SmartGen 3.0

Professional RDS Encoder

User's Manual

CONTENTS

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Warranty Service Conditions. Warranty period

General terms

We, Deva Broadcast Ltd. - Bulgaria, Burgas, post code 8000, 65 Aleksandar Stamboliyski, do guarantee to our clients, that in the date of supply of the original product, manufactured by us, it is without defects and lacks in attitude to the advertised equipment completion and described repair. Warranty service is terminated in cases when users have obtained this product from people or dealers that are not authorized in writing to sell and distribute the products of Deva Broadcast Ltd.

Warranty period

Warranty period of any kind of equipment, produced by Deva Broadcast Ltd., is 1(one) year.

Cases of unconditional termination of warranty service

We, Deva Broadcast Ltd., do not bear responsibility and unconditionally terminate the warranty service of the delivered equipment in cases of:

- wrong operation
- negligence
- operation in conditions different from the recommended by us
- erased or removed serial number
- damaged, substituted or removed warranty stickers
- damages caused as a result of failure of other type equipment
- noted changes in the arrangement of the equipment
- noted modifications of accessories and modules of the equipment

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Service

We, Deva Broadcast Ltd., are obliged to remove the established defects and damages completely on our expense with original spare parts or their analogues, totally preserving the initial technical characteristics of the product. The delivery of the service equipment from the site to the manufacturer or an authorized repair shop is at client's expense. Deva Broadcast Ltd. bears no responsibility for omitted benefits in case of failure.

How to obtain warranty service

You have to inform us at the mentioned bellow address, telephone or e-mail not later than 30 /thirty/ days before the expiration of the warranty period. After getting into contact, you will be informed if to send us the product or it would be necessary our specialists to do a revision on the spot for the proper operation.

Changes of warranty service

No one, except the producer of this equipment, is authorized to prolong, change, or terminate the period of warranty service. The warranty period of the apparatus is not prolonged with the period it was not being used, because the need of service or repair. The warranty period of the repaired components, no matter of the reason, expires together with the period of warranty service of the whole product.

Changes

We, Deva Broadcast Ltd., preserve the right to change the design and the structure of any of our products without notice and with no obligation to make corresponding changes in products previously manufactured or already sold.

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SAFETY INSTRUCTIONS

ATTENTION!

The current voltages in this equipment are dangerous!

The personnel, engaged with this equipment,
always must observe the safety regulation!

This manual is directed to all the potentially threatened specialists engaged with mounting, maintenance, repair and service of this or other equipment. It has only and completely instructional character. The following information is not complete and reliable for getting qualified training in giving first aid. Such qualification can be obtained only after successfully finishing of special trainings in giving first aid.

Deva Broadcast Ltd. is not responsible for injuries or damages, caused as a result of the improper procedures or manipulations over the equipment, by a person, not trained for such a purpose.

Before starting work, the people performing with this equipment must be familiar with the fire alarm, local communications, as well as the safety requirements.

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ATTENTION!

Always disconnect from the main power supply
before opening covers, doors, enclosures, gates, panels or shields

Always use preventives as rubber gloves, rubber covers and others,
used for work at high voltage.

Never start doing internal adjustment,
do not perform maintenance or service
in case of fatigue or bad concentration.

Do not eliminate tamper circuits of RACK cabinets, covers or shields when manipulating with the equipment. Do not approach too closer to the operating nearby apparatuses, except it is not extremely indispensable. Do not touch components and circuits that you are not familiar with, or you are not sure they are fool-proofed.

ATTENTION!

In case of emergency immediately disconnect the main power supply!

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TREATMENT OF ELECTRICAL SHOCK

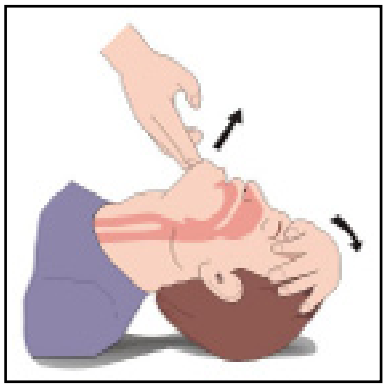
1. If the victim is not responsive

give a first aid, following the pictures A, B and C.

PLACE VICTIM ON HIS BACK ON A HARD AND FLAT SURFACE. CHECK IF HE HAS NOT SWALLOWED HIS TONGUE. IN SUCH A CASE USE A HARD OBJECT IN ORDER TO OPEN HIS JAWS AND TAKE OUT THE TONGUE TO PREVENT SUFFOCATION.

! CALL FOR MEDICAL ASSYSTENCE AS SOON AS POSSIBLE !

A - AIRWAY



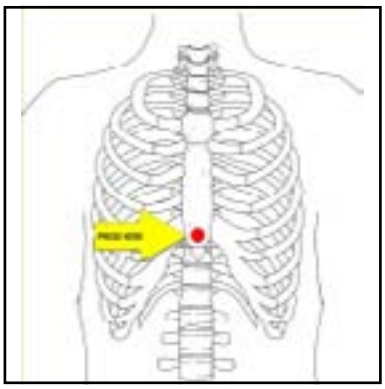
If unconscious, open airway lift up neck, push forehead back, clear out mouth if necessary, observe for breathing.

B - BREATHING

If not breathing, begin artificial breathing. Tilt head, pinch nostrils, make airttght seal, 4 quick full breaths. Remember mouth to mouth resuscitation must be commenced as soon as possible.

C - CIRCULATION

Check cordial pulse. If pulse is missing, begin artificial circulation.



1. In case the rescuer is alone he must simulate in 80 sec 10 compressions, then immediately 2 quick breaths.
2. If the rescuers are two they must simulate in 60 sec, compressions and an artificial breath at each 5 circulations.

