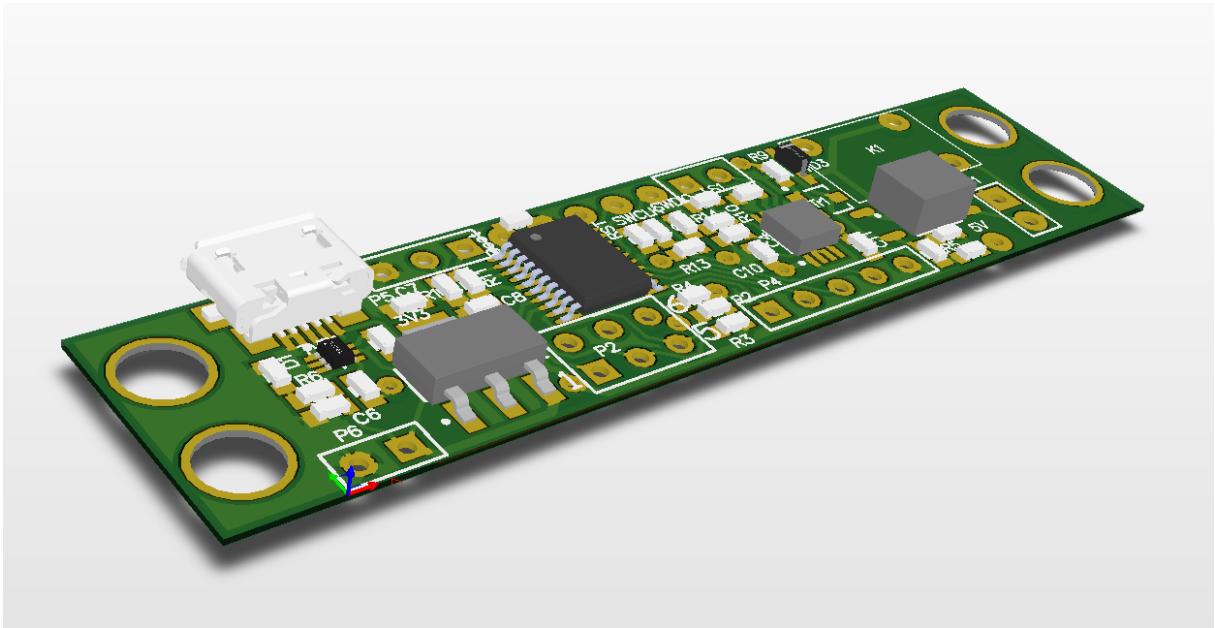


Mini CW Keyer

by: S54MTB



Operation manual

Introduction and first connection

The *Mini CW Keyer* module is based on USB Virtual Com Port (VCP) device. The module setup is done with command line interface using terminal from any PC. The setup is stored in the internal flash and PC is not required for normal operation. The *Mini CW Keyer* can be used when powered with 5V.

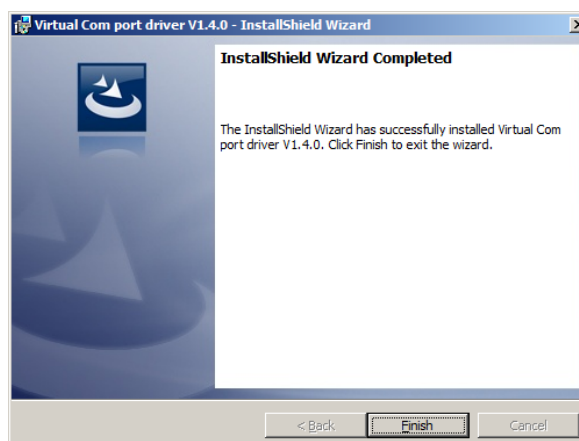
Please read! Before first use (or connection) you should:

- Install VCP Driver
- Install terminal software

Installation of VCP Driver

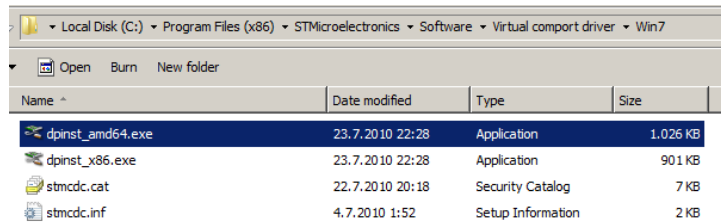
For proper operation VCP driver is required. It can be downloaded from the following address <http://www.st.com/web/en/catalog/tools/PF257938#>. Alternative link is http://e.pavlin.si/wp-content/uploads/2016/02/VCP_V1.4.0_Setup.zip

Unzip the content and run **VCP_Vx.x.x_Setup.exe**



This will not install the driver, just create files for installation in your application folder. Now open the installation folder:

C:\Program Files (x86)\STMicroelectronics\Software\Virtual comport driver

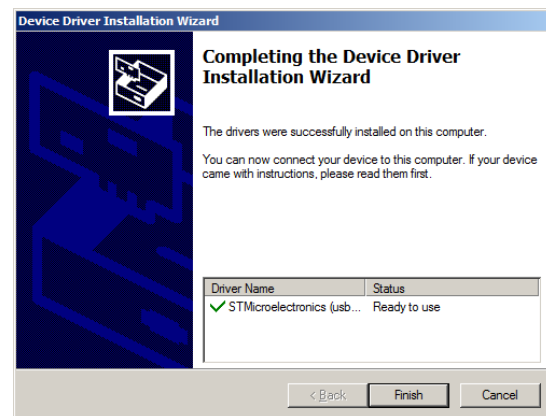
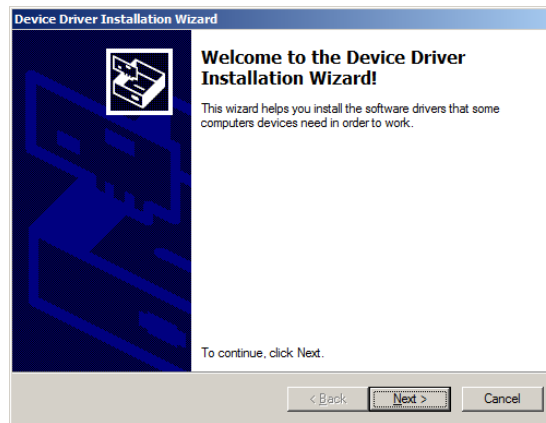


The screenshot shows a Windows Explorer window with the following table of files:

Name	Date modified	Type	Size
dpinst_amd64.exe	23.7.2010 22:28	Application	1.026 KB
dpinst_x86.exe	23.7.2010 22:28	Application	901 KB
stmcdc.cat	22.7.2010 20:18	Security Catalog	7 KB
stmcdc.inf	4.7.2010 1:52	Setup Information	2 KB

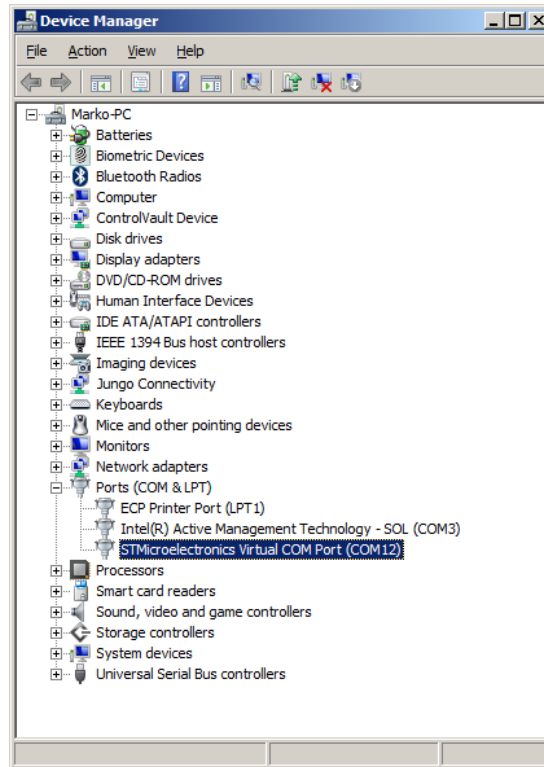
Open your OS version folder ([Win7] or [Win8]) and run the driver installation:

- Double click on **dpinst_x86.exe** if you are running a **32-bits OS** version
- Double click on **dpinst_amd64.exe** if you are running a **64-bits OS** version

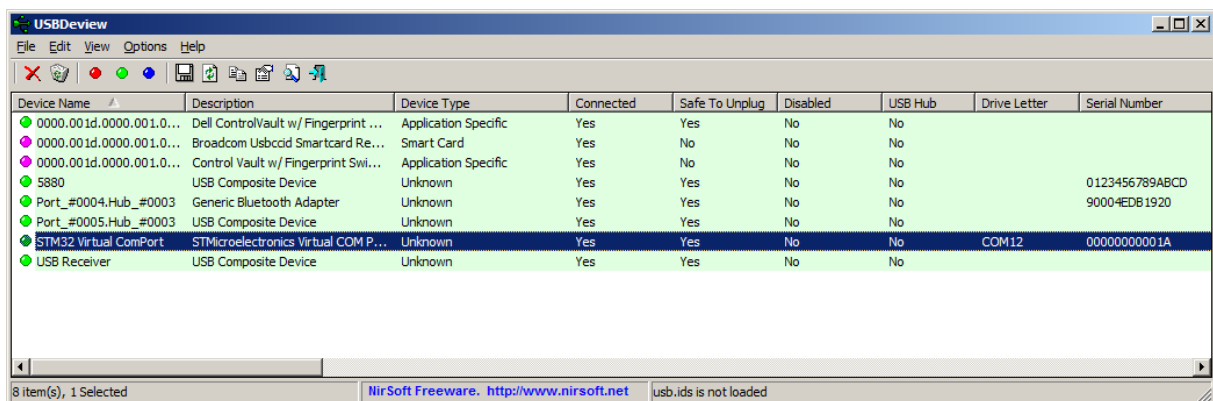


Now it's time to connect the device to any free USB port. The notification will inform you about the device installation and assigned COM port number. This is important for final step when connecting to the device with the terminal.

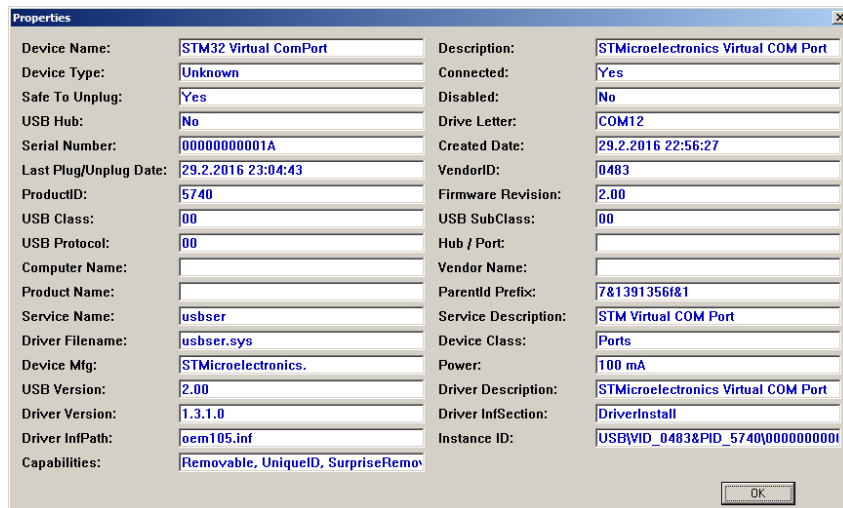
In case you missed the notification, you can check the assigned COM port number in the Device manager window (run `mmc devmgmt.msc`)



And check under the group »Ports (COM & LPT). Alternatively, it is possible to check the device with open source *USB Device View* application:



Double clicking on the device opens detailed view with complete USB device descriptor:



USBDevView can be downloaded from NirSoft web page:

