

# S51KQ software for microcontrollers & PC

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## UNIPLL project (CQ-ZRS 3/96):

File name	band	RTX	ME	L	display MHz	VCO frq MHz	Q2	JPI	step	PLL_ic	rem / IF	Software
<b>UNI10GHz</b>	3cm	TX	32	-	10000-10484.8	2500.0-2621.2	10.24	AB	1.6MHz	SDA-6102	ATV	<b>v1.30</b>
<b>UNI5GHz</b>	6cm	TX	32	-	5598-6000	1866.0-2000.0	10.24	AB	1.2MHz	SDA-6102	ATV	<b>v1.30</b>
<b>UNI13T</b>	13cm	TX	32	-	2300-2450	2300.0-2450.0	10.24	AB	640kHz	SDA-6102	ATV	v1.00
<b>UNI13PTL</b>	13cm	TX	64	-	1000-2700	1000.0-2700.0			500kHz	TSA-5055T	ATV	<b>v1.30</b>
<b>UNI23T</b>	23cm	TX	32	-	1200-1350	1200.0-1350.0	8.00	AB	500kHz	TSA-5511	ATV	v1.00
<b>UNI23TL</b>	23cm	TX	32	*	1200-1350	1200.0-1350.0	8.00	AB	500kHz	TSA-5511	ATV	<b>v1.30</b>
<b>UNI70TL</b>	70cm	TX	32	*	430- 440	430.0- 440.0	6.40	BC	25kHz	TSA-5511		
<b>UNI70RL</b>	70cm	RX	32	*	400- 465	389.3- 454.3	6.40	BC	25kHz	TSA-5511	IF -10.7	
<b>UNI70HL</b>	70cm	RX	32	*	400- 465	355.0- 420.0	6.40	BC	25kHz	TSA-5511	IF -45.0	
<b>UNI70WL</b>	70cm	RTX	32	*	430- 440	394.0- 404.0	6.40	AB	50kHz	TSA-5511	WBFM36	
<b>UNI-TVL</b>	1m	TX	32	*	300- 400	300.0- 400.0	6.40	BC	25kHz	TSA-5511	TV	<b>v1.30</b>
<b>UNI2MTL</b>	2m	TX	32	*	130- 160	130.0- 160.0	6.40	BC	25kHz	TSA-5511		
<b>UNI2MRL</b>	2m	RX	32	*	130- 165	119.3- 154.3	6.40	BC	25kHz	TSA-5511	IF -10.7	
<b>UNIAVIO</b>	avio	RX	64	*	108- 140	97.3- 129.3	6.40	BC	25kHz	TSA-5511	IF -10.7	
<b>UNI3MTL</b>	3m	TX	32	*	88- 108	88.0- 108.0	6.40	AB	50kHz	TSA-5511		
<b>UNI3MT</b>	3m	TX	32	-	88- 108	88.0- 108.0	6.40	AB	50kHz	TSA-5511		
<b>UNI3MRL</b>	3m	RX	64	*	87- 108	76.3- 97.3	6.40	AB	50kHz	TSA-5511	IF -10.7	
<b>UNI3MRLP</b>	3m	RX	64	*	87- 108	97.7- 118.7	6.40	AB	50kHz	TSA-5511	IF +10.7	

*Important:* TSA-5511 is build on UNIPLL pcb, insted of SDA-6102 & TSA-5055T, both must be mounted near VCO!

