

## 6 digits IV-11 VFD Clock with 2 Alarms

Thanks for your interest in my 6 digits IV-11 VFD Clock.

I have tried to create stylish, reliable, accurate and easy to use Clock and I hope you will love it and this Clock is what you are really expected to see when you was looking for something new.

Please read carefully the information below as it will help you to use your Clock efficiently and in proper way and hopefully will avoid any negative moments which could arise in case of incorrect or careless use.

### **Clock key features:**

Based on six Soviet IV-11 tubes from USSR time

Six 20mm high digits IV-11 Vacuum Fluorescent Display (VFD) Tube

Displays Time , Date and 2 Alarm clock sets

Time / Date display mode with auto switch in 10 seconds interval.

Accurate time clock source from internal crystal.

Integrated 2 Alarm Clocks

Easy control with only 2 buttons

Uses standard 12V wall plug Power Supply

Precision Seconds setup

Internal buzzer for Alarm1 and Alarm2

Auto preset and manual display brightness

The Clock functions in two main modes:

**Display Mode** and **Setup mode**

### **Display mode:**

In the **Display Mode** Clock indicates the following information:

**Time** in format HH MM SS ,

where HH is Hours (00-12 or 00-23), MM is Minutes (0-59), SS is Seconds (00-59)

**Alarm1** in format HH MM: 1, where number 1 indicates Alarm1

**Alarm2** in format HH MM: 2, where 2 indicates Alarm2

**Date** in format : DD.MM.YY (LED dot separators),

where DD is day (1-31), MM is Month(1-12), YY is Year (00-70)

**Time/Date** in format HH MM SS and DD.MM.YY

with 10 seconds display interval

**Blank**, all digits are Switched Off -.

It's manual Night Mode, when all digits are off

## Setup Mode:

**Setup Mode** is for changing configurable parameters, allowing:

- Set Current Time
- Set Alarm1 time and switch it on/off
- Set Alarm2 time and switch it on/off
- Set Date
- Set 12 or 24 Time Display mode

**Config Mode.** This mode allow you to change several configurable parameters. All parameters numerated from 1 to 8 and in Config mode the parameter number displays in the least left digit position

**Parameter 1** defines format of Date to display, date can be set to display in the following formats: **DD.MM.YY** or **MM.DD.YY** format

**Parameter 2** defines Tube Night/Brightness start time

**Parameter 3** defines Tube Day/Brightness start time

**Parameter 4** defines Tube Day/Night Brightness levels

**Parameter 5** defines 24/12 hours time format

The rest parameters are not in use yet

## How to connect and control your Clock

Please use 12V at minimum 200mA DC Current Power Supply , which is widely available to buy on eBay or in your local shop.

Please use only good quality, regulated and certified power adapter, as failrure to have it, could destroy your clock due to unstable output and high levels of spikes on the 12V power line.

Power adapter should have 2.1mm round connector. Inner contact is +12v, outer is Ground contact

Clock also has 2 contact pads for soldering 12v supply. These contacts marked as + and – X12 connector.

Connect your Clock to 12V power supply.

Wrong polarity does not destroy your Clock, but it will not be functioning.

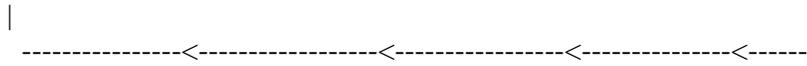
Please refer to Connection Diagram to be sure you have connected it properly.

Switch your Power Supply on, Clock should start to run in **Display Mode** and it should start from the default current time 00:00:00.

Easily control your Clock with only 2 buttons:

Use Button1 to change displaying information. Every single push will change it in the following order:

-> Time -> Alarm1 -> Alarm2 -> Date -> Time/Date -> Blank ->



When Clock displays Time, Alarm1 or Alarm2, no separators are used, but when Date is displayed, LED dots are used to separate Day, Month or Year digits.

Use Button2 to shut off buzzer when Alarm1 or Alarm2 happens.

## **Indicator:**

### **PM Indicator:**

There is no AM/PM time indicator, so please set 12H display mode on after lunch time, when you can spot the difference between 12 and 24 hours display modes.

### **Active Alarm indicates by dot on the right side of the least right IV-11 tube:**

In Time **Display Mode**, It's on when either Alarm1 or Alarm 2 or both are active.

In Alarm 1 **Display Mode**, it's on when Alarm 1 is active.