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2. If the victim is responsive:

- Keep the victim warm
- Keep quiet near the victim
- Loosen the clothing
- Loosen the waist-band and the preventives

First aid

All the specialists and personal, engaged with installation, operation and servicing of the equipment, must pass through a special training in giving first aid in case of employment accident. The following information is not complete for proper acting in case of incident. They are short and have to be considered as recommendations.

It is a duty of ALL the personnel to become prepared to give adequate Emergency First Aid.

Such training is necessary in order to avoid employment accident or to know how to act if it occurs. This information might save your life or the life of your colleagues.

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TREATMENT OF ELECTRICAL BURNS

1. In cases of serious burns:

- Do not cover the wound with clothes
- Do not break blisters
- Remove adhered particles
- If there is an appropriate ointment, apply it on the wound
- Do not forget that the victim is in shock
- Arrange transportation to a hospital as soon as possible
- If arms or legs are effected keep them elevated

IMPORTANT:

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and ½ level teaspoonful of baking soda to each quart of water. Allow victim to sip slowly about half a glass over a period of 15 minutes. Discontinue fluid if vomiting occurs.

2. Less severe burns (1st & 2nd degree):

- Apply cool (not ice cold) compress using the cleansed available cloth article
- Do not break blisters
- Remove adhered particles
- If there is an appropriate ointment, apply it on the wound
- If arms or legs are effected keep them elevated
- Arrange transportation to a hospital as soon as possible

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OVERVIEW

1.1. Introduction

The “Radio Data System”

The Radio Data System allows the FM broadcaster to transmit certain basic digital data along with his regular audio programming. Packets of data transmitted on a low-level subcarrier identify the station and its particular broadcasting ‘format’, allow for transmission of advertising or other text messages, and perform additional identification, control and housekeeping chores.

RDS vs. RBDS

The Radio Data System was developed in Europe and is abbreviated RDS there. The first US implementation of RDS differed sufficiently from the European standard to warrant its being renamed the Radio *Broadcast* Data System, or RBDS. Differences between the two standards have been reconciled and minimized over the years, yet RBDS prevails as the US designation. For the sake of clarity and simplicity, the more generic and established term RDS will be used throughout this Manual.

General

SmartGen 3.0 is a complete, ‘full-function’ digital data encoder for quickly and easily implementing RDS at any FM radio station. In addition to static IDs, traffic and other ‘flags’, SmartGen supports dynamic data for sending song titles, advertising messages and specialized “in-house” applications to the listener’s radio.

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Features

Leading features of the SmartGen 3.0 include:

• "Static" data quickly programmed or updated with a PC or ASCII terminal. ASCII standardized interface supports "dynamic" functions.

• Works with popular hard-disk automation systems to transmit song titles, contests, billboards, scrolling advertisements, etc.

• Loop-through or 'sidechain' operation with any exciter/stereo generator combination.

• Operates with third-party hardware and software for increased functionality.

• Simple to install and easy to use!

1.2. Presentation

In the development of SmartGen 3.0 are used a grate range of high-tech components and products, produced by leading in this field manufacturers. An extremely presence in the schematic solutions of the device have the components of the producers ANALOG DEVICES, HEWLET-PACKARD, MICROCHIP, PHILIPS and MOTOROLA.

The peripheral and serving chains are extremely based on elements produced by the leaders in this sphere - Philips Semiconductors and the company which became very popular in the middle of the 90is - Microchip. This allows the creation of one well organized and friendly to use interface, through which could be managed and controlled a grate number of the system parameters. The visual control is built through proper LCD indicators from the German company ELATEC GmbH.

The final result from the combination of all described blocks and components is one product, collected in it completely innovative solutions for achieving best indices.

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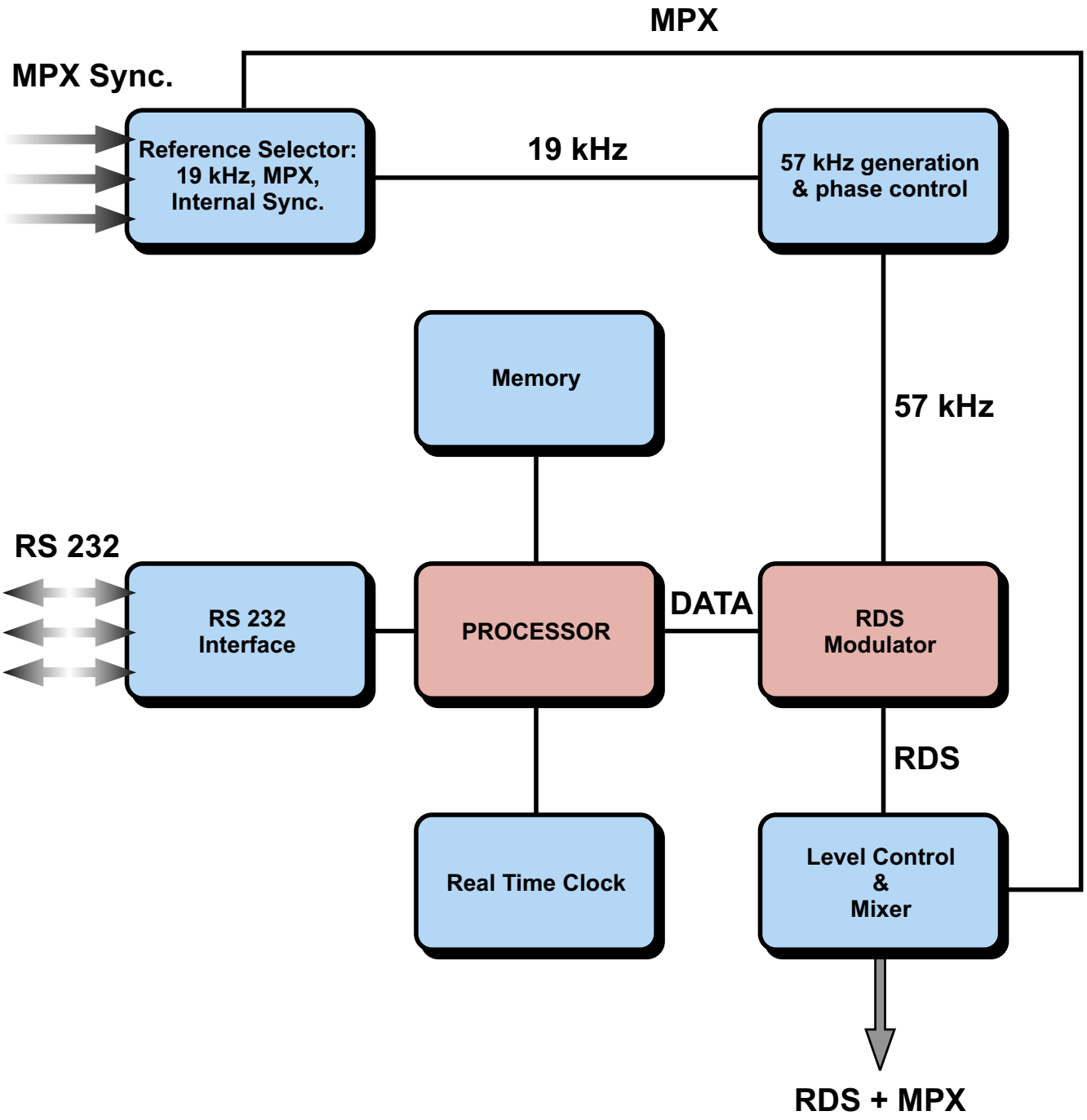
Block Diagram



