

SYNCHRONIZE A WINDOWS NT NETWORK WITH NETCLOCK MASTER CLOCKS

This Application Note provides detailed information on synchronizing WinNT Primary and Secondary Servers, WinNT Workstations and Win 95 or Win 98 Workstations.

NOTE:

The following Application Note provides additional information to assist you with installing the Timeserv program. Spectracom cannot supply you with the Timeserv program. Timeserv can only be obtained from the Resource Tool Kit for your version of Windows NT. The Resource Tool Kit can be obtained either locally or from the following mail-order companies:

Contact East 1 (800) 282-1800
Data Comm Warehouse 1 (800) 328-2261

TECHNICAL SUPPORT

For technical support on synchronizing computers or 911 equipment, contact Spectracom Tech Support via phone or email at the address information below. Tech Support is available Monday through Friday from 8:00 AM –5:00PM (Eastern).

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SECTION 1: CONNECTING THE SPECTRACOM MASTER CLOCK TO THE PRIMARY SERVER

- A) Using a standard straight-through serial cable, connect an available serial port on the back of the Spectracom Master Clock to the serial port on a server or workstation that is always on. (From this point on, this computer will be called the Primary Server). We recommend using Data Format 2, but Formats 0 and 1 are also supported. Refer to the Spectracom Master Clock manual for configuration information.

OR

- B) Use the Master Clock Remote RS-485 Port output with a Spectracom TimeTap to connect to the serial port of a Server or Workstation as described above. Refer to the TimeTap manual for wiring instructions.

OR

- C) Use either the Spectracom Model 8188 Ethernet Timeserver which connects to the Remote RS-485 port of the Master clock or the 8189 NetClock/NTP Master Clock. These devices provide an Ethernet connection to a Hub which keeps the serial port on the Primary Server free. Contact our Sales Department at (716) 381-4827 for information on these two products.

There is no additional software required for the NetClock Master Clock. Timeserv is the only required software. The Timeserv program needs to be installed on every NT machine on the Network. Windows 95 or 98 Workstations utilize the built-in command "Net Time" to synchronize.

NOTE:

If you have technical difficulties, refer to Doug Hogarth's (the author of Timeserv) website that provides information about himself as well as information about Timeserv. (Refer to the instructions below).

To retrieve technical information on Timeserv:

- 1) Go to www.niceties.com
- 2) Under personal interests, click on "time".
- 3) On the fourth line down (starts with "you can see") click on Timeserv.

A. Product Summary

Provides a description of what Timeserv is used for and discusses the key features.

B. Specifications

Click on Timeserv Documentation. Documentation goes into initialization and NetClock required settings and connections.

C. Update Information

Covers changes in the different versions of Timeserv.

D. FAQ

Covers common questions and Event Log Entries.

SECTION 2: HOW TO INSTALL THE TIMESERV PROGRAM

This section describes how to install the Timeserv program on all NT machines on the Network.

NOTE:

Windows 95 and Windows 98 Workstations do not use Timeserv to synchronize.
These workstations use the Net Time command. Refer to Section 6: TO SYNC
WINDOWS 95 OR 98 WORKSTATIONS TO THE PRIMARY SERVER.

* TIMESERV.EXE: Time Synchronizing Service

To install Time Synchronizing Service:

1) Verify there are no other Time Service programs running in the background (i.e. Net Time which is a built-in time program that would be loaded in a startup batch file or Clock Update Service which would be found in "Services"). These programs conflict with TimeServ and will cause erroneous time jumps.

2) Copy the TIMESERV.EXE and TIMESERV.DLL files to the %SYSTEMROOT%\SYSTEM32 folder. There are 4 versions. Install the version that corresponds to your processor. (Use I386 for Intel family, AMD, Cyrix etc...).

3) Copy the TIMESERV.INI file to the %SYSTEMROOT% folder.

4) Edit the TIMESERV.INI file to configure TIMESERV. The Timeserv.ini file is edited to allow operation from an RS232 Port, an Ethernet TimeServer, or from a synchronized Primary Server. Refer to the following steps for Timeserv.ini configurations using Spectracom products. The REM statements and unnecessary changes have been deleted from these sections to simplify the application note.