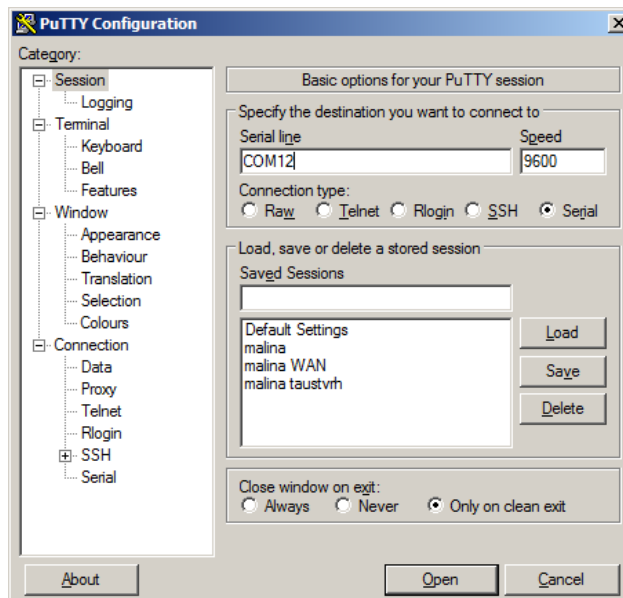
http://www.nirsoft.net/utils/usb_devices_view.html

Final step of the installation is setting up the terminal to communicate with the *Mini CW Keyer*.

Download the PuTTY from the web page

<http://www.putty.org/>

and follow the installation instructions. After installation, open the PuTTY and select »Serial« for the connection type. Enter the COM port from the driver installation and click Open:



Now it is finally possible to setup the device and use command line interpreter for adjusting the parameters.

Command line interface

Different sets of commands are provided for adjusting the operation of the device: audio settings, timing running and repetition, message entry and controlling settings storage in internal flash.

When invalid command is entered, the device displays brief help:

```
Commands :  
AUD V/R/F/C/D  
MSG ...Text...  
MODE N/S/D  
RPT T/N/D  
RUN  
OUT P  
CAT  
STORE x  
LOAD x  
DEL x  
ID ...Text...  
STOP  
START x
```

Audio settings

Audio output is generated using internal timer programmed into PWM mode. The PWM width can be adjusted from 0 to 50% and frequency of the PWM can be set between 100Hz and 10kHz. All audio parameters are set with the command

```
AUD <V|R|F|C|[D]> <Vol>|<1|0>|<Freq>|<1|0>
```

Audio Volume

Audio volume is adjusted by changing PWM ratio between 0 and 50%. The volume parameter is 0 to 100%, where 100% volume sets the PWM to 50%. The command syntax is:

```
AUD V <Vol>
```

Where <Vol> is between 0 and 100.

Example: To set the volume to 5% enter command

```
AUD V 5
```

and press enter.

Audio Frequency

Audio frequency is entered in Hz and sets the audio PWM to required frequency. The frequency can be set between 100Hz and 10kHz. The command syntax is:

AUD F <Freq>

Where <Freq> is between 100 and 10000.

Example: To set the frequency to 500Hz enter command

AUD F 500

Hear (Run) audio generator

Audio generator can be run manually to check the settings. The command syntax is:

AUD R <1|0>

Example: To start audio generator enter command

AUD R 1

Frequency and volume can be altered when audio generator is active.

Enable audio signals during CW

Audio output should be enabled when required for generating CW beeps (“Dits” and “Dahs”). The command syntax is:

AUD C <1|0>

When enabled with **AUD C 1** the tones will be heard during the CW.

Example: To disable audio signals for CW enter command

AUD C 0

Display audio settings

Audio settings can be displayed when AUD command is entered without parameter or “D” parameter is used. The command syntax is:

AUD [D]

CW Message settings

The message is generated at selected speed and repetition timing and counting. Main timing unit is dot time. All times are integer multiplications of this:

C **Q** **C** **Q**
3 1 1 3 1 1 3 3 1 3 1 1 3 7 3 1 1 3 1 1 3 3 1 3 1 1 3

Not all characters are allowed. The device will display warning when invalid character is entered. At current version only alphanumeric characters are allowed:

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789.,:?'-/(){}[]"@= and space.

More characters will be added with future versions of the software.

Enter CW message

The message is entered using MSG command:

MSG <Text>

Where <Text> is any sequence of valid characters with maximum length of 64.

