

## XDR LCD kit – practical experience

Céd has asked me to provide some comments about PI readout. Here are some “subjective” impressions and observations, also including other subjects.

### PI Code detection

Frequency	Station (Germany, unless specified)	Signal	Observation
106.2	Radio Oberland	46 (“local”)	immediate PI d91e, adjacent channels are free, PS after 2 seconds
105.4	Radio Oberland	36 (“local”)	immediate PI d91e, adjacent channels are free, no PS
105.0	Radio 7	40 (50 kW, 149 km, unstable)	No PI. Some co-channel QRM (see next row)
105.0	B5 aktuell	42+ (25 kW, 78 km, usually stable)	PI almost immediate from 42.
104.8	Radio IN	43 (0.2 kW, 27 km, local)	PI after 1-5 seconds
104.3	Radio Alpenwelle	0.5 kW, 80km, almost line-of-sight.	No PI with 36. PI after 6 seconds with 37. PI after 1 second at 40. PS will display after approx 30 seconds and signal 41.
87.7	Bayern 2	30 (0.1 kW, 87 km, perfect line-of-sight)	PS after 2 seconds, PI is immediate.
87.9	Hitwelle	38	PI almost immediate at 38, sometimes erroneous PI. PS after 2-3 seconds, but not always complete
94.5	M 94,5	30	PI almost immediate, occasional erroneous values. PS after some time, but fragments only.
95.2	Radio Oberösterreich (AUT)	49-52 (100 kW, 186 km)	PI a707 after approx 1 minute. Several erroneous values to follow. This is difficult also on other radios.
95.6	CR 3 (CZE)	81 kW, 203 km	PI code 232d displayed after 3-4 seconds at signal 27, sometimes even faster. I think the Czech use a higher deviation and RDS deviation. PS displayed correctly after some time. Getting incomplete at signal 25. On 95.5 there is a local with signal 40.
101.5	DRS 1 (SUI)	Smax 52	PI from approx signal 48, PS after some time.
102.5	Radio 7	26	PI d30B ( <b>why not displayed as d30b ??</b> )

			almost immediate, signal 26, PS, but not always reproducible.
102.6	Free FM	33-37 (unstable 1 kW, 136 km)	102.7 has strong signal (75, splattering). No chance for a PI.
102.9	Radio Impuls (CZE)	33-37	Strong deviation (sounds rather distorted).
104.7	Radio Rijeka (HRV)	15-21	This has become a regular guest. It is impossible on any other receiver because of very strong 104.6 and strong 104.8. No chance for a PI.
106.3	DLF	30-33	Some splatter QRM from 106.25 (leaky cable).

Note: The (RDS) deviation in Germany and Austria is set by the transmitter operators in accordance with official guidelines. There are no known exceptions. With stronger RDS deviation, PI will be decoded even on weaker signals. A good example for RDS deviation above average are stations from Tunisia, which can be received via Sporadic E. Often, the PS is displayed before you manage to recognize that there is an audible signal.

I do not remember to have seen PS with less than three bars (i.e. > 40 db, see below). Well, just after typing this, I get it with 2 bars and signal 30. Why: That station is in perfect line-of-sight, so there is virtually no “distortion” on the RDS subcarrier. Such distortion, caused by reflections, may render the RDS signal undecodable even on a strong signal. I remember strong tropospheric signals on the Liguarian sea, where almost no RDS was received. Looking at the RDS error rate with RDS DX showed why ...

**PI code detection quality:** In most cases, the PI code is displayed correctly. I have had good experience with a RDS decoder made by Fabio Arpino. This decoder will display the PI code with a “?”, unless the same PI code has been received twice in a row. This is a good compromise between “quick” and “reliable”. Erroneous codes are unlikely to repeat in such a way and will be excluded “by design”.

I think the decoding will work very nice for Sporadic E, because it is extremely fast. For MS reception, signals will have to be pretty strong to generate PI code. I had some pings recently on 93.9, the signal level was between 20 and 30 – insufficient for PI. But this is a lot of guessing, time will tell.

### The XDR signal strength indicator

I have worked out the following correlation between „signal“ and signal strength bars:

> 40 3 bars  
39 2 to 3 flashing  
32-38 2 bars  
29-31 1 to 2 flashing  
21-28 1  
< 20 no bar

## Two minor bugs

Rarely, the smax value is doubled, e.g. signal cycling from 31 to 36, smax is mostly 36, but sometimes displays 72. It is automatically corrected in the next smoothing interval, after a few seconds.

Very rarely, the signal value is doubled. I have seen values e.g. like 178 when the signal is 89 in reality.

## Why do I think that the “signal” is actually “db”?

- a) The numbers reminded me of the db values I get on my Sony SA3ES (unfortunately, I decided to leave that in my summer house, so I cannot make direct comparison).
- b) I use a low noise preamp by Burdewick. I think it is specified at 16 db, and the nice thing is its relay: It remains always connected and can be switched on and off. So it is very simple to do some comparative measurements:

Frequency	no preamp	with preamp	gain
87.7	30	48-49	18-19
87.9	38	55-56	17-18
88.4	79	92-93	13-14
88.7	39-40	57	17-18
89.0	47-48	62	14-15
89.5	76-77	92	16-17
90.8	0	1	On this empty channel, the preamp should not have any effect, and indeed behaves well!
92.2	10	16-17	6-7
92.5	19-21	27-28	7-8
92.6	20	27	7
92.8	39	48	9
93.9	0-2	4-5	With preamp, a station gets audible. The music is recognizable at signal 4.
94.1	39-40	50	10-11
94.3	3	17	14
94.3	13	22	9
94.5	30	40	10
95.0	90	97	7 (this is my local “pest”, 0.1 kW, 2 km)
95.2	29	50	21
95.6	24-25	44-45	20
95.7	2	21	19, without preamp, the program is still readable at signal 2, at lower volume. With preamp, the volume goes normal.
96.9	11	20	9
98.2	6	25	19
101.5	30	53	23
102.5	26	48	22
102.9	11	33	22
103.6	4-5	24-25	20, the channel is empty, sometimes there is nothing to

			hear and with preamp there is still signal 17. Perhaps some local HF noise?
104.7	5-6	15-21	10-15
105.9	2	5-6	Depending on the antenna position, the channel is empty. Preamp behaves nicely.
106.3	12	30	18
107.2	60-61	80-81	20

The gain of the preamp seems higher on higher frequencies. The measured signal difference seems not to be linear over the dynamic range. I am not a specialist into such matters, so I don't enter into speculations.

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Günter Lorenz  
<http://www.fmlist.org>