















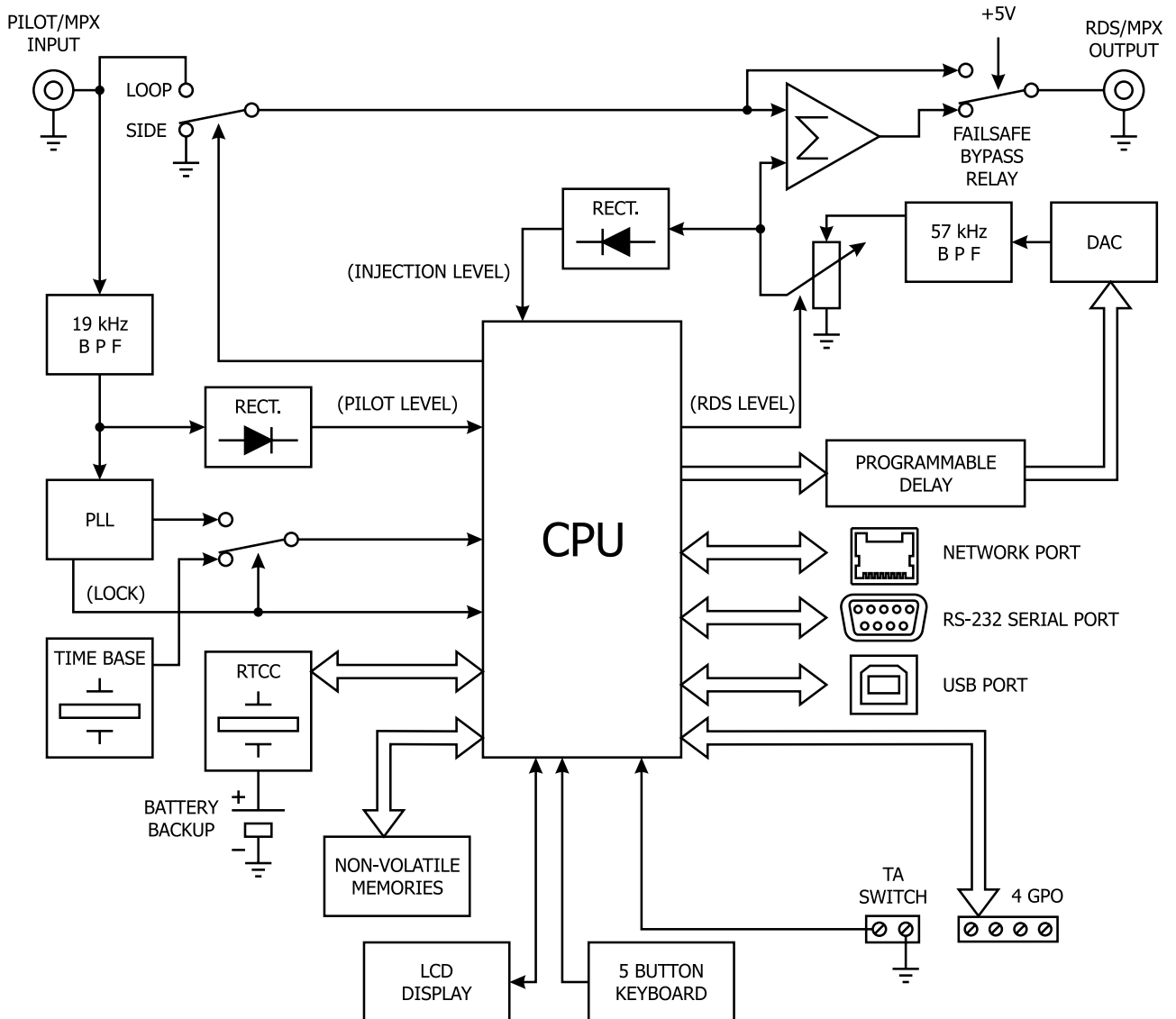




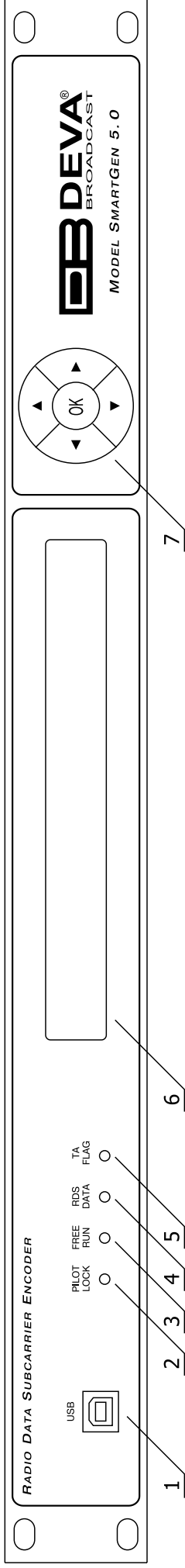


|  |  |
|--|--|
| Auto “parses” long messages for best text display      | Yes  |
| Scrolling by character                                 | from 1 up to 8                                   |
| Scrolling by word, Auto centering, Truncate long words | Yes  |
| <b>COMMUNICATION</b>                                   |  |
| Communication Interfaces                               | RS232, USB, LAN                                  |
| Connection with Automation Software                    | Yes  |
| Network Connectivity                                   | 2 TCP ports; 2 UDP ports                         |
| Scheduler  | Yes  |
| Configuration  | Embedded Web Server<br>SmartGen Encoders Manager |
| Password Protection                                    | Yes  |
| ASCII Protocol   | Yes  |
| UDP, TCP, HTTP, SNTP                                   | Yes  |
| Supported Network Protocols:                           | HTTP, SNTP, UDP, TCP, UPnP                       |
| UECP Protocol  | Fully compliant with EBU SPB490 Ver.7.05         |
| PI <=> CALL Calculator                                 | Yes  |
| Remote Display   | Yes  |
| Supplied with Intuitive Software                       | Yes  |
| Comes with 2-years Limited Warranty                    | Yes  |
| <b>OPERATING CONDITIONS</b>                            |  |
| Temperature  | -15°C to 55°C                                    |
| Humidity   | < 95%, non-condensing                            |
| Altitude   | 0 to 5000m above sea level                       |
| <b>POWER</b>   |  |
| Voltage  | Internal, 115V or 230V                           |
| Power Consumption                                      | 10VA   |
| Connector  | IEC320, Fused and EMI-suppressed                 |
| <b>SIZE AND WEIGHT</b>                                 |  |
| Dimensions (W;H;D)                                     | 485 x 44 x 180 mm                                |
| Shipping Weight  | 540 x 115 x 300 mm / 2.445 kg                    |

## BLOCK DIAGRAM

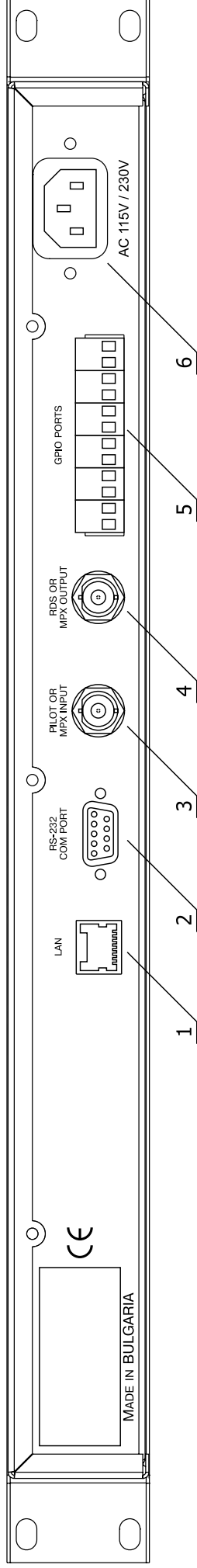


## FRONT PANEL



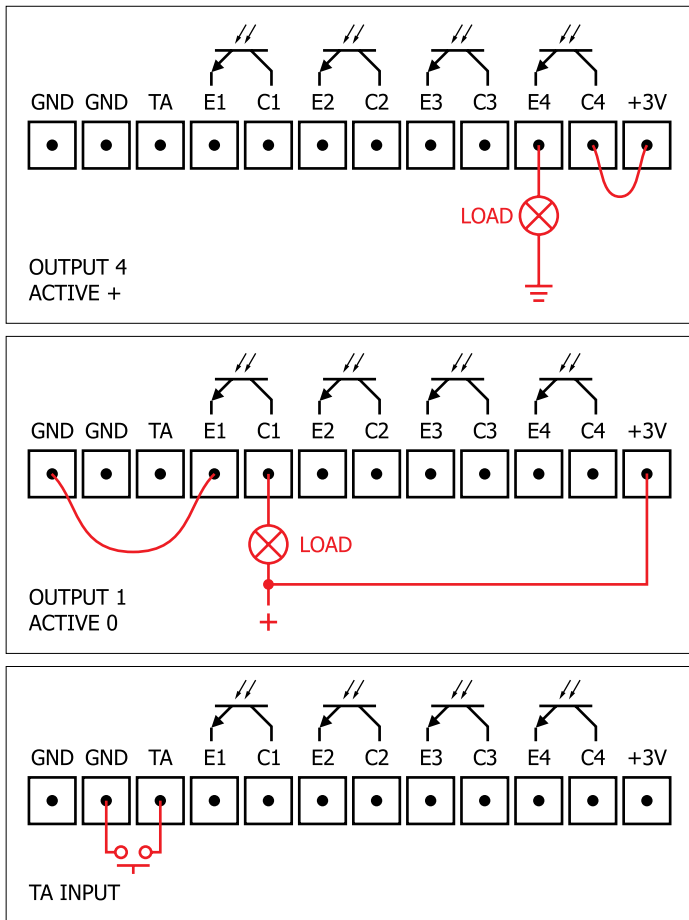
- 1. USB Connector** - B-Type, for interconnection with PC
- 2. PILOT LOCK** - This LED lights when the encoder has locked to the 19kHz stereo pilot signal from the stereo generator, either in the sidechain or the loop-through mode of encoder operation.
- 3. FREE RUN** - Will be lit when no 19kHz pilot is present at the PILOT OR MPX INPUT, and the synchronization source is set to “Auto”, the encoder defaults to a crystal-controlled internal timebase. This enables RDS transmissions with monaural programming. When synchronization source is set to “Internal”, the FREE RUN led blinks every second.
- 4. RDS DATA** - This LED flashes dimly as RDS data is being transmitted, serving as an indication that the encoder is operating normally. When synchronization source is set to “External”, and no 19kHz pilot is present at the PILOT OR MPX INPUT, the LED flashes with period of four blinks per second to indicate the absence of RDS signal at the encoder’s output. If the RDS output is set to OFF. The LED will not be lit.
- 5. TA FLAG** - This LED flashes whenever the TA flag is raised, either with a software command or with a switch closure. **REMEMBER:** the TA flag is only temporary. It must be turned off as soon as the announcement ends.
- 6. LCD Display**
- 7. Navigational Buttons** – UP and DOWN, LEFT and RIGHT and OK buttons are used to navigate through the LCD menus selecting various functions and parameters.

## REAR PANEL



- 1. LAN** - RJ-45 TBASE10 connector for TCP & UDP connections;
- 2. RS-232 COM PORT** - DB-9 Female connector, for interconnection with PC or automation
- 3. RDS/MPX INPUT** - BNC Connector for RDS/MPX input signal
- 4. RDS/MPX OUTPUT** - BNC Connector for RDS/MPX output signal
- 5. GPIOD PORTS** - General Purpose Ports
- 6. MAINS CONNECTOR** - AC 115V/230V, IEC-320 type

## REAR PANEL GENERAL PURPOSE PORTS



### Electrical Characteristics of Optocouplers

- $V_{ec} < 6V$
- $V_{ce} < 70V$
- $I_c < 50mA$
- $P_d < 150mW$

## Safety Warning

### **ALWAYS OBSERVE THE SAFETY PRECAUTIONS.**

Careful observance of the safety precautions will help prevent physical injury, damage of the equipment, and extend the equipment life.

- The servicing of electronic equipment should be performed only by qualified personnel;
- Before removing the covers the unit must be switched off and the mains cable unplugged;
- When the equipment is open, the power supply capacitors should be discharged using a suitable resistor;
- Never touch the wires or the electrical circuits;
- Use insulated tools only;
- Never touch the metal semiconductor. They might carry high voltages;
- For removing and installing electronic components, follow the recommendations for handling MOS components.
- Do not remove the factory sticker from the equipment. It contains information as regards the name, serial number and MAC address of the device.
- To join the equipment to the mains supply, use the power cord purchased with the equipment.

## Operating Recommendations

To ensure normal operation of the DEVA unit, we recommend following the instructions listed below.

- Install the unit in places with good air conditioning. The unit is designed to operate within the ambient temperature range of 10 to 50°C. The equipment rack should be ventilated in order for the device to keep its internal temperature below the maximum ambient temperatures;
- We do not recommend installation in rooms with high humidity, dusty places or other aggressive conditions;
- Although the device is intended to be installed closed to exciters or transmitters, we do recommend the device to be located away from abnormally high RF fields.
- Use only checked power supply cables. We strongly recommend the usage of shielded cables;
- Connect the DEVA unit to reliable power supply sources only. In case of unstable power supply, please use Uninterruptible Power Supply (UPS);
- Use the device only with its top cover on to avoid electromagnetic anomalies. Otherwise, this may cause problems with the normal functionality of the unit;
- To ensure normal remote operation of the unit, make sure to connect the device to a good quality Internet connection;
- For the normal operation of your DEVA device, check if the network settings past through all the required data traffic.