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APPLICATIONS SUPPORTED

The following is an alphabetical listing of RDS applications that are fully supported by the SmartGen 3.0. The standardized RDS application abbreviation is followed by an expansion of the application name and a short explanation of the function.

3.1. AF

List of Alternative Frequencies: A "network" broadcaster, or one with low-power rebroadcast transmitters to fill holes in his coverage area, can include a list of all frequencies where the identical program can be heard simultaneously. The RDS receiver (particularly the upscale car radio) constantly searches for the best signal that carries the very same program. When a better signal is found, the radio re-tunes with no noticeable interruption. The principal utility of this RDS function is with European radio networks and US stations with 'translators'. Refer to Appendix B.

3.2. DI

Decoder Information: This is one of several 'flags' that convey yes/no or other very basic data. This particular flag tells the receiver whether the broadcast is monaural, or is being transmitted in any of several methods of stereo or binaural broadcasting. As many as 16 encoding options may be accommodated! This is a rather esoteric function and, thus far, remains unused both in Europe and in the US.

3.3. M/S

Music / Speech Switch: The Music/Speech switch defines the station's primary programming. An all-talk, all-news or all-sports station might set this to SPEECH, though MUSIC will be the setting of choice for most FM broadcasts.

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3.4. PI

Program Identification: This block of data identifies the broadcast station with a hexadecimal numerical code, which becomes the "digital signature" of the station. The code is assigned by the broadcasting authority in some countries, and in the US is calculated from a numerical encoding of station call letters. The receiver processes the PI code to assist automatic tuning features (station memories), and to prevent false switching to alternative frequencies that might be shared by broadcasters in nearby regions.

3.5. PS

Program Service Name: This is the station's "street name" that will appear on the receiver faceplate display. The PS can be up to eight characters in length (including spaces) and can be as simple as the station's call letters (KWOW or KWOW FM) or a slogan (NEWSTALK or LIVE 95). The Program Service Name is automatically displayed, even on automobile receivers, so it is meant to remain 'static.' Because of driving safety considerations, broadcasters are discouraged from making the PS 'dynamic'; that is, to alternate it between different entries. As a matter of fact, it is a violation of both the CENELEC and the NRSC standards to flash or scroll the PS display. Nevertheless, this nefarious practice is becoming more and more common.

3.6. PTY

Program Type: The PTY data flag identifies the station format from a collection of pre-defined categories. Many RDS receivers are able to seek the listener's preferred format automatically. This means that a car radio can switch from a fading station to a stronger one that carries the same *variety* of music, though not the very same program, as provided by AF switching. The PTY function of RDS helps a broadcaster catch 'transient audience' share. A listing of the PTY categories is given in Appendix C.

Under some programming circumstances, the PTY identifier may be made 'dynamic,' changing between categories for a station that "dayparts" (changes its format for specific time periods). The PTY code is not meant to change from song to song or to accommodate a top-of-the-hour newscast, however.

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3.7. RT

Radiotext: This is a 64-character block of plain text that the listener can select for visual display on the faceplate of the radio. This function is generally not available on automobile receivers for safety considerations, which has precipitated the frownedupon practice of scrolling the PS field instead. Most radios have limited alphanumeric display capability, so the 64 characters 'march' across the front panel, much akin those annoying LED advertising signs found in airport buses or fast food emporia. Like the scrolling PS implementation, Radiotext can announce song titles and performers, run special promotions or contests, or broadcast sponsors' messages

3.8. TA

Traffic Announcement: This is a *temporary* flag added to the RDS data stream *only* as a traffic bulletin is being aired. Some RDS car radios can be set to search for traffic bulletins among various TP stations (see TP below) while tuned to a listener's preferred program, or even while playing a tape or CD. As soon as any TP station broadcasts a traffic bulletin, the receiver *temporarily* switches-over to receive it. When the bulletin is finished, the receiver switches back to the original program, tape or CD.

