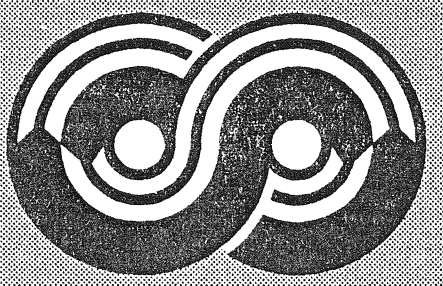

R·D·S

RADIO DATA SYSTEM

The greatest Advance in Sound Broadcasting since the Implementation of FM-Stereo.

THE RDS SOFTWARE DECODER for the PC by

FRANKEN RDS-TEAM

Displays everything what´s on the Air with RDS!

FRANKEN
RDS-TEAM

Ing.-Büro Dieter Nohse
Weichselleite 18
W-8501 Obermichelbach
Germany

THE RDS SOFTWARE DECODER FOR THE IBM AT-COMPATIBLE PC

DEAR RDS-USER!

For a RDS-professional it is desirable to check and analyse the RDS data which are sent from the RDS-broadcasting stations in a comfortable way. In particular, for RDS analysis from mobile reception, the current available software decoders are expensive and not flexible, because a special receiver is needed that makes it not possible to connect an own RDS receiver.

Franken RDS-Team has recognized this disadvantage and has developed a pure software solution for the IBM AT-compatible PC or laptop. Experienced RDS software designers have developed this RDS software decoder for practice, which will set a new dimension for RDS real time analysis and measurement.

The program is suitable for the engineer at the broadcasting stations and for the development engineer of RDS applications (e.g. consumer electronics). With the exception of time critique parts, the software is written in TURBO Pascal and therfore easy for maintenance and easy adaptable for future RDS implementations. An update service is obvious for our registered customers. The enclosed feature list gives a detailed description of the various features of the program.

Please notice the new implemented full EON support and the unique and powerful RDS logic analyser functions.

With the (as we know) world's first RDS logic analyser, the RDS encoders at the transmitters can be checked very accurate and comfortable in a wide range of application (bad times for the encoder manufacturers!).

Usable for real time analysis of RDS data from mobile reception, the package can be adapted to <u>any</u> RDS receiver with the delivered interface cable. The cable, which has open ends on the receiver side, features an integrated active buffer for decoupling and pulse enhancement. No external power supply voltage is necessary!

It should be no problem for an electronic technician, to wire the digital signals RDS-DATA and -CLOCK from the RDS demodulator to an extra connector (e.g. 3,5mm phone jack). The RDS signals are connected directly to the interface cable. The other side is plugged into the parallel printer interface (LPT, PRN) of the AT. If you like, we can configurate the cable on the receiver side according to your description with no extra charge!

Franken RDS-Team also offers the complete adaption of a <u>delivered</u> RDS receiver for an adequate price (within Europe only). Generally it can be said, that any RDS receiver is adaptable, where the service manual is available and the digital RDS signals are accessible!

A list of (known) adaptable RDS receivers

Manufacturer	Device	Type
Blaupunkt	Car Radio	Montreux RDR 49
GRUNDIG	Car Radio	WKC 3851/4870/4871/5000/5500/3870/3880/1910
GRUNDIG	HIFI Tuner	T9000, T905, T8300, T303, R303
GRUNDIG	World-Receiver	Satellit 700
Opel	Car Radio	SC 804 und SC 303 (C)
Philips	HIFI Tuner	FT 980

FRANKEN
RDS-TEAM

R·D·S RADIO DATA SYSTEM

Ing.-Büro Dieter Nohse
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Germany

A list of our satisfied customers (steady growing):
ARD, BBC (England), BMW, BR, DELCO, EBU (Switzerland), FTZ, GÖTTING KG, GRUNDIG, HR, IBJ, IRT, LFK, LPR, MATSUSHITA, MITSUBISHI, MOTOROLA (Scotland) NDR, NEC, NOB (Netherland), NOZEMA (Netherland), OPEL, ORF (Austria), PHILIPS, PTT (Switzerland), RBT, RDP (Portugal), ROHDE & SCHWARZ, SCHNEIDER, SDR, SGS THOMSON, SHINTOM (Japan), SR, SWF, GERMAN TELECOM, TELECOM DENMARK, TELEFUNKEN, TIESSECI (Italy), WDR, ...

Prices (excluding VAT):

1.	RDS software decoder as described in the enclosed information on 3½"/DD or 5¼"/DD floppy disk for the IBM AT compatible PC with an english instruction manual including an active interface cable (no external power supply necessary) with open wires on the receiver side for the adaption to any RDS receiver.	2.198,00 DM
2.	Within Europe only: Complete adaption of a delivered RDS receiver. Forwarding costs are calculated separately!	198,00 DM
3.	Customer specific software options.	on request

Prices for quantities of 5 up by request!

Important:

- **Please specify in your order the format of the floppy disk (3½"/DD or 5¼"/DD).**
- **Specify the connection of the interface cable on the receiver side. Otherwise we will leave this side with open ends.**
- **Payment within 14 days 2% discount, 30 days net.**
- **Payment in advance (2% discount) is prefered for delivery outside Europe.**
- **Prices FOB Obermichelbach.**

With kind regards
FRANKEN RDS-TEAM

D. Nohse

- Dieter Nohse -

P.S. Please note, that the distribution of the program is done avocational (in spare-time). For that reason it is not possible to contact us by phone on week-days during "normal" working time. But we can make shure, that this will have no influence to our support because the authors are occupied with RDS even in full-time. After 6.00 PM (18.00h) on week-day you may contact us by phone: Germany +49 (0)911 767851.

FEATURES OF THE RDS SOFTWARE DECODER FOR THE IBM AT

- Software runs on any IBM AT compatible PC.
- Mobile or stationary operation.
- Flexible system.
- Very easy to operate.
- Software is written in Turbo-Pascal.
- Easy to maintain.
- Simple PC interface with a provided active interface cable.
- No external "blackbox" required for RDS decoding.
- **RDS realtime decoding and display of all RDS data.**
- Clearly arranged data presentation on 9 logical screens.
- Up to 15 user definable HELP screens, 12 screens are predefined.
- Display of PI code and ECC.
- Binary display of TP, TA and M/S.
- Text display for DI, PTY(N), CC and coverage.
- Display of PS name.
- Display of RT (2 rows).
- Display of PIN, DATE and TIME.
- Display of detected group types.
- Display of AF heads.
- Display of AF method (A/B).
- Easy selection of an AF list.
- Counter for number of AF lists.
- Display of up to 108 AF pairs. Indication for LFMF codes and AF pairs in descending order.
- Instant display of RDS block error rate, momentary and maximum.
- RDS quality bargraph with a sliding averrage over 16 RDS blocks.
- Display of percental share of group types per 2 seconds.
- Display of absolute share of group types per 1 minute.
- Dynamic figure of the last 266 RDS group types.
- Analysis of TDC and IH.
- **Detailed evaluation of EON.**
- **Detailed Evaluation of radio paging with all possible types of RP messages.**
- **Simple TMC decoder according to the ALERT C protocol.**
- Hexadecimal/ASCII display of all decoded groups 0..15A/0..15B.
- Enhanced group analysis of all groups by address codes of block 2.
- Manual and automatic RDS block synchronisation.
- "Freeze" display function.
- All screens can be stored as ASCII file.
- RDS simulation with some delivered RDS sampler files for learning and demo purpose.
- 0, 1, 2, 3, 4 and 5 bit burst error correction is selectable.
- Error correction is applied to all 26 bits.
- Error correction can be applied to blocks 1,2,3,4 or on blocks 3 and 4 only.
- Display of non correctable error rate.
- Accepts multiple of 4 MBS paging blocks (offset E, USA).
- **USA option: Evaluation of group types 3A (City, State), 10A (PTYN) and 15A (fast PS).**
- RDS sampler: RDS data may be recorded up to 3 minutes in realtime.