## Unpacking and inspection

Upon receipt, the equipment should be inspected for possible shipping damages. If such are found or suspected, notify the carrier at once and contact DEVA Broadcast Ltd. The original shipping carton box and packing materials should be kept for possible reuse, in case of return for Warranty repair, for example. Shipping damages as a result of improper packing for return may invalidate the Warranty!

**The packing material (plastic bags, polystyrene, nails, etc.) must never be left within reach of children, as these items are potential sources of danger.**

**IT IS VERY IMPORTANT** that the [“Product Registration Card”](#) included in the Manual be completed accurately and returned. This will assure coverage of the terms of the Warranty and it will provide a means of trace in case of lost or stolen equipment. In addition, the user will automatically receive SERVICE OR MODIFICATION INSTRUCTIONS from DEVA Broadcast Ltd.

## Mounting

### **RACK REQUIREMENTS 1U**

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The unit mounts in a standard 19-inch equipment rack and requires only 1 $\frac{3}{4}$  inches (1U) of vertical rack space. In order the painted finish around the mounting holes to be protected, the use of plastic washers is recommended.

### **RACK REQUIREMENTS COMPACT UNITS**

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Our customized 1U 19-inch rack accessory provides a professional mounting option for up to three compact size DEVA units. It is made of milled aluminum and finished in black powder coat. Two extra blanking panels and set of mounting screws are provided with each rack bracket kit.

### **STAND-ALONE DEVICES**

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DEVA's stand-alone units (Radio Explorer series, BandScanner series, DVB Explorer) do not require additional tools or installation brackets.

## AC Mains Power

### FUSE HOLDER

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The fuse holder is placed inside the unit, next to the voltage selector. Apply downward pressure and pull the cap outward to access the 5mm mains fuse. The reverse process will release the cap.

### MAINS VOLTAGE SELECTOR

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Before connecting the AC Power, make sure that the internal Power Switch is in accordance with the mains supply at your location. The Power Supply Factory Settings are:

- 100 - 240 VAC
- 1 Amp Fuse

**CAUTION:** Permanent damage will result if improper AC supply voltage is applied to the device. The warranty DOES NOT cover damages caused by applying improper supply voltage or usage of improper fuse.

### POWER CORD

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The detachable IEC-type power cord is supplied with the unit. The individual cord conductors may be color-coded in either of two ways:

- 1) In accordance with US standards:  
BLACK = AC "HOT"  
WHITE = AC NEUTRAL  
GREEN = EARTH GROUND

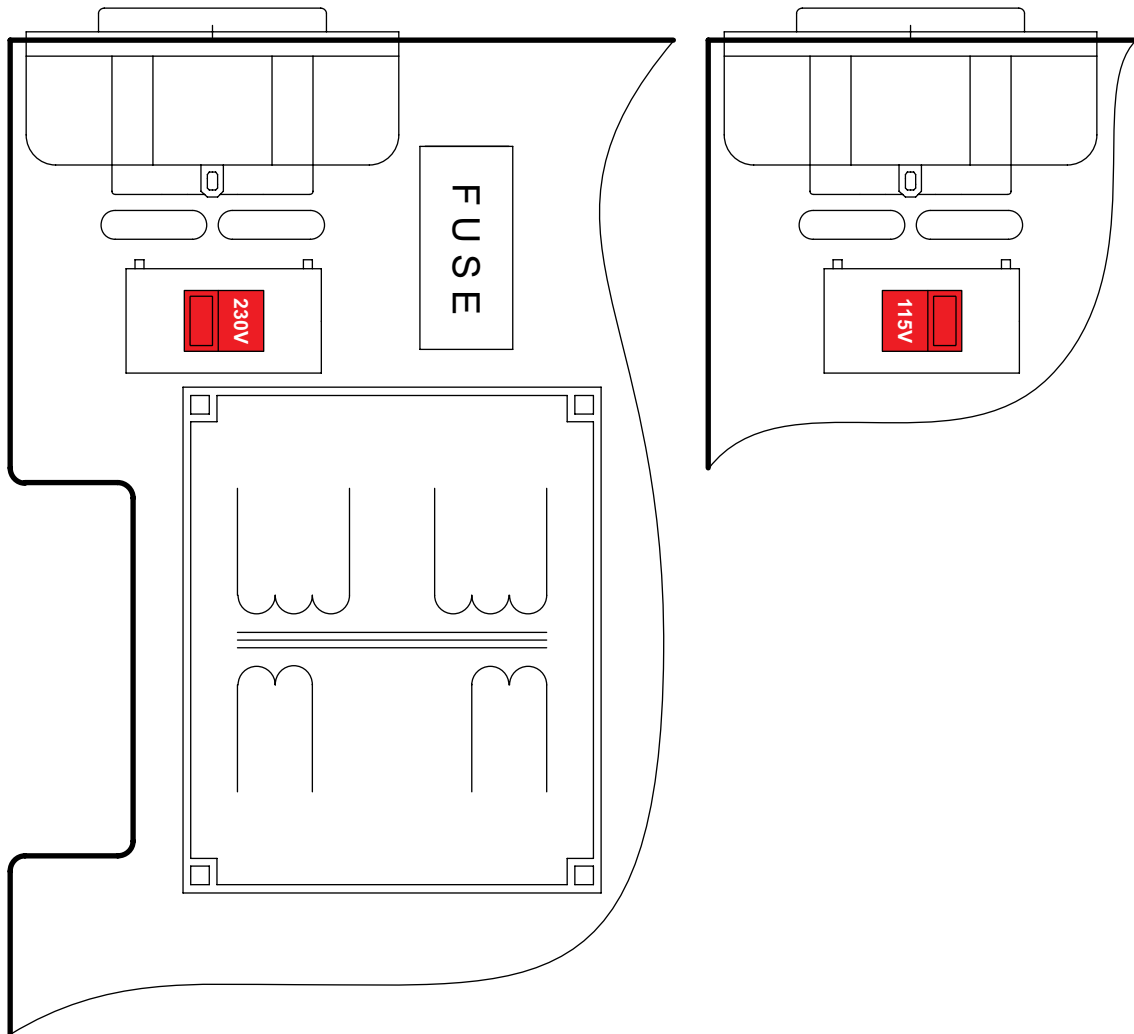
- 2) To European CEE standards:  
BROWN = AC "HOT"  
BLUE = AC NEUTRAL  
GREEN/YELLOW = EARTH GROUND

### GROUND LOOPS

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Because the unbalanced INPUTS/OUTPUTS of the device are chassis-ground-referenced, a mains frequency or INPUT/OUTPUT ground loop could be formed between the input or output cable shield grounds and the AC power cord ground. A 'ground-lifting' AC adapter may help in this situation, although the chassis must be properly grounded for safety purposes. In general, the equipment being installed in a rack will satisfy the safety requirement.

## MAINS VOLTAGE SELECTOR LOCATION











## Selection of Operating Modes

### **SIDCHAIN MODE**

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Configured for sidechain operation, the rear-panel PILOT OR MPX INPUT connector simply bridges (monitors) the output of the stereo generator to derive timing information from the 19kHz stereo pilot. Alternatively, a TTL-level 19kHz sync square wave may be applied to this input. We do not recommend this, however, as the phase relationship between the synchronizing square wave and the 19kHz pilot component in the composite, multiplex output of the stereo generator may not be assured.

In sidechain operation the RDS OR MPX OUTPUT will contain only the RDS subcarrier, the composite/MPX signal is *not* routed through the SmartGen 5. This operating mode best preserves multiplex signal integrity and assures uninterrupted program transmission in the event of a catastrophic encoder failure (very doubtful). As delivered, the SmartGen 5 is configured for sidechain operation.

### **LOOP-THROUGH MODE**

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When the SmartGen 5 is configured for loop-through operation, the RDS subcarrier is internally combined with the composite/MPX signal. This means that the RDS OR MPX OUTPUT *will include* the composite/MPX program signal (at unity gain) with the RDS subcarrier added. Also, in the loop-through mode the internal bypass relay will pass-through the multiplex signal in the event of an encoder power failure.

## Connecting The SmartGen 5

### **IMPORTANT CONNECTION CONSIDERATIONS!**

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The SmartGen 5 encoder must be properly configured for the desired operating mode: sidechain or loop-through before it is installed in the signal path. Use SmartGen Encoders Manager or LCD Menu ([see “LCD Menu Explained” on page 42](#)) to confirm that the encoder is properly configured before connecting the SmartGen 5 to other air-chain equipment.

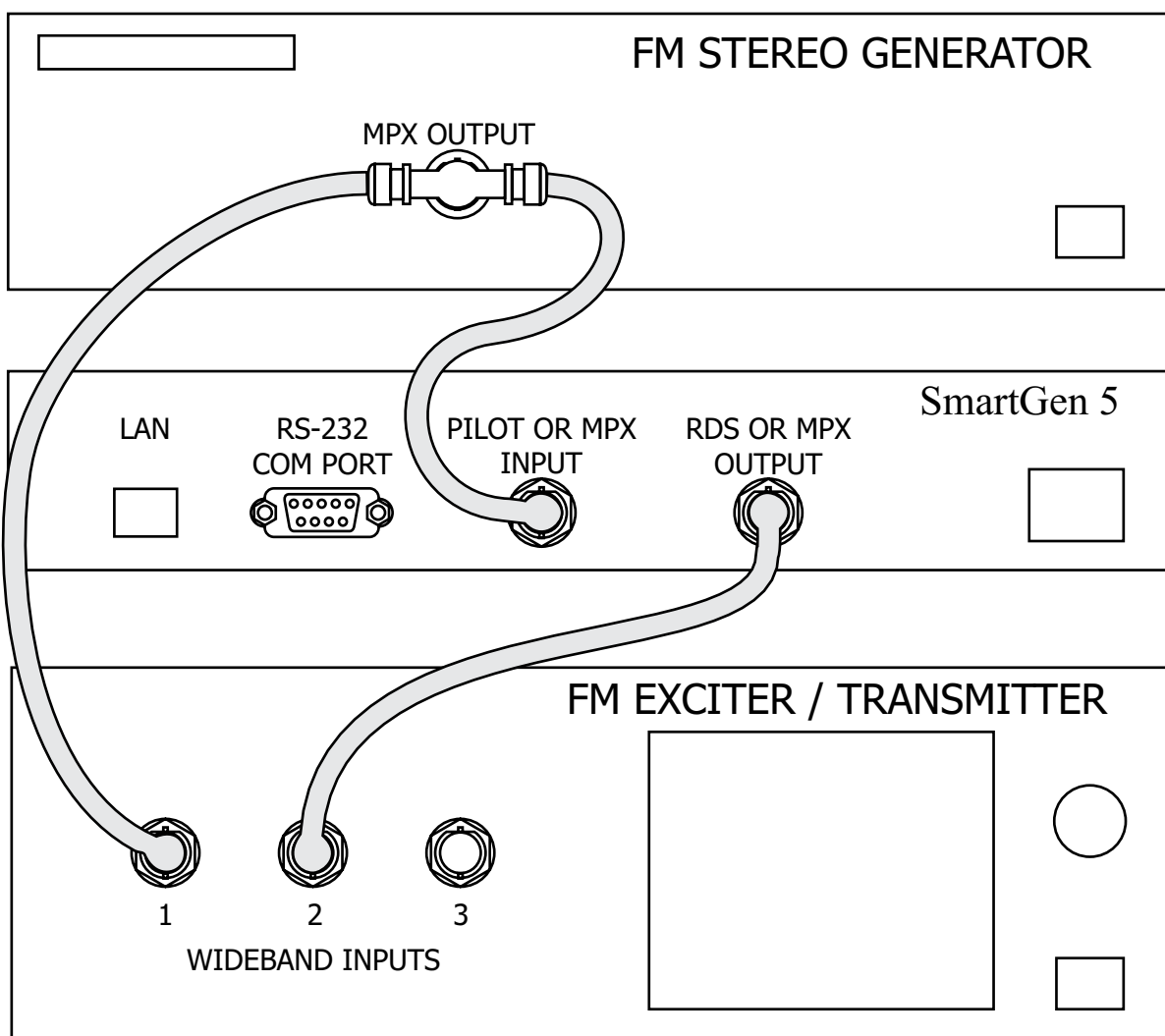
Also, it is important that the operating software be installed on the PC before it is connected to the encoder for programming the ‘static’ message registers and operating defaults. In addition, we heartily recommend testing the encoder with its controlling interface (computer, terminal, automation, etc.) before it is placed in the air chain. This will ensure that 2-way communication with the encoder can be established and that the encoder is properly initialized.

## SIDECCHAIN MODE (PREFERRED)

Attach a BNC ‘T’ adapter to the composite/MPX output of the stereo generator as shown in Figure below. Connect one side of the ‘T’ directly to a wideband (composite/ MPX) input of the FM exciter and the other side to the PILOT OR MPX INPUT of the SmartGen 5. (This is only a bridging ‘sync’ connection when the circuit board has been jumpered for sidechain operation and does not affect the composite/MPX signal.)

If the stereo generator has a dedicated 19kHz TTL-level output designated for RDS encoder sync, you may connect this to the encoder PILOT OR MPX INPUT. We do not recommend this, as a dedicated 19kHz sync output may not have the proper phase relationship with the stereo pilot.