A. To sync the Primary Server using RS232, refer to Section 3: TO EDIT TIMESERV.INI TO SYNC PRIMARY SERVER WITH RS232 (SERIAL PORT OR SPECTRACOM TIMETAP).

OR

B. To sync the Primary Server using an NTP Server, refer to Section 4: TO EDIT TIMESERV.INI TO SYNC PRIMARY SERVER USING AN ETHERNET TIME PROVIDER (NTP).

OR

C. To synchronize other NT servers or NT Workstations, refer to Section 5: TO EDIT TIMESERV.INI TO SYNC MULTIPLE NT SERVERS OR NT WORKSTATIONS TO THE PRIMARY SERVER.

5) Exit and save file.

6) Reboot the machine.

7) At the command prompt, type: (You must be logged on with administrator privileges to do this.)

Timeserv -automatic

If you need to make any further changes to the .ini file after you have rebooted, edit and save the file. At the command prompt type:

Timeserv -update

8) The Win NT clock in the bottom right hand corner should update within a couple of minutes of starting the service.

9) To verify everything is correct, stop the service (see Notes below). Manually change the system clock to a bogus time and go back in and restart the service. The time should jump to the correct time. Go into the Event Viewer. Look at the Application Log and click on the Timeserv event. Click on view, then Refresh. You should get a line stating that time offset is either < or > .5 seconds indicating the service is operating correctly. The < or > sign depends on the amount of change that occurred from the original setting.

NOTES:

To manually start /stop

Start button to Settings, to Control panel, to Services.
Select Time Service.

Event Viewer

Start button to Programs, to Administrative tools, to Event Viewer.
Look at the Application Log and click on the Timeserv event.
Click on view, then Refresh.

SECTION 3: TO EDIT TIMESERV.INI TO SYNC PRIMARY SERVER WITH RS232 (SERIAL PORT OR SPECTRACOM TIMETAP)

This section describes how to edit Timeserv.ini for an RS232 Interface to the Primary Server.

NOTE:

The time in Data Format 2 always reflects UTC. The correction for local time and Auto DST must be made in the computer setup. If using Format 0 or 1 set for local time (Time Zone offset entered and DST enabled), you must match the equivalent settings in Windows NT. Also, if using Data Format 0 from the master clock, it is required that the year be set properly on the computer (manually). Data Format 0 does not supply year information.

1) The Timeserv program was written to accept several time sources. "Type =" selects the Time Source for the Primary Server. Spectracom is used for an RS232 connection to our Master Clock.

Type = Spectracom. Remove semicolon from the front of this statement for all Spectracom Master Clocks. All other 'Type =' statements should have a semicolon in front.

2) "Primary Source =" is used to list valid TimeServers.

;PrimarySource = \\TIMESOURCE (Has semicolon)

3) "Period =" is used to determine the delay between each Time Set. " Period = 0" will provide an attempt every 50 minutes. If the time offset is greater than 0.5 seconds, the time is reset to the Spectracom Reference. If the time offset is less than 0.5 seconds, the time will not be set and will be evaluated again every 50 minutes until it is greater than 0.5 seconds.

Period = 0 (No semicolon)

4) "Port =" is the name of the serial port on your machine that is physically connected to the Spectracom clock.

;Port = \\.\COM1
Port = \\.\COM2 (Remove semicolon from the appropriate port)
;Port = \\.\COM3

5) "Modem commands", "Prefixes" and "Phone Numbers" are used for dial-up service. The modem is not used with the Spectracom Clocks.

All "ModemCommand =" and "Prefix =" and "Phone Number =" statements should have semicolons in front.

6) The "NTPServer =" statement is only used with an Ethernet Timeserver Since the Server is being synched using RS232, this statement should have a semicolon in front.

```
;NTPServer = (Has semicolon)
```

7) "Timesource =" is used to determine if this particular machine can give the time to another machine. Since all workstations get their time from the Server, the answer should be yes.

```
;timesource = no  
timesource = yes (No semicolon)
```

8) The " log =" is used to determine if an event log will be created to generate indications of valid time sets or attempts and for error entries. The answer initially should be yes to assist in installation. If you determine later on that you do not want these entries, the answer can be changed to no.

```
;Log = no  
Log = yes (No semicolon)
```

9) "SecondaryDomain =" defaults to searching for a timesource in your current domain. Alternatively, it can be set to a domain/workgroup name.

```
;SecondaryDomain = (Has semicolon)
```