In Alarm 2 **Display Mode**, it's on when Alarm 2 is active.

In Date **Display Mode**, it's on when either Alarm1 or Alarm 2 or both are active.

## **More detailed description of buttons use:**

In the **Display mode** you can do:

Button2. Normal push changes Display brightness level (Manual adjustment, 8 levels).

Button2. Normal push shuts alarm buzzer off, if it was buzzing at the moment.

Button2. Long push switched under tubes LED in case it has been installed on your clock.

**Please note, this function is optional and not included into the current assembled or kit clock available for sale now.**

Button1. Normal push changes information to display – Time , Alarm1, Alarm2, Date, Time/Date or Blank Mode and then back to Time.

Button1. Long push leads to **Setup Mode**, where you can modify the appropriate values.

Button1 & Button2 together. Long push leads to Frequency Test Mode. Clock will display 400000, which means 400kHz frequency output has been activated.

**Please note**, that the only way to leave these mode and come back to the normal **Display mode** is to switch your Clock off . All your current time, date and alarms setups will be lost, so you'll need to set it up again.

In **Setup Mode** you can do:

Button 2. Normal push increments the value of highlighted digit.

Button2. Long push de-activate Active Alarm  
( works only in Alarm1 or Alarm2 **Setup Mode**).

Button1. Normal push changes the position of highlighted digit

Button1. Long push goes back to Display Mode, where Clocks displays the current Time, Date, Alarm1 or Alarm2 sets.

## **How to setup Time, Date and Alarms**

**To set or adjust the current time**, push Button1 until Clock starts to display time.

Now push and hold Button1 until Seconds Ones digit starts to flash.

Release Button1. You are in the **Setup Mode** now.

Seconds Ones digit is highlighted by flashing, so Seconds value can be reset by pushing Button2 now.

Push Button1 to highlight next digit. Push Button1 and it highlights Seconds Tens digit. You can push Button2 to reset seconds value.

Push Button1 to highlight next to the left digit. Now Minutes Ones are flashing.

Use Button2 to set correct value. Every Button1 push will increase value by one.

Push Button1 to choose next digit to set. Minutes Tens will be flashing.

Push Button1 again in case don't need to change Minutes tens value

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Ones digit should be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Tens should be flashing.

Use Button2 to set correct value.

Now you set the current Time.

Push Button1 and it will highlight Seconds Ones again. Push Button1 to reset seconds value when you need to synchronize the seconds.

Push and hold Button1 until Digit stops flashing. You have left **Setup Mode**.

**To set the current date** push Button1 until clock displays Date.

Use the same technique to set up Date.

Now push and hold Button1 until Years Ones start to flash.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Year Tens will be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Month Ones will be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Month Tens will be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Day Ones will be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Day Tens will be flashing.

Use Button2 to set correct value.

If some digits still don't have the correct value, push Button1 until this digit is highlighted again.

Use Button2 to correct the value.

To leave **Setup Mode** push and hold Button1 until Digit stops flashing.

Use the same technique to **set Alarm1 or Alarm2.**

To go to the Alarm **Setup Mode** just choose the Alarm to display then push and hold Button1 until first Alarm digit starts to flash. You are in the alarm **Setup Mode** now.

In this case only 4 digits can be set up and first digit is highlighted - Alarm Minutes Ones.

In the Alarm **Setup Mode**, when digit is flashing, as soon as you change Alarm digit Value by pressing Button2, Active Alarm Indicator will be switched on and this Alarm will be activated.

To de-activate Alarm, go to the Alarm **Setup Mode**, then push and hold Button2 until Active Alarm Indicator is switched off, which means this alarm is no longer active. To leave Alarm **Setup Mode**, push and hold Button1 until digit stops to flash. You are now in the **Display Mode**.

## **How to change from 24 to 12 or from 12 to 24 Hours displaying**

I recommend to do this procedure sometime after lunch, when PM time is started. It gives you clear sign that you have changed the time scale.

To change clock display between 12 and 24 hours mode, please go to Config Mode as it's described below in "**How to change parameters in Config Mode**" section.

## **How to change/set clock brightness**

To manually change tube brightness, make sure your clock is in Display Mode, then push Button 2. Every Button2 push decreases brightness by one level of 10 in total. When you reached lowest level( minimal tube brightness) next Button2 push restores maximum tube brightness.