## Other projects based on PIC 16F84 :

File name	project	CQ-ZRS	mode	usage	remarks	Software
<b>LANCI</b>	LANC	-	D8 & DV remote	Cam.	Tiny Camcorder remote controller	<b>v1.10</b>
<b>PCGENX</b>	PCGENX	2/1996	DTMF/KEYB	ATV	cgen 2,3,4,5,6 controler, I2C bus	
<b>PCLOCK2</b>	PCGENX	-	DTMF		remote switch	
<b>PCVOICE</b>	PCGENX	-	Voice BEACON	FM rpt	3 voice msg., AUTO + DTMF remote	<b>v1.01</b>
<b>PCCAM</b>	PCGENX	-	CAMERA contrl	ATV	DTMF remote, 2x ON/OFF + L,R	<b>v1.00</b>
<b>ATVRX2</b>	ATVRX2	6/1997	PLL TSA5055T	ATV	850-2050 Mhz FM PLL receiver	<b>v1.30</b>
<b>VIDEO84</b>	VIDEO84	2/1997	B/WVgen	ATV	test video gen.	
<b>VEGEN2W</b>	VEGEN2	2/1998	B/WVgen	ATV	video gen., real time clock	
<b>VEGEN2X</b>	VEGEN2	2/1998	B/WVgen	ATV	video gen., real time clock	
<b>VEGEN2Y</b>	VEGEN2	2/1998	B/WVgen	ATV	video gen., real time clock	
<b>RRC4CPU0</b>	RRC-4	-	-	FM RPT	repeater controler CPU-0	
<b>RRC4CPU1</b>	RRC-4	-	-	FM RPT	repeater controler CPU-1	
<b>RRCREV</b>	REVbox	-	DTMF/CTCSS	FM RPT	repeater REVERSE module	
<b>IT700</b>	IT-700	-	DTMF/line PPatch		radio telephone interface	

<i>Index:</i>	File	- Source file name (ime datoteke)	Q2	- Used Q2 crystal (MHz)
	band	- Frq. band (frekvenci pas)	JPI	- Jumper setting (polozaj mostiëka)
	RTX	- Used for (namen uporabe)	step	- Channel step (kanalni korak)
	ME	- Number of memries (stevilo spominov)	PLL_ic	- Used PLL circuit (uporabljeno vezje)
	L	- Lock detect *=yes ( izpis LOCK bita)	rem/IF	- (medfrekvenca)
	display	- LCD print out (izpis na LCD)		- New version
	VCO frq	- Real VCO frq. (realna VCO frekvenca)		- Brand new software

New software releases:

**LANC-I v1.10 1999-11-25**

Tiny remote controller for Digital8 and DV camcorders.

**UNI13PTL v1.30 2000-02-25**

Software for UNIPLL based 13cm ATV TX. PLL frequency range 1.0-2.7GHz  
Philips TSA-5055T used, the same functions as 23cm version + 64 mem. & ADC.

# UNIPLL - Universal PLL board

## Software & Hardware info 1996 - 2000

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UNIPLL is a universal PLL board cpu controlled, with LCD, keyboard and TSA-5511 PLL (optional with ext. SAD6102 or TSA5055T). It will convert your old ATV transmitter to a finest digitally controlled ATV transmitter. All you need is one small board, few components and cpu with program. Why UNIPLL for ATV? Because you can any time see exact frequency and pll\_lock state. You will have enough memory for independent storage of your favorite ATV frequencies. UNIPLL offers user friendly control of your ATV TX via keyboard and will add new qualities to your ATV system. It is also the best ATV pll project in this area.

UNIPLL board is based on: MICROCHIP PIC-16F84 cpu, Philips made and wide available PLL ic TSA-5511 in 18pin DIL, two or one line Hitachi compatible LCD, 24C02 (24C04...) or similar EEPROM, 4 keys (pushbuttons) for tuning frequency, selecting memories & menu options, Murata Piezzo, 2 xtals and few other components (res., cap, etc). CPUs are preprogrammed with one selected software from previous UNIPLL software table. All programs are large and totally fills CPU program area. Single UNIPLL CPU can hold one single software at time.

### Common functions of UNIPLL programs are:

- All software versions below VCO frq. 1.6 GHz uses the same UNIPLL board, size 5.8 x 9.2 cm. PLL is a TSA-5511, on board. Crystal Q2 must be properly selected from software table, also the position of JP-1.
- All software versions above VCO frq. 1.6 GHz uses only CPU part of UNIPLL board. PLL is a SDA-6102 or TSA-5055T (SMD) soldered on external HF board (not supplied). Both IC's uses external parts for Ud tuning, near circuit. Power supply and I2C bus of PLL are connected to the main UNIPLL board.
- A 10GHz version drives VCO on 2.5 GHz frq, this signal source must be multiplied by 4 on to 10 GHz.
- A 5GHz version drives VCO on 1.9 GHz frq, this signal source must be multiplied by 3 on to 5.7 GHz.
- A 13cm ATV TX with TSA-5055T PLL uses 4MHz reference crystal on PLL IC.
- All versions uses the same 4 keys (push buttons) and there are the same main functions on those keys.
- All keys have higher AUTO\_REPEAT speed in VFO mode, and slower in MEMORY mode.
- Any pressed key will produce short beep, error on I2C bus and any other error will produce additional beeps.
- There is the same way of displaying parameters on LCD, as follow: 