Example:

MSG CQ CQ CQ DE S54MTB S54MTB S54MTB

Special chars:

Two special chars are available: “<” and “>” (brackets). Left bracket < changes the character spacing from 3 “dits” to one “dit”. Right bracket > restore normal operation. This is usable for entering special sequences:

AA,New line “.-.-“
AR,End of message “.-.-.”
AS,Wait “.-...”
BK,Break “-...-.-“
BT,New paragraph “-...-.-“
CL,Going off the air (“clear “-...-.-.”
CT,Start copying “.-.-.-“
DO,Change to wabun code “.-.-.—“
KN,Invite a specific station “.-.-.”
SK,End of transmission (also “...-.-.-“
SN,Understood (also VE) “...-.-.”
SOS, Distress message “...—...”

To enter sequence for AR (**end of message**), simply enter <AR> into the message. It is even possible to insert any sequence of “dits” and “dahs” by simply insert sequence of E and T within brackets.

Example

The message:

msg <tete> c <tete> c <eee> s <ttt> o

will emit for time “C”, two times “S” and two times “O”, because <tete> is equal as C.

Timing mode

Timing mode of the message is set with **MODE** command. There are two modes for calculating the duration of the dot time. Entered numbers are converted to milliseconds. All stored values for dot time are in milliseconds. Two modes for entering the dot time are possible: **N**ormal and **S**low.

When specifying speed in **Normal** mode, the unit is Word Per Minute (WPM), calculated from standard word *PARIS*, with the duration of 50 dots when *PARIS* is converted to dots, dashes and pauses using scheme indicated in the picture above. The formula for calculation from WPM to the duration of the dot in milliseconds is therefore $\text{DotTime} = 60.000 / (50 \text{ WPM})$.

For **Slow** mode, the unit is millisecond. Dot time in **Slow** mode can be from 1000ms to 100000ms.

Mode command syntax is:

```
MODE <N|S> <t>
```

Where <t> is time entered in WPM for **Normal** mode and milliseconds for **Slow** mode.

Example for setting the CW speed to 15WPM:

```
MODE N 15
```

Example for setting the CW speed to QRSS with 3 seconds dot time:

```
MODE S 3000
```

Message timing mode is displayed when **MODE** command is entered without parameter or parameter "D" is used.

Repetition settings

Message generation can have two parameters set: the period of the message (marked with blue line) and number of repetitions.



Number of repetitions can be set to some integer number or zero for repeating message infinitely.

The syntax of the **RPT** command is:

```
RPT <T|N|[D]> <Period>|<Num>
```

Message period is specified with the T parameter. Units are seconds between 1 and 60.000s. Example to set 1 minute period:

```
RPT T 60
```

Note! When specified period is shorter than complete message duration, the next message will follow after 7 dot time units. This is the same when period parameter is 0.

Message repetitions are specified with the N parameter. The number of repetitions can be from 1 to 65536. When 0 (zero) is set, the beacon will repeat message infinitely. Example to set 10 repetitions:

```
RPT N 10
```

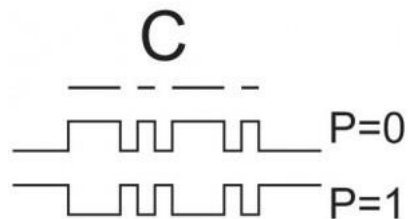
Note! When repeat number is set to >0, the device will stop generating morse code when specified number of repetitions are reached. To restart the sequence, the device should be restarted using power cycle or reset signal.

Output signal settings

One output signal is audio described above. Second output signal is digital output pin. The pin can be programmed for high or low polarity and enabled during CW. The OUT command syntax is:

```
OUT <P|C|[D]> <1|0>
```

The polarity of the output signal is set with the P parameter. The polarity can have value 0 or 1. When set to 0, the idle mode is Low. When value is set to 1, the idle mode is High:



Example to set output signal “0” polarity:

```
OUT P 0
```

Output is enabled for CW with the “C” parameter. To enable output pin, enter following command:

```
OUT C 1
```

Run the sequence with current settings

When all required parameters are set, the sequence can be tested or run with the RUN command. The command doesn't require any additional parameters.

RUN

If repetition is set to 0 (infinite), the device will continue emitting signals forever. To stop the running sequence enter command:

STOP

Note! Settings can be altered when generator sequence is running, but it is highly recommended to stop the execution when changing the message and then run again.

