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key words (Microchip, PIC24F16KA101, ATV, DA-TV, ham radio, F1CJN, vidéo generator, mire)

PAL Video Generator PICDREAM II

This document describes the PAL video generator PICDREAM II. It uses a PIC24F16KA101 from Microchip and a video PAL encoder AD724 from Analog Devices.

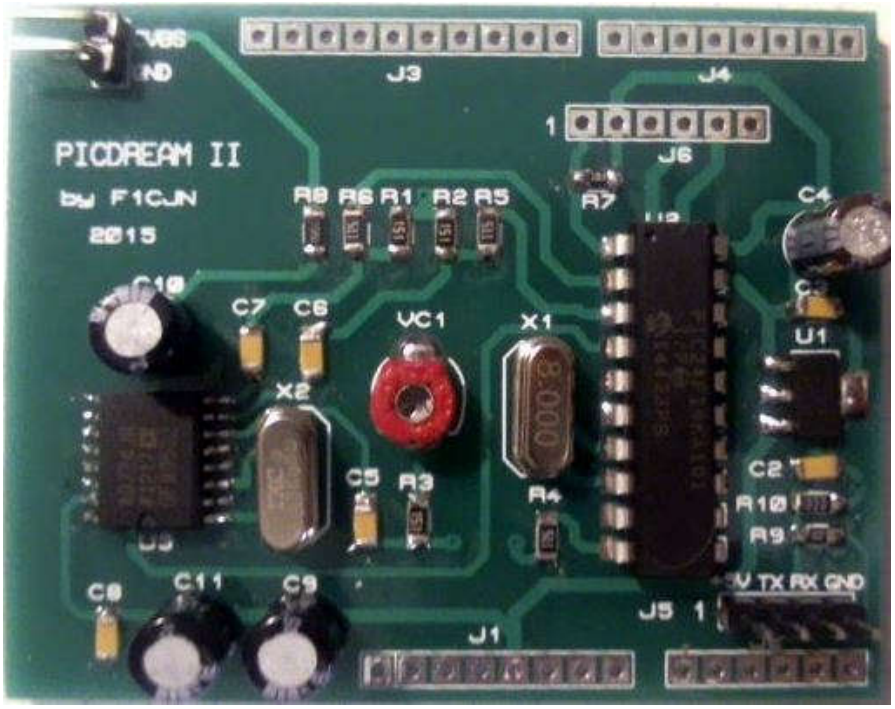
The video generator :
- produces a video composite PAL 625 lines interlaced,
- writes a scrolling or fixed programmable text at the top of the screen,
- writes a scrolling or fixed programmable text at the botton of the screen,
- provides a pseudo bar image or pseudo SMPE, can be selected,
- provides selected background colors and characters text colors .

See Youtube :

The generator can be programmed from a serial link at 38400 bauds, 8N1, without handshake, from :
- an RS232 TTL interface(a few euros on eBay), with a 5V external power supply,
- an USB TTL interface(a few euros on eBay), powering the 5V from the USB,
- an Arduino because the board is directly plugin on the Arduino Uno board. This is useful, for example, for an ATV repeater , to be programmed with different messages selected in real time. The Arduino then provides the 5V and the A0 et A1 are uses to drive the PICDREAM II board.

The programmed texts and generator modes can be memorized in the PIC EEPROM by a single command.