- RDS Sampler data may be stored in a sampler file.
- Sampler file is loadable at any time and "playback" for further analysis.
- Report generator for a formated output on a printer.
- Powerful setup for customized operation.
- PTY, COUNTRY, DI, STATE and the complete RDS character set can be defined by setup.

FEATURES OF THE RDS LOGIC ANALYSER

- Fully integrated, powerful RDS logic analyser.
- Viewfunction of the sampler memory with easy access to every RDS group within the sampler record.
- Hexadecimal, ASCII and binary display of a selected RDS group.
- Hardcopy function for the RDS LA screen.
- Filter function, to select a certain RDS group for timing analysis.
- Various sampler modes as SINGLE, CONTINUOUS, INTERNAL TRIGGER are available.
- Internal trigger can be defined on all RDS groups (0A/B..15A/B).
- Internal trigger can be defined on PI change.
- Optional external trigger by request (will need a special interface cable!).
- Precise timing measurements between two events.
- Various trigger delays available.
- Goto marker and goto trigger function.
- Help function available.

On demand of the German ARD, **Franken RDS-Team** has implemented a very unique feature for timing tests of RDS encoders. This is (as we know) the world's first RDS logic analyser (LA). With the powerful LA functions, the user can sample RDS data with different internal triggers together with time delays and analyse (view) the sampled RDS data very simple. An optional external trigger mode is available by request.

For instance, it is possible to trigger to the event of RDS group 14B/15B (begin/end of a traffic announcement) or PI-change with the trigger position in the middle of the sampler memory. After the sampler has been started, it will sampling continuously until the trigger event occurs. Then a delay counter will start according to the selected delay (front, middle, end). After timeout of that delay counter the sampler will stop automatically and the user can analyse, view or store the contents of the sampler memory. If the trigger event is set to the middle, then the sampler memory contains all RDS data approx. 1½ minutes before and after the trigger event.

After sampling, the user may view the contents of the sampler memory. All groups are shown in sequence as they are recorded. The sampler can record approx. 3 minutes (=2100 RDS groups) of RDS data including checkbits.

With the cursor functions, each group in the memory can be selected. Time measurements can be done between a marked group and the group at the current cursor position. A FILTER function enables to skip only between a specified RDS group. 4 different modes of trigger possibilities are included. The sampler can run in single, continuous and internal trigger mode. For the internal trigger mode, 3 time delays are definable.

HARDWARE INTERFACE

No external "blackbox" is required. The interface is as easy as possible. A buffer for decoupling is integrated in the 25-pin connector of the **delivered** active interface cable. You will <u>not</u> need an external power supply! Just provide the open wires with an appropriate adapter (e.g. cinch connectors) and connect the cable to the digital signals RDS-DATA and RDS-CLOCK from the RDS demodulator of your RDS receiver. Then plug in the cable to the parallel printer interface (LPT, PRN) of your AT, that's all...!

You may also order the cable with a connector for a RDS receiver by your choice without extra cost. In that case we need a description of the configuration of that connector.

CONCLUSION

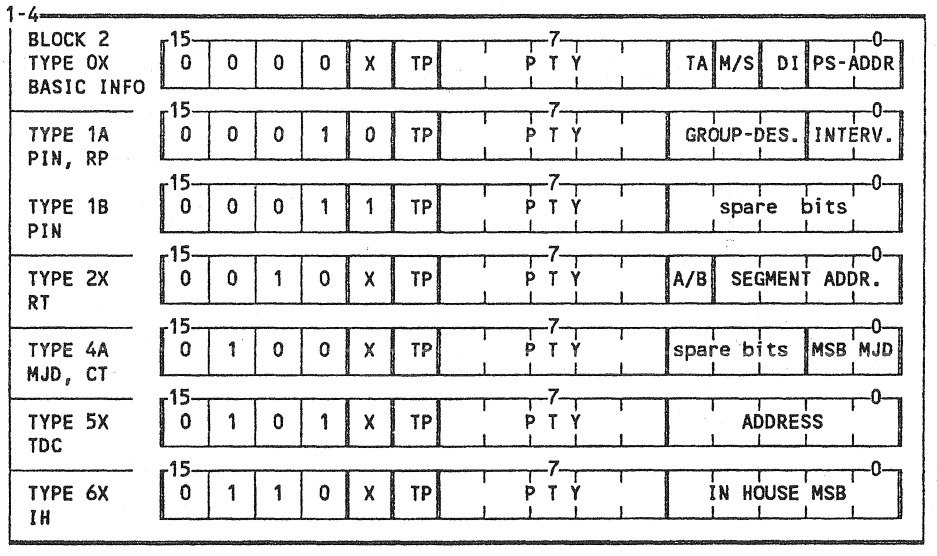
The RDS software decoder and logic analyser was designed and written from insiders of the RDS scenery and includes many powerful and unique features. All what you see on the screens is realtime, because RDS decoding is also done by the AT (no blackbox). This is the one and only way for realtime decoding! Since every RDS receiver (HIFI or car radio) is suitable for this software, there is no need to buy a special one.

Use of a normal IBM PC/XT (8 bit databus) for this software is also possible in theory, but may give some timing problems with the keyboard interrupt of DOS, if the computer is too slow. However, we cannot guarantee proper operation, because this depends hardly on the machine and bus speed so that we recommend an AT compatible PC.

The following paragraphs will give you a brief description of all the software features. The figures are hardcopies of the different logical screens.

THE HELP SCREENS

Simple recall of 12 predefined help screens by function key F1 and selection by cursor keys. It is very easy to add your own help screen(s) with an ASCII text editor. Just add 23 lines (rows) and you have created a new personal help screen. Up to 15 help screens (23 rows each) will be loaded at the start of the program and will be "on line" at your finger tips. As an example, the help screen 1-4 is shown in the next figure:

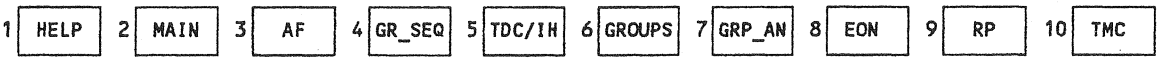


THE RDS DATA SCREENS

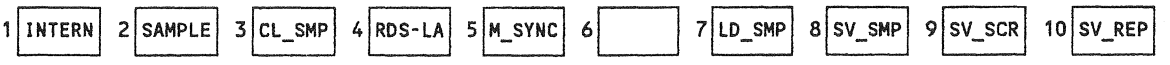
All data screens display the RDS data in real time! Don't trust any software with a "black box" (RDS decoder) between RDS receiver and AT! This cannot be real time!

