

The Medicina IRA-SKA Engineering Group

**Synchronization distribution
for Best-2**

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Abstract

The Best-2 demonstrator [1] is composed by 32 receiver installed on 8 antennas (4 receiver each antenna). An UTC phased 1PPS sync signal (One Pulse Per Second) is needed to synchronize and time tag data acquisition from receivers. A sync distributor board has been designed and tested at the Medicina laboratories to supply 1PPS signal to ADC boards and correlator.

1PPS distributor board

In order to distribute a very stable sync signal to the receiver boards (ADCs and correlator), a PPS (Pulse Per Second) distributor board (figure 1 and 2) has been designed using state of the art devices.

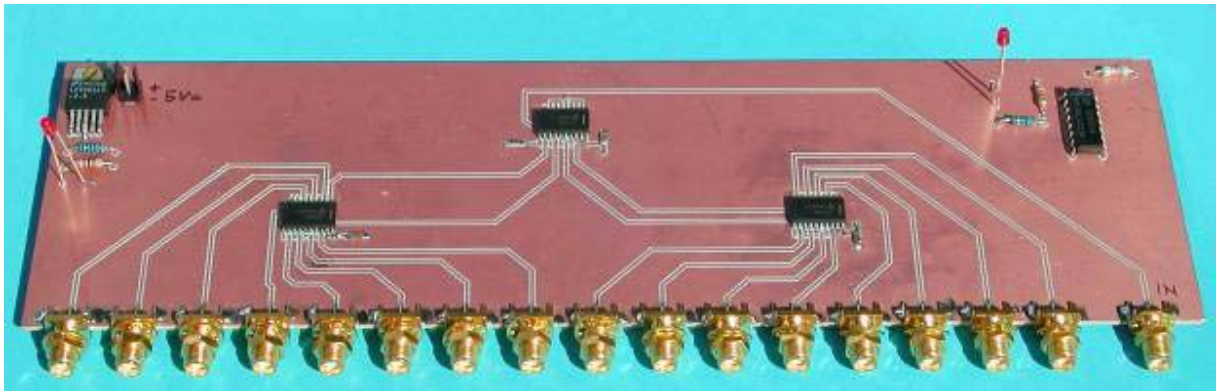


Fig. 1. PPS distributor board.

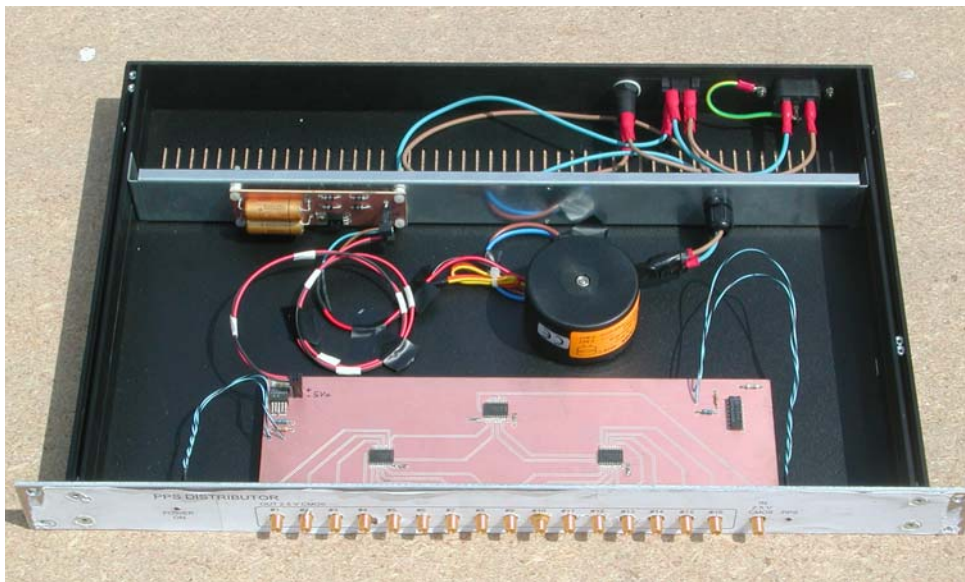


Fig. 2. PPS distributor rack.

A 5V TTL input signal is supplied to the system (50Ω loaded) and then splitted in 16 outputs (3V BiCMOS – 50Ω). The electrical schematic diagram is reported in Figure 3. In order to properly split the input signal, SN74ABT244A buffers from Texas Instruments have been used. A red led is used to monitor the presence of the power supply and a second red led indicates the PPS activity on the board. The second led emits a light pulse at each PPS.

The parts list is reported in Tab.1

Quantity	Reference	Part
4	C1,C2,C3,C5	0.1uF
2	C4,C6	33uF
2	D1,D2	Red LED 3 mm
17	J1,J2,J3,J4,J5,J6,J7,J8, J9,J10,J11,J12,J13,J14, J15,J16,J17	SMA connectors
1	J18	B2S connector
1	R1	50Ω
1	R2	270Ω
1	R3	4.7kΩ
1	R4	18kΩ
1	R5	390Ω
3	U1,U2,U4	SN74ABT244A
1	U3	74LS123

Tab. 1. Parts list.