3.9. TP

Traffic Program Identification: The TP flag identifies the station as one that routinely broadcasts traffic bulletins for motorists as part of its normal, everyday programming. When the TP flag is displayed on the receiver faceplate, the radio is searching for traffic announcements. The radio keeps track of TP stations offering this service to speed up the search-and-switch process.

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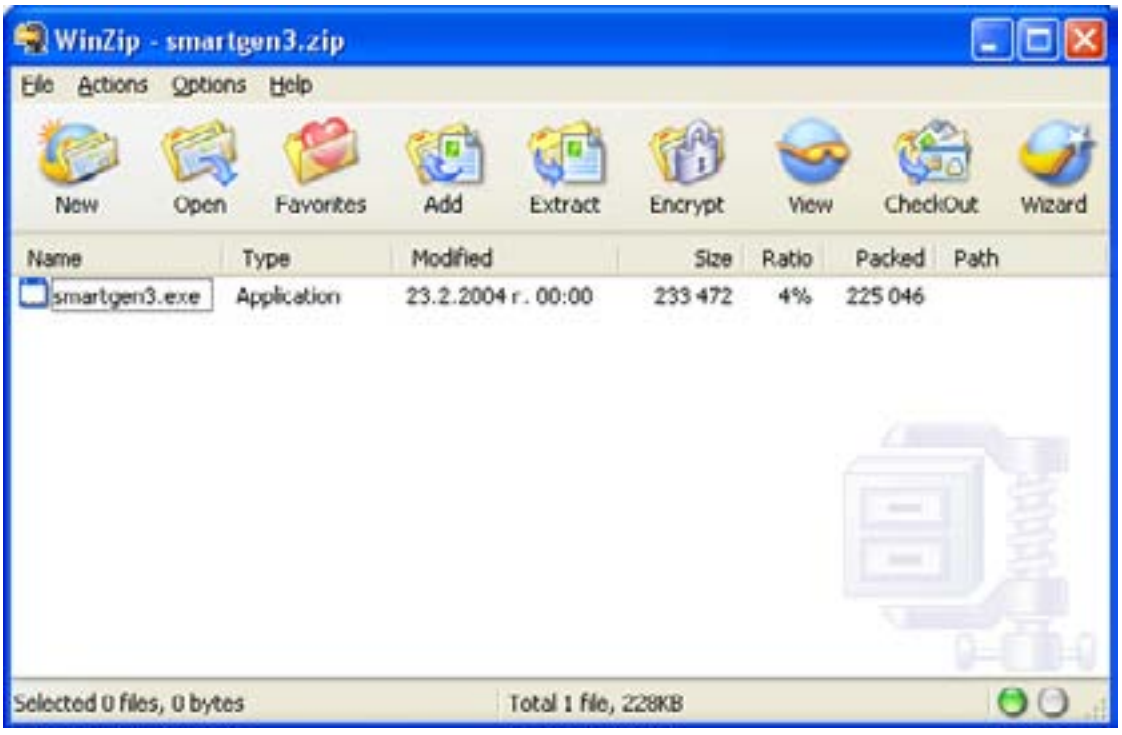
PROGRAMMING THE ENCODER

Software provided with the SmartGen 3.0 RDS Encoder runs under any version of Microsoft Windows® on IBM-compatible PCs. The computer and encoder communicate via the *RSR 232*.

4.1. Installing the Software

The software must be extracted from provided archive SmartGen3.zip into any user-specified directory. The use of WinZip is recommended or any compatible program. Archive contains one file as shown below:



After extraction execute smartgen3.exe.

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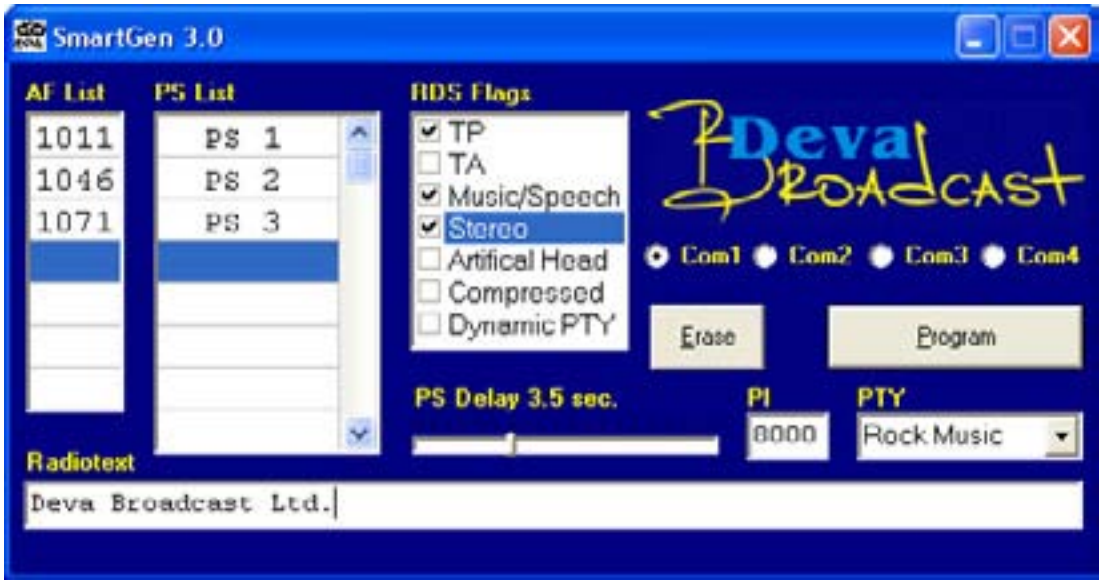
4.2. Data entry



4.2.1. AF List

Refer to Appendix B.

Note: AF value must be in kHz i.e. multiply value from Appendix B by 100.

4.2.2. PS List

Up to 30 PS Fields may be entered for broadcasting.