Internal storage commands

Internal storage has room for storing up to eight settings. Before storing the current setup, some identification must be provided. The ID command is used to set the identifier to the current setup. The setup will be stored and cataloged under the name provided with ID command. The catalog is displayed with CAT command. Storing and loading the settings to /from the storage is done with STORE and LOAD commands, respectively. Individual settings can be deleted with command DEL. And finally, the settings can be marked for auto-run after power-up with the command START. All commands except ID and CAT accept numeric parameter from 1 to 8 indicating location from 1 to 8 within internal storage.

Name the current setup

Current setup is named with the command ID. Identifier maximum length is 8 characters. Longer identifiers will be truncated during storage to internal flash memory. Syntax:

ID <Identifier>

To name the current setup e.g. "DEMO 1" enter following command:

ID DEMO 1

Display catalog of the internal storage

The catalog is displayed with the command CAT without any parameters. Example (with listed catalog):

CAT

```
1: DEMO 1 - a.V=50% a.f=800Hz a.cw=1 CW.t=80ms CW.msg :'CQ CQ
S54MTB' Out.p=0 Out.cw=1
2: <Empty>
3: <Empty>
4: <Empty>
5: <Empty>
6: <Empty>
7: <Empty>
8: <Empty>
```

Store settings

Settings are stored to one of 8 locations with the STORE command:

STORE <n>

Where <n> is number of the storage location from 1 to 8.

Load settings

Settings are loaded from one of 8 locations in non-volatile storage to current setup with the LOAD command:

LOAD <n>

Where <n> is number of the storage location from 1 to 8.

Delete settings from internal flash storage

Any of the 8 locations in non-volatile storage can be deleted with DEL command:

DEL <n>

Where <n> is number of the storage location from 1 to 8.

Mark settings for auto-start during power-up

Any of the 8 locations in non-volatile storage can be marked for auto-running after power-up with START command:

START <n>

Where <n> is type of autorun option. "0" denotes no autorun, "1" is for unconditional autorun and "2" is for selectable autorun. There are three input pins (PA1, PA2 and PA3), which can be set to 8 different combinations. When this combination match the catalog number-1 and the option "2" is set at the same time, the settings will be loaded from the storage and run accordingly to stored parameters. When option "1" is selected, the first entry in the catalog having option "1" set will be loaded and run during startup.

The selected autorun option will appear with the indicator "AR!" for option "1" or "SAR!" for option 2 in catalog:

cat

```
1: <Empty>
2: <Empty>
3: <Empty>
4: <Empty>
5: <Empty>
6: <Empty>
7: <Empty>
```

```
8: <Empty>
id 1
store 1
Backup... status 0
Writing... status 0
id 2
start 1
store 2
Backup... status 0
Writing... status 0
id 3
start 2
store 3
Backup... status 0
Writing... status 0
cat
1:      1 - a.V=0%  a.f=0Hz  a.cw=0 CW.t=0ms  CW.msg
: ''  Out.p=0  Out.cw=0
2:      2 - a.V=0%  a.f=0Hz  a.cw=0 CW.t=0ms  CW.msg
: ''  Out.p=0  Out.cw=0  AR!
3:      3 - a.V=0%  a.f=0Hz  a.cw=0 CW.t=0ms  CW.msg
: ''  Out.p=0  Out.cw=0  SAR!
4: <Empty>
5: <Empty>
6: <Empty>
7: <Empty>
8: <Empty>
```