FFFF.FFF	CC	M	L
----------	----	---	---

  
example: 2330.000 01 M 1280.500 31 V L 434.400 00 M L ..... 105.400 09 M L  
F=frequency, CC=memory number, M=memory mode / V=vfo mode, L=lock / ?=unlock
- From version 1.20 and up are build in software additional LCD messages like:
  - At power\_on : **Software name & authors callsign**
  - At Info cmd : **Version & date of actual software**
  - At total init : **EEPROM Init -> ....**
- Each software offers to user at least 32 memory places, one VFO with both frequency limits, Function\_key for switching between MEM / VFO modes, plus separate MR / MW functions.
- After power on, or reset, MEM (memory) mode is selected, and switched to memory location "00".

- UNIPLL & ATVRX2 keyboard commands:

	<b>DOWN</b>	<b>UP</b>	<b>F</b>	<b>MR/MW</b>
Memory mode	memory_down	memory_up	VFO mode	Memory READ
VFO mode	freq_down	freq_up	MEM mode	Memory WRITE
Key+Pwr_ON	software version	toggle LCD type	EEPROM Init	IF N/W (ATVRX2)

- UNIPLL software versions uses additional Power\_ON commands

Build in all versions: **F+Power\_ON** initializes EEPROM circuit (first run?).  
 Version 1.20 and up: **DOWN+Power\_ON** displays software version

- Changing LCD type (1line/2lines) from version 1.30 and up only

For software that uses SDA-6102 PLL ..... on keyboard with **UP+Power\_ON** cmd  
 TSA-5055T PLL, and ATVRX-2 v1.30

For software that uses TSA-5511 PLL ..... on PLL: with connecting 220E resistor from PIN-9 of PLL to the GND or +5v  
**0v on PIN-9 = 1 line LCD.**  
**+3-5v on PIN-9 (or left open) = 2 line LCD or 2 ctrl. chip on LCD.**

- All software versions (except those using SDA PLL circuit) have build in detection (and print out on LCD) of VCO's PLL\_LOCK state. Versions with the last character **L** in the name, displays this state in real time (few times in second). Version without last character **L** in the name displays this state in the start of UNIPLL board, or at pressing of any UNIPLL key.
- If there is not usable PLL or EEPROM circuit, UNIPLL will announce this Error with few beeps.

Programs for ATV will have main step 62.5KHz (23cm) and 80KHz (13cm, 6cm, 3cm), but for this needs active step on keyboard is switched on to 0.5MHz on 23cm, 0.640MHz on 13cm, 1.2MHz on 6cm, and on to 1.6MHz on 3cm band.. On ATVRX2 is channel step set up on to 1MHz, and on UNII3PTL version is step 0.5MHz.

Program for 70cm high speed (38k4) user packet radio WBFM rtx (UNI70W) supports 1st IF at 36.000 MHz and VFO steps 50KHz. Current 'žfone' versions of UNIPLL software (25k step) don't support common RTX, except by using HF mixing methods with sigle frequency VCO for RX as well for TX mode.

UNIPLL module is not usable on PSK equipment due to poor PLL loop noise and stability conditions.

PCBs are professionally made and are available from author; also the preprogramed CPUs. Source files for UNIPLL are normaly not available, except for mass reproduction.

The UNIPLL project was published in Slovenian HAM radio magazine: CQ-ZRS 3/96 in June 1996. Schematics files for printing on HPLaserJet or matrix printer can be found in ATVRRC directory on S50ATV file server BBS. To access on S50ATV BBS use command: C S50ATV , on any S5 high speed node. This and many other S51KQ projects can be find on Internet address: <http://lea.hamradio.si/~s51kq>



# PCGENX - Universal I2C controller

## Software & Hardware info 1996 - 1999

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PCGENX is an universal cpu controller board with I2C bus. It was designed for controlling of CGEN video generators, but latter was used in some other applications too. On board are main cpu, DTMF decoder, Beep generator, 1 relay, 2 jumpers and connector for RTX (audio IN, OUT, /PTT), and one for 4 button keyboard.

