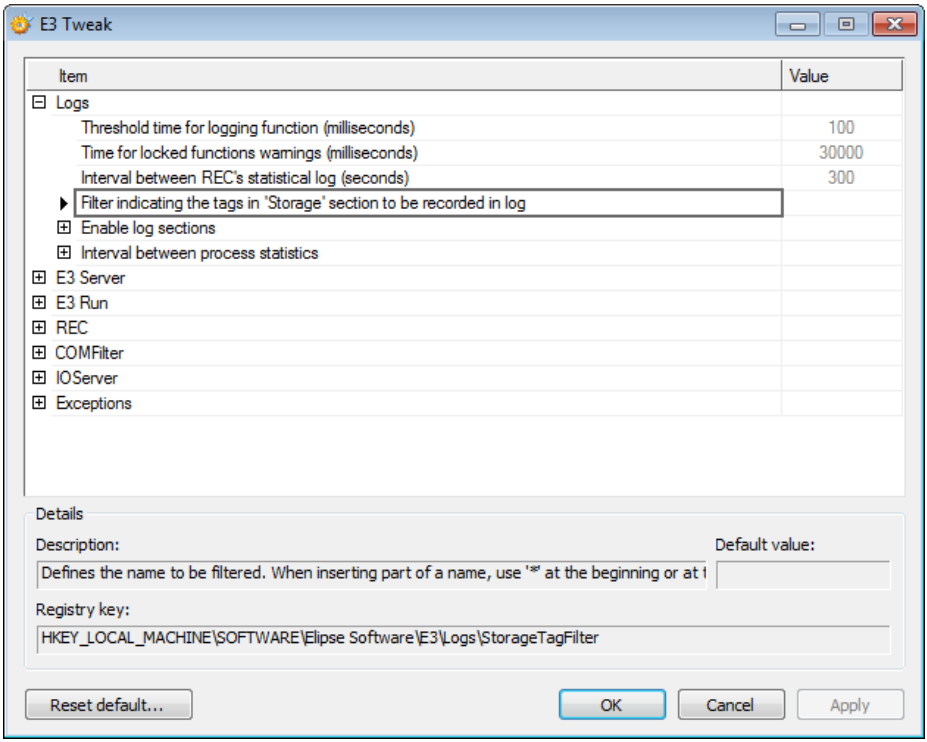
This options allows configuring the frequency, in seconds, of REC protocol statistics' log recording. Default value of this option is 300 (five minutes). A value of 0 (zero) disables periodic log generation, and the minimum accepted value is 10. In case of typing a value between one and nine in this field, E3 then uses 10 s.



Option to define the interval between REC's statistical log

6.4 Add Storage Tag Filter

This section allows filtering which Tags are recorded on the log. This is a **String**-type text field, and an asterisk (*) character can be used at the beginning or at the end of this filtering text, allowing to select several Tags ending or beginning with a certain **String**. Default value of this section is an empty **String**.