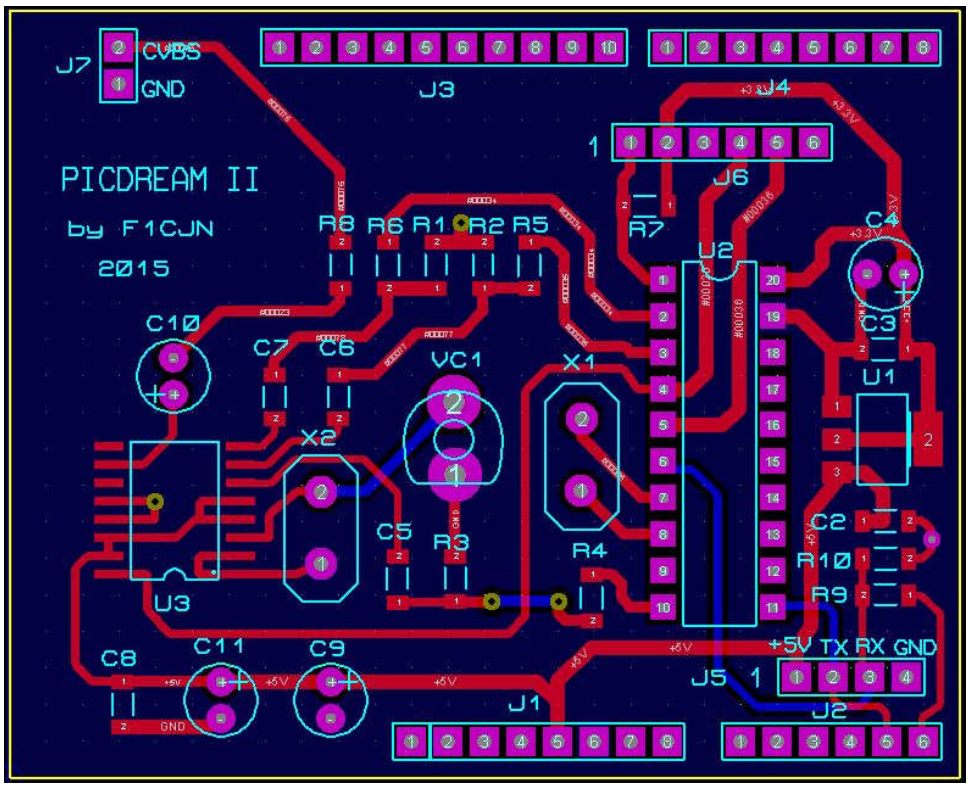
Version 1.1



1 Bill of matérials

Qté	Reference	Value
Résistors		
3	R1-R3	150
3	R4-R6	510
1	R7	10k
1	R8	75
1	R9	1k
1	R10	2,2k
Capacitors		
1	C4	10uF to 22uF
6	C2,C3,C5-C8	100nF
3	C9-C11	220uF
1	VC1	trimmer 4.2-20pF
Integrated circuits		
1	U1	LD1117-3.3
1	U2	PIC24F16KA101
1	U3	AD724
Various		
2	J1,J4	CONN-H8
2	J2,J6	CONN-H6
1	J3	CONN-H10
1	J5	CONN-H4
1	J7	CONN-H2
1	X1	8MHz
1	X2	4.43MHz

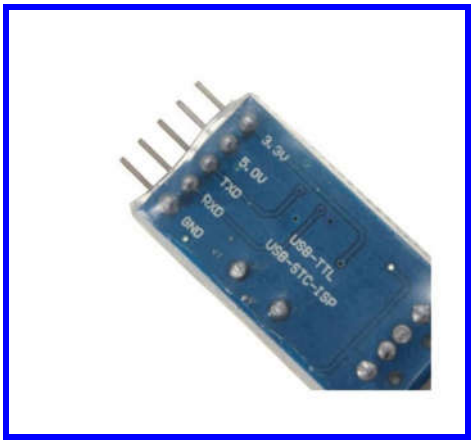
Components placement : Top view



2 Utilisation

Exemple with USB-TTL interface

These interfaces are priced between 1 and 2 euros at Ebay.



USB-TTL interface wiring :

TX (green) connected to RX data at J1
RX (blanc) connected à TX data at J1
+5V (rouge) connected to +5V at J1
GND (noir) connecté à GND to J1

* Warning : some USB-TTL interfaces have inverted names RX et TX . In this case connect RX to RX and TX to TX.

Je suggest to use the "Termite" terminal software, because it memorizes the commands sent to the board , so it is easy to recall them during tests.
Termite must be programmed with **38400 bps, 8N1, no handshake**

- Warning : if the USB is disconnected from the PICDREAM II, then reconnected to the PICDREAM II, Termite must be stopped and restarted to be reconnected to the USB port.

3 Commands

First send a CR due to the “UART first missing character” bug.

Commands are sent in lowercase and must be enclosed by < >

3.1 Couleurs

<t1>mytext	"mytext" is written on line 1
<t2>mytext2	“mytest2" is written on line 2
<c1>xx	text color of line 1
<c2>xx	text color of 2
<b1>xx	background color of line 1
<b2>xx	bachground color of line 2

With for colors xx ma = magenta, wh = white, ye = yellow, bk = black, cy = cyan, re = red, gr = green, and bl = blue

Exemple : <c1>cy couleur du texte de la line 1 = cyan

3.2 Scrolling test (limited to à 72 caractères)

The scrolling mode must be declared before entering the text characters. (except if it is already in Scrolling mode).

<s1>	= line 1 scrolling
<s2>	= line 2 scrolling

3.2 Fixed text

The mode fixed text must be declared before entering the text characters. (except if it is already in Fixed mode).