The Menu Line

The menu line for the function keys F1..F10 is the bottom line on each screen for a fast function access:

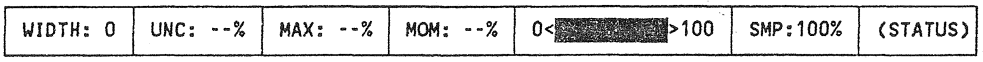


The menu line will change when the ALT-key is pressed:



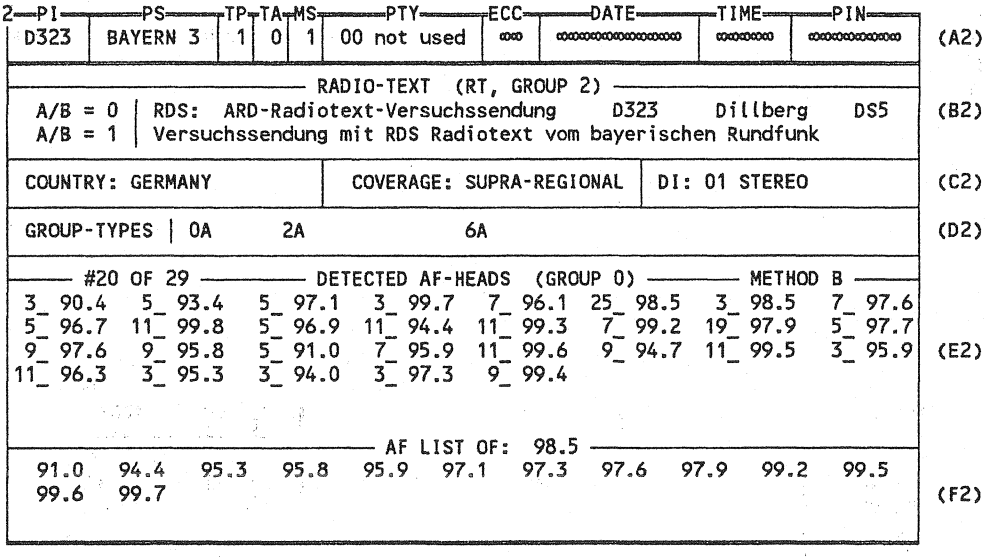
The Status Line

The status line is the top line on each screen:



WIDTH:	Selected burst width for error correction.
UNC:	Percentage of uncorrectable errors.
MAX:	Percentage of maximal occured error.
MOM:	Percentage of momentary errors.
<▒▒▒▒▒▒▒▒>	Bargraph of the RDS reception quality (sliding average).
SMP:	Percentage of the occupied sampler memory.
(STATUS):	SYNC, NSYN, STOP, ARMED, etc.

Screen 2: Basic RDS information



(A2) Fundamental RDS information as PI, PS, TP, TA, M/S, PTY, ECC, DATE, TIME and PIN from the observed RDS transmitter. This information will be copied to the RDS data screens 3-8 too.

(B2) Display of RT (radiotext). 2 rows with 64 characters each will be displayed according to the logical state of the text A/B flag.

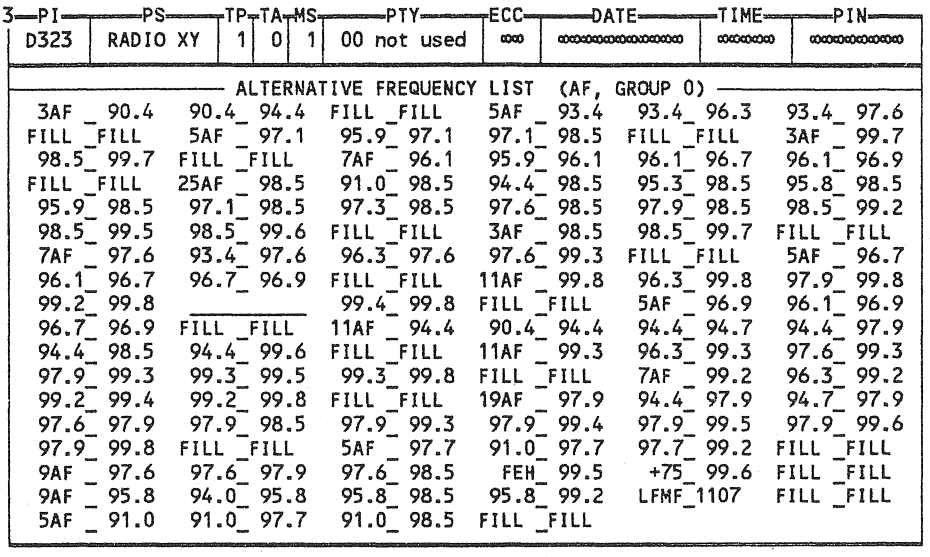
(C2) Interpretation of COUNTRY (1st element of PI), COVERAGE (2nd element of PI) and DI. These strings may be changed in setup to allow translation into your language or redefinition. With the USA option enabled, the strings COUNTRY and COVERAGE will be substituted to show STATE and CITY (group 3A).

(D2) This row clearly shows all RDS group types which are sent from the observed transmitter. With help screen 1-3 you will find out very quick what kind of RDS features are implemented.

(E2) Up to 48 AF heads will be collected in this field. The AF method and number of AF lists are displayed additional. The selection of a particular AF list in the field below (F2) is done easy with the cursor keys.

(F2) AF sublist of a marked AF head in the field above (E2). LFMF codes or AFs of pairs in descending order (method B only) are marked. This is not shown in the figure!

Screen 3: The AF lists



3 PI	PS	TP	TA	MS	PTY	ECC	DATE	TIME	PIN	
D323	RADIO XY	1	0	1	00 not used	∞	∞∞∞∞∞∞∞∞∞∞∞∞∞	∞∞∞∞∞	∞∞∞∞∞∞∞∞∞	(A3)

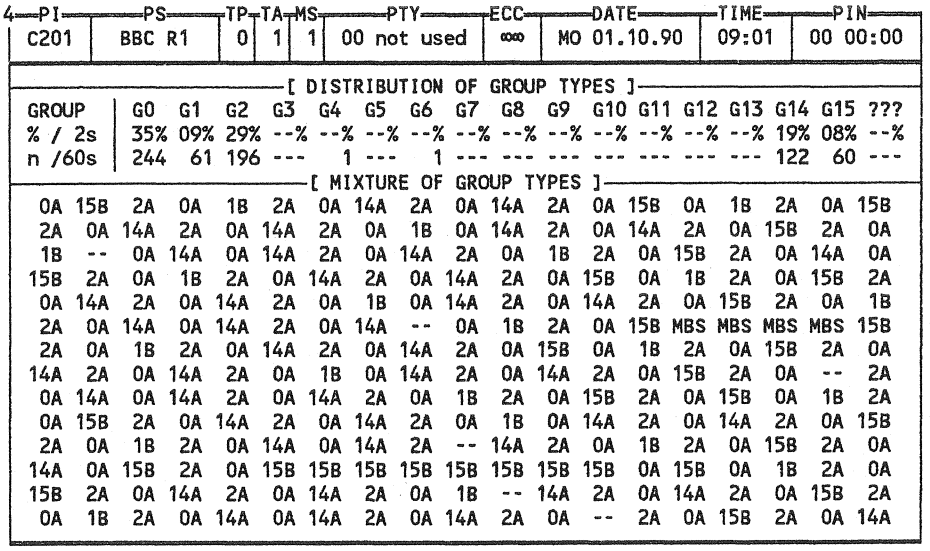
ALTERNATIVE FREQUENCY LIST (AF, GROUP 0)

3AF _ 90.4	90.4_ 94.4	FILL _FILL	5AF _ 93.4	93.4_ 96.3	93.4_ 97.6			
FILL _FILL	5AF _ 97.1	95.9_ 97.1	97.1_ 98.5	FILL _FILL	3AF _ 99.7			
98.5_ 99.7	FILL _FILL	7AF _ 96.1	95.9_ 96.1	96.1_ 96.7	96.1_ 96.9			
FILL _FILL	25AF _ 98.5	91.0_ 98.5	94.4_ 98.5	95.3_ 98.5	95.8_ 98.5			
95.9_ 98.5	97.1_ 98.5	97.3_ 98.5	97.6_ 98.5	97.9_ 98.5	98.5_ 99.2			
98.5_ 99.5	98.5_ 99.6	FILL _FILL	3AF _ 98.5	98.5_ 99.7	FILL _FILL			
7AF _ 97.6	93.4_ 97.6	96.3_ 97.6	97.6_ 99.3	FILL _FILL	5AF _ 96.7			
96.1_ 96.7	96.7_ 96.9	FILL _FILL	11AF _ 99.8	96.3_ 99.8	97.9_ 99.8			
99.2_ 99.8	_____	99.4_ 99.8	FILL _FILL	5AF _ 96.9	96.1_ 96.9	(B3)		
96.7_ 96.9	FILL _FILL	11AF _ 94.4	90.4_ 94.4	94.4_ 94.7	94.4_ 97.9			
94.4_ 98.5	94.4_ 99.6	FILL _FILL	11AF _ 99.3	96.3_ 99.3	97.6_ 99.3			
97.9_ 99.3	99.3_ 99.5	99.3_ 99.8	FILL _FILL	7AF _ 99.2	96.3_ 99.2			
99.2_ 99.4	99.2_ 99.8	FILL _FILL	19AF _ 97.9	94.4_ 97.9	94.7_ 97.9			
97.6_ 97.9	97.9_ 98.5	97.9_ 99.3	97.9_ 99.4	97.9_ 99.5	97.9_ 99.6			
97.9_ 99.8	FILL _FILL	5AF _ 97.7	91.0_ 97.7	97.7_ 99.2	FILL _FILL			
9AF _ 97.6	97.6_ 97.9	97.6_ 98.5	FEH_ 99.5	+75_ 99.6	FILL _FILL			
9AF _ 95.8	94.0_ 95.8	95.8_ 98.5	95.8_ 99.2	LFMF_1107	FILL _FILL			
5AF _ 91.0	91.0_ 97.7	91.0_ 98.5	FILL _FILL					

(B3) Display of up to 108 AF pairs as they come "from the air". LFMF codes and AF pairs in descending order (method B only) are marked (not shown in the figure). Filler codes are displayed too.

When the number of AF pairs does not exceed 108, the display is pseudo static after a full AF sequence. However, this implies 100% quality (no errors) of the received RDS signal. In case of errors, the string "_____" indicates, that the following AF pair(s) up to the next AF head may not be attached to the preceding AF head. An AF head begins with the string "nAF". "xxH" means, that the code is undefined and therefore is displayed hexadecimal. FM offsets are decoded ("+25", "+50", "+75") for historical reason, but please note, that these codes are undefined now!

Screen 4: RDS group type distribution



4 PI	PS	TP	TA	MS	PTY	ECC	DATE	TIME	PIN	
C201	BBC R1	0	1	1	00 not used	∞	MO 01.10.90	09:01	00 00:00	(A4)

DISTRIBUTION OF GROUP TYPES

GROUP	G0	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	???	
% / 2s	35%	09%	29%	--%	--%	--%	--%	--%	--%	--%	--%	--%	--%	--%	19%	08%	--%	(B4)
n /60s	244	61	196	---	1	---	1	---	---	---	---	---	---	---	122	60	---	

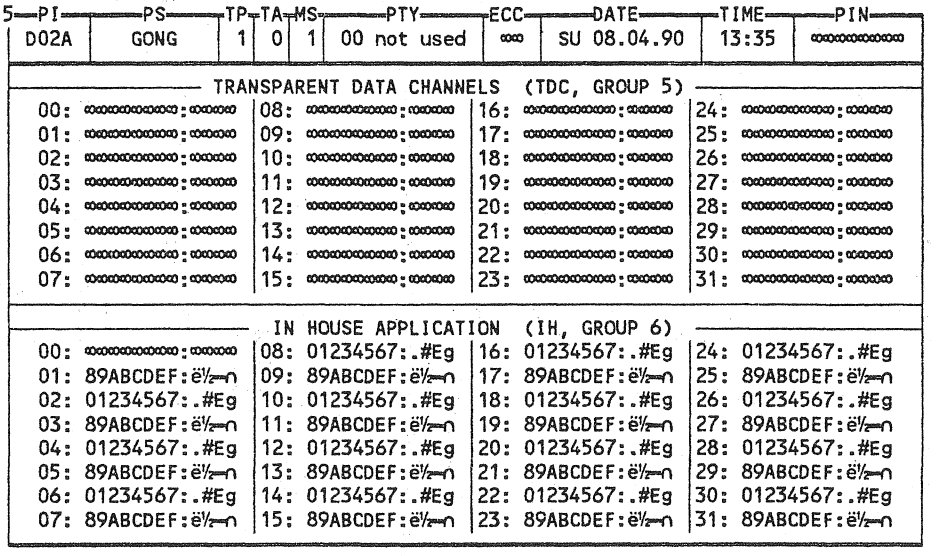
MIXTURE OF GROUP TYPES

0A 15B	2A	0A	1B	2A	0A 14A	2A	0A 14A	2A	0A 15B	0A	1B	2A	0A 15B			
2A 0A 14A	2A	0A 14A	2A	0A	1B	0A 14A	2A	0A 14A	2A	0A 15B	2A	0A				
1B --	0A 14A	0A 14A	2A	0A 14A	2A	0A	1B	2A	0A 15B	2A	0A 14A	0A				
15B 2A	0A	1B	2A	0A 14A	2A	0A 14A	2A	0A 15B	0A	1B	2A	0A 15B	2A			
0A 14A	2A	0A 14A	2A	0A	1B	0A 14A	2A	0A 14A	2A	0A 15B	2A	0A	1B			
2A 0A 14A	0A 14A	2A	0A	14A --	0A	1B	2A	0A 15B	MBS	MBS	MBS	MBS	15B			
2A 0A	1B	2A	0A 14A	2A	0A 14A	2A	0A 14A	2A	0A 15B	0A	1B	2A	0A 15B	2A	0A	(C4)
14A 2A	0A 14A	2A	0A	1B	0A 14A	2A	0A 14A	2A	0A 15B	2A	0A	--	2A			
0A 14A	0A 14A	2A	0A 14A	2A	0A	1B	2A	0A 15B	2A	0A 15B	0A	1B	2A			
0A 15B	2A	0A 14A	2A	0A 14A	2A	0A	1B	0A 14A	2A	0A 14A	2A	0A 15B				
2A 0A	1B	2A	0A 14A	0A 14A	2A	--	14A	2A	0A	1B	2A	0A 15B	2A	0A		
14A 0A 15B	2A	0A 15B	15B	15B	15B	15B	15B	15B	15B	15B	0A 15B	0A	1B	2A	0A	
15B 2A	0A 14A	2A	0A	14A	2A	0A	1B	--	14A	2A	0A 14A	2A	0A 15B	2A		
0A 1B	2A	0A 14A	0A	14A	2A	0A 14A	2A	0A	--	2A	0A 15B	2A	0A 14A			

(B4) Percental share per 2 seconds and absolute share per one minute of all detected group types. The right column below the question marks "???" is reserved for MBS groups or unidentified groups due to errors.

(C4) Realtime display of the group type sequence. Faulty blocks 2 are indicated with "--". MBS blocks (USA) are indicated with "MBS". Please note the 8 groups of type 15B in the figure, which are mostly sent at begin and end of a traffic announcement.

Screen 5: TDC and IH analysis



5 PI	PS	TP	TA	MS	PTY	ECC	DATE	TIME	PIN	
D02A	GONG	1	0	1	00 not used	∞	SU 08.04.90	13:35	∞∞∞∞∞∞∞∞∞∞	(A5)

TRANSPARENT DATA CHANNELS (TDC, GROUP 5)

00:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	08:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	16:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	24:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	
01:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	09:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	17:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	25:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	
02:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	10:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	18:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	26:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	
03:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	11:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	19:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	27:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	(B5)
04:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	12:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	20:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	28:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	
05:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	13:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	21:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	29:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	
06:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	14:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	22:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	30:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	
07:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	15:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	23:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	31:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	

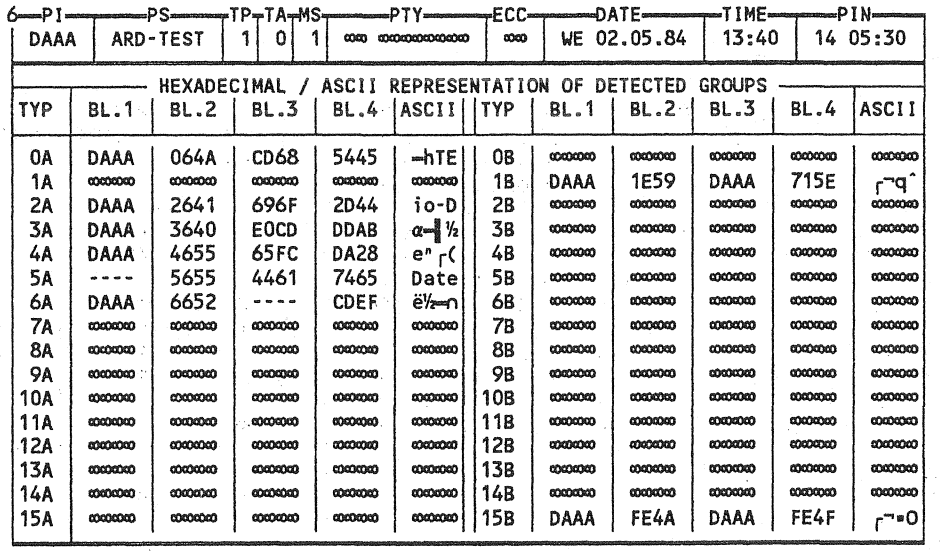
IN HOUSE APPLICATION (IH, GROUP 6)

00:	∞∞∞∞∞∞∞∞∞∞:∞∞∞∞∞	08:	01234567:.#Eg	16:	01234567:.#Eg	24:	01234567:.#Eg	
01:	89ABCDEF:ë½⌐∩	09:	89ABCDEF:ë½⌐∩	17:	89ABCDEF:ë½⌐∩	25:	89ABCDEF:ë½⌐∩	
02:	01234567:.#Eg	10:	01234567:.#Eg	18:	01234567:.#Eg	26:	01234567:.#Eg	
03:	89ABCDEF:ë½⌐∩	11:	89ABCDEF:ë½⌐∩	19:	89ABCDEF:ë½⌐∩	27:	89ABCDEF:ë½⌐∩	(C5)
04:	01234567:.#Eg	12:	01234567:.#Eg	20:	01234567:.#Eg	28:	01234567:.#Eg	
05:	89ABCDEF:ë½⌐∩	13:	89ABCDEF:ë½⌐∩	21:	89ABCDEF:ë½⌐∩	29:	89ABCDEF:ë½⌐∩	
06:	01234567:.#Eg	14:	01234567:.#Eg	22:	01234567:.#Eg	30:	01234567:.#Eg	
07:	89ABCDEF:ë½⌐∩	15:	89ABCDEF:ë½⌐∩	23:	89ABCDEF:ë½⌐∩	31:	89ABCDEF:ë½⌐∩	

(B5) Realtime display of blocks 3 and 4 of the transparent data channels (TDC) in hexadecimal and ASCII representation. The blocks are sorted according to their address information in block 2.

(C5) Realtime display of blocks 3 and 4 of the in house channels (IH) in hexadecimal and ASCII representation. The blocks are sorted according to their address information in block 2.

Screen 6: RDS group analysis



6 PI	PS	TP	TA	MS	PTY	ECC	DATE	TIME	PIN	
DAAA	ARD-TEST	1	0	1	∞∞ ∞∞∞∞∞∞∞∞	∞∞	WE 02.05.84	13:40	14 05:30	(A6)

HEXADECIMAL / ASCII REPRESENTATION OF DETECTED GROUPS

TYP	BL.1	BL.2	BL.3	BL.4	ASCII	TYP	BL.1	BL.2	BL.3	BL.4	ASCII	
0A	DAAA	064A	CD68	5445	⌐hTE	0B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
1A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	1B	DAAA	1E59	DAAA	715E	⌐¬q^	
2A	DAAA	2641	696F	2D44	io-D	2B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
3A	DAAA	3640	E0CD	DDAB	α⌐▌½	3B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
4A	DAAA	4655	65FC	DA28	e"┌(	4B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
5A	----	5655	4461	7465	Date	5B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
6A	DAAA	6652	----	CDEF	ë½⌐∩	6B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
7A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	7B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	(B6)
8A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	8B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
9A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	9B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
10A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	10B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
11A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	11B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
12A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	12B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
13A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	13B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
14A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	14B	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	
15A	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	∞∞∞∞	15B	DAAA	FE4A	DAAA	FE4F	⌐¬▪O	

(B6) Detailed hexadecimal display of all (!) groups separated by type A/B and all blocks including block 1. Blocks 3 and 4 are displayed in ASCII too. Errors in the datastream of the RDS encoder are exposed very simple at one glance. Faulty blocks are marked with the string "----".

Please note, that even block 1 is displayed. Don't think this is unnecessary because we know, that everything may happen in the world of RDS encoders!

Screen 7: Enhanced RDS group analysis

7 PI: D313 | PS: SDR3 | TP: 1 | TA: 0 | MS: 1 | PTY: 00 not used | ECC: ---- | DATE: ---------- | TIME: -------- | PIN: ---------- (A7)

SORTED GROUP 02 BY ADDRESSCODE IN BLOCK 2

GR	MASK	ADDR	BL.2	BL.3	BL.4	ASCII	ADDR	BL.2	BL.3	BL.4	ASCII
00	03	00	2400	4152	442D	ARD-	16	2410	5072	6F67	Prog
01	1F	01	2401	5261	6469	Radi	17	2411	7261	6D6D	ramm
>02	1F	02	2402	6F74	6578	otex	18	2412	3A20	5344	: SD
03	1F	03	2403	742D	5665	t-Ve	19	2413	5233	2020	R3
04	--	04	2404	7273	7563	rsuc	20	2414	2020	2020	
05	1F	05	2405	6873	7365	hsse	21	2415	2020	2020	
06	1F	06	2406	6E64	756E	ndun	22	2416	2020	2020	
07	1F	07	2407	6720	2020	g	23	2417	2020	2020	
08	--	08	2408	2020	2020		24	2418	2020	2020	(B7)
09	--	09	2409	2020	2020		25	2419	2020	2020	
10	1F	10	240A	2044	6567	Deg	26	241A	2020	2020	
11	--	11	240B	6572	6C6F	erlo	27	241B	2020	2020	
12	--	12	240C	6368	2044	ch D	28	241C	2020	2020	
13	--	13	240D	5331	2020	S1	29	241D	2020	2020	
14	0F	14	----	----	----	----	30	241E	2020	2020	
15	03	15	----	----	----	----	31	241F	2020	2020	

(B7) Detailed hexadecimal display of blocks 2, 3 and 4 of a particular group type, sorted by addresscodes of block 2. Blocks 3 and 4 are displayed in ASCII too. Beside the RDS LA, this window is the most powerful window for enhanced group analysis. It allows you to analyse every group type, even those which are undefined until now.