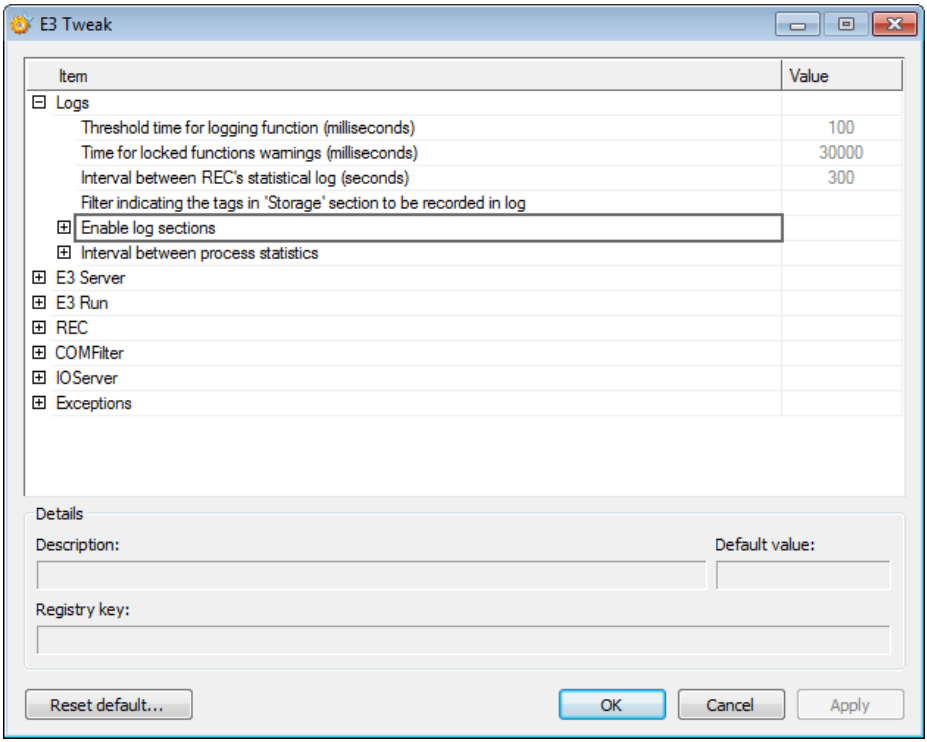


Option to add a Storage Tag filter

6.5 Enable or Disable Log Sections

It is possible to define log Sections that are enabled. Sections can be subdivided into modules, so that it is possible to enable each module separately. Each module has a configuration item with question **Enable log section/module?**.

If items are not modified, system automatically assumes that logs are not created. If items are modified, a **No** answer disables log creation (except for **IOData** Section, please check **Notes**), and an **Yes** answer enables Section log. Modifying a Section value implies in changing all Module values inside that Section.



Options to enable or disable log sections

NOTES:

- **IOData** Section is an exception to this case. Its corresponding item is **Disable IOData section**. Not changing this item is the same as enabling this Section. Changing it by answering **No** to question **Enable log section/module?** disables this Section
- Changing these variables can be performed while E3 is executing, and it is applied up to 30 seconds after execution

Available log Sections are described on the next table.

Log Sections and their modules

SECTION	DESCRIPTION
DB	Shows errors on database or data discard operations, as well as results of operations executed on acquisition and execution threads
ImportExport	Log generated by Studio on data importing or exporting processes
IOData	Shows data read and written by E3Run
Playback	Log generated by E3Playback

SECTION	DESCRIPTION
RECRaw	Detailed log of REC communications. Available modules on this section are the following: • **Client**: Records request packages • **Server**: Records response packages
Storage	Allows tracking Storage operations. Available modules on this Section are the following: • **Dropped**: Lists all values discarded by a Storage • **Input**: Lists all variations of Tag values linked to a Storage • **Stored**: Displays all values sent by a Storage to a Database
Sync	Allows monitoring information synced between E3 Server and E3Run (and among E3 Servers in **Hot-Standby** mode). Available modules on this section are the following: • **Alarm**: Shows alarm messages generated by E3Run, which are passed to an alarm summary kept by E3 Server • **Vars**: Shows changes made on E3 Server's persistent Tags database
Track	Records the life cycle of certain types of objects, from creation to destruction. Available modules on this section are process identifiers: **E3Admin**, **E3Run**, **E3Server**, **IOServer**, **Studio**, and **Viewer**
Undo	Records system activities of Studio's **Undo** menu

There are special log sections that record operations executed on a specific thread, as well as their duration. Only operations that last more than a certain time (default value is 100 ms) are logged. These logs allow checking when E3 processing becomes slow, almost stopped. Available special log sessions are described next:

- **Full**: Main log gathering general information about E3 Server, E3Run, Studio, and Viewer execution. Available modules are described on the next table.

Available modules for Full logs

MODULE	DESCRIPTION
AlarmQueue	Threads for sending alarm events
AlarmServer	E3Run's thread responsible for asynchronously sending Alarm events
DBCallbackManager	Thread responsible for receiving and storing in cache the statistics sent by the E3DBEngine process

MODULE	DESCRIPTION
DomainManager	E3 Server Domain's state manager thread (opens or closes the active Domain, updating a Domain based on changes on .dom files)
E3Admin	E3Admin's main thread
E3Runtime	E3Run's main thread, allows identifying locks or slowdowns during E3's execution
E3Server	E3 Server's main thread
EventQueue	E3 Server's threads responsible for sending asynchronous Link events
IOManager	E3Run's thread responsible for receiving data generated by IOServers
LicenseManager	E3 Server's license check thread
Link2Stub	E3Run's thread responsible for asynchronously sending Link events
OpcAsyncCreateServer	OPC client's threads responsible for isolating the connection and access to an OPC server
OpcCallback	E3Run's or Studio's thread responsible for asynchronously receiving events from OPC clients
OpcClient	Thread where the OPC client is executed
OpcClientHost	Main OPC client's thread
OpcQueue	Thread responsible for sending OPC client's notifications asynchronously
RemoteDomain	E3 Server's threads responsible for managing client connections from Remote Domains
RemoteDomainsManager	Thread where management of **RemoteDomain** sets occurs
ServerControl	E3 Server's threads responsible for managing a local or remote Domain server
ServerControlMonitor	E3 Server's thread responsible for automatically starting E3Admin for logged in users
ServerLinkManager	E3 Server's thread implementing Link management
ServerSubscriptionManager	Thread managing alarm signature connections
StandbyAlgorithm	E3 Server's thread implementing **Hot-Standby** algorithm decisions
Studio	Studio's main thread (interface)
ThreadPool	Reusable E3DBEngine process' thread responsible for executing queries
UaClient	OPC UA client's main thread

MODULE	DESCRIPTION
Viewer	Viewer's main thread (interface), allows diagnosing Screen opening time, script execution time, etc.

- **FullDB**: Records operations of E3 database access' threads (generated by E3Run and E3 Server). Available modules are described on the next table.

Available modules for FullDB logs

MODULE	DESCRIPTION
DBAcquisition	Thread that sends application-generated data to queue files (.e3i files)
DBCallback	Thread that sends statistics about connections and operations finished or failed for the parent process
DBEngineHost	E3DBEngine process' main thread
DBExec	Thread that removes operations from queue files (.e3o files) and executes commands on a database
OCIThread	OCI's (*Oracle Call Interface*) thread
WatchDog	E3DBEngine process' thread responsible for terminating this process if a lengthy operation is locked

- **FullIO**: Records activities on IOServer's threads. Available modules are described on the next table.

Available modules for FullIO logs

MODULE	DESCRIPTION
CallBack	Thread for sending data collected by a Driver to E3Run
Driver	Thread executing a Driver
IOServer	IOServer's main thread, which receives Driver configuration and requests sent by E3Run
UaClientHost	E3UaClient process' main thread
WatchDog	IOServer's thread responsible for terminating this process if any lengthy operation is locked

- **FullPower**: Records detailed information on E3PowerEngine (when the electrical model file is in **XPD** format) or PowerEngine2 (when the electrical model file is in **EDB** format) threads. This log records, for example, information about performance diagnosis, in addition to detailed results of several operations.

Available modules are described on the next table.

Available modules for FullPower logs

MODULE	DESCRIPTION
DistLoadModel	Module responsible for calculations on **Distribution Load Modeling** Electrical Study
External Reader	Module responsible for calculations on **External Reader** Electrical Study
LoadShedding	Module responsible for calculations on **Load Shedding** Electrical Study
PowerEngine	Elipse Power's main module, responsible for handling E3 requests
PowerFlow	Module responsible for calculations on **Power Flow** Electrical Study
SelfHealing	Module responsible for calculations on **Self-Healing** Electrical Study
Send	Module responsible for sending results generated by several Electrical Studies to E3
StateEstimator	Module responsible for calculations on **State Estimator** Electrical Study
TopologyProcessor	Module responsible for calculations on **Topology Processor** Electrical Study
Workspace	Module responsible for centralizing values of Measurements used by Electrical Studies

- **FullREC**: Records operations executed on REC-managed threads. Available modules are described on the next table.

Available modules for FullREC logs

MODULE	DESCRIPTION
RECServer	Server thread for a REC connection (on E3 Server)

- **PowerEngine**: Records general information on E3PowerEngine (when the electrical model file is in **XPD** format) or PowerEngine2 (when the electrical model file is in **EDB** format) threads. Available modules are described on the next table.

Available modules for PowerEngine logs

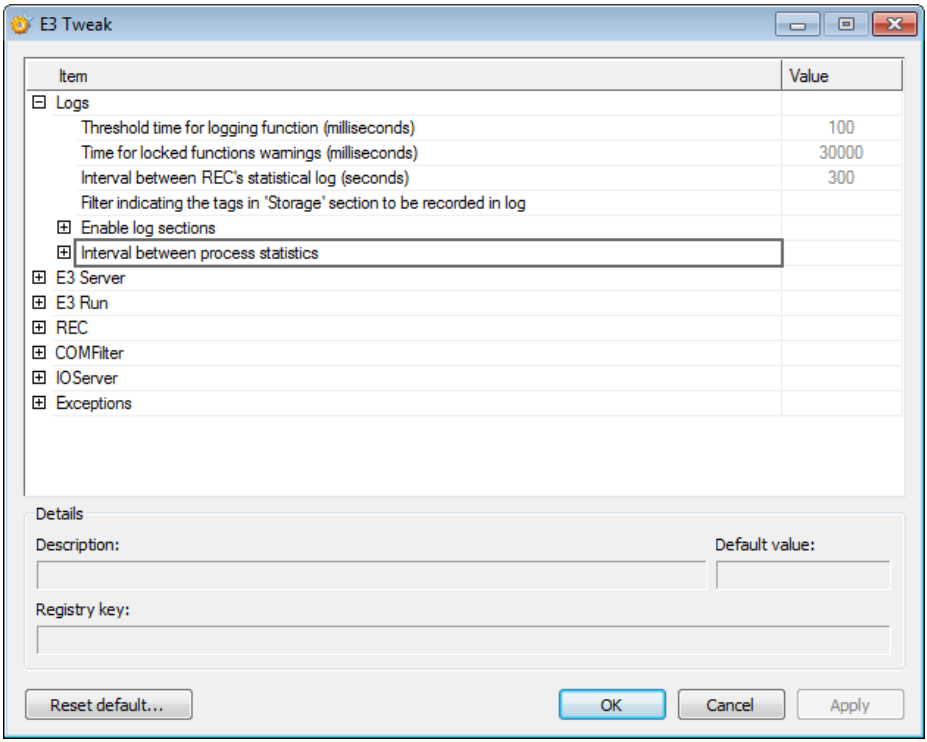
MODULE	DESCRIPTION
DistLoadModel	Thread with information about **Distribution Load Modeling** Electrical Study
ExternalReader	Thread with information about **External Reader** Electrical Study

MODULE	DESCRIPTION
Input	Thread with input information for Measurements and Measurement Sources
LoadShed	Thread with information about **Load Shedding** Electrical Study
Output	Thread with output information for Measurements and Measurement Sources
PowerEngine	Thread with global information about PowerEngine
PowerFlow	Thread with information about **Power Flow** Electrical Study
SelfHealing	Thread with information about **Self-Healing** Electrical Study
StateEstimator	Thread with information about **State Estimator** Electrical Study
TopologyProcessor	Thread with information about **Topology Processor** Electrical Study
Workspace	Thread with information about Measurement values used by Electrical Studies

NOTE: Module configuration only has precedence over Section configuration.

6.6 Interval Between Process Statistics

This section allows configuring time options for recording process statistics. Available options in this section are described on the next table.



Options to define interval between process statistics

Options for interval between process statistics

MODULE	DESCRIPTION
E3Admin	Configures an interval between E3Admin's process statistics. Default value of this option is 60.
E3DBEngine	Configures an interval between E3DBEngine's process statistics. Default value of this option is 60.
E3OpcClient	Configures an interval between E3OpcClient's process statistics. Default value of this option is 60.
E3PowerEngine	Configures an interval between E3PowerEngine's process statistics. Default value of this option is 60.
E3Run	Configures an interval between E3Run's process statistics. Default value of this option is 60.
E3Server	Configures an interval between E3Server's process statistics. Default value of this option is 60.

MODULE	DESCRIPTION
E3UaClient	Configures an interval between E3UaClient's process statistics. Default value of this option is 60.
IOServer	Configures an interval between IOServer's process statistics. Default value of this option is 300.
Studio	Configures an interval between Studio's process statistics. Default value of this option is 60.
Viewer	Configures an interval between Viewer's process statistics. Default value of this option is 60.

NOTE: For all modules, a value of 0 (zero) disables statistical recording. Using a value between one and nine forces E3 to use a value of 10. All values are in seconds.

CHAPTER 7

COM Filter Configuration

This section contains configurations for COM filter.

