

# IV-18 (NB-18) VFD Tube Clock

Energy Pillar

## Instructions

v1.2.0

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## Attention

- ◇ **Attention:** To prevent accidental damage, do not place this clock on an uneven surface.
- ◇ **Warning:** The clock has an internal high voltage circuit; do not touch the components while the clock is operating.
- ◇ **Warning:** Clock is for indoor use in a dry place only.
- ◇ **Warning:** Please do not let children touch the clock.

## Functional features

1. Eight digits in IV-18 (IB-18) VFD tube display. (~1980-1992 made in USSR).
2. Display hour, minute and second (12 or 24 hour format optional).
3. Display year, month and day and Chinese lunar date (YY-MM-DD or MM-DD-YY.DD-MM-YY.YY-DD-MM format optional).
4. Leading zero ON/OFF function.
5. GPS real-time adjustment. Automatically adjusts date and time; GPS status display (with optional GPS receiver).
6. GMT time zone functions, the clock will calculate the local time based on satellite.
7. Temperature display (°C or °F) (with optional temperature sensor).
8. Two alarm clock (set ON/OFF independent alarms).
9. Alternating, date and temperature display. Adjustable display intervals.
10. Timer function. Can be set up to 99 hours, 59 minutes and 59 seconds.
11. Display ON/OFF timer. Easily check time and date after when powered off.
12. 8 manual brightness levels; auto brightness for ambient conditions.
13. Sound ON/OFF button.
14. Display information auto-rotates 180° based on clock orientation.
15. IR remote controller operation. (included)
16. Extremely precise RTC module provides accuracy  $\Delta$  less than 1 minute/year.
17. Built-in backup lithium battery will maintain clock time more than 3 years.

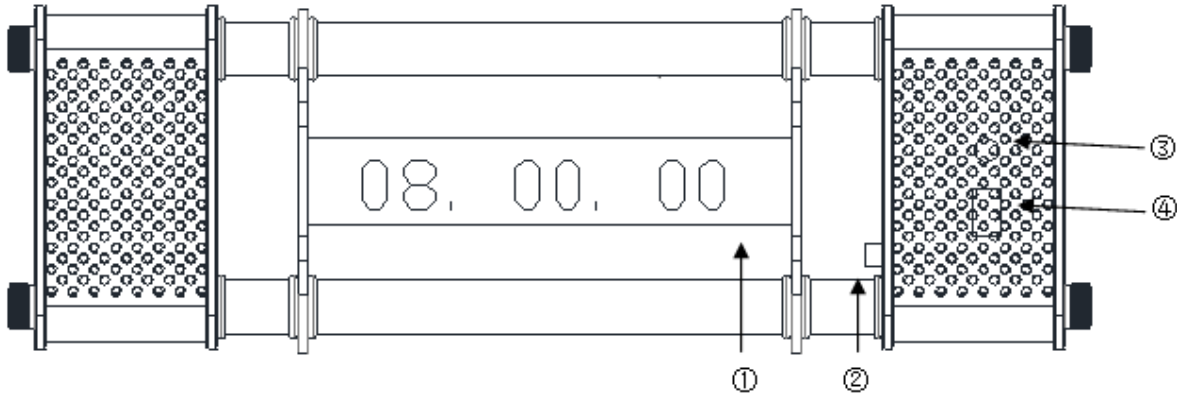
## Technical Specifications

Input voltage:	DC5V
Working current:	Max 220mA
Tube type:	IV-18 ( IB-18, manufactured in USSR, 1984-1992)
Size:	200mm x 52mm x 64mm; tube length 115mm x diameter 18mm
Working temp:	0°C - 60°C
Weight:	350g
Shell material:	Aluminum alloy

## Package Contents

Name	Quantity	Name	Quantity
VFD tube clock	(1)	Power adaptor (Mini USB)	(1)
IR remote controller	(1)	User manual	(1)

## Appearance Layout



Num	Name	Num	Name
①	IV-18 VFD tube	②	IR receiver
③	GPS Receiver Socket	④	Mini USB Power Socket

## IR Remote Control Function



- |           |              |                |
|-----------|--------------|----------------|
| 1. POWER  | 2. BACKLIGHT | 3. SET         |
| 4. DATE   | 5. ALARM     | 6. TEMPERATURE |
| 7. LEFT   | 8. RIGHT     | 9. FUNCTION    |
| 10. OK    | 11. CANCEL   | 12. NUM 0      |
| 13. NUM 1 | 14. NUM 2    | 15. NUM 3      |
| 16. NUM 4 | 17. NUM 5    | 18. NUM 6      |
| 19. NUM 7 | 20. NUM 8    | 21. NUM 9      |

IR controller uses (2) AG10 cells or (1) CR2025 cell, depending on remote controller supplied. Transportation rules may not permit shipment with lithium battery installed. Please insert battery or remove protective insulator to operate.