Now also possible to set 2 different times to change your clock brightness. Clock brightness has 11 levels to set from 0 to 10, where 0 means all tubes are switched off and 10 means maximum brightness.

Please go to **Config Mode** and choose **Parameter 5**, it will return to you **0501** value, where **05** is default value to Day brightness and **01** is default value for Night brightness.

Using procedure described below in "**How to change parameters in Config Mode**" section, setup appropriate brightness values for Day and Night periods.

To activate automatic brightness change, do not forget to set **Parameter 2** (Tubes Night time) and **Parameter 3** (Tubes Day time), must be different values, as the same values disables automatic brightness change. You have to do it via **Config Mode** described below.

Please note that when Day time equals Night time , automatic brightness change is not activated.

## **Another way to understand Button1 and Button2 usage:**

### Button1 in **Display Mode**:

Normal push – switches between Display Modes

Long push - goes to the **Setup Mode**

### Button1 in **Setup Mode**:

Normal push – choose parameter to configure

Long push - goes back to the Display mode

### Button2 in **Display Mode**:

Normal push – switch off alarm buzz/or change display brightness

Long push – switches on/off under tubes LEDs (optional feature and is not included in the current sale)

### Button2 in **Setup Mode**:

Normal push – change parameter value

Long push - switch off selected alarm

Button1 and Button2 together:

In **Display Mode**:

Normal push – not defined yet  
Long push - go to Frequency test Mode

**In Setup Mode:**

Normal push – not defined yet  
Long push - go to Frequency test Mode

## Using Backup battery

To activate your Backup battery you have to switch your Clock off, disconnect it from power adapter.

Carefully detach tubes board from the microcontroller one.

Just put jumper on the Backup battery connector J1 to activate your current time and Alarm Sets power failure protection.

Carefully attach tubes board from the microcontroller one, make sure that all inter board connector pins fit its socket on another board.

Connect your power adapter and switch clock on.

To reset clock to its default values, switch off clocks power supply, disconnect power connector and remove Back up battery jumper from J1 2 pins connector for a about 10-15 seconds.

## How to change parameters in Config Mode:

Change display mode to Blank mode. To do so, in **Display Mode** push Button1 till all digits are off.

Push and hold B2 button until clock enters **Config Mode** and displays any digit from 1 to 8 in the far left position. You are now in **Config Mode**. If you are done it first time, clock will display Parameter 1 and far left digits will be 1.

Use B1 button to choose config parameter from 1 to 8. At the moment only 6 parameters are available to set there

**Parameter 1** displays and available to set when far end left digit indicates 1

**Parameter 2** displays and available to set when far end left digit indicates 2 and so on.

## Here is what parameters means and how to set it up:

**Parameter 1** defines format of Date to display. Far right digit can be set to 0 or 1.

When it set to 0, Date displays in **DD.MM.YY** format

When it set to 1, Date displays in **MM.DD.YY** format

While your Clock in **Config Mode** and Parameter 1 has been chosen, press and hold B1 button until parameter value digit starts blinking. You are now in **Config Setup Mode**.

Use B2 button to set this parameter to 0 or 1.

Leave **Config Setup Mode** by pushing and holding B1 button until digit stops blinking. You now have left Config Setup Mode, but still in **Config Mode**.

Push B1 button to choose next parameter to set.

**Parameter 2** defines Tube Night time for brightness change. It's time when your tubes brightness will be changed from Day to Night brightness.

Four digits value represents time in HHMM format, where HH – hours (00-23), MM is for Minutes (00-59)

While your Clock in **Config Mode** and Parameter 2 has been chosen, press and hold B1 button until Minutes Ones digit is highlighted by flashing. You are now in **Config Setup Mode**.

Use Button2 to set correct value. Every Button1 push will increase value by one.

Push Button1 to choose next digit to set. Minutes Tens will be flashing.

Push Button1 again in case don't need to change Minutes tens value

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Ones digit should be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Tens should be flashing.

Use Button2 to set correct value.

Now Tube Night brightness time has been set.

Leave Config Setup Mode by pushing and holding B1 button until digit stops blinking. You now have left **Config Setup Mode**, but still in **Config Mode**

Push B1 button to choose next parameter to set.

**Parameter 3** defines Tube Day time for brightness change. It's time when your tubes brightness will be changed from Night to Day brightness.