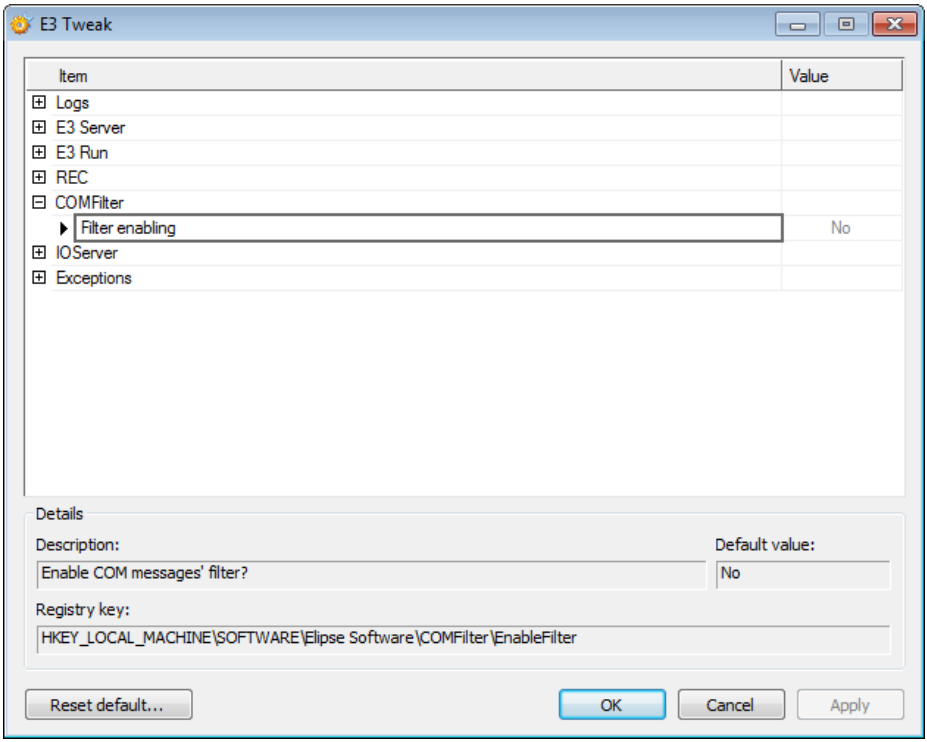
7.1 Enable Filter

E3Run implements a COM call filter aiming to avoid reentrant calls. This filter by default is disabled and to enable it (recommended only in systems that present errors or locks without an apparent cause), users can modify the **Filter enabling** item.

If this item is modified, an **Yes** answer to question **Enable COM messages' filter?** enables this filter and a **No** answer disables this filter.

This configuration is read from Registry only when E3Run is started. Therefore, when changing Registry E3 must be restarted.

On E3's **Full** log it is possible to check for reentrant COM calls, for debugging purposes.



Option to enable COM messages' filter

CHAPTER 8

IOServer Configuration

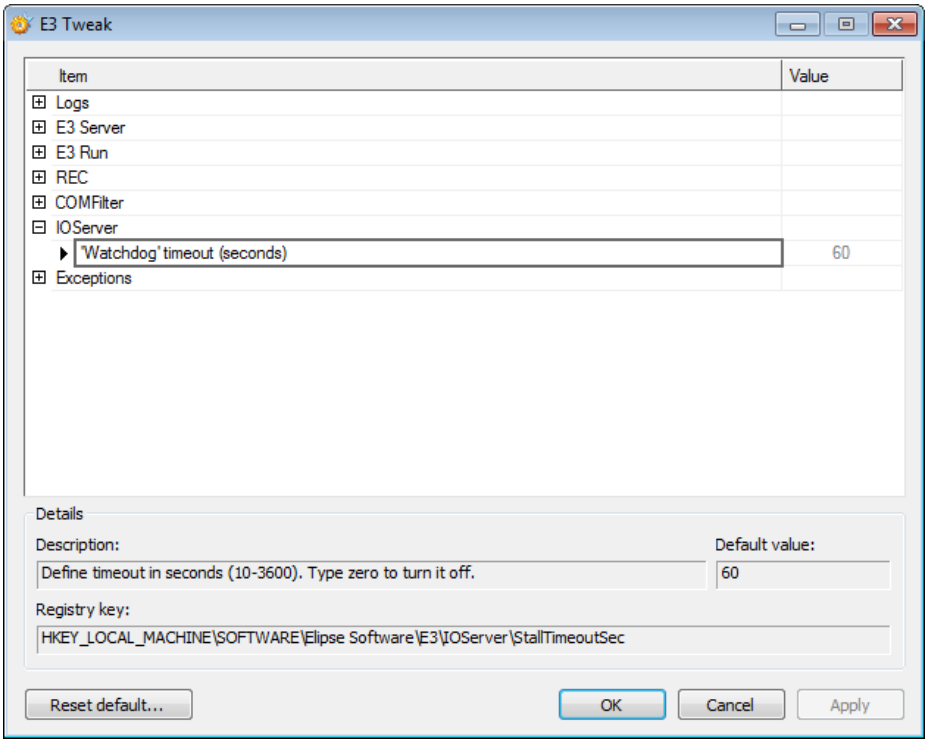
This section contains configurations for IOServer.