At the moment exists following software for PCGENX board:

File name	project	CQ-ZRS	mode	usage	remarks	Software
<b>PCGENX</b>	PC GENX	2/1996	DTMF/KEYB	ATV	cgen 2,3,4,5,6 controller, I2C bus	
<b>PCLOCK2</b>	PCGENX	-	DTMF		remote switch	
<b>PCVOICE</b>	PCGENX	-	Voice BEACON	FM rpt	3 voice msg., AUTO + DTMF remote	<b>v1.01</b>
<b>PCCAM</b>	PCGENX	-	CAMERA contrl	ATV	DTMF remote, 2x ON/OFF + L,R	<b>v1.00</b>

**PCVOICE** is a new software. It enables usage of PCGENX and additional 3 ISD circuits, as an automatic VOICE becon (identifier) on fone repeater site, or as stand alone voice beacon. Software enables varius USER commands as well as SYSOP remote access with pasword and full controll over the system. Available DTMF commands are:

<b>User commands</b>	- <b>A1 A2 A3 A0</b>	Play: MSG1 (ID), MSG2, MSG3, Check setup
<b>Sysop commands</b>	<b>B0 B1 B2 B3 B8</b>	Enable BEACON, Cmd-A1, Cmd-A2, Cmd-A3, Cmd-A0
	<b>C0 C1 C2 C2 C8</b>	Disable BEACON, Cmd-A1, Cmd-A2, Cmd-A3, Cmd-A0
	<b>xxxxxx</b>	6 digit fixed password: Enter in a SYSOP MODE
	<b>#</b>	Quit sysop mode. Auto QUIT occur after 20s of no activity!

### Common functions of PCVOICE program are:

- After Power\_ON system will go ON with short molody folowing by playing MSG1 (ID) from first ISD bank. This even occur regardless to the system setup.
- SYSOP can access to the system setup remotly with 6 digit DTMF password. In SYSOP MODE each executed command will be confirmed with "R" for 1, or "O" for value 0 in CW. At the end of any DTMF entry system will announce SYSOP MODE with "S" in CW. Sysop can manually terminate sysop mode with DTMF command "#". Or it will be automaticly terminator after 20s of no activity.
- Sysop can remotly ENABLE or DISABLE all user commands, plus Automatic beacon identification and system check command (A0). All predefined functions are saved to the internal EEPROM. After power failure PCGENX will start\_up to the same state as was before failure.
- AUTOMATIC BEACON INDETIFICATION will play - if enabled, after (each) 70 minutes of no DTMF activity, Voice mesage from bank-1 (MSG1), folowing by "K" in CW. Any DTMF code on input will reset beacons timer to 0 (cont begins from 0).

- By executing SYSTEM CHECK command (A0), repeater or system will go ON\_AIR with short melody, following with Telemetry data in CW, as follows:

**- short melody**

```

- "R"          // Beacon (R=on 0=off)
- "R"          // user cmd A1 (R=on 0=off)
- "0"          // user cmd A2 (R=on 0=off)
- "0"          // user cmd A3 (R=on 0=off)
- "R"          // user cmd A0 (R=on 0=off)

- "K"

```

- On board LED will shortly blink if the BEACON is ON. Any presence of DTMF on input will put LED ON as long DTMF tones exists. If the PCGENX goes ON\_AIR LED will go ON too.

HOW TO CONNECT ISD1416P to the PCGENX board ?

ISD1416P: Pins 1-6, 9-10, 12-13 and 26 are connected to GND  
Pins 16, 23 and 27-28 are connected to the +5v  
Pin 14 is the Audio OUT, via 10nF from each ISD to common point, and out to the TX

Pin 24 is connected to the PCGENX board as follow:

ISD-1 pin 24 (first bank) to the SCL connector point  
ISD-2 pin 24 (second bank) to the SDA connector point  
ISD-3 pin 24 (first bank) to the hot pin of jumper JP1.

Jumper JP2 stays OPEN. Don't connect any keyboard on PCGENX if the PCVOICE software is installed !  
For how to make simple interface, and how to record Voice messages in to IDS circuits, take a look in ISD1416P PDF data file available on WWW.