As you know, the address codes of a particular group type is coded in the last 1 to 5 bits of block 2. Using this address code with a mask allows to sort the data of a particular group by their address codes. Group and mask selection (groups: 0..15, masks: --,0,1,3,7,F,1F) is done easy with the cursor keys. With mask "--" the groups are displayed in sequence without sorting.

In the figure above group 2 (RT) has been selected with mask 1F (binary 11111). So rows with address 0..15 display the radiotext strings with text A/B=0 wheras rows 16..31 displays those strings with text A/B=1. You want to analyse EWS? No problem, simply select group type 9 and voilà...!

The help screen 1-3

1-3

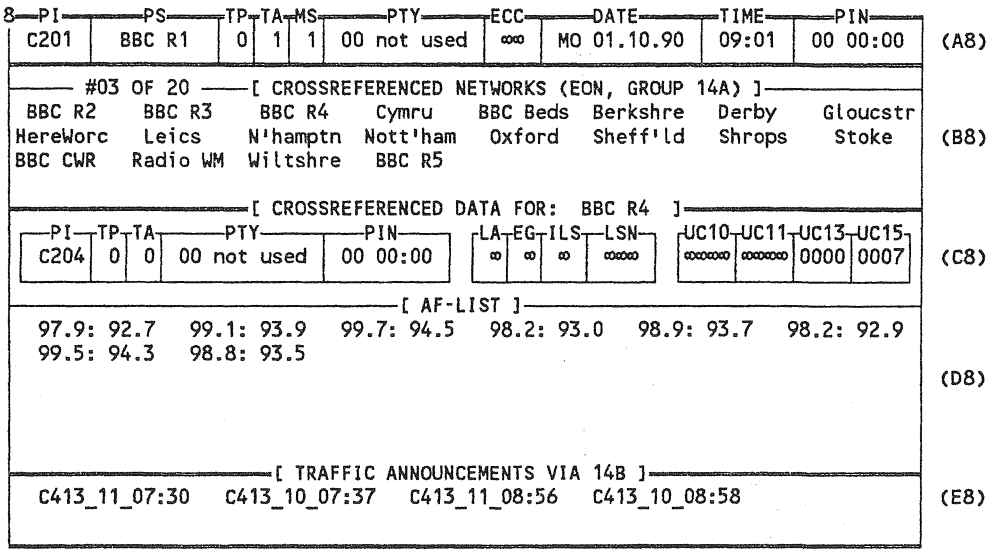
GLOSSARY OF TERMS

AF = ALTERNATIVE FREQUENCY
CT = CLOCK TIME AND DATE
DI = DECODER INFORMATION
ECC= EXTENDED COUNTRY CODE
EON= ENHANCED OTHER NETWORK
EWS= EMERGENCY WARNING SYSTEM
IH = IN HOUSE APPLICATION
M/S= MUSIC / SPEECH
ON = OTHER NETWORK
PI = PROGRAMME IDENTIFICATION
PIN= PROGRAMME ITEM NUMBER
PS = PROGRAMME SERVICE NAME
PTY= PROGRAMME TYPE
RP = RADIO PAGING
RT = RADIO TEXT
TA = TRAFFIC ANNOUNCEMENT
TDC= TRANSPARENT DATA CHANNEL
TMC= TRAFFIC MESSAGE CHANNEL
TP = TRAFFIC PROGRAMME

GROUP TYPES (all groups incl. PI,TP,PTY)

0A: TA,M/S,DI,AF,PS	0B: TA,M/S,DI,PS
1A: RP, PIN, LA	1B: PIN
2A: RT (64 char.)	2B: RT (32 char.)
3A: Navigation (USA)	3B: undefined
4A: MJD, CT	4B: undefined
5A: TDC	5B: TDC
6A: IH	6B: IH
7A: RP	7B: undefined
8A: TMC	8B: undefined
9A: NWS	9B: undefined
10A: Ext. PTY (USA)	10B: undefined
11A: undefined	11B: undefined
12A: undefined	12B: undefined
13A: undefined	13B: undefined
14A: EON	14B: EON-TA
15A: Fast PS (USA)	15B: TA,M/S,DI

Screen 8: Enhanced other network EON



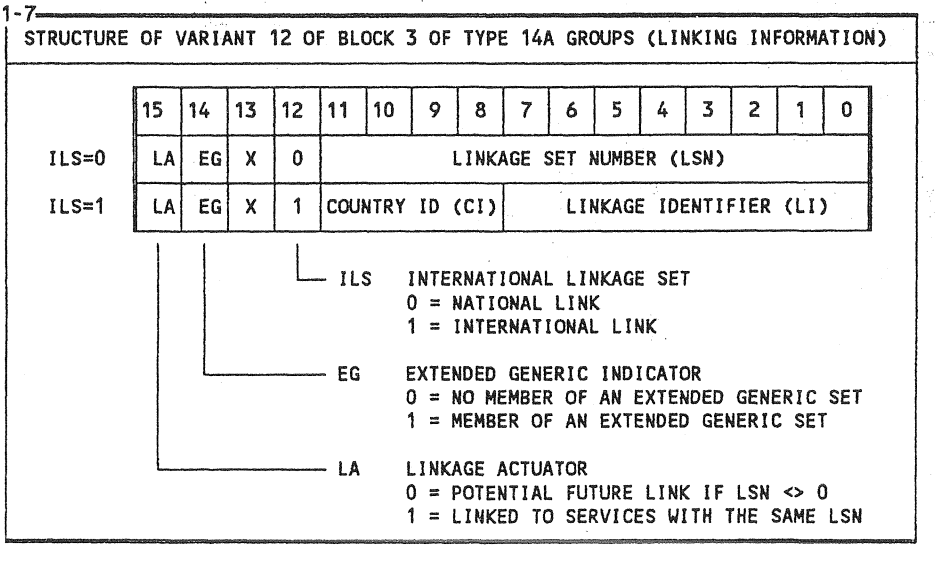
(B8) Up to 32 crossreferenced network names will be collected in this field. The PS of the current network is marked. The selection of a particular network is done easy with the cursor keys.

(C8) This fields show the basic EON data such PI(ON), TP(ON), TA(ON), PTY(ON) and PIN(ON) of the selected network. In addition to this, the linkage information is shown clearly with LA, EG, ILS and LSN (see help screen 1-7). The data of block 3 with usage codes (UC) 10, 11, 13 and 15 is shown in the last 4 fields in hexadecimal.

(D8) Up to 36 AF-pairs of the crossreferenced network will be collected in this field. A colon (":") between pairs means, that the frequencies are mapped (usage codes 5..9), whereas an underline ("_") marks an AF-pair of method A with usage code 4.

(E8) This field monitors the occurence of 14B groups, which indicates the begin (TA=1) and end (TA=0) of a traffic announcement on a crossreferenced network. An entry is of the form "PPPP_FF_hh:mm", where PPPP is the PI-code in hexadecimal, FF is the TP- and TA-flag in binary and hh:mm is the current PC time in 24 hour format (not CT!). The display will scroll if the last position in this field has been reached. In the example above, traffic announcements were made at 7:30h until 7:37h and at 8:56h until 8:58h on the service station with the PI-code C413 ("Radio WM").

The help screen 1-7



Screen 9: Radio paging (RP)

9 [RADIO PAGING (RP, GROUP 7A)]

CALL # 66 GROUP CODES: 00-99 (A9)

TYPE/SUBSC	MESSAGE	TYPE/SUBSC	MESSAGE
D10 274853	08 944098	D10 220193	08 6198230
D10 123473	054 117333	D10 239183	0241 03260
D10 237723	0522 14410	D10 252333	031 682428
D10 288384	010 128821	D10 260023	0755 87201
D10 183284	08 6625277	D10 266453	060 00127
D10 239144	0382 10137	D10 274853	08 944098
D10 115994	08 7835322	D10 123473	054 117333
D10 182224	010 768781	D10 237723	0522 14410 (B9)
D10 264224	08 6640300	▪BEEP 288384	
D10 277064	08 7630129	D18 183284	0049 911 703 8892
D10 252792	010 758833	I15 239144	[123]123456789012345
D10 181332	0171 02004	IF7 115994	[321]9ABCDEF
D10 108892	08 7519528	A80 182224	ABCDEFGHIJKLMNOPQRSTUVWX
D10 178762	010 127711		YZabcdefghijklmnopqrstuv
D10 185482	08 383850		wxyzABCDEFGHIJKLMNOPQRST
D10 256852	08 928333		UVWXYZab
D10 183513	019 01080	D10 266453	060 00127

The RDS data screen 9 will show radio paging information in 2 columns. Undefined or missing characters due to errors will be shown as "-".

(A9) On top left, a counter informs about the number of calls since the last RDS block synchronisation. On top right one can see, what paging group codes are designated to the observed network.

(B9) The current message is marked with a "▪". Each data line is split into 3 parts: the type of message, the number of the subscriber and the message itself. *In the figure above, some "dummy messages" has been included in the right column, to demonstrate the representation of the different message types.* However, it should be noted, that we have never recognized another message type than the 10 digit numeric message!

The types of the radio paging messages:

BEEP A paging call without additional message.
Defined characters: none.

D10 A paging call with a 10 digit numeric message.
Defined characters: 0..9 and blank.

D18 A paging call with a 18 digit numeric message.
Defined characters: 0..9 and blank.

I15 An international paging call with a 15 digit numeric message.
The country code is enclosed in brackets (e.g.[123]).
Defined characters: 0..9 and blank.

IF7 An international function paging call with a 7 digit function message.
The country code is enclosed in brackets (e.g.[321]).
Defined characters: 0..F hexadecimal.

A80 A paging call with up to 80 alphanumeric characters.
Defined characters: Full character repertoire of the RDS specification.

Screen 10: Traffic message channel (TMC)

```
10═══════════[ TRAFFIC MESSAGE CHANNEL (TMC, GROUP 8A) ]═══════════
┌─ Transmitter Info ──┬─── Message Information ──┬─── Cycle Information ──┐
│ Data Base.... 63    │ # of foreground mess.. 1023 │ Cycle time / DC.... 15/15 │
│ Subset....... 63    │ # of new foreg. mess... 255 │ Cycle time offset..... 15 │ (A10)
│ Version....... 3    │ # of background mess... 255 │ Total # bg. mess.... 1023 │
│ PI(ON)..... D35A    │ Mess. insert. counter... 15 │ # of fg. messages.... 255 │
└─────────────────────┴─────────────────────────┴──────────────────────────┘
SLoc:   255  Evt:    63  Ext:    11  D/P:    11                    HG  (01)
SLoc:   255  Evt:    63  Ext:    11  D/P:    11                    HGR (02)
SLoc:   255  Evt:    63  Ext:    11  D/P:    11  FLoc: 65535     HGX (03)
FLoc: 65535  Evt:  2047  Ext:  1111  D/P:   110  DA:       1     SG  (02) (B10)
FLoc: 65535  Evt:  2047  Ext:  1111  D/P:   110  CI:     111     MG1 (01)
FF:  5FF9FFE   0101 1111 1111 1001 1111 1111 1110  CI:     111     MG2 (02)
```

The decoding and the interpretation of TMC is defined in the ALERT C protocol (ALERT= Advice and problem Location for European Road Traffic). It is presupposed, that the user of this screen is familiar with this protocol. This is only a simple TMC decoder, where the TMC data is evaluated on a binary, decimal or hexadecimal base. In particular, the interpretation of the location codes needs a large data base for each country.

(A10) The system information of a TMC network can be split into 3 categories: transmitter information, message information and cycle information. With the exception of PI(ON), all other data in this section is shown in decimal.

(B10) A message will be split into its parts according to the table below. A modulo 100 counter at the right side informs, how many times the same message has been received within the last 14 TMC groups (type 8A).

Message Type	Short Location (SLoc)	Full Location (FLoc)	Event (Evt)	Extent (Ext)	Duration / Persistance (D/P)	Diversion Advice (DA)
Half group (HG)	0...255 decimal	n.a.	0...63 decimal	00...11 binary	00...11 binary	n.a.
Half group repeated (HGR)	0...255 decimal	n.a.	0...63 decimal	00...11 binary	00...11 binary	n.a.
Half group cross ref. (HGX)	0...255 decimal	0...65535 decimal	0...63 decimal	00...11 binary	00...11 binary	n.a.
Single group (SG)	n.a.	0...65535 decimal	0...2047 decimal	0000...1111 binary	000...111 binary	0...1 binary

A multi group message consists of the first (MG1) and subsequent (MGn) groups and will be split into its parts according to the type of message:

Message Type	Short Location (SLoc)	Full Location (FLoc)	Event (Evt)	Extent (Ext)	Duration / Persistance (D/P)	Continuity Index (CI)
1. Multi group (MG1)	n.a.	0...65535 decimal	0...2047 decimal	0000...1111 binary	000...111 binary	000...111 binary
n. Multi group (MGn)	-	-	-	-	-	000...111 binary

Because the optional information of the second and subsequent multi groups (MG2..5) is in free format, no statement can be done, what kind of messages are sent additional. Therefore, this information will be shown with it's continuity index in hexadecimal and binary (28 bits).

THE READY TO PRINT REPORTS

Example of a RDS report without EON

```
R D S Software Decoder for IBM AT              (C) 1989-1992 FRANKEN RDS-TEAM

       RDS Report of   SDR3          (FR 01.02.91, 18:41)            Page   1

         PI: D313      (GERMANY , SUPRA-REGIONAL)
         PS: '  SDR3  '
         TP: 1
         TA: 0
         MS: 1
        ECC: ∞∞
        PTY: (00) not used
         DI: (01) STEREO
        PIN: ∞∞∞∞∞∞∞∞∞∞∞∞∞∞
       TIME: ∞∞∞∞∞∞∞∞
       DATE: ∞∞∞∞∞∞∞∞∞∞∞∞∞∞∞∞∞∞

       RT A: ARD-Radiotext-Versuchssendung          Degerloch DS1  ∞∞∞∞∞∞∞∞∞∞∞∞∞∞
       RT B: Programm: SDR3

       DETECTED RDS GROUPS: 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
                            A  -  A  -  -  -  A  -  -  -  -  -  -  -  -  -
                            -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  B
       ------------------------------------------------------------------------
       Number of detected AF lists: 11      AF-METHOD: B

        3AF _ 98.9:    97.4_ head

        7AF _ 95.5:    92.2_ head   head_ 97.4   head_ 98.1

        9AF _ 99.9:    head» 92.2   head» 96.5   head» 97.0   99.5_ head

        7AF _ 97.0:    92.2_ head   96.5_ head   99.9» head

       13AF _ 92.2:    head_ 95.5   head_ 96.5   head_ 97.0   head_ 97.4
                       head_ 98.1   99.9» head

        7AF _ 97.4:    92.2_ head   95.5_ head   head_ 98.1

       11AF _ 96.5:    92.2_ head   head_ 97.0   head_ 98.1   head_ 99.7
                       99.9» head

        3AF _ 99.5:    head_ 99.9

        7AF _ 94.6:    head_ 96.5   head_ 99.7   99.9» head

        9AF _ 98.1:    92.2_ head   95.5_ head   96.5_ head   97.4_ head

        7AF _ 99.7:    94.6_ head   96.5_ head   99.9» head
```

This is a typical RDS report of "SDR3". The basic RDS data are shown on top of the report. It can be seen that PIN, TIME and DATE (CT) are not implemented on "SDR3". AF data is coded according to method B. There are 11 AF sublists. AF pairs in descending order are present. The string "head" indicates the frequency of the AF head on the left side. If the AF-pairs are separated with "»" instead with an underline ("_"), then this AF pair is in descending order (AF of a related programme, method B only).