## Operational Beep Tones

Beep	Description	Meaning
Be	1 short beep	Normal operation
Be...	1 long beep	Confirm and saved
Bebebe	3 short beeps	GPS-Satellite time sync successful
Bebebebe	4 short beeps	Set Error/Cancel/Alarm

## Display Mode Switch

### 1. Display time Mode

After powering on the clock or pressing the POWER button in shutdown state, clock displays in time mode. Clock will display HOUR, MINUTE, SECOND in this mode.

### 2. Display calendar date Mode

Press **DATE** button to enter calendar date display mode. Clock will display YEAR, MONTH, DAY. Clock will return to display time mode after three seconds.

### 3. Display lunar date Mode

Press **DATE** button twice to enter display lunar calendar date mode. Clock will display YEAR, MONTH, DAY of lunar date. Clock will return to display time mode after three seconds.

### 4. Display alarm Mode

Press **ALARM** button to show alarm 1 mode. Press **ALARM** button again to show alarm 2 mode. Clock will return to display time mode after three seconds.

### 5. Display temperature Mode

Press **TEMPERATURE** button to show temperature. (when used with the optional temp. sensor) Clock will return to display time mode after three seconds.

### 6. Timer Mode

Press **ALARM** button three times to enter timer mode. In display timer mode, press **CANCEL** to return to the display time mode.

### 7. Menu Mode

Press **FUNCTION** button to enter menu mode and then press **CANCEL** to exit.

## Power ON/OFF

In display time mode, press **POWER** button to control ON/OFF power of clock display. It will be display "**HELLO**", when powered ON and "**POWER OFF**", when powered OFF.

Clock will cut the filament and high voltage supply of the VFD tube in order to extend the life-span of the VFD tube.

## Adjust Brightness

In the display time mode, press the **LIGHT** button repeatedly to change brightness in 8 steps. After step 8, the display will show "**Auto**" and the clock will adjust brightness automatically according to environmental light. This provides high brightness during the daytime and low brightness at night, so as not to disturb your sleep.

## Temperature Unit °C/°F

In the display temperature mode (with the optional temp. sensor), press **FUNC** button to toggle between °C/°F.

- **This option is stored in the clock and is not lost when powered off.**

## Set Time

In display time mode, press **SET** button to enter set time mode.

After entering set time mode, **SECOND** will be blinking, meaning **SECONDS** are now being set. Press **LEFT** or **RIGHT** button to change between **SECOND (SS)**, **MINUTE (MM)** and **HOUR (HH)** setting.

Press button **NUM0 - NUM9** to change the number.

Press **OK** to save setting.

Press **CANCEL** to abort setting and exit.

- **After setting success, clock will beep for a long time, and return to display time mode.**
- **If setting is illogical, clock will beep four short times and abort. Settings will not be saved and the clock will return to display time mode.**
- **When setting time, clock displays in 24H format.**

## Set Date

In display date mode, press **SET** button to enter set date mode.

After entering set date mode, **DAY (DD)** will be blinking, meaning now setting **DAY**. Press **LEFT** or **RIGHT** button to change setting position between **DD - MM - YY**.

Press button **NUM0 - NUM9** to change the number.

Press **OK** to save settings.

Press **CANCEL** aborts setting and exits.

- **After setting success, clock will beep for a long time, and return to display time mode.**
- **If setting is illogical, clock will beep four short times and abort. Settings will not be saved and the clock will return to display time mode.**
- **The moon date doesn't need setting, the clock will calculate automatically according to the Gregorian calendar.**
- **Two digit of YEAR (YY) means 20YY year.**

## Set Alarm

In display (alarm 1) or (alarm 2) mode, press **SET** button enter set alarm mode.

In set alarm mode, **HOUR (HH)** will blink, meaning now setting **HOUR** of alarm. Press **LEFT** or **RIGHT** button to change between **(HH)** and **(MM)** setting position.