8.1 Define Watchdog Timeout

IOServer has a watchdog mechanism, which monitors calls performed by E3Run. If any of these calls last longer than one minute (default value), then the following actions are taken:

- An error message is recorded on E3 log
- IOServer process is immediately terminated, causing a DCOM call from E3Run (or from Studio) to fail, probably creating a new process for IOServer

A value of 0 (zero) in the **'Watchdog' timeout (seconds)** field disables this watchdog mechanism. Possible values for this option are in the range between 10 and 3600.



Option to define a Watchdog timeout

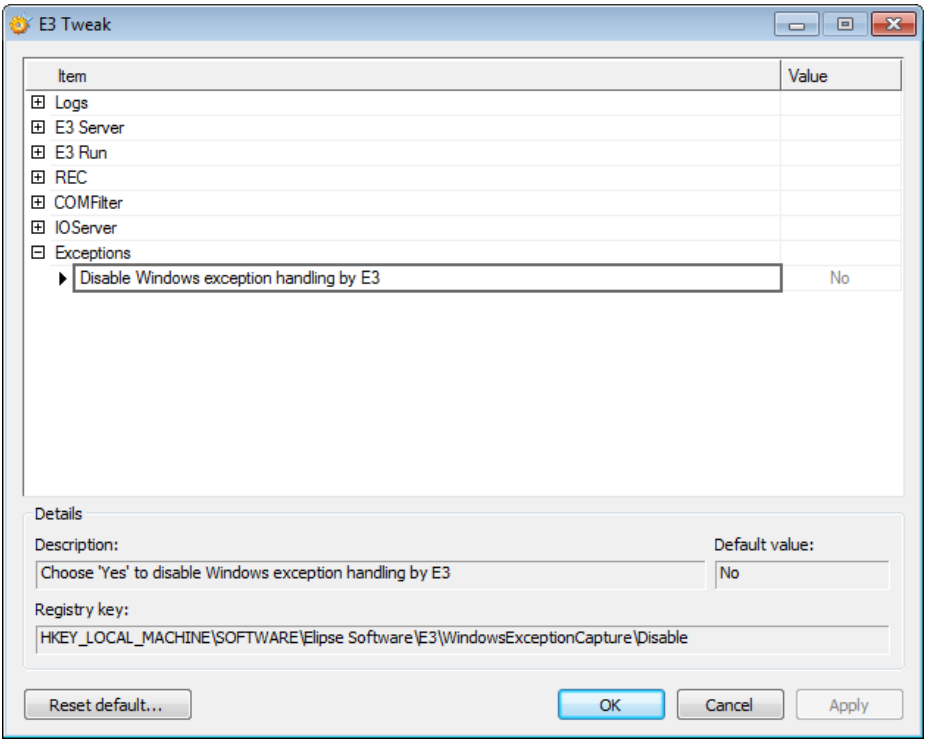
CHAPTER 9

Exception Configuration

This section contains configurations for E3 exceptions.

9.1 Disable Windows Exception Handling

Disables Windows exception handling by E3. If this option is enabled (value different from zero), Windows exceptions generated at run time (E3Run) or on database threads are not handled by E3, and therefore not registered in the log, and also terminate the execution of these processes. Disabling this option (default value) enables E3 to write Windows exceptions to the log.



Option to disable Windows exception handling

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