10) "Speed =" is the baud rate of the port being used on the Master Clock. The REM statement says this is automatic on Spectracom but we like to remove the semicolon just in case. Typically this is going to be 9600. There are a few times when you may be using 1200. This is especially true if you have a Motorola Centracom which may be one or the other. Refer to the appropriate Master Clock manual if you are not sure of the baud rate setting of the port.

```
;Speed = 300  
;Speed = 1200  
;Speed = 2400  
Speed = 9600 (Remove semicolon from Baud Rate of Master clock)  
;Speed = 14400
```

11) "RandomPrimary =" is for use with an Ethernet Timeserver Since the Primary Server is being set with RS232, this line is not required.

```
;RandomPrimary = yes (Has semicolon)
```

12) "Hour = 6" is used for modem calls. The modem is not used when connected to the Spectracom Clock.

```
;Hour = 6 (Has semicolon)
```

13) "Tasync = no" means to use TimeAdjustment API to disable CMOS sync

```
TAsync = no (No semicolon)
```

SECTION 4: TO EDIT TIMESERV.INI TO SYNC PRIMARY SERVER USING AN ETHERNET TIME PROVIDER (NTP)

This section describes how to edit Timeserv.ini for an NTP Interface to the Primary Server.

1) The Timeserv program was written to accept several time sources. "Type =" selects the Time Source for the Primary Server. "Type = NTP" is used for an Ethernet Timeserver to sync the Server.

Type = NTP Remove semicolon. All other "Type =" statements should have a semicolon.

2) "Primary Source =" is used to list valid Timeservers

;PrimarySource = \\TIMESOURCE (Has semicolon)

3) "Period =" is used to determine the delay between each Time Set. " Period = 0" will provide an attempt every 50 minutes. If the time offset is greater than 0.5 seconds, the time is reset to the Spectracom Reference. If the time offset is less than 0.5 seconds, the time will not be set and will be evaluated again every 50 minutes until it is greater than 0.5 seconds.

Period = 0 (No semicolon)

4) "Port =" is the name of the serial port on your machine that is physically connected to the Spectracom clock. Since the serial port of the Server is not being used, all statements should have a semicolon in front.

;Port = \\.\COM1
;Port = \\.\COM2 (All statements have semicolons)
;Port = \\.\COM3

5) "Modem commands", " Prefixes" and "Phone Numbers" are used for dial-up service. The modem is not used with the Spectracom Clocks.

All "ModemCommand =" and "Prefix =" and "Phone Number =" statements should have semicolons in front.

6) The "NTPServer =" statement is the IP address of the NTP server being used to sync the Primary Server.

NTPServer = (Remove the semicolon and enter the IP address of the NTP Timeserver

NOTE: *This is Network Dependent. See your Network Administrator.*

7) "Timesource =" is used to determine if this particular machine can give the time to another machine. Since all workstations get their time from the Server, the answer should be yes.

;timesource = no
timesource = yes (No semicolon)

8) The "log =" is used to determine if an event log will be created to generate indications of valid time sets or attempts and for error entries. The answer initially should be yes to assist in installation. If you determine later on that you do not want these entries, the answer can be changed to no.

;Log = no
Log = yes (No semicolon)

9) "SecondaryDomain =" defaults to searching for a time source in your current domain. Alternatively, it can be set to a domain/workgroup name.

;SecondaryDomain = (Has semicolon)

10) "Speed =" is the baud rate of the Master Clock. Since the Server is not using RS232 to sync to the NetClock, the baud rate is not needed.

All "Speed =" statements should have a semicolon in front of them.

11) "RandomPrimary =" is for use with multiple Ethernet Timeservers. Since there is only one Timeserver present, this line should have a semicolon.

;RandomPrimary = yes (Has semicolon)

12) "Hour = 6" is used for modem calls. The modem is not used when connected to the Ethernet Timeserver

;Hour = 6 (Has semicolon)

13) "Tasync = no" means to use Time Adjustment API to disable CMOS sync.

TAsync = no (No semicolon)

SECTION 5: TO EDIT TIMESERV.INI TO SYNC MULTIPLE NT SERVERS OR NT WORKSTATIONS TO THE PRIMARY SERVER

This section describes how to edit Timeserv.ini for other NT Servers on the Network and NT Workstations.