Four digits value represents time in HHMM format, where HH – hours (00-23), MM is for Minutes (00-59)

While your Clock in Config Mode and Parameter 3 has been chosen, press and hold B1 button until Minutes Ones digit is highlighted by flashing. You are now in **Config Setup Mode**.

Use Button2 to set correct value. Every Button1 push will increase value by one.

Push Button1 to choose next digit to set. Minutes Tens will be flashing.

Push Button1 again in case don't need to change Minutes tens value

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Ones digit should be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Tens should be flashing.

Use Button2 to set correct value.

Now Tube Day brightness time has been set.

Leave Config Setup Mode by pushing and holding B1 button until digit stops blinking.  
You now have left **Config Setup Mode**, but still in **Config Mode**

Push B1 button to choose next parameter to set.

**Parameter 4** defines Alarms snooze time. Default value is 5 minutes, displayed as 0005 in Config Mode Parameter 4. possible values to set from 0001 to 0060, which means 1 to 60 minutes.

While your Clock in Config Mode and Parameter 4 has been chosen, press and hold B1 button until least right digit is highlighted by flashing. You are now in **Config Setup Mode**.

Use Button2 to set correct value. Every Button1 push will increase value by one.

Using Button1 you can highlight any digit from 4 digits displayed, but you can increase value only least right digit. As soon as you reached 60 minutes value, next Button2 push resets value to 01.

Push Button1 again in case don't need to change Minutes tens value

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Ones digit should be flashing.

Use Button2 to set correct value.

Push Button1 to choose next digit to set. Hours Tens should be flashing.

Use Button2 to set correct value.

Leave **Config Setup Mode** by pushing and holding B1 button until digit stops blinking.  
You now have left **Config Setup Mode**, but still in **Config Mode**

Push B1 button to choose next parameter to set.

**Parameter 5** defines brightness levels for Day and Night time periods. Four digits displayed are divided into two digits groups. Least left 2 digits represent the Day brightness value, while right 2 digits display - Night brightness value. Default value for Day brightness is set to 5, default value for Night brightness is 01. So when you set clock to display Config Parameter 5, clock displays it as 0501. Possible values to set for Day or Night brightness are from 00 to 10, where 00 brightness level means tubes are off and level 10 is the maximum tubes brightness.

While your Clock is in Config Mode and Parameter 5 has been chosen, press and hold B1 button until least right digit is highlighted by flashing. You are now in **Config Setup Mode**.

Use the same technique to setup either Day or Night or both brightness levels.

Leave **Config Setup Mode** by pushing and holding B1 button until digit stops blinking. You now have left **Config Setup Mode**, but still in **Config Mode**

Push B1 button to choose next parameter to set.

**Parameter 6** defines format of Hours to display. Far right digit can be set to 0 or 1.  
When it set to 0 (default value), time is displayed in 24 hours format  
When it set to 1, time is displayed in 12 hours format

While your Clock in **Config Mode** and Parameter 6 has been chosen, press and hold B1 button until parameter value digit starts blinking. You are now in **Config Setup Mode**.

Use B2 button to set this parameter to 0 or 1.

Leave **Config Setup Mode** by pushing and holding B1 button until digit stops blinking. You now have left Config Setup Mode, but still in **Config Mode**.

Leave Config Mode by pushing and holding B1 button until your clock come back to Blank Mode and all digits are off.

You now have left Config Mode. Check that you are back in Display Mode by pushing B1 button. Clock should be switching between Display Modes –Time, Alarm1, Alarm2, Date.. modes

## **Important Notice:**

This clock is designed for inside use only. Do not use this Clock outdoor under any circumstances.

Use only good quality, certified Wall Plug Power Supply, which can provide not less than 200mA DC current at 12V.

Due to high voltage on the board, do not use this clock in bathroom, under rain or in the wet and/or dusty conditions

Some internal components are under High Voltage, so before handling or do any maintenance work, be sure that power supply is switched off.

Do not use the Clock without proper designed and manufactures enclosure. Only leave the Clock in the place, where it can not be reached by children or home pets.

I do not accept any liability may cause during improper or care less use of this Clock.

Even this Clock is fully functioning, it sells in the form of kit, meaning you have enough knowledge, skills to put it in the case and connect it properly.

Due to constant improvement, you clock design could be slightly different from the sale description, but technical parameters and functionality will be the same or better.

The latest User Manual can be found on WEB page at

<http://www.kosbo.com>