**PCCAM** is a new software too. It enables usage of PCGENX board and additional 3 RELAYS, as an simple remote control unit for video camera and ATV tx. Software enables few USER DTMF commands and one timer, as follows:

<b><u>User commands</u></b>	<b>11 10</b>	On board RELAY-0	ON OFF	
	<b>21 20</b>	Ext. RELAY-1	ON OFF	
	<b>3</b>	Ext. RELAY-2	ON / OFF	// Real time execution
	<b>4</b>	Ext. RELAY-3	ON / OFF	// Real time execution
	<b>51 50</b>	Auto TIMER on RELAY-0	ON OFF	

**Common functions of PCCAM program are:**

- After Power\_ON external RELAY-1 will go on state as was at time power failure occur. If the TIMER is enabled, LED will shortly blink and the RELAY-0 will be put OFF after caa 10 minutes of no activity. Any DTMF tone on input will put LED ON. Command "3" and "4" are for moving camera left and right. There is no answer\_back via AIR build in, as done in PCGENX or PCVOICE versions.
- HOW TO USE PCCAM software with PCGENX board ?  
At first place two 100E resistors at I2C conn. must be changed with 5K6. Resistor 39K near I2C conn. shuld be removed. Resistor 1K righth of JP1 must be changed to the 5K6. EXTERNAL NPN transistors with relays shuld be connected as on board relay (transistor BC337). RELAY-1 (transistor) to the SCL, RELAY-2 to the SDA and RELAY-3 to the hottest pin of JP-1. JP-2 remains OPEN. Don't connect keyboard on PCGENX. Do not forget to put protection diode on each external relay, as done on board !

## Projects based on 80c535 microcontroller :



File	project	CQ-ZRS	mode	usage	remarks	Software
<b>HCALL</b>	HCALL	-	POCSAG 1k2/2k4	HAM	Amateur radio Paging server	v0.90

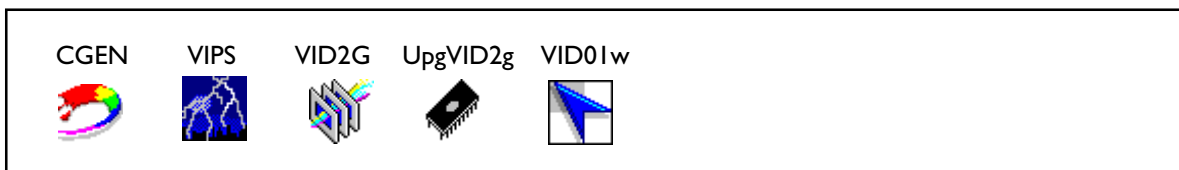
## Projects based on ATMEL AVR :



File name	project	CQ-ZRS	used cpu	usage	remarks	Software
<b>VID2G</b>	VID2G	1+2/1999	ATmega103	ATV	PAL / NTSC video identifier & gen.	<b>v2.01</b>

## S51KQ software for Windows 95/98 :

EXE file	project	CQ-ZRS	usage	remarks	Software
<b>CGEN</b>	CGEN-xx	4/95, 1/96	ATV	Manager for CGEN modules	<b>v1.00</b>
<b>VIPS</b>	ATVRC	5/1996	ATV	Win manager for home usage	<b>v1.00</b>
<b>VID2w201</b>	VID2G	1+2/1999	ATV	PAL / NTSC video identifier & generator manager	<b>v2.01</b>
<b>UpgVID2G</b>	VID2G	1/2000	ATV	VID2G operating system upgrade tool	<b>v1.00</b>
<b>VID01w10</b>	VID-01	3/1994	ATV	Compiler for EPROM of VID-01 b/w inserter	<b>v1.00</b>



**NEW** [CPU source files \(BIN, HEX\) available with reproduction rights.](#)

**NEW** [UNIPLL-2 under development](#) **NEW**

With large LCD, multiband user selectable software 10m - 3cm will be build in, RTX shift support, VFO steps from 5kHz and up, various IF support, full RS-232 access, memory download/upload, Windows software, etc..

Visit our WWW site in future !

Internet: <http://lea.hamradio.si/~s51kq>  
 More than 43 Mb of S51KQ stuff, photos, schematics, EXE files, programs,..

**On S51KQ CD:** Full internet home page image, full S50ATV Ax25 BBS image, large PDF library, picture collection, DSP3MV collection, additional software, AVI files, etc etc.  
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