Left two digits will display which alarm is being set, A1 means now setting alarm 1, A2 means now setting alarm 2.

Press button **NUM0 - NUM9** to change the number.

Press **OK** to save setting.

Press **CANCEL** to abort setting and exit.

- **After setting success, clock will beep for a long time, and return to display time mode.**
- **If setting is illogical, clock will beep four short times and abort. Settings will not be saved and the clock will return to display time mode.**
- **To disable the alarm function, press the FUNC button in alarm display mode, then clock display OFF, means this alarm is disabled.**
- **If the clock alarm is sounding, press any button to stop the alarm. The clock will automatically stop the alarm after 60 seconds.**

## Menu 1: Date Format YY-MM-DD / YY-DD-MM / DD-MM-YY / MM-DD-YY

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "1" for: Date Format.

Press **OK** to enter settings screen. The display shows the current date format. Press **RIGHT/LEFT** key to toggle to the available date formats. (YY-MM-DD / YY-DD-MM / DD-MM-YY / MM-DD-YY ).

Press **OK** to save the settings and exit or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **The date format applies only to the normal date display. When setting the date, the setting display will follow the YY-MM-DD format.**

## Menu 2: Time Format 12H/24H

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "2" for: Time Format.

Press **OK** to enter settings screen. The display shows the current time format. Press **RIGHT/LEFT** key to toggle to the available time formats. (12H/24H).

Press **OK** to save the settings and exit or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **The time format applies only to the normal time display. When setting the time, the setting display will follow the 24H format.**

## Menu 3: Set UTC

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "3" for: Set UTC.

Press **OK** to enter settings screen. The display will show the current UTC settings. Press **RIGHT/LEFT** key to toggle the format between GMT-12 and GMT+12.

Press **OK** to save the settings and exit the menu.

- **This option is stored in the clock and is not lost when powered off.**
- **After setting UTC, the next GPS sync will adjust the local time.**

## Menu 4: GPS Status

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "4" for: GPS status screen.

Press **OK** to enter the settings screen. The will show the current GPS status.

Displaying **NO GPS**: the GPS receiver is disconnected or the BAUD setting is wrong.

Displaying **SEARCH**: the GPS receiver is connected and is searching for the satellite signal.

Displaying **ONLINE**: the GPS receiver is receiving the satellite, and it is checking real-time data.

- **If the difference between the clock time and satellite time is 1 second or greater, the clock will immediately update to the satellite time.**
- **After a successful GPS update, the clock will sound three short beeps.**

## Menu 5: Set GPS BAUD RATE

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "5" for: Set GPS Baud Rate.

Press **OK** to enter the settings screen. The will show the present GPS BAUD setting. Press **RIGHT/LEFT** key to toggle the BAUD rate. (4,800bps / 9,600bps / 19,200bps / 38,400bps)

Press **OK** to save the settings and exit Menu "5" or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **Please set the BAUD rate according to your GPS receiver user manual. If the BAUD rate is incorrect for your GPS Receiver, the clock will not synchronize.**

## Menu 6: Set Leading Zero Mode

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "6" for: Set Leading Zero Mode.

Press **OK** to enter the settings screen. This will display the leading zero status. Press the **RIGHT/LEFT** key to toggle the leading zero ON/OFF.

Displaying **ON**: when the first number is 0, leading zero will display. e.g. 08:00:00 for 8 am

Displaying **OFF**: when the first number is 0, leading zero will NOT display. e.g. 8:00:00 for 8 am

Press **OK** to save the settings and exit menu 6, or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **The display mode for Leading Zero only affects the normal time display. When actually setting the time, the leading 0 will always be displayed in 24H format.**

## Menu 7: Set Buzzer Mode

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "7" for: Set Buzzer Mode.

Press **OK** to enter the settings screen. This will display the current Buzzer Mode settings. Press the **RIGHT/LEFT** key to toggle the Buzzer Mode ON/OFF.

Displaying **ON**: Buzzer will operate and produce a beep sound.

Displaying **OFF**: Buzzer sound will not operate and will be silent.

Press **OK** to save the settings and exit Menu "7", or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **Alarm settings will override the buzzer mode. Even if the buzzer mode is OFF, the Alarm will ring if scheduled.**

## Menu 8: Interval of Scrolling Date Display

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "8" for: Interval of Scrolling Date Display.

Press **OK** to enter the settings screen. This will display the current Interval of Scrolling Date Display. Enter the digital number to set the interval from 00-99 seconds. (N=interval)

Setting "00 SEC" will prevent clock from displaying the scrolling date.

Press **OK** to save the settings and exit Menu "8", or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **If the interval is >0, the clock will display the date for 3 seconds every N seconds.**

## Menu 9: Interval of Scrolling Temp Display

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "9" for: Interval of Scrolling Temp Display.

Press **OK** to enter the settings screen. This will display the current Interval of Scrolling Temp Display. Enter the digital number to set the interval from 00-99 seconds. (N=interval)

Setting "00 SEC" will prevent clock from displaying the scrolling temp.

Press **OK** to save the settings and exit Menu "9", or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **If the interval is >0, the clock will display the temp for 3 seconds every N seconds.**
- **Requires optional temp sensor for proper display information.**



## Menu 10: Set Auto Power Off Time

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "10" for: Set Auto Power Off Time.

Press **OK** to enter the settings screen. This will display the current Auto Power Off Time. Enter the digital number to set the Auto Power Off Time.

Press **OK** to save the settings and exit Menu "10", or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **After setting the Auto Power Off Time, the clock will make a long beep sound and return to the menu mode.**
- **You may specify every digit of the Auto Power Off Time. If values are an illogical time, the settings will be cancelled without change.**
- **When the Auto Power Off time is reached, the clock will display, "Auto OFF" for three seconds and then turn off automatically.**
- **During the time period that the clock is in OFF time mode, pressing any digital number button on the remote will cause the clock to display the time for three seconds.**
- **In the off time mode, you can still set the time the same as in the power on mode.**

## Menu 11: Set Auto Power On Time

Press **FUNC** button to enter the Menu and use the **RIGHT** or **LEFT** key to switch the menu number to "11" for: Set Auto Power On Time.

Press **OK** to enter the settings screen. This will display the current Time of Auto Power On. Enter the digital number to set the Time of Auto Power On.

Press **OK** to save the settings and exit Menu "11", or press **CANCEL** for no change and return back to the main screen.

- **This option is stored in the clock and is not lost when powered off.**
- **After setting the Auto Power On Time, the clock will make a long beep sound and return to the menu mode.**
- **You may specify every digit of the Auto Power On Time. If values are an illogical time, the settings will be cancelled without change.**
- **When the Auto Power On time is reached, the clock will display immediately.**
- **When you want to end the Auto Power Off function, simply set the Auto Power Off Time and Auto Power On Time to the same value.**

## Timer Function

In the display time mode, press the **ALARM** key 3 times to enter the timer function.

When you enter the timer function, the clock will initially show "o 01.00.00" as the default. The leading "o" means that the timer is not yet running and the duration of the timer is 1 hour or "01.00.00". Use the digital numbers on the remote to directly set the countdown time. The allowed time limits for the countdown duration can be from 00:00:01 - 99:59:59. Please enter the duration in a valid time format. E.g. 90 minutes is 01.30.00.

After completing the setting, press **OK** to start the clock countdown function. The first character on the left side will be scrolling the segments to show that the timer is active.

When the countdown time is over, the clock will make four short beeps repeatedly and at the same time the display will flash "00:00:00" Press **OK** to end.

- **When you set the countdown time, any value can be entered but the timer will only behave correctly if the entered setting is a valid time format. If the time is an invalid format, the operation will abort with four short beeps.**
- **While the timer function is working, the screen will only display the countdown time. You cannot view any other display mode unless you press OK to stop the timer. If you press CANCEL, you will exit from timer mode and return to the main screen.**

## Special Functions

In power off mode, press the following key combination to will show the special function.

**8-3-7-7-OK** Check the present software version (present: v1.2.0)

**4-6-4-8-OK** Restore the default option settings (does not change the time and the date)

**8-3-7-8-OK** Test mode (press **RIGHT/LEFT** key to check the VFD tube display. After review, press **CANCEL** to exit from the Special Function mode.)

## Notes

1. The VFD tube product is from the ~1980-1992 time era and is representative of the available display technology of that period. It is a vintage product and is not intended to be of the same quality as today's display technology.
2. It is normal and expected for the clock to become warm during operation.
3. The time will be kept even if the power is off but the display will not operate if the Mini USB power supply is not plugged in. Please check this first.

- **For any questions, please contact the designer.**

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