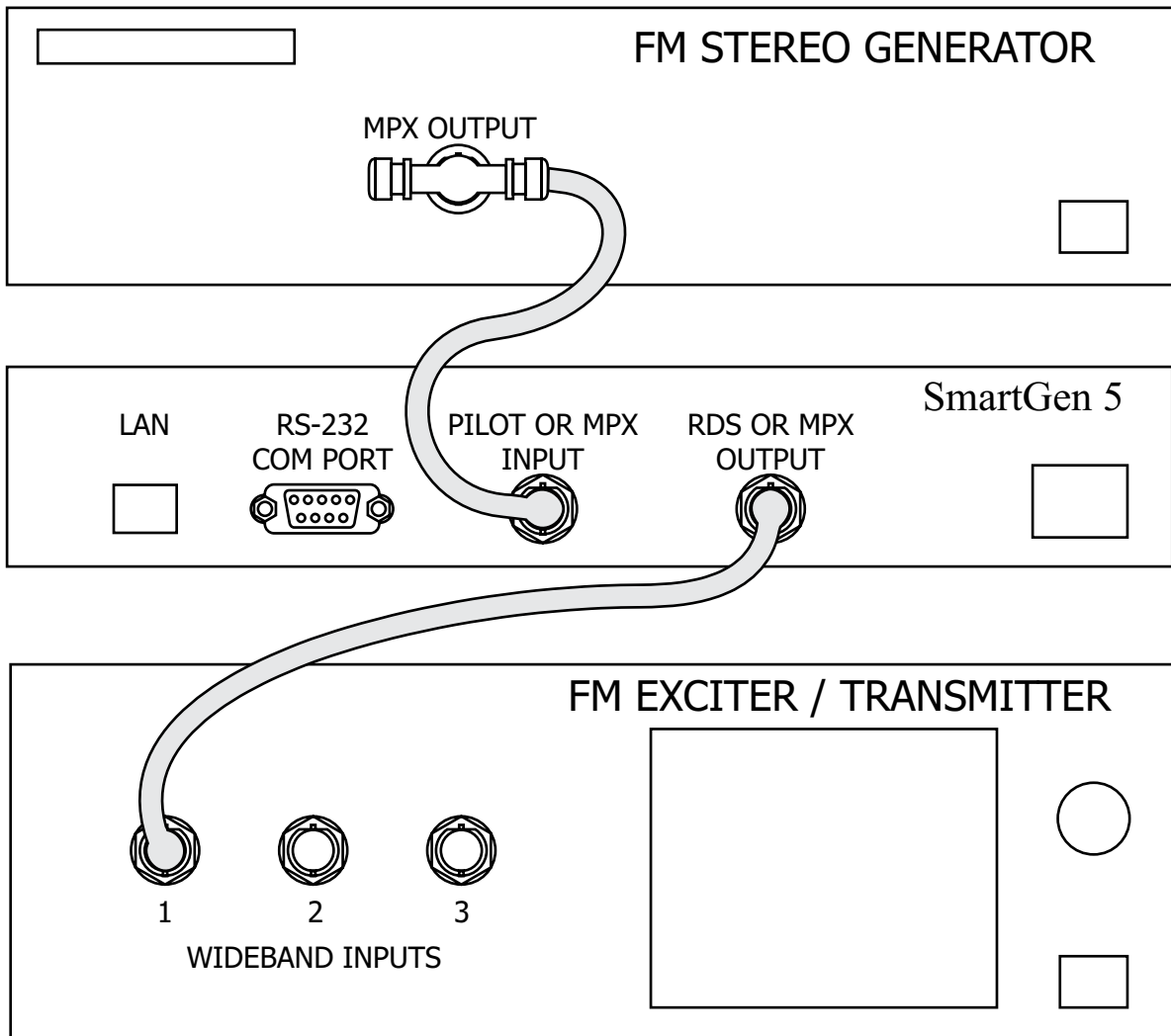
Cable the RDS OR MPX OUTPUT of the encoder to a second wideband (subcarrier) input of the FM exciter.



**“Sidechain” Encoder Connection**

## LOOP-THROUGH MODE

In the loop-through mode, the output of the stereo generator is cabled directly to the PILOT OR MPX INPUT of the SmartGen 5 as shown in Figure below. Connect the RDS OR MPX OUTPUT of the encoder to a composite/MPX wideband input of the FM exciter. When configured for loop-through operation, the composite/MPX signal *passes through* the encoder with unity gain, and with the RDS subcarrier added.



**Loop-Through Encoder Connection**

## **MANUALLY ACTIVATING THE TA FLAG**

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The Travel Announcement feature is a temporary command. This flag must coincide with the actual voice warning of a traffic condition. The encoder includes a provision to access this flag with a manual switch closure, which will doubtless prove faster, more convenient and more reliable than software control of the TA function.

A run of twisted-pair cable may be taken from the LOCAL TA CONTROL barrier strip connector on the rear panel of the encoder to a normally open momentary (spring-return!) push-button switch located conveniently at the announcer's operating position.

The TA flag will be transmitted as long as the switch is held down. *It is important that this alert is active only for the duration of a traffic announcement.* The TA flag must be turned off immediately after completing the verbal traffic warning.

## Data Interconnection

### USB PORT

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Front-panel USB port, convenient for setting service flags and entering static RDS data

### RS-232 COM PORT

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Rear-panel RS-232 COM PORT which may be connected directly to station automation equipment for dynamic messaging such song titles, weather info, etc.

### LAN PORT

---

Rear-panel LAN port, preferred for remote monitoring. Also applicable for servicing and station automation.

**NOTE:** For RS-232, USB or LAN interfaces with a PC for local/remote programming of the 'static' data registers, software must be installed on the computer *before* it is connected to the encoder. Refer to software installation instructions beginning in section [“Programming Options” on page 44](#).

ASCII Communication syntax is explained in section [“ASCII Programming Syntax” on page 50](#).

### COMPUTER OR TERMINAL REQUIREMENTS

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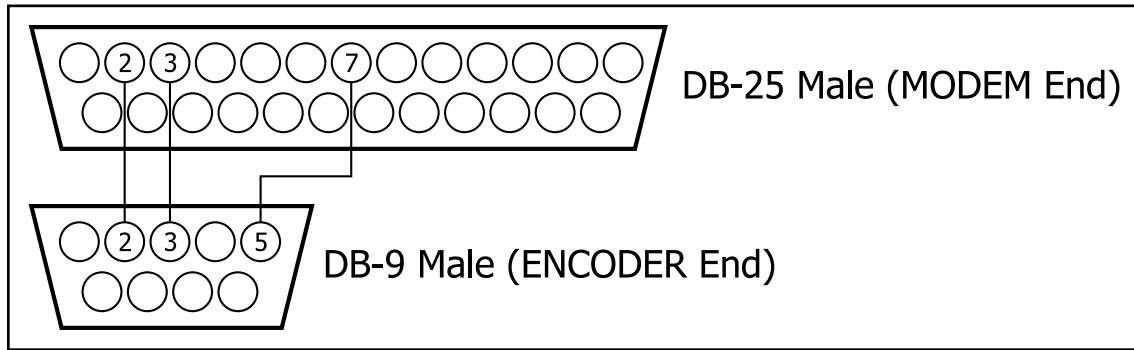
For fast and easy encoder programming via the serial COM, USB or LAN port, Windows®-based RDS Data-Entry Software routines are available for download at [www.devabroadcast.com](http://www.devabroadcast.com). As an alternative, the encoder may be addressed with any computer running a 'terminal emulation' program (e.g.: HyperTerminal, normally supplied with Windows® XP), or with a simple “dumb” terminal that has an RS-232 interface. The encoder can accommodate several baud rates, but the factory default is 9600 baud. Set the terminal (or terminal program) for: 9600-baud / 8 data bits / no parity / one stop bit / no flow control (9600,8,N,1,none).

Static PS and other IDs, flags, the Alternative Frequency list and operating mode options are uploaded into non-volatile encoder memory from a PC, either with USB, RS-232 serial or TCP/IP connections. If Dynamic PS or RadioText messaging is not used, a slogan, phone number or advertising messages can also be entered manually into the 64-character Dynamic PS and RadioText fields. These will be displayed on the radio faceplate as a repetitive scrolling-PS or static RadioText messages. Keep in mind that RadioText and Dynamic PS are separate functions, both of which are simultaneously available with the SmartGen 5.

Once static data has been uploaded, the encoder may be disconnected from the computer, relocated to another operating point, or reconnected to an alternative data source for dynamic messaging. This may be a hard-disk-based station automation system that provides song title and artist, plus ads or station promos. The automation system must be configured to the encoder's communication port and programmed to deliver dynamic data in proper syntax as explained by the instructions in section [“ASCII Programming Syntax” on page 50](#).

## MODEM LINK

In addition to the LAN connection, a modem link also may be used for addressing the encoder from a remote location via RS-232 serial connection. When properly configured, a modem link will appear 'transparent,' as if the encoder were connected directly to the controlling system. Figure below, shows proper pin connections for the cable used to connect the SmartGen 5 to a conventional external modem. The three conductors shown are the only ones required.



**Encoder/Modem Connections**

## Subcarrier Injection Level

In the *sidechain* mode of operation, the RDS subcarrier is the only signal that appears at the rear-panel RDS OR MPX OUTPUT connector. Because some exciters require a high signal level at auxiliary wideband (SCA) inputs, the RDS signal has been made adjustable to any value between zero and 4 volts, peak-to-peak.

In *loop-through* operation of the encoder, the composite/MPX program signal that is fed to the PILOT OR MPX INPUT appears with unity gain at the RDS OR MPX OUTPUT. A typical peak-to-peak level of the Composite/MPX program signal is up to 10dBu. The same 0-4V RDS subcarrier level range is available in this mode.

### SETTING SUBCARRIER AMPLITUDE

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Injection level is best set with a modulation monitor that includes a subcarrier measurement utility. Alternatively, a basic mod-monitor can be used alone, but program modulation and the stereo pilot must be turned off to resolve the low RDS injection level.

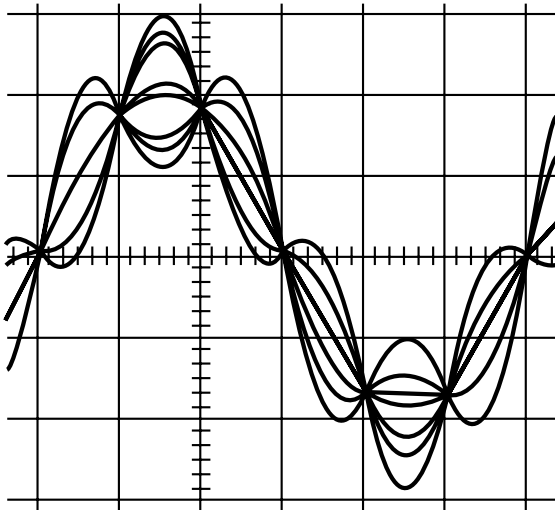
**NOTE:** If using a mod-monitor that does *not* have separate subcarrier measurement ability, keep in mind that mod-monitors are *peak-responding* for total modulation readings near 100% modulation, but may be *average-responding* for measurements at low levels of modulation. Because the RDS subcarrier is a complex, suppressed-carrier double-sideband signal, an average reading of 3% RDS injection can represent a level that is substantially higher when measured peak-to-peak. It is the *peak* level we are interested in with broadcasting.

Perhaps a better means of setting injection when a subcarrier monitor is not available is simply to bridge the input of the exciter with an oscilloscope using a BNC "T" adapter. With the audio program muted, the peak-to-peak value of the 19kHz stereo pilot signal can be noted. With this figure in mind, turn off pilot modulation (but do not *disconnect* the stereo generator) and set the peak-to-peak value of the RDS subcarrier to about one-third of the measured 19kHz pilot level. When programming is restored, the mod-monitor should indicate a 3% increase in total modulation, though this may be difficult to resolve near the 100% mark. Readjust the output level of the stereo generator to fine-tune the original total-mod figure.

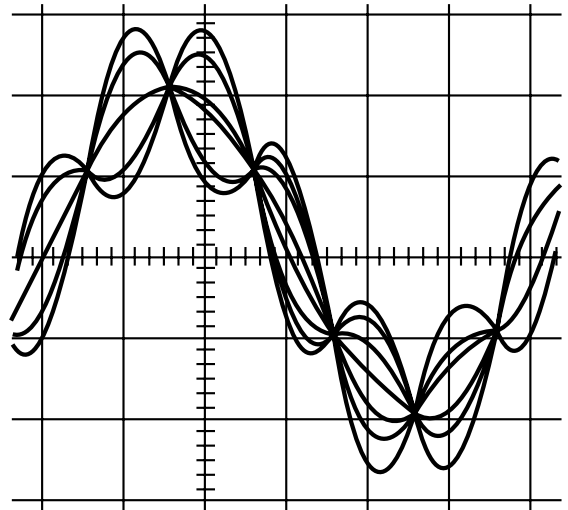
In the United States, the FCC permits an extra 5% modulation for each subcarrier, with total modulation not to exceed 110% even with two or more subcarriers.

## SUBCARRIER PHASE

In the interest of maintaining optimum carrier modulation by the program signal, the 57kHz RDS subcarrier should be in quadrature with the 19kHz stereo pilot. Both in-phase and *quadrature* relationships are shown here in figures below, respectively. Note that a quadrature relationship yields a slightly lower peak level, which allows the greatest carrier modulation by the program audio signal.