The string "∞∞∞∞∞∞" is a filler code and indicates, that no data has been decoded for the corresponding entry. The formating of the file is as shown above and may be printed on a standard printer with the DOS command PRINT, COPY or TYPE.

Example of a RDS report with EON

```
R D S Software Decoder for IBM AT                (C) 1989-1992 FRANKEN RDS-TEAM

       RDS REPORT OF: ' BBC R1 '    (SA 06.04.91, 15:50)            PAGE    1

         PI: C201       (UNITED KINGDOM , NATIONAL)
         PS: ' BBC R1 '
         TP: 0
         TA: 1
         MS: 1
        ECC: xxx
        PTY: (00) not used
         DI: (01) STEREO
        PIN: 00 00:00
       TIME: 15:50
       DATE: SA 06.04.91

       RT A: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
       RT B:          BBC Radio One               Number One for Music

       DETECTED RDS GROUPS: 0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
                            A  -  A  -  A  -  A  -  -  -  -  -  -  -  A  -
                            -  B  -  -  -  -  -  -  -  -  -  -  -  -  B  -
       -------------------------------------------------------------------
       NUMBER OF DETECTED AF LISTS: 1     AF-METHOD: A

       11AF _ 97.9:    99.1_ 99.7   98.2_ 98.9   99.5_ 98.8   98.3_ 99.6
                       97.7_ 97.8

       -------------------------------------------------------------------
       NUMBER OF CROSSREFERENCED NETWORKS VIA EON: 20

       #  1 --------------------------------------------------------------
       PS: ' BBC R4 '   PI: C204          PIN: 00 00.00
       TP: 0            TA: 0             PTY: (00) not used

       Usage codes:     10       11       12       13       14       15
                     xxxxxxxx xxxxxxxx xxxxxxxx   0000     0000     0007

       AF-List ( f1:f2 = mapped AF ; f1_f2 = method A ):
       (5)  97.9: 92.7  (5)  99.1: 93.9  (5)  99.7: 94.5  (5)  98.2: 93.0
       (5)  98.9: 93.7  (5)  98.2: 92.9  (5)  99.5: 94.3  (5)  98.8: 93.5

       #  2 --------------------------------------------------------------
       PS: ' Cymru   '  PI: C417         PIN: 00 00.00
       TP: 0            TA: 0             PTY: (00) not used

       Usage codes:     10       11       12       13       14       15
                     xxxxxxxx xxxxxxxx xxxxxxxx   0000     0000     000B

       AF-List ( f1:f2 = mapped AF ; f1_f2 = method A ):
       (4)  6AF _ 93.3  (4)  94.0_ 94.2  (4)  93.5_ 94.5  (4)  96.8_FILL

       #  3 --------------------------------------------------------------
```

In the above example of "BBC R1", the EON crossreferences are shown for 2 other networks. This is only an extract of the report, because the BBC sends 20 (!) EON lists. The crossreferences are made for PS, TA, TP, AF, PIN, and PTY. It can be seen that usage code (UC) 15 is used for internal use.

All the AFs of "BBC R4" are mapped (UC 5), whereas "Cymru" has a method A AF list (UC 4). The number in brackets in front of an AF-pair [e.g. "(5) 98.9: 93.7"] displays the usage code of that pair.

THE RDS LOGIC ANALYSER

Features of the LA

With the RDS logic analyser, the user may view the contents of the sampler memory. All groups are shown in sequence as they are recorded. With the cursor functions, each group in the memory can be selected. Timing measurements can be done between a marked group and the group at the current cursor position. A FILTER function enables to skip only between a specific RDS group.

Four different modes of trigger possibilities are included. The sampler can run in single, continuous and internal trigger mode. The sampler can record up to 2100 RDS groups (≈3 minutes) of RDS data including checkbits.

The RDS Logic Analyser screen

RDS LOGIC ANALYSER

Nr.	TYPE	1	2	3	4	ASCII	Nr.	TYPE	1	2	3	4	ASCII
1278	2A	D41C	2402	6E64	6F72	ndor	1294	0A	D41C	040A	96A2	4F20	ôCO
1279	--	D41C	----	A2AF	4449	C DI	1295	2A	D41C	2407	2044	----	D4Q
1280	6A	D41C	6403	89AB	CDEF	ù$Z	1296	2A	D41C	2408	----	----	B³
1281	6A	D41C	6404	----	4567	#Eg	1297	0A	D41C	040F	A2AF	3720	C 7
1282	0A	D41C	040A	8FAF	----	O	1298	6A	D41C	6409	----	----	ù$Z
M1283	2A	----	2403	7420	----	t qa	1299	6A	----	640A	----	4567	#Eg
1284	--	D41C	----	----	6E2C	Sen,	1300	--	D41C	----	E78F	5241	φ RA
1285	0A	D41C	040F	96AF	3720	ô 7	1301	2A	D41C	2400	436F	6465	Code
1286	6A	D41C	6405	89AB	CDEF	ù$Z	1302	2A	D41C	2401	7273	7461	rsta
1287	6A	D41C	6406	0123	4567	#Eg	1303	0A	D41C	0409	8FA2	4449	CDI
1288	0A	D41C	0408	E7A2	5241	φCRA	1304	6A	D41C	640B	89AB	----	ù$So
1289	2A	D41C	2405	2050	492D	PI-	1305	6A	D41C	640C	0123	4567	#Eg
1290	2A	----	2406	436F	----	Codd	1306	0A	----	040A	----	4F20	VO
1291	0A	D41C	0409	8FA2	4449	CDI	1307	2A	D41C	2402	6E64	6F72	ndor
1292	6A	----	6407	89AB	CDEF	ù$Z	1308	2A	----	2403	7420	----	t Aa
1293	6A	----	6408	0123	4567	#Eg	1309	--	D41C	----	8FAF	3720	7

BLOCK 1	BLOCK 2	BLOCK 3	BLOCK 4
00110100 00011100	00100100 00000011	01110100 00100000	01110001 01100001

The figure above gives an example of the representation of the LA screen. Up to 32 RDS groups out of 2100 are displayed. Each group is numbered according to it's position in the sampler memory. All blocks are displayed in hexadecimal and blocks 3 and 4 are displayed in ASCII too. The block at the current cursor position is displayed additional in binary on bottom of the screen. When block 2 is errorfree, then the group type is displayed in a separate column. Faulty blocks are indicated with "----".

The menu line of the RDS LA

1 HELP 2 MODE 3 TRIG 4 TR_DLY 5 FILTER 6 [ ] 7 G_MARK 8 G_TRIG 9 [ ] 10 [ ]

The status line of the RDS LA

GROUPS: 2099	TIME: 183,825S	MODE: INT_TRIG: 15B	DLY: [_T_]	FILTER: 14A

GROUPS: Number of groups between marker and cursor.
TIME: Elapsed time between marker and cursor.
MODE: Selected trigger mode as SINGLE, INT_TRIG XX, PI-CHANGE, CONTINUOUS, EXT_TRIGGER (optional).
DLY: Selected trigger delay.
FILTER: Selected RDS group for display.