Typical application

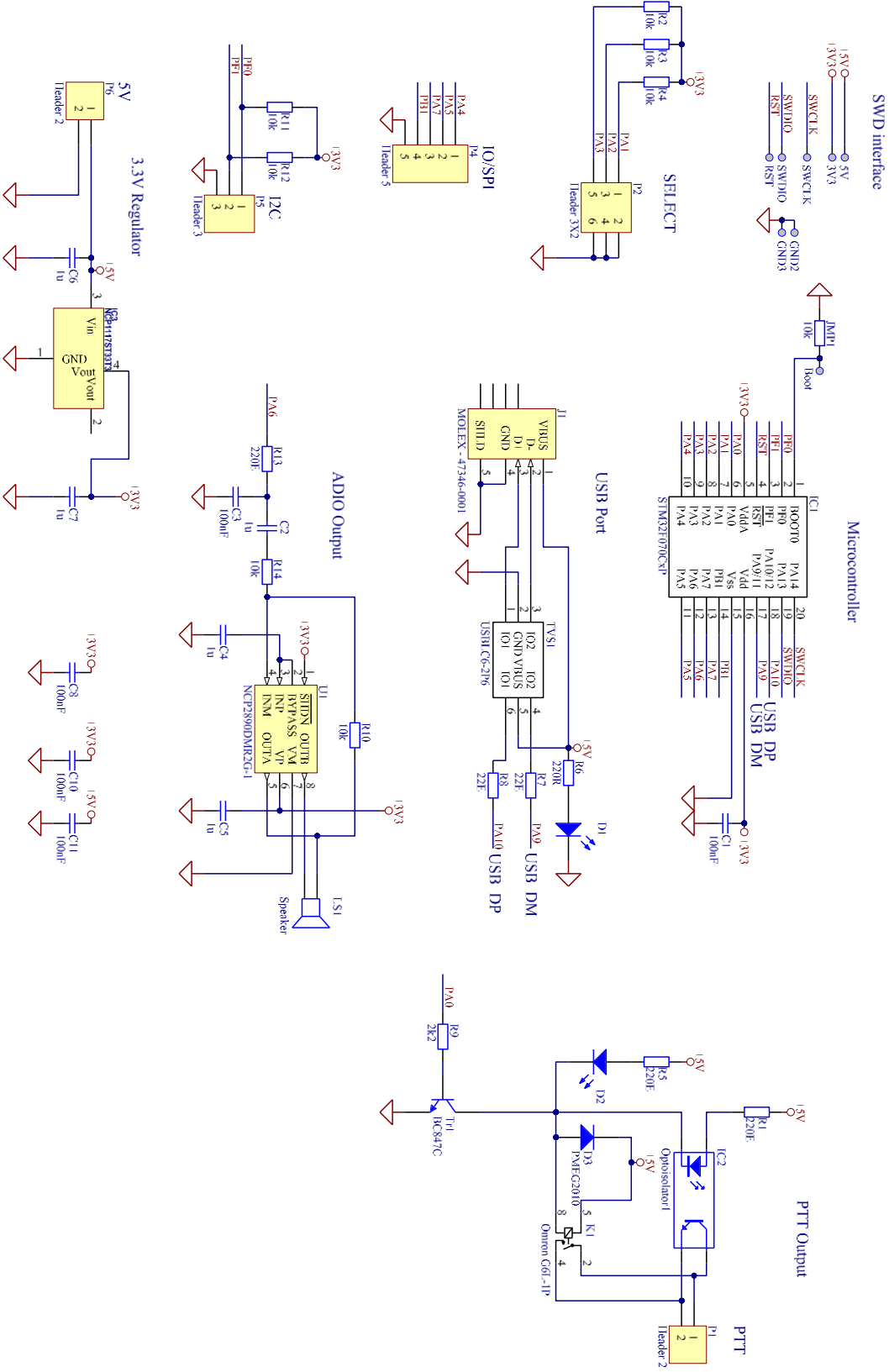
Typical application of the device is QRSS CW Beacon with 5 seconds dot time and only one message run at the startup. The PTT output can energise simple CW Oscillator tuned to required frequency.

The device is powered by 5V and initialised with following commands:

```
AUD V 10
AUD F 800
AUD C 1
MSG S54MTB S54MTB BEACON TEST TEST TEST S54MTB TEST
MODE S 5000
OUT P 0
OUT C 1
ID QRSSBEAC
START 1
STORE 1
Backup... status 0
Writing... status 0
CAT
1: QRSSBEAC - a.V=10% a.f=800Hz a.cw=1 CW.t=5000ms CW.msg : 'S54MTB
S54MTB BEACON TEST TEST TEST S54MTB TEST' Out.p=0 Out.cw=1 AR!
2: <Empty>
3: <Empty>
4: <Empty>
5: <Empty>
6: <Empty>
7: <Empty>
8: <Empty>
```

Schematic

Schematic diagram:



Contacts:

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Project, software updates, discussion:

<http://v4.si/>

<http://e.pavlin.si/2016/02/16/programmable-cw-morse-keyer-for-beacon/>