**Subcarrier in-Phase**



**Subcarrier in Quadrature**

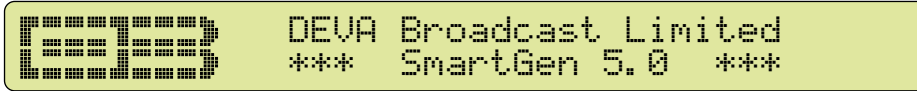
The SmartGen 5 has the ability to smoothly adjust the phase of the generated RDS signal to the PILOT tone. Although some stereo generators supply a pilot-sync reference for RDS (usually a TTL-level square wave), this reference may or may not be in exact phase with the actual stereo pilot component of the composite/MPX signal. For this reason we recommend using the composite/MPX signal for synchronization. In the sidechain mode, the SmartGen 5 simply bridges the output of the stereo generator and does not load or otherwise compromise the composite/MPX signal.

## Navigation Through LCD Menu

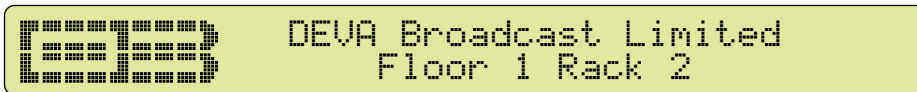
### THE BASICS

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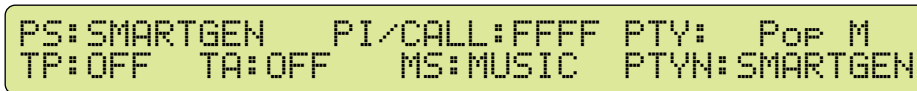
Upon power-up, the LCD Screen shows the Company Logo and the model of the device.



After a few seconds the model is replaced with the Site Name.



After a few seconds the Initial screen disappears, replaced by Mandatory RDS Readings.



This is the starting point of the navigation process.

Before proceeding further in the menu structure it is important to notice the basic functionality.

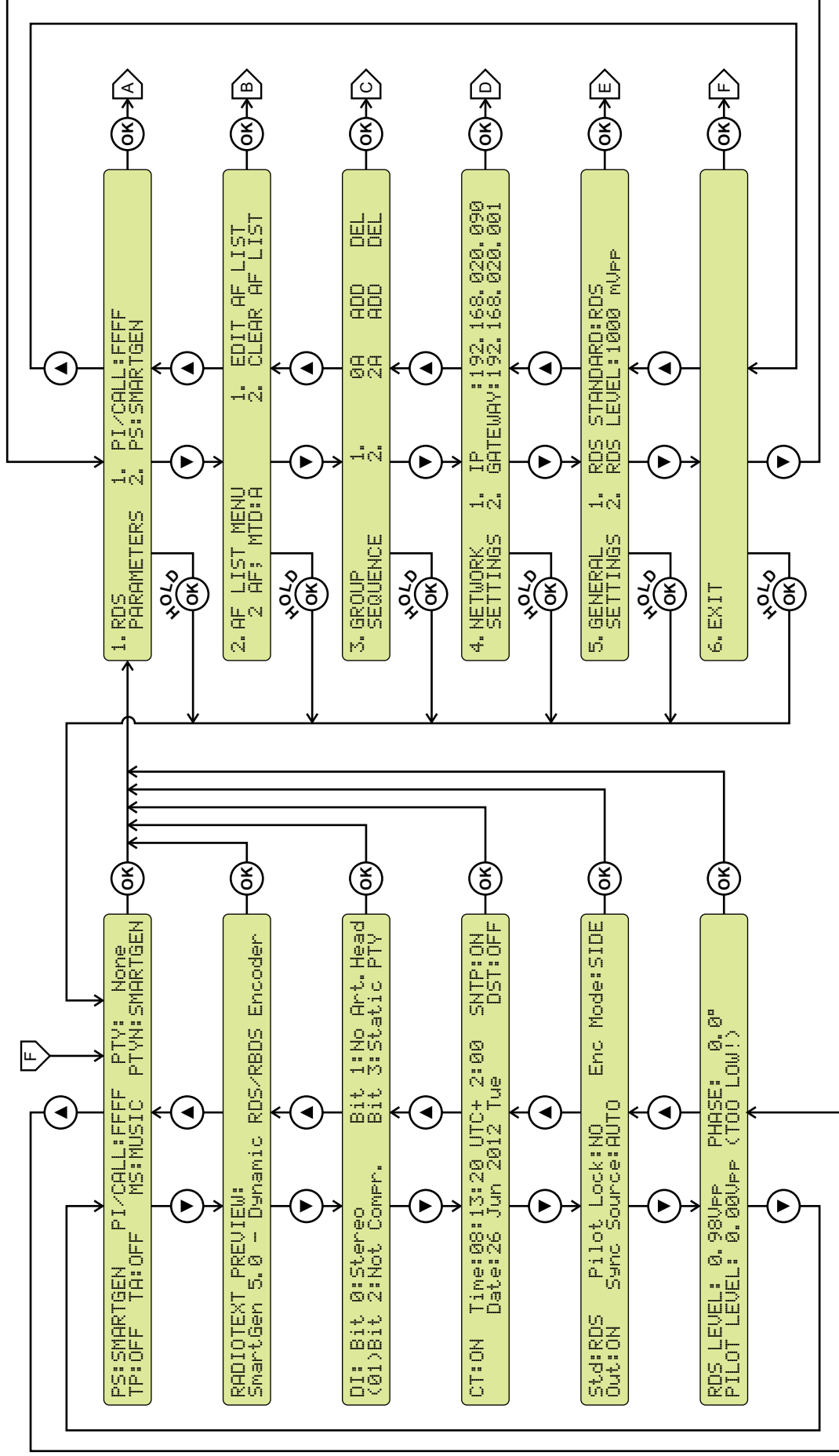
The Keyboard that consists of Up, Down, Left, Right and OK Buttons is situated right-hand from the LCD Screen.

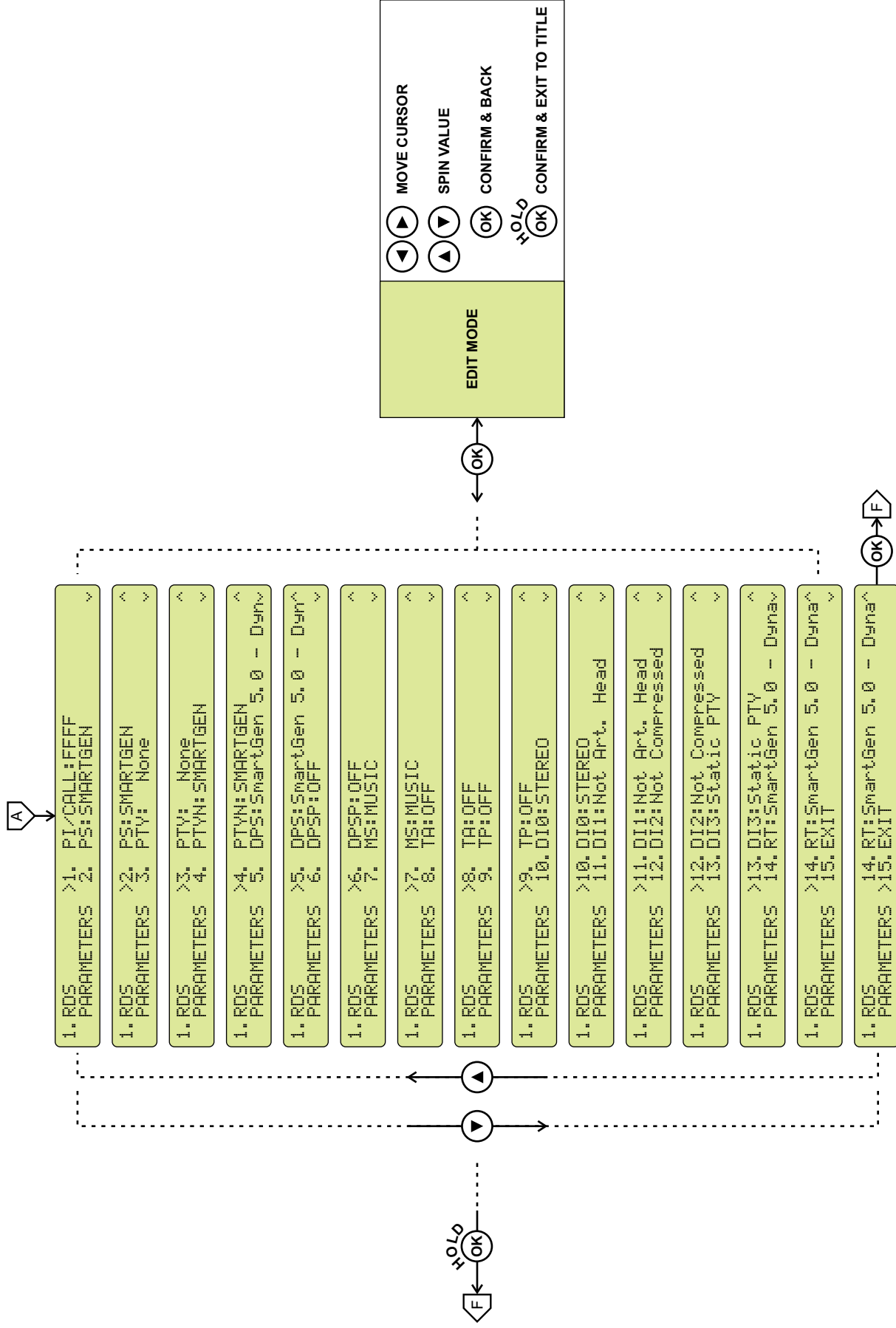
The Main Menu structure has an up-and-down basis, expanded with left-to-right branches.

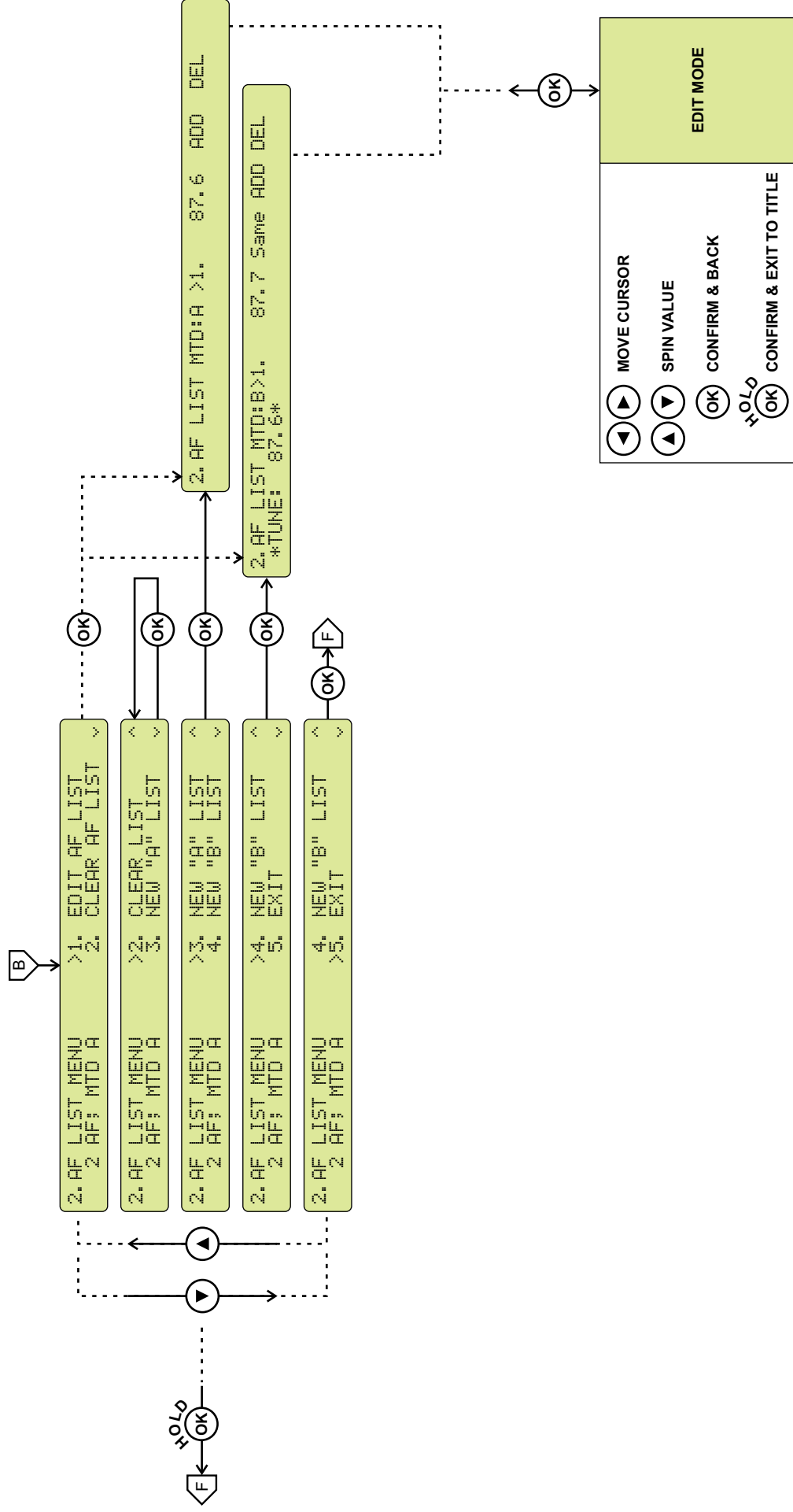
### MENU STRUCTURE

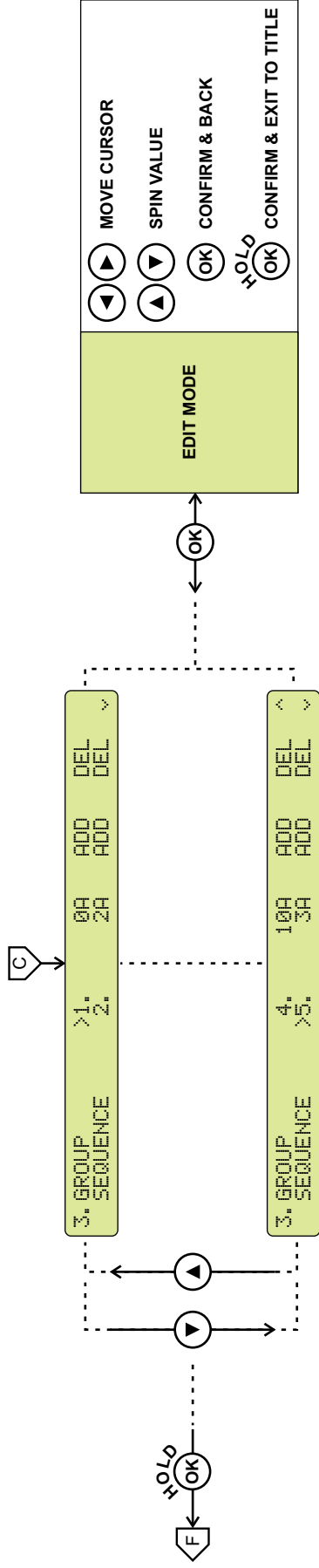
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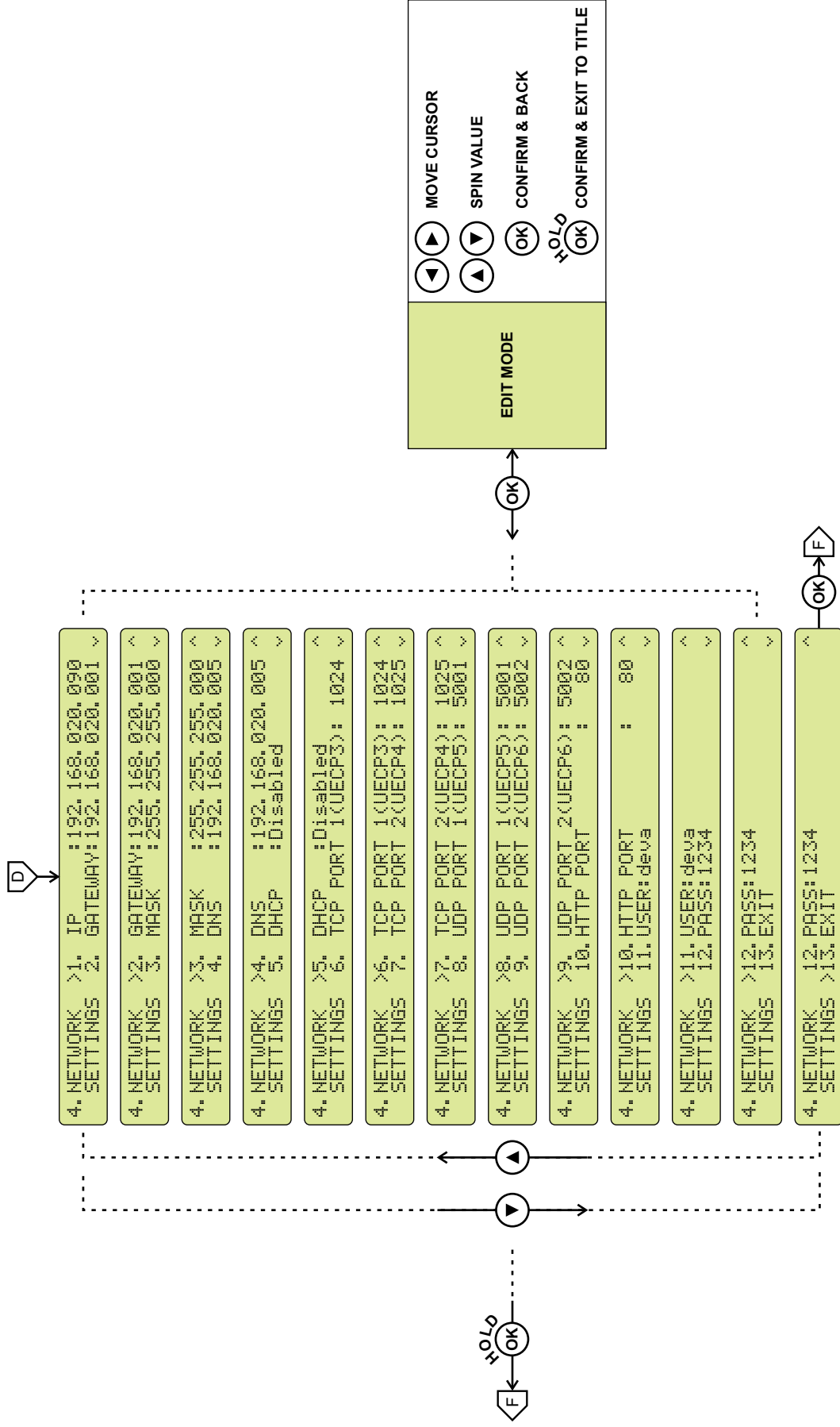
The following block diagram shows expanded view of the menu structure. To switch over to the different pages use the denoted Buttons.



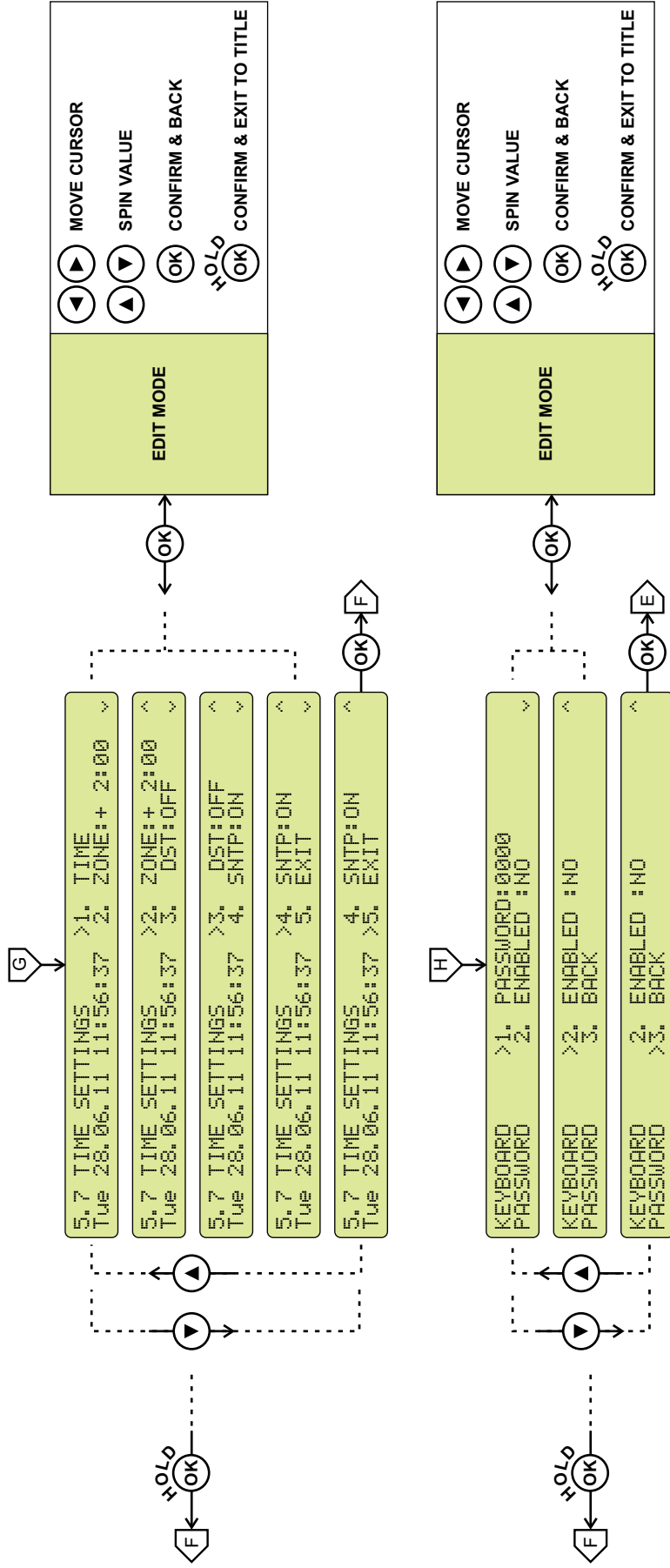












## LCD MENU EXPLAINED

### Main Screen with Mandatory RDS Readings

```
PS: SMARTGEN   PI/CALL: FFFF   PTY:  Pop M  
TP: OFF   TA: OFF   MS: MUSIC   PTYN: SMARTGEN
```

This screen shows PI, PS, PTY, TP, TA, MS, PTYN, which are considered mandatory.

### RadioText Preview

```
RADIOTEXT PREVIEW:  
SmartGen 5.0 - Dynamic RDS/RBDS Encoder
```

By definition, RadioText is up to 64 characters long. At the same time LCD Screen has its limitations, therefore a whole RT can not be shown. When RT exceeds the LCD's boundaries it will be scrolled from right to left.

### DI

```
DI: Bit 0: Stereo           Bit 1: No Art. Head  
(01)Bit 2: Not Compr.      Bit 3: Static PTY
```

This screen shows Decoder Information (DI), which unites several flags. See [“RDS Applications Supported” on page 70](#) or consult the RDS/RBDS Standard for in-depth explanation.

### Date & Time

```
CT: ON   Time: 08:13:20 UTC+ 2:00   SNTP: ON  
Date: 26 Jun 2012 Tue             DST: OFF
```

This screen show whether or not the transmission of CT (group 4A) is switched on or off. As well the current Time & Date are shown.

### Decoding Standard, RDS Output, Pilot Lock, Operating Mode

```
Std: RDS   Pilot Lock: NO   Enc Mode: SIDE  
Out: ON    Sync Source: AUTO
```

This screen shows the vital switches of the RDS Encoder.

Standard (Std) – RDS or RBDS

Pilot Lock –

*YES* - locked to the 19kHz stereo pilot signal.

*NO* - defaulted to the internal timebase

RDS Out – showing when the RDS output signal is switched “On” or “Off”.

Enc Mode – SIDECHAIN or LOOPTHROUGH ([see “Selection of Operating Modes” on page 25](#))

Sync Source - Internal, External, Auto


### RDS Level, Pilot Level, Phase

```
RDS LEVEL: 0.98VPP   PHASE: 0.0°  
PILOT LEVEL: 0.00VPP (TOO LOW!)
```

This screen monitors the RDS & PILOT Levels, as well showing the selected PHASE.

## KEYBOARD LOCK

---

To prevent unauthorized local access SmartGen 5 offers password protected keyboard locking. By default the keyboard is unprotected. To enable protection, navigate to 5.11.2 and change ENABLED to YES. From 5.11.1 select desired 4 digit password. Once the keyboard password is enabled it will be indicated with the following symbol .

```
PS: SMARTGEN  PI/CALL:FFFF PTY: Pop M  
TP:OFF TA:OFF MS:MUSIC PTYN:SMARTGEN
```

From now on every attempt to use keyboard will be prompted for password: ENTER PASSWORD: 0\*\*\*, and access will be denied upon false entry.

**NOTE:** Keyboard lock will not prevent to navigate through Main Screen i.e. only Editing is locked.

## RESTORE FACTORY DEFAULTS

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When an emergency recover is necessary, which probably will never be used, SmartGen 5 can Restore Factory Defaults from its non-volatile memory.

Disconnect/Remove all external appointments except the Mains Power. Navigate to 5.15 using the Keyboard. Press OK Button. Following Screen should be displayed:

```
WARNING! All settings will be LOST!  
To proceed press ->, Other to cancel
```

If intended to Restore Factory Defaults, confirm with Right Button.

See section [“Factory Defaults” on page 56](#) for detailed listing of Factory Settings.

**WARNING:** Perform Emergency Recover with caution because any remote users would not be aware, hence they may cease to communicate with device.

## Programming Options

### **ADVANCED PROGRAMMING FOR STATION AUTOMATION**

---

Developed as a fully 'interactive' RDS encoder, the SmartGen 5 can interconnect directly with station automation to transmit dynamic messaging to the receiver. Examples of this are song title and artist information, weather reports or air personality ID. Station automation communicates with the SmartGen 5 through an RS-232, USB or LAN interface.

The data stream from a station automation system must be formatted properly for communication with the SmartGen 5 encoder. Commands require proper preambles, or headers, so that the SmartGen 5 interprets dynamic data as valid command sets.

### **SIMPLIFIED WINDOWS® DATA-ENTRY SOFTWARE**

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To help get RDS on-air quickly and painlessly, a very simple and intuitive Windows® interface is available for download at [www.devabroadcast.com](http://www.devabroadcast.com). This can be used by anyone to set the static IDs and flags, to program default entries into the dynamic messaging fields, and to set other operating parameters that affect how data from station automation is displayed on the radio faceplate.

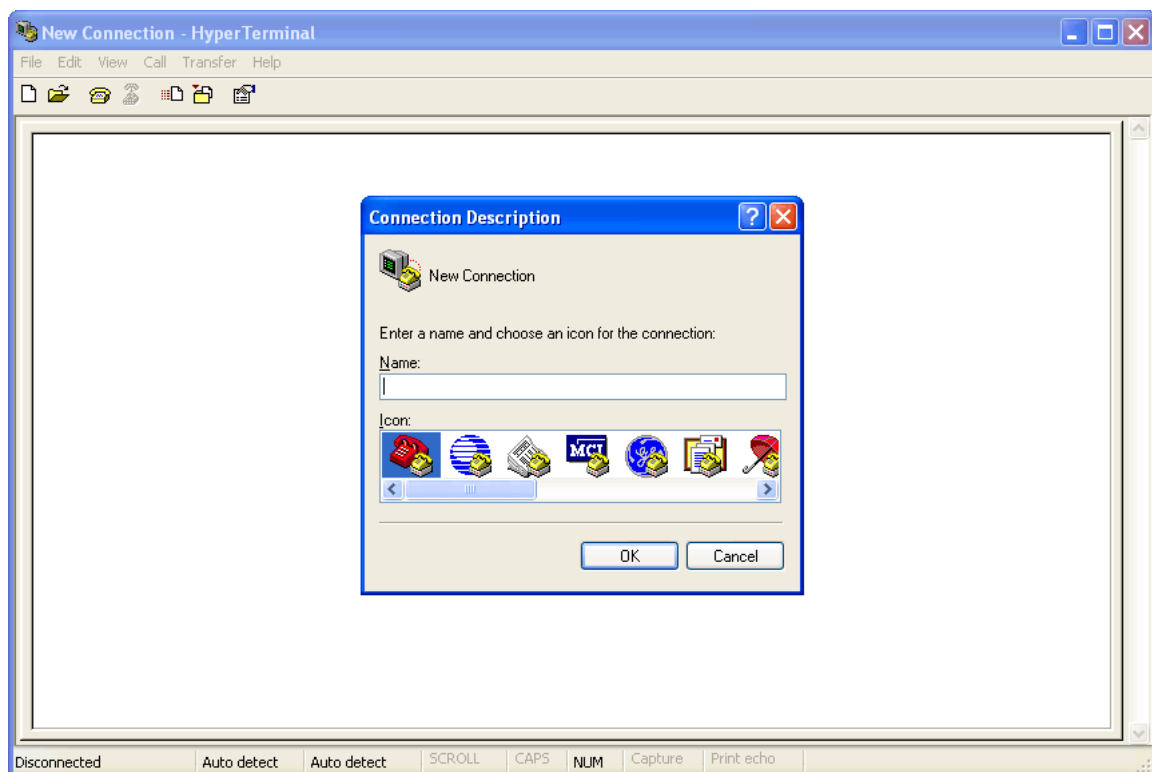
## Terminal Configuration

Configuration of the terminal, computer or automation system obviously will depend on parameters placed by hardware and firmware. For simplicity, the encoder ASCII programming illustrations in this section will utilize HyperTerminal, the terminal emulation program by Hillgraeve, Inc., developed for Microsoft and supplied with the Windows® XP operating system. It is hoped that programming instructions based on terminal emulation will help the programmer understand what ASCII syntax the encoder requires, serving as an example for direct-connection with station automation.

If using HyperTerminal, it's best first to upgrade to the latest version. It can be downloaded from [www.hilgraeve.com/hpte](http://www.hilgraeve.com/hpte). The more current product seems to run more smoothly and has text editing features not found in earlier versions.

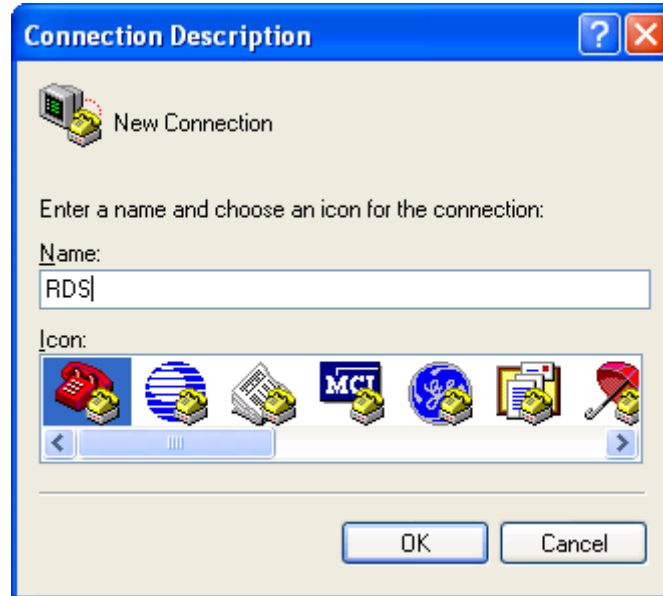
**NOTE:** Do not connect the SmartGen 5 Encoder until the HyperTerminal program has been configured properly.

HyperTerminal is started under Windows® XP with the command routine: Start / Programs / Accessories / Communications / HyperTerminal. Double-click: HyperTrm.exe. This brings up the main HyperTerminal screen with a Connection Description window for naming your encoder communications program. How this connection is configured depends on the serial (COM) port will be addressed.

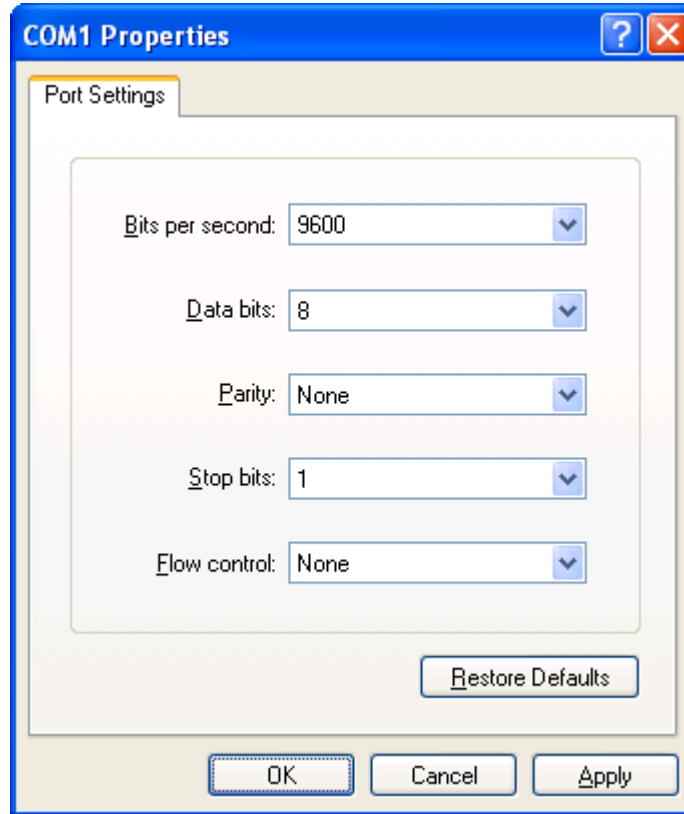


## SERIAL COM PORT CONFIGURATION

Give the encoder connection a name; we have chosen 'RDS' for this illustration. Click Connect using and select COM1, unless there is a reason to use another serial COM port. Click OK.



The next window that appears shows COM1 Properties. Here you set the communications parameters as follows: Bits per second: 9600, Data bits: 8, Parity: None, Stop bits: 1, Flow control: None. Check your settings against the screen shot. Click OK to close all boxes and to clear the HyperTerminal data entry screen.



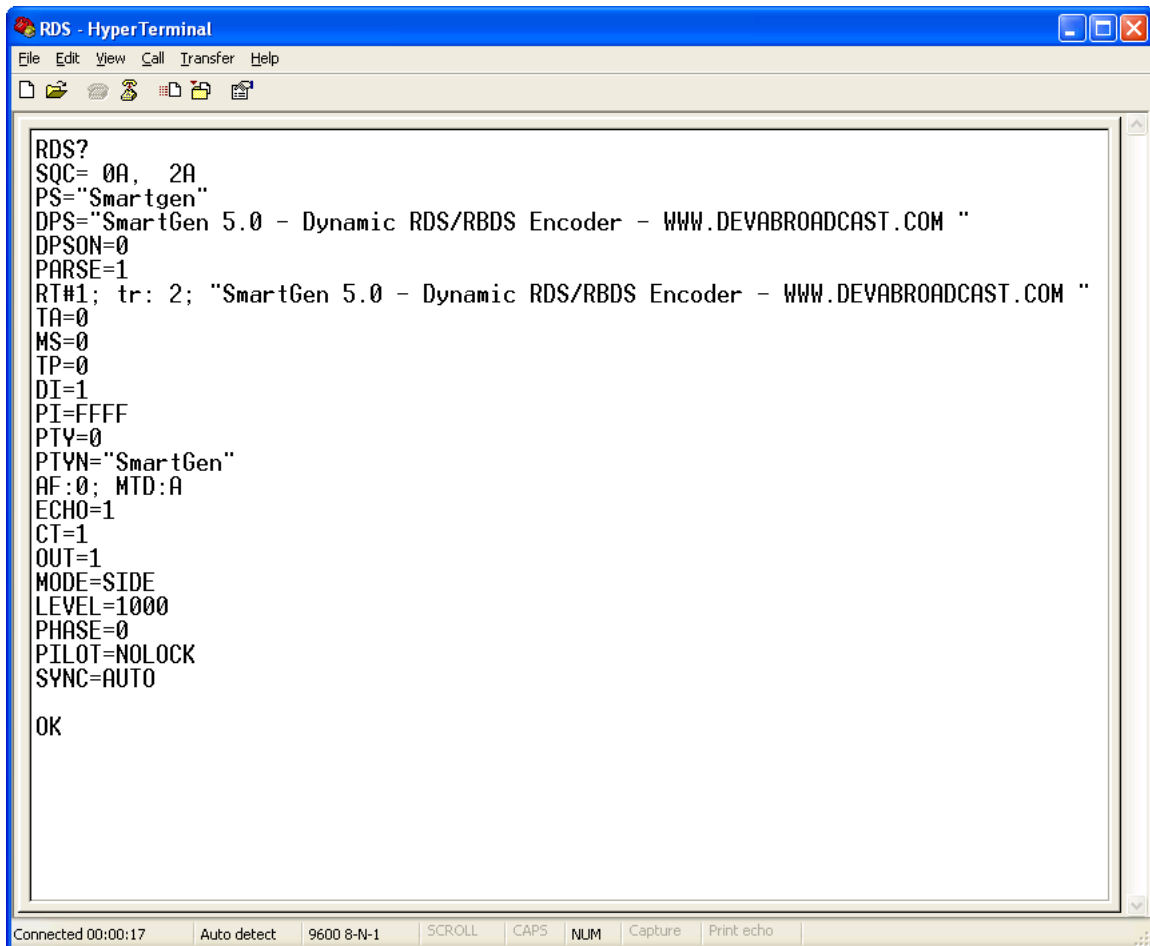
If you experience trouble communicating with the SmartGen 5, there's a quick and easy check to verify that the computer and the terminal program are functioning normally. With pins 2 and 3 of the DB-9 connector shorted with a screwdriver, whatever is typed on the keyboard should appear on the screen.

When COM port setup is complete the computer may be connected to the encoder COM port. Next, skip to Power-Up, below.

## POWER-UP

Once the encoder is connected (by the serial COM) and powered-up, communications should be automatic. A notation at the bottom of the HyperTerminal screen verify connection.

Type: RDS?↵. This will cause the encoder to send back the contents of all ID, flag and message registers, which (shown here) are the data entered previously. RDS? can be used at any time to make the encoder 'spill its guts'. This exercise does not interrupt or interfere with encoder operation.



```
RDS?  
SQC= 0A, 2A  
PS="SmartGen"  
DPS="SmartGen 5.0 - Dynamic RDS/RBDS Encoder - WWW.DEVABROADCAST.COM "  
DPSON=0  
PARSE=1  
RT#1; tr: 2; "SmartGen 5.0 - Dynamic RDS/RBDS Encoder - WWW.DEVABROADCAST.COM "  
TA=0  
MS=0  
TP=0  
DI=1  
PI=FFFF  
PTY=0  
PTYN="SmartGen"  
AF:0; MTD:A  
ECHO=1  
CT=1  
OUT=1  
MODE=SIDE  
LEVEL=1000  
PHASE=0  
PILOT=NOLOCK  
SYNC=AUTO  
  
OK
```

All valid interrogations are followed by: OK; a NO shows that the interrogation was not valid. Any single parameter in a register can be interrogated independently. Simply type the register designation followed by a single question mark. A response shown at the right for the typed command: PI?↵

```
OK  
PI?  
3D44  
OK  
-
```

## ECHO

---

It's best for your computer screen to display what has been "echoed" by the encoder as data is entered. Each character typed on the keyboard is sent to the encoder, which turns it back around to be shown on the monitor screen. This round trip gives continuous confirmation of 2-way communications. Typing `ECHO=1` ↵ will provide this round-trip communications verification.

The return data path is not essential, however. The SmartGen 5 will accept programming commands on a receive-only basis. For example, a studio-transmitter radio link (STL) may include 1-way data transmission that could be used to address the encoder.

If double characters appear when typing, your terminal has been configured for local echo. Rather than defeating the echo function of the encoder, local echo should be turned off. This is usually a software command in the terminal or terminal program. Local echo must be used with a 1-way link, however, so that the terminal screen will show what is typed.

The SmartGen 5 has been set to echo as the factory default. The command to turn echo off is `ECHO=0` ↵. To turn echo back on again, type `ECHO=1` ↵.

# ASCII Programming Syntax

## HOW TO TYPE

---

In these programming instructions the exact ASCII syntax to be entered on the keyboard will be given in the font used in this example: `DPS=HELLO↵`. Specifically, the field: DPS, the equal sign and the word HELLO would be typed, followed immediately by pressing the Enter key. We will use ↵ as the symbol for Enter.

Take time to type deliberately and slowly. Even at 9600 baud, some delays are inherent in the communications between the computer and the encoder. One characteristic of typing too quickly will be the omission of line feeds in responses returned from the encoder.

## USING ALL-CAPS

---

Programming commands should be typed in ALL CAPS (capital letters) and messages should be kept as simple as possible. Though the encoder will accept lowercase letters and all ASCII punctuation in the DPS and TEXT fields, RDS radio displays have limited character sets and may show ambiguous lowercase characters or gibberish. To assure readability, keep the keyboard Caps Lock key engaged and avoid fancy punctuation. ‘Smileys’ are not a good idea.

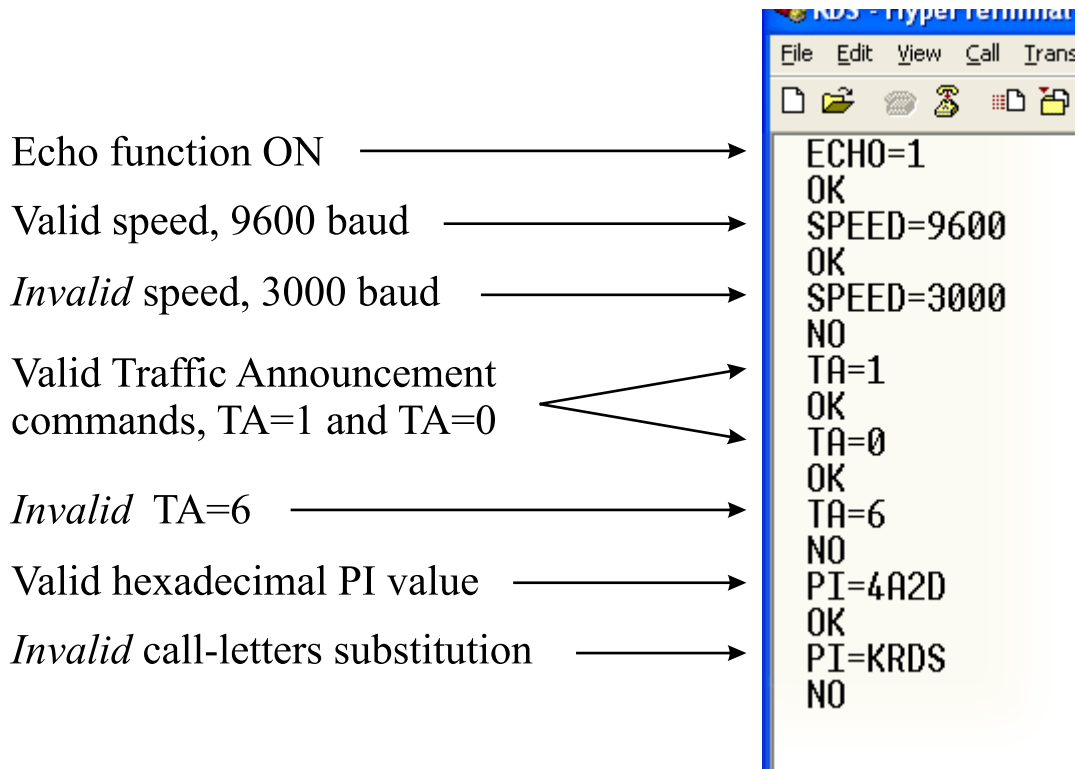
## CORRECTING MISTAKES

---

Under HyperTerminal, use the Enter key to drop to a new line, if required, and use either the Backspace key or the keyboard’s directional arrows to navigate within a text entry. Overtyping an entry will automatically replace the previous characters. What is shown on the screen before the Enter key is pressed is what will be sent to the encoder.

## VALIDITY SYMBOLS

The SmartGen 5 ignores ASCII inputs that do not conform to proper formatting rules. This is an important feature when the encoder is connected full-time to station automation. When a valid command is accepted by the encoder, it returns OK to the computer screen. If a data input is properly formatted, but is ambiguous or otherwise not accurate, the screen will display NO. Examples of valid and invalid commands are shown below. Follow programming instructions *exactly* to ensure that commands will be accepted.



# Encoder Housekeeping Commands

## REGISTER INTERROGATION

---

Typing: RDS?`↵` returns the status of all flag and ID settings and the contents of static message buffers to the screen. This was illustrated in section [“Power-Up” on page 48](#)“.

## ENCODER INITIALIZATION

---

The “initialize” command is invoked by typing: INIT`↵`. This is used to reestablish encoder operation in the unlikely event of an internal software ‘crash,’ or for any other reason to restore all the factory defaults (see [“Factory Defaults” on page 56](#)). INIT`↵` is an emergency recovery command only. It is not necessary to execute INIT`↵` prior to updating any encoder programming.

## ENCODER RESET

---

Typing: RESET`↵` initiates a ‘hardware reset’ equivalent to turning the encoder off and back on again. This reset command does not clear the registers of programming commands that have been saved as described above.

## FIRMWARE VERSION

---

Type: REV?`↵` for a display of the encoder’s firmware version. This might prove important in determining whether differences exist between SmartGen 5 encoders purchased at different times.

## NETWORK SETTINGS

---

Type: NET?`↵` for a display of the encoder’s Network Settings, which include IP Address, Subnet Mask, Gateway, DNS Server and DHCP Client. This is useful when information about Network Settings is needed at a glance, instead of interrogate each one Network Parameter.

## Listing of Encoder Commands and Prompts

| Command | Description   |
|---------|---|
| PI      | Program Identification, 4 digit HEX number (station “digital address”)  |
| PS      | Program Service Name, 8 (max) ASCII characters (station “street name”)  |
| DPS     | Dynamic PS, 64 (max) ASCII characters (for messaging in PS field)   |
| DPSON   | Dynamic PS ON/OFF, 0 or 1 (0 = OFF, 1 = ON)   |
| PTY     | Program Type, 0 to 31 (describes station format)  |
| PTYN    | Program TYPe Name, 8 (max) ASCII characters (describes current PTY)   |
| TP      | Traffic Program, 0 or 1 (0 = NO, 1 = YES)   |
| TA      | Traffic Alert, 0 or 1 (0 = flag OFF, 1 = flag ON)   |
| DI      | Decoder Information, 0 to 15  |
| MS      | Music/Speech, 0 or 1 (0 = speech-only, 1 = music)   |
| TEXT    | RadioText, 64 (max) ASCII characters  |
| SPEED   | COM Speed, 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps.<br><b>NOTE:</b> SPEED could be get/set only on RS-232 connection   |
| AFA     | Sets Alternative Frequencies List using method A.<br>Up to 25 comma delimited Frequencies in range 87.6 to 107.9 MHz<br><b>Example:</b> AFA=101.8, 99.9   |
| AFB     | Sets Alternative Frequencies List using method B.<br>Up to 100 comma delimited Frequencies in range 87.6 to 107.9 MHz<br><b>Example:</b> AFB=101.8T, 99.9S, 90.5R<br>Tuning Frequency is denoted with following ‘T’ (e.g. 101.8T)<br>Tuning Frequency must be entered always first.<br>Same Program is denoted with following ‘S’ (e.g. 99.9S)<br>Regional Program is denoted with following ‘R’ (e.g. 90.5R) |
| TATIME  | TA Timeout, 0 to 255 minutes (0 = OFF)  |
| ECHO    | Command Echo, 0 or 1 (0 = ECHO OFF, 1 = ECHO ON)  |
| PARSE   | Dynamic PS Method, 0 to 9<br>0 = centered, 9 = left justified, 1-8 = N characters at a time   |
| G       | G=BBBBCCCCDDDD<br>BBB,CCCC and DDDD are the RDS B,C and D data blocks   |
| H       | H=BBBBCCCCDDDD, (see G), TP and PTY are preserved   |
| SQC     | Group Sequence, 0A to 15A, 0B to 13B.<br><b>Example:</b> SQC=0A, 2A, 10A<br><b>NOTE:</b> 4A, 14B, 15B are not allowed. 2A and 2B could not coexist.<br>Group Sequence could not be empty!   |

| Command                                       | Description  |
|---|--|
| RT+TAG  | Radiotext+ tagging data (00-63, 00-63, 00-63, 00-63, 00-63, 00-31, 0-1, 0-255). Eight comma delimited decimal numbers with RT+ tagging data in following order: Tag 1 "Type", Tag 1 "Start", Tag 1 "Length", Tag 2 "Type", Tag 2 "Start", Tag 2 "Length", item running bit value and data timeout (0=NO TIMEOUT, 1-255 timeout minutes). |
| RT+TPL  | Set the RT+ information in group 3A such as CB flag, Server Control Bits and Template number(0-65535).   |
| MODE  | Operating Mode, 0 or 1 (LOOP or SIDE) 0 = loop-through, 1 = sidechian  |
| OUT   | Switch RDS output signal ON or OFF, 0 = OFF, 1 = ON  |
| SYNC  | Selects the synchronization source of the RDS subcarrier, 0 to 2, (AUTO, INT or EXT), 0 = AUTO, 1 = INT, 2 = EXT   |
| TIME  | UTC Time, HH:MM:SS (HH=hour, MM=Minutes, SS=Seconds)   |
| DATE  | Date, DD.MM.YY (DD=Day, MM=Month, YY=YEAR)   |
| CT.OFFSET                                     | Local Time offset, -15:30 to +15:30, in multiples of half hours  |
| SNTP  | Switch SNTP Client ON or OFF, 0 = OFF, 1 = ON  |
| IP  | IP Address, XXX.XXX.XXX.XXX  |
| MASK  | Subnet Mask, XXX.XXX.XXX.XXX   |
| GATEWAY                                       | Gateway, XXX.XXX.XXX.XXX   |
| DNS   | DNS Server, XXX.XXX.XXX.XXX  |
| DHCP  | Switch DHCP Client ON or OFF, 0 = OFF, 1 = ON  |
| IPPORT1                                       | Sets TCP Port 1, 1024-65535  |
| IPPORT2                                       | Sets TCP Port 2, 1024-65535  |
| IPPORT3                                       | Sets UDP Port 1, 1024-65535  |
| IPPORT4                                       | Sets UDP Port 2, 1024-65535  |
| HTTPPORT                                      | Sets HTTP(WEB) Port, 80(default) or 1024-65535.<br><b>NOTE:</b> All Network Ports must be unique   |
| LEVEL   | RDS subcarrier Level in mVp-p, 0-4095  |
| PHASE   | RDS subcarrier Phase in degrees, 0 to 3599, 1 = 0.1 degree   |
| CT  | Switch transmission of 4A group ON or OFF, 0 = OFF, 1 = ON   |
| DST   | Daylight Saving Rule, 0 to 3,(0=OFF, 1=AUTO EU, 2=AUTO USA, 3=MANUAL)  |
| Use '=' to SET parameter value, e.g.: PI=1234 |  |
| Use '?' to GET parameter value, e.g.: TIME?   |  |

| <b>SPECIAL COMMANDS</b> |   |
|-------------------------|---|
| <b>Command</b>          | <b>Description</b>  |
| RDS?                    | Returns all data in encoder memory  |
| NET?                    | Returns all Network settings  |
| REV?                    | Returns firmware & hardware revision numbers  |
| PILOT?                  | Returns the Status of the 19 kHz PLL.<br>LOCK - locked to the 19kHz stereo pilot signal.<br>NOLOCK - defaulted to the internal timebase |
| AF?                     | Returns the current AF list   |
| AF.CLEAR                | Clears the current AF list  |
| SNTP.SYNC               | Forces SNTP to synchronize immediately  |
| ISDST?                  | DST is in effect? (1 = DST is observed, 0 = DST is not observed)  |
| RESET                   | Resets the encoder as if AC power were cycled off and on  |
| GRMON?                  | RDS groups counters   |
| GRMONINI                | Clears the RDS groups counters  |
| UPTIME?                 | Returns device uptime   |
| RESET                   | Resets the encoder as if AC power were cycled off and on  |
| INIT                    | Initializes the encoder to all factory defaults   |
| CLS                     | Clears the Terminal Screen  |
| <b>Response</b>         | <b>Meaning</b>  |
| OK                      | Command received by encoder properly formatted and understood   |
| NO                      | Command properly formatted but data not understood  |
| ACCESS DENIED           | Command is disabled for this port by Access Rights  |

**DON'T FORGET** that all the static RDS registers, including simple scrolling messages, can be entered or changed easily through either the Windows® or network data entry screens.

