DIY KIT 112. POCKET SAMPLER

INTRODUCTION

This compact PC-driven sampler monitors voltage changes over periods ranging from milliseconds to months. It can also be used as a simple low frequency digital scope to examine audio and other signals up to about 5KHz. No batteries are required as it is powered from the computer's parallel port.

The original kit designed by *Graham Cattley* and published in *Electronics Australia, August 1996*. We repackaged it to fit into an extended D shell plastic case. We have included a copy of the original magazine article. Disregard the construction details in the article since we have redesigned the PCB & hardware. Software to use with the Pocket Sampler software is included on disk. The project is used with permission.

The original kit had to be "calibrated" every time it was moved to a different computer, as explained in the original article. However, it was found that some PC printer ports could not supply enough current, causing the 5v supply, and hence the reference voltage, to vary greatly, resulting in erratic readings.

To overcome this problem, and also to increase the overall accuracy, the voltage reference chip was changed. **This new chip provides a steady 1.235V reference voltage, connected directly to the reference input of the ADC. This allows the Sampler to read 2.47V on the 2V range and 24.7V on the 20V range**. Refer to the original article for a general description on how the kit works.

The kit is constructed on a double-sided, through-hole-plated printed circuit board (PCB). Protel Autotrax & Schematic were used to design the board.

ASSEMBLY INSTRUCTIONS

Fit the D25 connector to the PCB. The PCB is inserted between the two rows of pins on the connector. Use a flat-bladed screwdriver to spread the pins slightly apart if necessary. This will make it easier to insert the PCB. Make sure the connector pins are centered on the PCB pads and at right angles to it. Push the PCB in until the edge is touching the plastic housing of the connector. If this is not done then the PCB will not fit into the D shell covers.

Now add the other components. IC1 (voltage reference) must be pushed down close to the PCB before soldering so that it doen not hit the cover. There are no IC sockets. Solder all components quickly so as not to overheat. The leads of the diodes & resistors must be bent over very close to their bodies to fit onto the board. Make sure that the switch is sitting properly on the PCB before soldering. Proceed to "Testing & Calibration".

Fit the front panel to a plastic cover and hold it in position. Slide the PCB into the front panel and down into the plastic cover. Make sure that the D connector and the front panel slide all the way into the slots on the plastic cover. **Note:** it will be necessary to file away some of the "lip" on the edge of the top plastic cover to stop it interfering with the 2.5mm input jack metal ring. You can optionally add the two D25 mounting screws while fitting the covers into place.

PARTS LIST - KIT 112		
Resistors (0.25W, 2%)		
4K7 yellow violet black brown	R4	1
10K brown black black red	R3,5,6	3
75K violet green black red	R1	1
15K brown green black red	R2	1
20K trimpot	VR1	1
Capacitors		
47pF ceramic	C1	1
47uF 16V mini electro	C2	1
Semiconductors		
1N4148	D1-D9	9
74HC157	IC3	1
Quad 2-to-1 data selector/multiplexer		
ADC0804	IC2	1
8-Bit A/D converter		
LT1004CZ-1.2	IC1	1
1.2V Reference Diode		
Miscellaneous		
DPDT slide switch	SW1	1
2.5mm JACK	SKT1	1
D25 connector, male	X1	1
solder type		
Plastic D shell covers		1 set
D25 connector screws		2
Front panel piece		1
K112.PCB		1
Disk containing software		1

TESTING & CALIBRATION

The trimpot is used to scale the "20V" voltage input down to 2 volts. This adjustment only needs to be done once, after the unit is first assembled.

Plug the Sampler into printer port LPT1 and run the supplied program "K112TEST.EXE". This program displays the current range switch setting and input voltage. Set the switch to the "20V" range. Connect a 10VDC level to the input (use a multimeter to set the level accurately). Slowly adjust the trimpot until the voltage level on the screen reads 10V The Sampler is now fully calibrated and ready for use.

NOTE: We are using an 8-bit A/D converter with a 1.235V reference voltage so the Sampler has a resolution of approximately 10mV on the 2V range and 100mV on the 20V range.

When using the Windows software "PS_ISEE" please read the help section on "Analog Inputs" before first use.

The software provided with this kit is also available for downloading from our web page "**http://kitsrus.com**"