4.2.3. Parameters

TP: When the TP flag is set, the station broadcasts traffic announcements.

TA: This is a *temporary* flag added to the RDS data stream *only* as a traffic bulletin is being aired

MS: When checked the RDS flag MS is set to MUSIC. Otherwise MS is set to SPEECH;

PI: "digital signature" of the station;

PTY: Identifies the station format from a collection of pre-defined categories. Refer to Appendix C.

PS Delay Time: Defines the display delay between two PS Fields.

Radiotext: 64-character block of plain text that is broadcasted to the listener.

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4.3. Sending Data to Encoder

First choose on which port SmartGen 3.0 is connected. There are no other additional configurations for the port.

By pressing the **Program** button all entered data is stored into encoder.

4.4. Erasing All Data stored into Encoder

All stored data in SmartGen 3.0 could be erased by pressing Erase button.

Be careful erased data can't be restored in any way!

This option is used mostly for test purposes.

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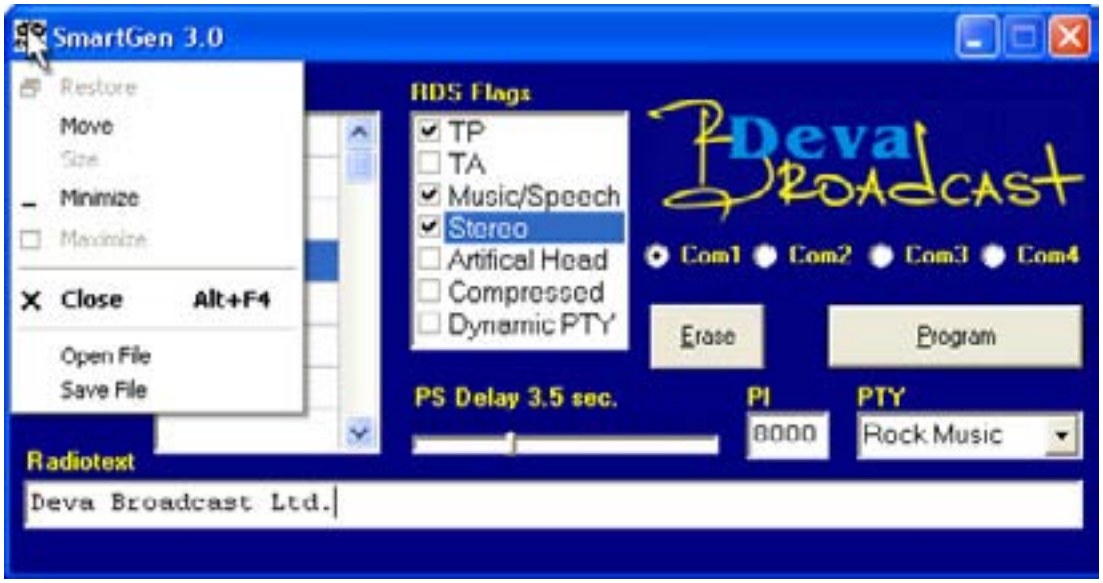
4.5. File Management

All the RDS programming information that is put into the data entry screen may optionally be saved as a file. This is useful when various programming segments throughout the broadcast day have program-specific RDS messaging, or to change advertising or station promo messages within a programming segment at random.

Data on the screen may be saved as a file either before, after, or instead of sending the information to the encoder.



Clicking on: Save File will prompt you for a location for the file, which will have a .rds extension. The file may be named in keeping with its content and stored on the computer Desktop or a dedicated folder.

To import a saved .rds file onto the screen, click on Open File. Browse to the Desktop or to a folder where the .rds file has been saved, and then double-click the file. This brings the RDS programming information onto the screen where it then can be sent to the Encoder with the Program button.

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INSTALLATION

5.1. Basic principles

The chapter contains detailed information concerning the correct assembly of the system. It is an obligatory condition for the achievement of perfect results. In order to obtain the optimum indices of functioning is necessary the instruction for the assembly to be fulfilled step by step and strictly observed.

5.2. Unpacking of the system

The equipment set consists of the following components:

- 1 indoor block
- user's manual
- software
- advertising CD-ROM containing information for the company – producer, catalogues

At the delivery check totality of the package. Check for the availability of all above described components. In case of missing inform the producer immediately.

5.3. Requirements

It is necessary before starting installation of the product to check if all necessary conditions for non problematic work of SmartGen are available.

The final choice of mounting point for any of the modules should be in conformity with the security of the specialists and the minimum risk of employment accident. Obligatory condition before starting the mounting is the technicians engaged in it to be instructed in order to avoid dangerous situations and risks.

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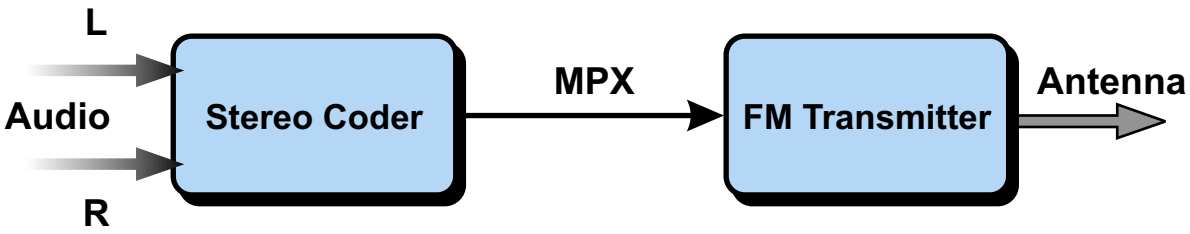
5.4. Installation of the connecting cables

After choosing the best place for installation you have to prepare the power supply cables and RF cables to be mounted. It is necessary all the cable paths to be safety and easy accessible for the cable installation. An obligatory condition for avoiding possible employment accidents is the strictly observing of the safety work regulations.