<f1>	= fixed line 1
<f2>	= fixed line 2

3.3 Patterns

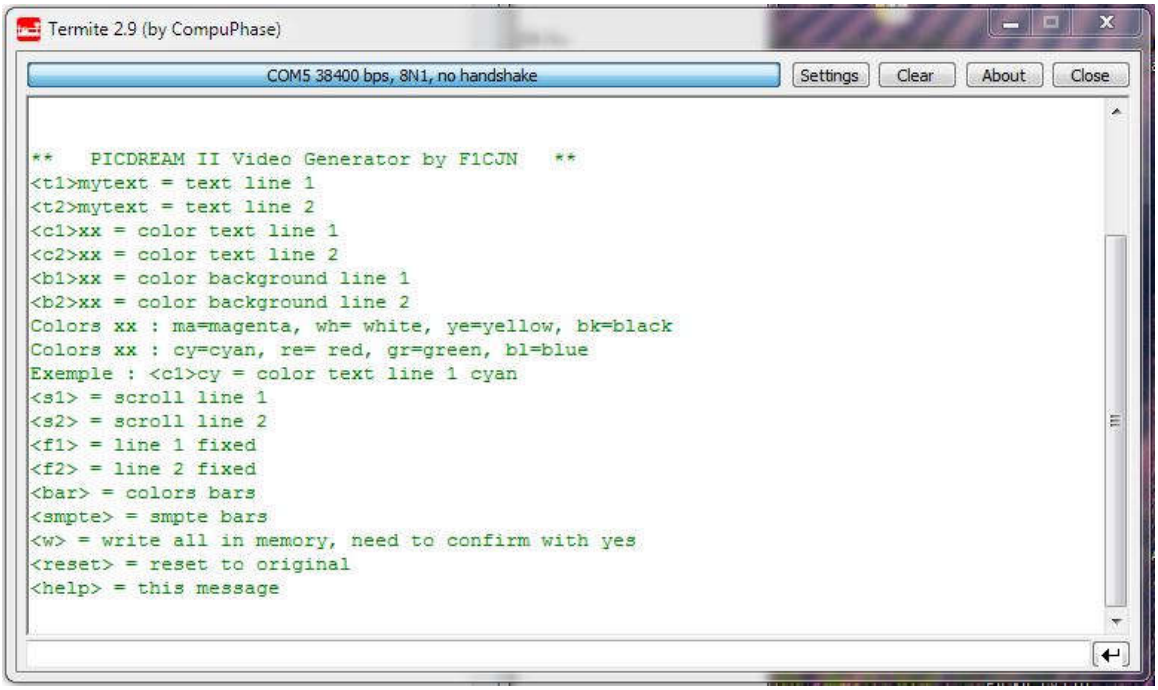
<bar>	= bars
<smpte>	= pseudo SMPTE

3.4 EEPROM memorization

<w> = memorize the all the parameters configuration, must be confirmed by entering "yes". then le PICDREAM II respond ***WRITE OK ***.

3.5 Various

<reset>	= reset to origin, clears E2PROM.
<help>	= see next image



4 Using PICDREAM II with an Arduino

Plug directly the PICDREAM II board on the Arduino Uno. Then the Arduino provides the 5Volt.

Nota : the Arduino TX output is 0-5Volt. A resistive divider (R9 and R10) reduces the voltage to 0-3,3 Volt on the RXD input of the PIC.

In the Arduino program, between each command sent to the PICDREAM, a time space instruction " delay 50 " must be inserted.

When the command is send, there is a glitch on the video screen, due to the priority interrupts on the PICDREAM II RXD input.

Test program exemple :

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(18,19); // A4,A5 analogique ~ RXpin,TXpin
// RXpin =18   et TXpin=19 for Arduino


 void setup() {
  mySerial.begin(38400);  //  38400 bauds connection Arduino et PICDREAM II
  Serial.begin (115200);    // 115200 bauds connection between Arduino et PC
  }

 mySerial.write("\r");  //  for the missing first character bug

 void loop(){
 mySerial.write("<t2>   F1CJN\r");  //  Line 2 text
 delay(2000);
 mySerial.write("<c2>re\r"); // Red text on line 2
 delay(2000);
 mySerial.write("<t2>PICDREAM II \r") ;// Line 2 text
 delay(2000);
 mySerial.write("<c2>ye\r"); // Yellow text on line 2
 delay (50);
 mySerial.write("<bar>\r");  // Bars pattern
 delay (50);
 mySerial.write("<b2>bk\r");// Red text background on line 2
 delay(2000);
 mySerial.write("<t2>   DA-TV\r"); // Line 2 text
 delay(2000);
 mySerial.write("<c2>wh\r"); // White line 2 text
 delay(2000);
 mySerial.write("<smpte>\r"); // Peudo SMPTE pattern
 delay(2000);
 mySerial.write("<b2>gr\r"); // Green text background on  line 2
 delay (50);
 }
```

5 PICDREAM II schematic: