Krontek
KT2050 Network Clock Controller

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INTRODUCTION

The Krontek KT2050 Slave Clock Controller converts network (SNTP) time to the electrical protocols required by analog and digital slave clocks (supported clock protocols are listed on the following page). The Controller has an auto-sensing 10/100Mbit Ethernet Interface and can drive a clock load of up to 750mA at 24VDC.

The Controller operates "stand alone", that is, it does not require any external support for normal operation, such as a PC or other device that can be switched off inadvertently. During a network failure the Controller will continue to operate from its internal time base.

The Controller derives its time from the network via an SNTP Server. SNTP time can be sourced externally from the Internet or from local timeservers such as the Krontek KT2000 GPS Timeserver. The Controller contains a battery backed Real Time Clock that will maintain the time for a period of 4 days in the event of a power failure. Lost time is accumulated and slave clocks are restored to the correct time when power is restored.

The Controller can be programmed from any PC on the network via a telnet session. Passcode protection is provided to prevent unauthorized access.

Daylight saving is fully automated and will adjust the slave clocks to the appropriate time as required.

TIME CORRECTION FORMATS

This page is included to provide a brief description of the various time correction formats. The Controller supports all popular correction formats used by Simplex, Cincinnati, Bodet and many others. If you are unsure of the type of clocks on you have please contact Krontek or one of our distributors for further advice. Note that any correction format not described here can be incorporated into the controller as required.

Sync Wired: This format consists of an 8 or 12 second control pulse indicating an hourly or twelve hourly correction. The Controller provides the option of a correction every hour or every twelve hours.

SR2: This is a corrective minute impulse format. The Controller provides a pulse each minute, at the 50th minute the polarity of the pulse is reversed and any clock that is less than 10 minutes ahead of time will stop operating. At the 59th minute a series of rapid pulses are produced that will synchronize all clocks to the correct minute.

Reverse Polarity: This format consists of an impulse each minute alternating in polarity. There is no time correction.

Standard BCD: This format provides an hour, minute and second data stream and can be selected for 50 or 60 bits per second.

Extended BCD: This format provides an hour, minute, second, day, month and year data stream at 128 bits per second.

D1/D2: This format controls Bodet Tower Clock Movements.

Syncroline: This format provides power and data for Krontek's Syncroline range of clocks.

Alpha: This format provides the serial correction data for Adaptive Displays' Alpha Clocks (requires 6VDC Power Pack).

Communicating with the Controller

Before you can communicate with the Controller you must know its IP address.

The Controller comes pre configured with an IP address of 192.168.0.128 and responds to a telnet session on default port 23. There are three options to enable communications with the Client:

1. Your network is already compatible, i.e. 192.168.0.xxx
2. Configure a PC to a compatible IP address, i.e. 192.168.0.50, and use a network crossover cable.
3. Use the DeviceDetector utility.

In reference to point 3. Download the utility DeviceDetector.zip from our website "www.krontek.com.au/downloads/devicedetector.zip" to your PC and unzip it. When you launch the program it will scan the network for Krontek Network Time devices (irrespective of their IP address) and list them. Click on the device you wish to configure. The IP and Subnet Mask address will be presented for editing.

After you update the settings the Controller will reboot. You will need to run DeviceDetector again to find the Controller and ensure the new address is correct.

Once you have set the address you can establish a telnet session using a telnet communications program such as HyperTerminal, HyperTerminal is usually included with your PC operating system.
Use windows 'start' -> 'help'-> 'search' and type in HyperTerminal to locate it on your machine. If it is not installed it is available from www.hilgraeve.com.

When using HyperTerminal use the TCP/IP connect option, the Controllers IP address and port 23.

An alternative to HyperTerminal is to open a DOS command window and type in "telnet xxx.xxx.xxx.xxx" (where x is the IP address you have assigned the Controller). The Controller uses the default telnet port 23 for the connection.

Important: Ensure you disconnect from the telnet session either by closing the terminal window or exiting the Controller menu using "99". Failure to do this will inhibit another session from being opened as only one session can operate at one time.

Main Menu

After making the telnet connection you will be presented with the following or similar menu:

```
-- Main Menu --

 1  - Set Time Server IP address
 2  - Set Time Server poll period
 3  - Set Time Zone Offset
 4  - Set Daylight Savings
 5  - Set Time & Date
 6  - Set Slave Correction Format
 7  - Set Controller IP address
 8  - Manually Advance Clocks
 9  - Display Status
 10 - Set/Change Passcode

 99 - Exit

Select
```

1 - Set Time Server IP address:

Select this to set the IP address of your network Time Server.

The Controller will display:

```
Current Time Server address: 192.168.000.070
```

```
Change Y/N?
```

If you opt to change you will be prompted with each 3 number field in brackets, you may change it or press enter to skip to the next field.

```
(192)220 .(168)150 .(000)0 .(070) 75
```

In the above example we changed the address to 220.150.000.075

The Controller will display the new address and ask for confirmation to save it.

2 - Set Time Server poll period:

The Controller displays:

```
Current Time Server poll period 1 hours

Enter new period 0-48 hrs or <CR> to exit
```

This is the time period between calls to the network Time Server.
Select a period of 0 to 48 hours. Default is 0.