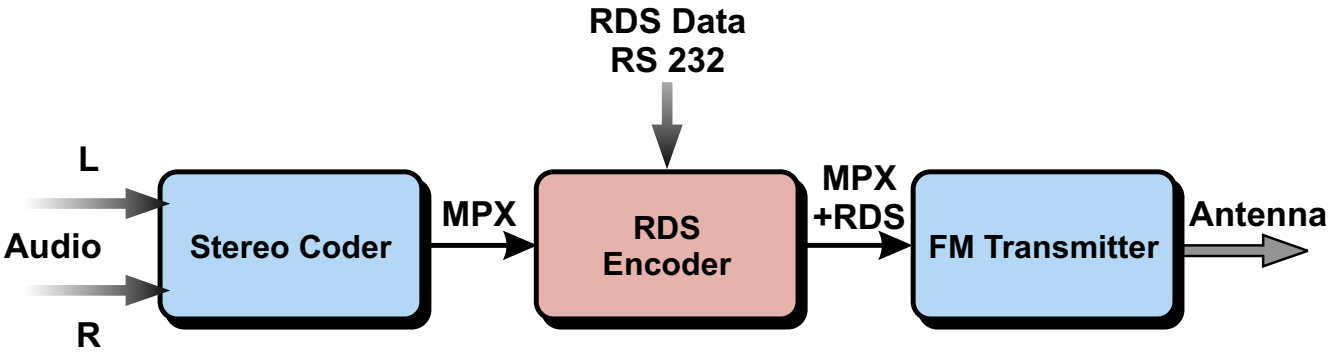
5.5. Indoor unit

The internal modules of the SmartGen are projected and intended to be mounted on 19“ RACK. The iron cramps for mounting are not included in the SmartGen accessories. After the installation of the modules is obligatory their connection with an earth rim.

5.6. Sample Installation Diagram



Standard FM Transmitter



FM Transmitter with RDS Encoder

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TECHNICAL SPECIFICATION

6.1. Technical Parameters

RDS/RBDS signal	
Sub-carrier	57 kHz (±3Hz)
Phase adjustment	±180°
Output level	-60dBu to 0dBu
Spectral purity	conform to CENELEC standard
Bandwidth	±2,4kHz (60dB)
SYNC/MPX connector input signal	
Connector asymmetrical	BNC
Max nominal input signal	+12dBu
Peek input signal	18dBu allowed
Max input signal	+22dBu
Pilot frequency	19000Hz ±3Hz
Recommended	19000Hz ±1Hz
Retransmission gain	±1dB DC-100kHz
RDS output signal	
Connector asymmetrical	BNC
Output impedance	100 ohms
Custom impedance	by request
Typical load impedance	>500 ohms
	<100 pF
THD	<0,02% (f=10kHz)
THD	<0,04% (f=57kHz)
Communication interfaces	
Set up port	COM0 RS232/TTL
EBU port	COM0 RS232/TTL
speed (baud)	1200 to 9600
parity	even, odd, none
TA control	yes by external switch
Miscellaneous data	
Temperature (operating)	0° to 55°
Storage	-40° to +80°C
Humidity class F	DIN40040
EMC CENELEC	EN5022
Generic standards	
EMC Immunity	10V/m
EMC test laboratory	TDF C2R
Supply voltage	230V
Tolerance on supply voltage	±20%
Supply frequency	45-65 Hz
Power supply filter	yes
Power consumption	8 VA approx.
Software reprogramming	yes
Weight	2100g without packaging and cable
Length/width	19" (483mm)
Height	1U (44,5mm)
Depth	130mm

Remark: All data in this sheet are the guarantied values. Any device corresponds to the described data.

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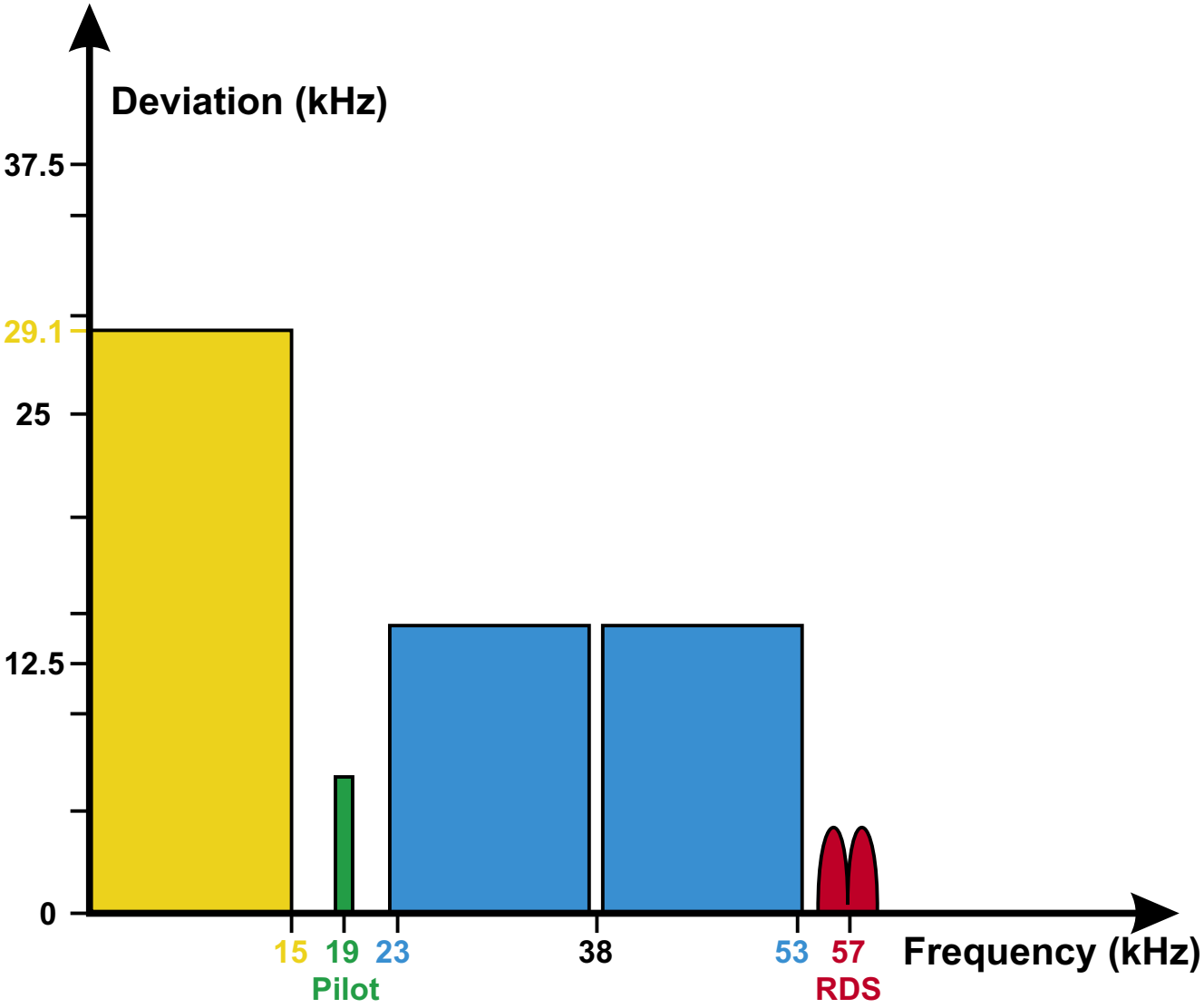
6.2. MPX Spectrum