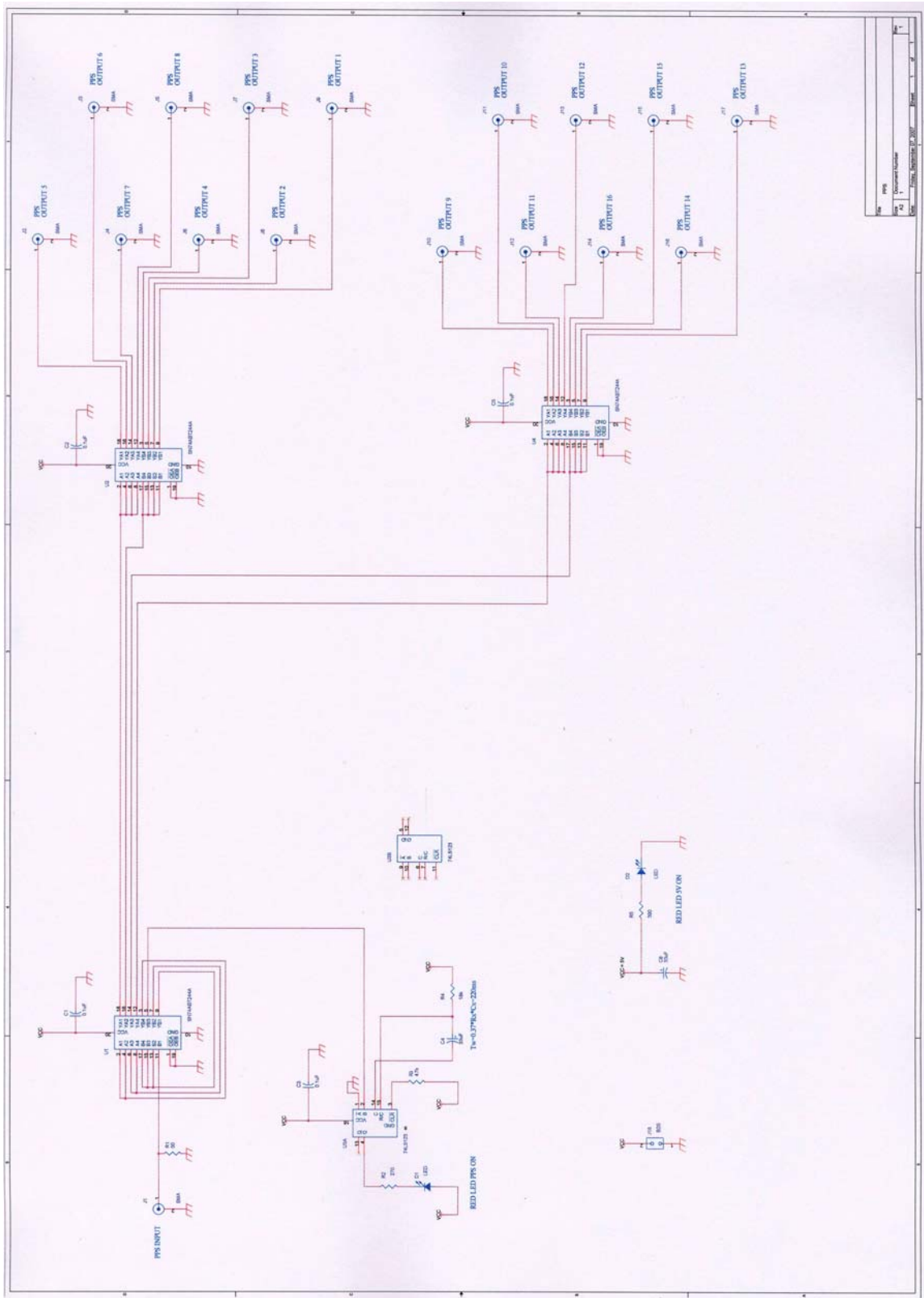


Fig. 3. The PPS board distributor schematic diagram.

Test

In figure 4 a plot of the oscilloscope PPS measurement is shown. The PPS pulse has a 400 nsec width.

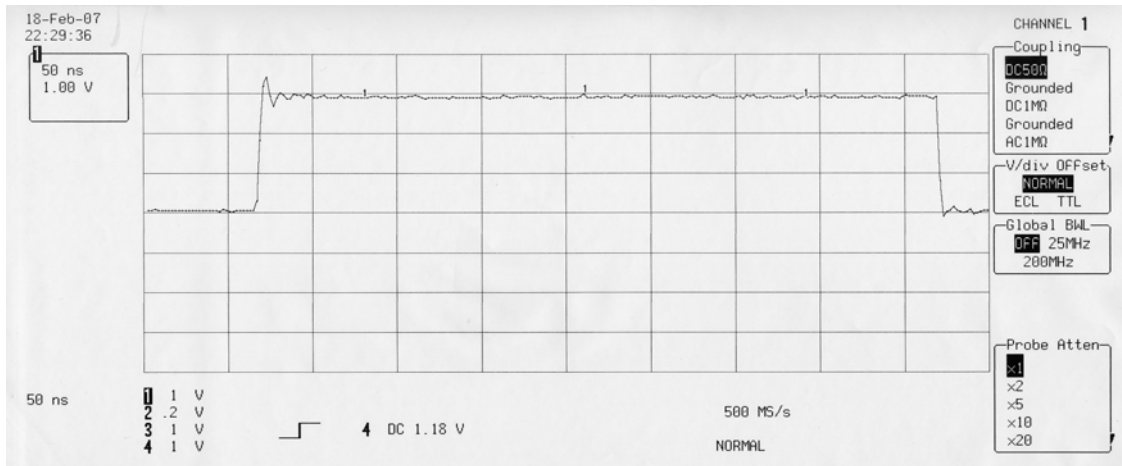


Fig. 4. 1PPS pulse shape measure.

References

- [1] May 11, 2006: "**Italian SKA test bed based on cylindrical antennas**", S. Montebugnoli, G. Bianchi, C. Bortolotti, A. Cattani, A. Cremonini, A. Maccaferri, F. Perini, M. Roma, J. Roda, P. Zacchioli. Published on [Astronomische Nachrichten](#), Volume 327, Issue 5-6 (p 624-625) (English; [pdf](#) [0.6Mb])