1) The Timeserv program was written to accept several time sources. "Type =" selects the Time Source for the Primary Server. "Type = Primary" is used to tell the machine to go to the Primary Server to obtain the time.

Type = PRIMARY (Remove the semicolon from this line. All other "Type =" statements should have semicolon in front of them).

2) "Primary Source =" is used to tell the Workstation the name of the Primary Server to grab the time from. Each server name should start with \\, separated by a semicolon.

PrimarySource = \\ (Remove the semicolon and enter the name of the Primary Server here)

3) "Period =" is used to determine the delay between each Time Set. "Period = 0" will provide an attempt every 50 minutes. If the time offset is greater than 0.5 seconds, the time is reset to the Spectracom Reference. If the time offset is less than 0.5 seconds, the time will not be set and will be evaluated again every 50 minutes until it is greater than 0.5 seconds.

Period = 0 (No semicolon)

4) "Port =" is the name of the serial port on your machine that is physically connected to the Spectracom clock. Since the time is coming from the Primary Server via Network cabling, the serial port is not being used. All statements should have a semicolon in front.

All three "Port =" statements should have a semicolon in front.

5) "Modem commands", "Prefixes" and "Phone Numbers" are used for dial-up service. The modem is not used with the Spectracom Master Clock.

All "ModemCommand =" and "Prefix =" and "Phone Number =" statements should have semicolons in front.

6) The "NTPServer =" statement is only used when an Ethernet Timeserver is being used. Since the Workstation/Server is being synched using Network cabling, this statement should have a semicolon in front.

;NTPServer = (Has semicolon)

7) "Timesource =" is used to determine if this particular machine can give the time to another machine. Since another machine could get the time from this machine, the answer should be yes.

;timesource = no
timesource = yes (Remove semicolon from this line)

8) The "log =" is used to determine if an event log will be created to generate indications of valid time sets or attempts and for error entries. The answer initially should be yes to assist in installation. If you determine later on that you do not want these entries, the answer can be changed to no.

;Log = no
Log = yes (No semicolon)

9) "SecondaryDomain =" defaults to searching for a Time Source in your current domain. Alternatively, it can be set to a domain/workgroup name.

;SecondaryDomain = (Has semicolon)

10) Speed is the baud rate of the Master Clock. Since the Master Clock is not syncing the Workstation (the Primary Server is), the baud speed is not used.

All five "Speed =" statements should have a semicolon in front of them.

11) "RandomPrimary =" is for use with a Network Server. Since the Server is considered a Network Server, the semicolon should be removed.

RandomPrimary = yes (No semicolon)

12) Hour 6 is used for modem calls. The modem is not used when connected to the Spectracom Clock.

;Hour = 6 (Has semicolon)

13) TAsync no means to use TimeAdjustment API to disable CMOS sync.

TAsync = no (No semicolon)

SECTION 6: TO SYNC WINDOWS 95 OR 98 WORKSTATIONS TO THE PRIMARY SERVER

This section describes how to use the Net Time Command to allow Windows 95 and 98 Workstations to sync to the Primary Server.

- 1) Add the following to the Logon Batch File. The time will update each time the workstation is rebooted.

Win95.bat NET TIME \\NTSERVER /S /Y (Add this line to batch file)

- 2) Go to Windows Explorer. Go to Windows. Right click on Net.exe. Click properties. Go to program. Check "close on exit".

Typing net time in the Command Prompt window can then also manually set the time.

TASK SCHEDULER

If you are using Internet Explorer 4.0, 4.0, 4.2 etc. there is a program called Task Scheduler which can be set to update the workstation at a user specified schedule so you do not have to reboot or type net time.

- 1) Download Task scheduler add-on or obtain from CD-ROM.
- 2) Double click on Task Scheduler.
- 3) Click on Browse. Double click on Windows.
- 4) Double click on Net.exe.
- 5) Click when you want to schedule a TIME update. Click Next.
- 6) Open advanced properties. Click Finish.
- 7) Change the Run line to C:\\Windows \\Net.exe time \\ (name of your primary server) /s /y.

The time of the workstation will now update the time from the primary server (which is synched to the NetClock) based on the schedule you chose. The operator will just see a small flash on the screen each time the update occurs.