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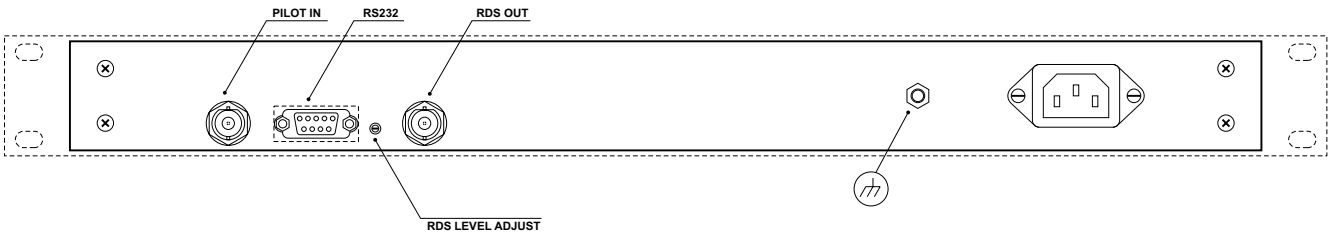
Technical Drawings & Adjustments

7.1. Front View

7.2. Rear View



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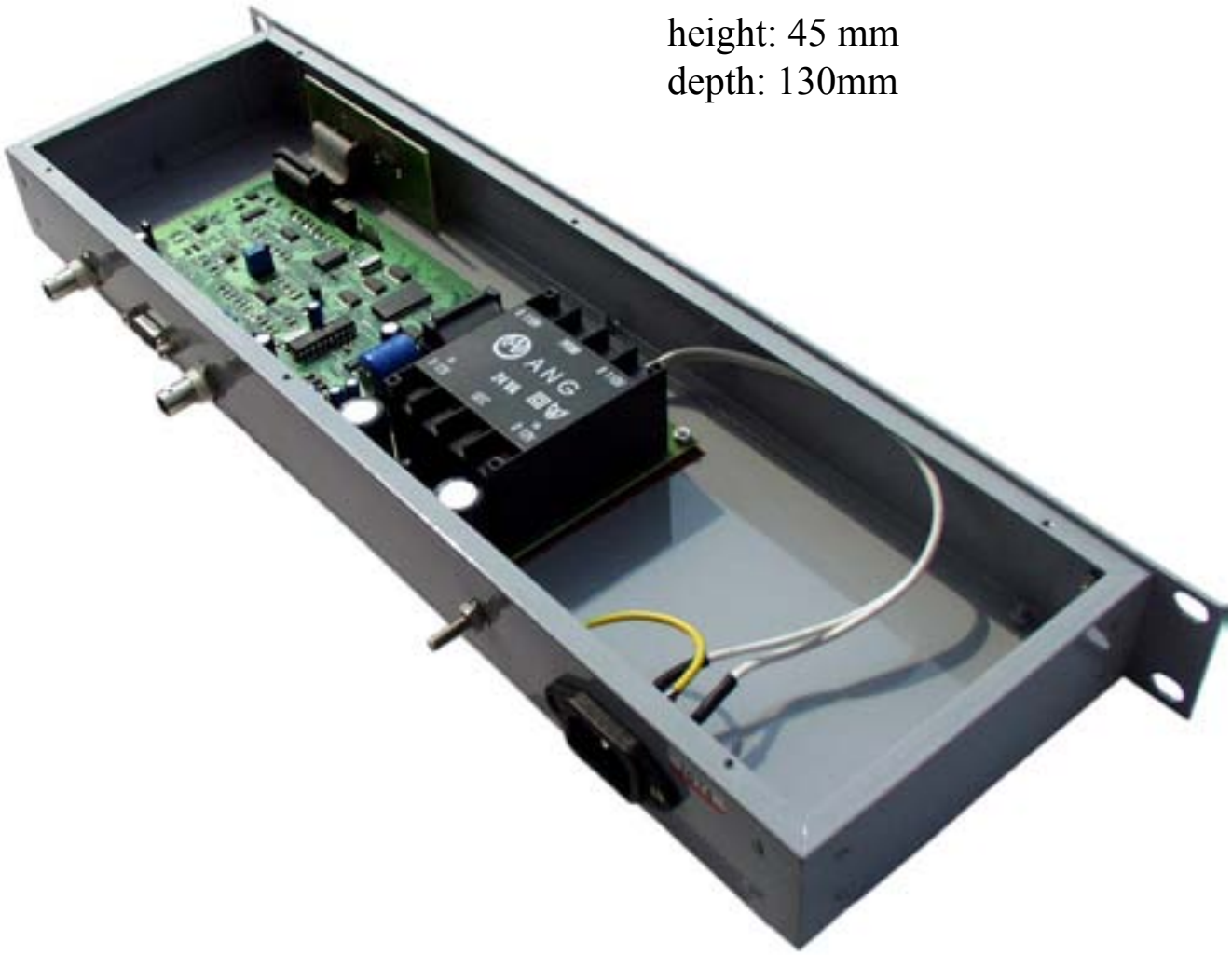
APPENDIX A