Zero will disable the polls to the Time Server and allow the time and date to be set manually.

This menu item has the additional feature of force polling the timeserver, you do not have to enter a time – just press Enter <CR> to exit. This provides a facility to force an update to the Controller's time and test the network time server (see 'Display Status' for poll results). The poll timer is restarted each time this menu item is executed.

3 - Set Time Zone Offset

The Controller displays:

```
Current Time Zone Offset: 10.0 hours

Enter offset -13 to +13 or <CR> to exit ?
```

Time Servers provide time based on UTC (also referred to as GMT or Zulu), that is, the time at the Earths zero meridian. Therefore you must add or subtract the time of the time zone you are in to set the local time.

Note: Use standard time - do not use daylight savings time.

Enter your time zone offset from UTC.

Then the Controller displays:

```
Add half hour Y/N ?
```

This allows you to add a further 30 minute offset. For instance Adelaide, Australia is UTC +9.5 hours.

Examples: London is 0, Paris is –1, New York is –5, Sydney is +10.

The Controller will display the new offset and ask for confirmation to save it.

4 - Set Daylight Savings

```
Daylight Saving options:

Select: 0 to Disable, 1 to Define your own

Or choose from the following table:

     --------- Start --------- ---------- End ---------- ------ Region -----
 2 - Last  Sun in Oct at 02:00 Last  Sun in Mar at 03:00 AUSTRALIA EASTERN
 3 - First Sun in Oct at 02:00 Last  Sun in Mar at 03:00 AUSTRALIA TASMAINIA
 4 - Last  Sun in Mar at 02:00 Last  Sun in Oct at 03:00 EUROPE
 5 - First Sun in Oct at 02:00 3rd   Sun in Mar at 03:00 NEW ZEALAND
 6 - Last  Sun in Mar at 02:00 Last  Sun in Oct at 01:00 UK
 7 - First Sun in Apr at 02:00 Last  Sun in Oct at 02:00 USA
 8 - 2nd   Sun in Mar at 02:00 First Sun in Nov at 02:00 USA NEW

Current Settings:
 Starts: Last  Sun in Oct at 02:00
 Ends  : Last  Sun in Mar at 03:00
 Region: AUSTRALIA EASTERN


Enter option or <CR> to exit
```

If you require daylight saving then either choose an entry from the table, or enter 1 and The Controller will allow you to configure a unique daylight saving period not available from the table – just follow the prompts.

Selecting 0 will disable daylight saving.

5 - Set Time and Date:

The time and date can only be set if the timeserver poll period is disabled (set to 0).

Note: The ability to set the time and date is to enable the functional testing of the time and calendar schedules. It is not recommended that the Controller operate in this mode over an extended period as the internal clock relies on a timeserver for accuracy.

The Controller displays:

```
Enter time as HHMMSS in 24hr format or <cr> to skip
```

Example: 2:43:35pm is entered as 144335

```
Enter date as DDMMYY or <cr> to skip
```

Example: 2nd Jan 2005 is entered as 020105

Press enter to return to the Setup Menu

6 - Set Slave Correction Format:

This option allows you to select the clock correction format you require – see page 4 for details. Setting the format to '0' will disable the output.

7 - Set Controller IP address:

Select this to set the IP address of the Controller.

This is an alternative to using the DeviceDetector utility.

Be warned, if you change anything but the last 3 digits you will not be able to communicate with the Controller again unless your PC is set to the same host IP settings.

The Controller will display:

```
Current Time Server address: 192.168.000.128

Change Y/N?
```

If you opt to change you will be prompted with each 3 number field in brackets, you may change it or press enter to skip to the next field.

```
(192) .(168) .(000) .(128) 220
```

In the above example we changed the last field to 220

The Controller will display the new address and ask for confirmation to save it.

Note: If you change the IP address the Controller will reboot and you will need to re establish a connection using the new IP address.

8 – Manually Advance Clocks:

This option allows you to set the time of the slave clocks. The resolution or accuracy to which you can set them to depends on the correction format. Some formats will only allow manual correction to within the hour.

9 – Display Status:

This option displays the various settings selected. In the case of Syncroline clocks it will also display the clock load on the controller. This should be kept to 90% or less for long term operation.

10 – Set/Change Passcode:

This option allows you to set the passcode to restrict unauthorized access to the controller.

Four characters are required. Alpha (A-Z) and numeric (0-9) characters are accepted. Lower case characters are internally converted to upper case.

A code of four zeros (0000) will disable passcode checking.

Technical Specifications

Accuracy: Dependant on timeserver (generally within 20ms of UTC)

Ethernet: Auto-sensing 10/100Mbit, RJ45 Interface

Ethernet Connection Indicators: Orange 10Mbit, Green 100Mbit

SNTP Protocol: Compliant with RFC 2030

Telnet Port: 23

Power Led: On when power is applied

Active Led: Flashes once per second when time base is operational

Power Supply Requirements: 24 volts DC, 2A

Output voltage: 24VDC @ 1.6A

Internal Clock: 15 day battery backup, ±2 mins/year accuracy

Dimensions: Length 87mm, Width 57mm, Height 27mm