Clearance

RACK cassette with dimensions
1 U,
width: 485mm
height: 45 mm
depth: 130mm



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APPENDIX B

Alternative frequency channels begin with Channel 1 at 87.6MHz, and go in 100kHz increments up to Channel 204 at 107.9MHz. The following table converts frequency to AF channel numbers.

MHz	Chan	MHz	Chan	MHz	Chan	MHz	Chan	MHz	Chan	MHz	Chan
87.60	1	91.00	35	94.40	69	97.80	103	101.20	137	104.60	171
87.70	2	91.10	36	94.50	70	97.90	104	101.30	138	104.70	172
87.80	3	91.20	37	94.60	71	98.00	105	101.40	139	104.80	173
87.90	4	91.30	38	94.70	72	98.10	106	101.50	140	104.90	174
88.00	5	91.40	39	94.80	73	98.20	107	101.60	141	105.00	175
88.10	6	91.50	40	94.90	74	98.30	108	101.70	142	105.10	176
88.20	7	91.60	41	95.00	75	98.40	109	101.80	143	105.20	177
88.30	8	91.70	42	95.10	76	98.50	110	101.90	144	105.30	178
88.40	9	91.80	43	95.20	77	98.60	111	102.00	145	105.40	179
88.50	10	91.90	44	95.30	78	98.70	112	102.10	146	105.50	180
88.60	11	92.00	45	95.40	79	98.80	113	102.20	147	105.60	181
88.70	12	92.10	46	95.50	80	98.90	114	102.30	148	105.70	182
88.80	13	92.20	47	95.60	81	99.00	115	102.40	149	105.80	183
88.90	14	92.30	48	95.70	82	99.10	116	102.50	150	105.90	184
89.00	15	92.40	49	95.80	83	99.20	117	102.60	151	106.00	185
89.10	16	92.50	50	95.90	84	99.30	118	102.70	152	106.10	186
89.20	17	92.60	51	96.00	85	99.40	119	102.80	153	106.20	187
89.30	18	92.70	52	96.10	86	99.50	120	102.90	154	106.30	188
89.40	19	92.80	53	96.20	87	99.60	121	103.00	155	106.40	189
89.50	20	93.90	54	96.30	88	99.70	122	103.10	156	106.50	190
89.60	21	93.00	55	96.40	89	99.80	123	103.20	157	106.60	191
89.70	22	93.10	56	96.50	90	99.90	124	103.30	158	106.70	192
89.80	23	93.20	57	96.60	91	100.00	125	103.40	159	106.80	193
89.90	24	93.30	58	96.70	92	100.10	126	103.50	160	106.90	194
90.00	25	93.40	59	96.80	93	100.20	127	103.60	161	107.00	195
90.10	26	93.50	60	96.90	94	100.30	128	103.70	162	107.10	196
90.20	27	93.60	61	97.00	95	100.40	129	103.80	163	107.20	197
90.30	28	93.70	62	97.10	96	100.50	130	103.90	164	107.30	198
90.40	29	93.80	63	97.20	97	100.60	131	104.00	165	107.40	199
90.50	30	93.90	64	97.30	98	100.70	132	104.10	166	107.50	200
90.60	31	94.00	65	97.40	99	100.80	133	104.20	167	107.60	201
90.70	32	94.10	66	97.50	100	100.90	134	104.30	168	107.70	202
90.80	33	94.20	67	97.60	101	101.00	135	104.40	169	107.80	203
90.90	34	94.30	68	97.70	102	101.10	136	104.50	170	107.90	204

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APPENDIX C

Listing of the PTY Categories

PTY	US (NRSC)	EUROPE (CENELEC)
0	None	None
1	News	News
2	Information	Current Affairs
3	Sports	Information
4	Talk	Sports
5	Rock Music	Education
6	Classic Rock Music	Drama
7	Adult Hit Music	Culture
8	Soft Rock Music	Science
9	Top 40 Music	Varied
10	Country Music	Pop Music
11	Oldies Music	Rock Music
12	Soft Music	Easy Listening Music
13	Nostalgia Music	Light Classics Music
14	Jazz	Serious Classics Music
15	Classical Music	Other Music
16	Rhythm and Blues Music	Weather
17	Soft R and B Music	Finance
18	Foreign Language	Children’s Programs
19	Religious Music	Social Affairs
20	Religious Talk	Religion
21	Personality	Phone-In
22	Public Non-Commercial	Travel
23	College	Leisure
24	(unassigned)	Jazz Music
25	(unassigned)	Country Music
26	(unassigned)	National Music
27	(unassigned)	Oldies Music
28	(unassigned)	Folk Music
29	Weather	Documentary
30	Emergency Test	Alarm Test
31	Emergency!	Alarm!

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