## Factory Defaults

### NETWORK SETTINGS

---

|                     |               |
|---------------------|---------------|
| IP                  | 192.168.1.2   |
| Gateway             | 192.168.1.1   |
| Subnet Mask         | 255.255.255.0 |
| DNS                 | 192.168.1.1   |
| DHCP                | Disabled      |
| TCP PORT 1          | 1024          |
| TCP PORT 2          | 1025          |
| UDP PORT 1          | 5001          |
| UDP PORT 2          | 5002          |
| HTTP Server Port    | 80            |
| WEB Server Username | user          |
| WEB Server Password | pass          |

**NOTE:** Network Settings will not be affected when Factory Defaults are issued through ASCII Command `INIT`.

### GENERAL SETTINGS

---

|                      |              |
|----------------------|--------------|
| RDS Standard         | RDS          |
| RDS Level            | 1000mVpp     |
| RDS Phase            | 0.0°         |
| Output Mode          | Sidechain    |
| RDS                  | On           |
| Synchro Source       | Auto         |
| COM Speed            | 9600 bps     |
| Beeper               | Off          |
| LCD Backlight        | On           |
| LCD Power Save       | On           |
| Site Name            | SmartGen 5.0 |
| CT                   | On           |
| Daylight Saving Time | Off          |
| SNTP                 | On           |
| Local Time Offset    | 0            |
| RTC Correction       | 0            |
| GPO 1 ID             | output 1     |
| GPO 2 ID             | output 2     |
| GPO 3 ID             | output 3     |
| GPO 4 ID             | output 4     |
| GPOs State           | Inactive     |

## BASIC RDS SETTINGS

|            |   |
|------------|---|
| PI         | FFFF  |
| PTY        | None  |
| PS         | SMARTGEN  |
| PTYN       | SMARTGEN  |
| TA         | OFF   |
| TP         | OFF   |
| TA Timeout | 0 (Off)   |
| MS         | Music   |
| DI(0)      | Stereo  |
| DI(1)      | No Artificial Head  |
| DI(2)      | Not Compressed  |
| DI(3)      | Static PTY  |
| RT         | SmartGen 5.0 - Dynamic RDS/RBDS Encoder - WWW.DEVABROADCAST.COM |
| A/B Flag   | On  |
| Dynamic PS | Off   |
| Parse      | 1 char  |
| DPS Text   | SmartGen 5.0 - Dynamic RDS/RBDS Encoder - WWW.DEVABROADCAST.COM |
| AF List    | Empty   |

## UECP SETTINGS

|                          |                             |
|--------------------------|-----------------------------|
| Site Address List        | Empty                       |
| Encoder Address List     | Empty                       |
| Current DSN              | 1                           |
| Main PSN                 | 1                           |
| Selected Reference Input | 1                           |
| Group Sequence           | 0A, 2A                      |
| Access Rights            | Access Granted on all ports |

## WEB Configuration

SmartGen 5 can be accessed through Internet using your favorite browser. No additional software is required.

To access Device Web Interface it is necessary to know the IP address assigned to device ([see “Network Settings” on page 52](#)) and password.

Into browser’s address field type device IP, e.g. http://192.168.20.16. Depending on browser it may be required to specify port, which is appended after IP address and in our default case must be :80.

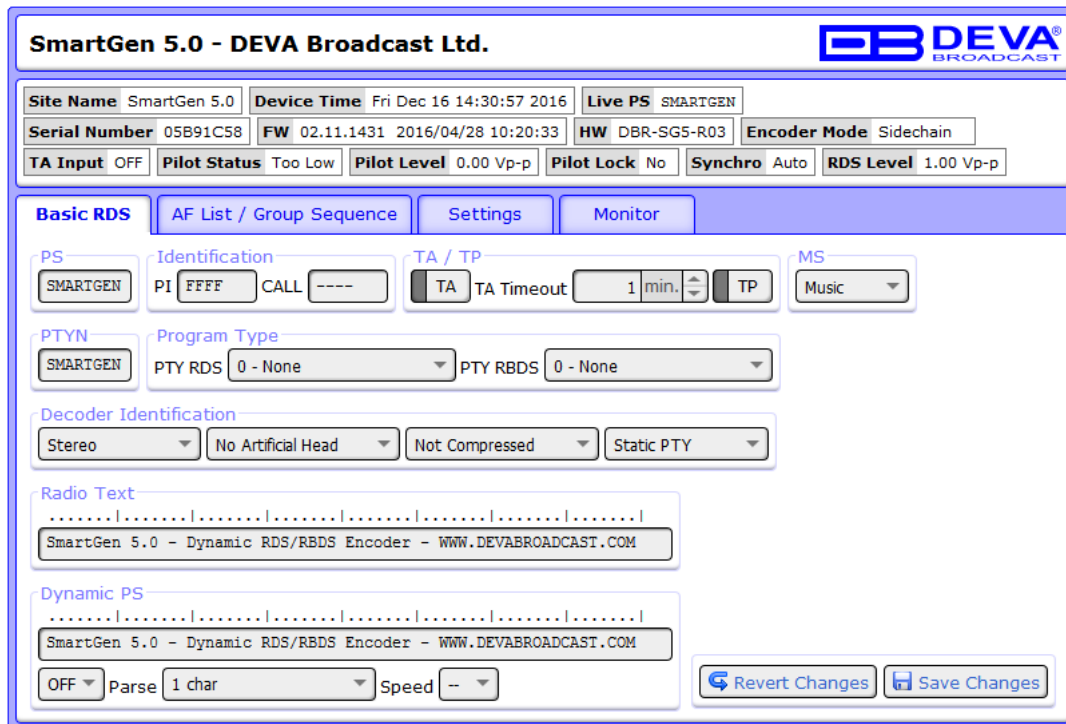
**ATTENTION:** Depending on Internet Protocol Settings, assigned IP address may not be visible outside your local network, thus device may be accessed only within that network. Consult with your network administrator for the appropriate IP settings.

Username and Password will be requested when connecting for the first time. Default values are *user* and *pass*.

The WEB interface is visually divided into two sections:

1. On top of the control window is placed constant section containing all the mandatory settings and statuses. This section is intended to allow fast reading of these parameters and is a permanent part of the WEB Interface.
2. Below this section is placed the content of each tab that enables the set-up of the RDS/RBDS encoder - Basic RDS, AF List/Group Sequence, Monitor.

## BASIC RDS



In this tab you will find all the essential RDS parameters needed for the Basic RDS applications.

**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.

**Identification - PI/CALL** – The *PI* code is your station’s ‘digital address’. It is a hexadecimal code that is assigned by an appropriate broadcasting authority in most countries, but in the United States the *PI* code is numerically calculated from the station’s call sign. We have provided a calculator utility within the encoder. An in-depth discussion of the mathematical calculation is given in RDS/RBDS Standard.

To use the *PI* calculator for US ‘K’ and ‘W’ call signs, simply enter call letters into the CALL box. The hexadecimal code will automatically be calculated into PI box. If the hexadecimal code for a US station is known, you may enter it under PI, and then the call sign will be calculated automatically into *CALL* box. When PI calculator fails to calculate PI or CALL the corresponding box will be filled with ‘----’.

**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.

**TA (Traffic Announcement)** – This is a temporary flag added to the RDS data stream only when a traffic bulletin is being aired. Some RDS car radios can be set to search for traffic bulletins among various *TP* stations 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.

**MS (Music/Speech Switch)** – This flag simply indicates whether music or speech is the primary broadcast programming.

**PTYN (Program Type Name)** – Program Type Name is transmitted as 8-bit characters. *PTYN* must only be used to enhance Program Type information and it must not be used for sequential information. PTYN Enable – [Enable] or [Disable] type 10A Group Transmission. This group allows further description of the current Program Type.

**PTY (Program Type)** – The *PTY* data flag identifies the station format from a 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. The *PTY* code is not meant to change from song to song or to accommodate a top-of-the-hour newscast, however.

**DI (Decoder Identification)** – This is one of several ‘flags’ that convey yes/no or other very basic data. This flag helps the receiver to indicate whether the broadcast is monaural or is 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.

**RT (Radio Text)** – This is a 64-character block of plain text that the listener can select for visual display on the faceplate of the radio by pressing an INFO button on the receiver. This function is not available on many automobile radios for safety reasons, which has precipitated the frowned-upon practice of scrolling the PS field instead. The Radio Text can announce song titles and performers, run special promotions or contests, or broadcast sponsors’ messages.

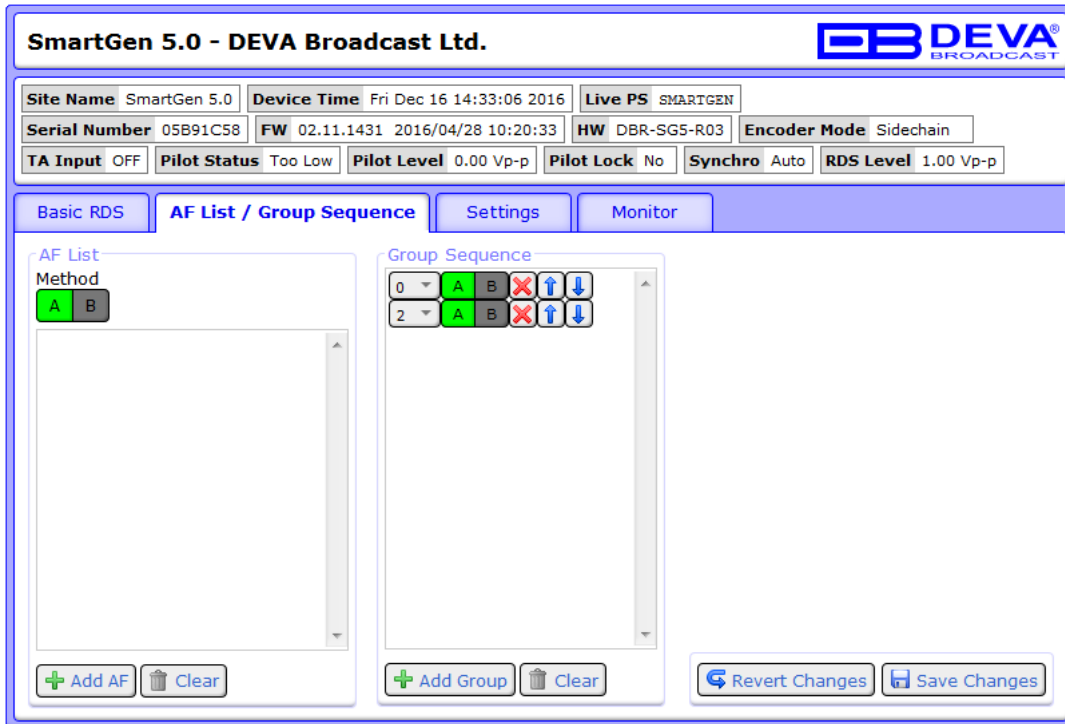
**Dynamic PS** ‘marches’ the message across the display screen one character at a time. The message requires a much longer transmission time in this mode, but a glance at the radio display a few seconds still allows the driver to get the full message without missing words.

*Scroll Speed* – The speed of dynamic PS messaging is set here, or dynamic PS messaging can be turned off entirely. When 0 - *DPS* Disabled is selected, the dynamic PS message remains in the nonvolatile encoder memory, but only the 8-character default static “street name” typed into the PS field (Basic RDS) will be displayed on the receiver faceplate. Setting the speed at 1 - Slowest will result in the slowest refresh rate of the ‘block’ message, or slowest safe scrolling. 9 - Fastest is the fastest speed, but many RDS radios display gibberish at high speed settings. The display should be stable with any radio at a speed setting of 7 or lower.

*Parse Mode* – sets the scroll step to be used in the “block” mode message transmission, more popular as ‘grouped-word’ method. Once Parse Mode option is set, this encoder function is valid for any scrolling-PS message, whether it is entered into the static DPS register, or received as ASCII text from station automation. Very short words are sent together in groups. For example, THIS IS constitutes seven characters that can be sent as a group. The same is applicable for OF THE or NOW HERE, also. Longer words, up to and including 8 characters, are sent individually: WARNING or DOUGHNUT or BICYCLE. The device can either center words that are sent individually on the radio display or left-justify them. This will be covered along with the function of the ‘DPS Scroll Step’. Words that exceed the available 8 characters are ‘sidestepped’ through two or more consecutive displays. Examples: EMERGENC followed by MERGENCY, or SUPERMAR followed by UPERMARK and PERMARKE and ERMARKET. This method of splitting words gives a good sense of continuity and readability. Setting Parse Mode to 1 - Scroll by 1 letter will scroll the message one character at a time, as described. Other numbers also safe-scroll the message, but at 2, 3, 4, and up to 8 characters at a time. Selecting 9 - Left Justified will parse, as described, but text will be left-justified rather than centered on the display. 2 through 8 may be useful in some special RDS applications, but 0 and 1 are the primary Parse Mode selections. To recap: 0 - Centered will enable the more-popular, centered-auto-parsed block mode and 1 - Scroll by 1 letter the Dynamic PS, letter-by-letter option.

**WHEN APPLYING NEW SETTINGS** – In order new settings to take effect, it is necessary to press the [Save changes] button. Please keep in mind that some of the new settings can reset the encoder.

## AF LIST / GROUP SEQUENCE



**SmartGen 5.0 - DEVA Broadcast Ltd.**

Site Name: SmartGen 5.0 | Device Time: Fri Dec 16 14:33:06 2016 | Live PS: SMARTGEN  
 Serial Number: 05B91C58 | FW: 02.11.1431 2016/04/28 10:20:33 | HW: DBR-SG5-R03 | Encoder Mode: Sidechain  
 TA Input: OFF | Pilot Status: Too Low | Pilot Level: 0.00 Vp-p | Pilot Lock: No | Synchro: Auto | RDS Level: 1.00 Vp-p

Basic RDS | **AF List / Group Sequence** | Settings | Monitor

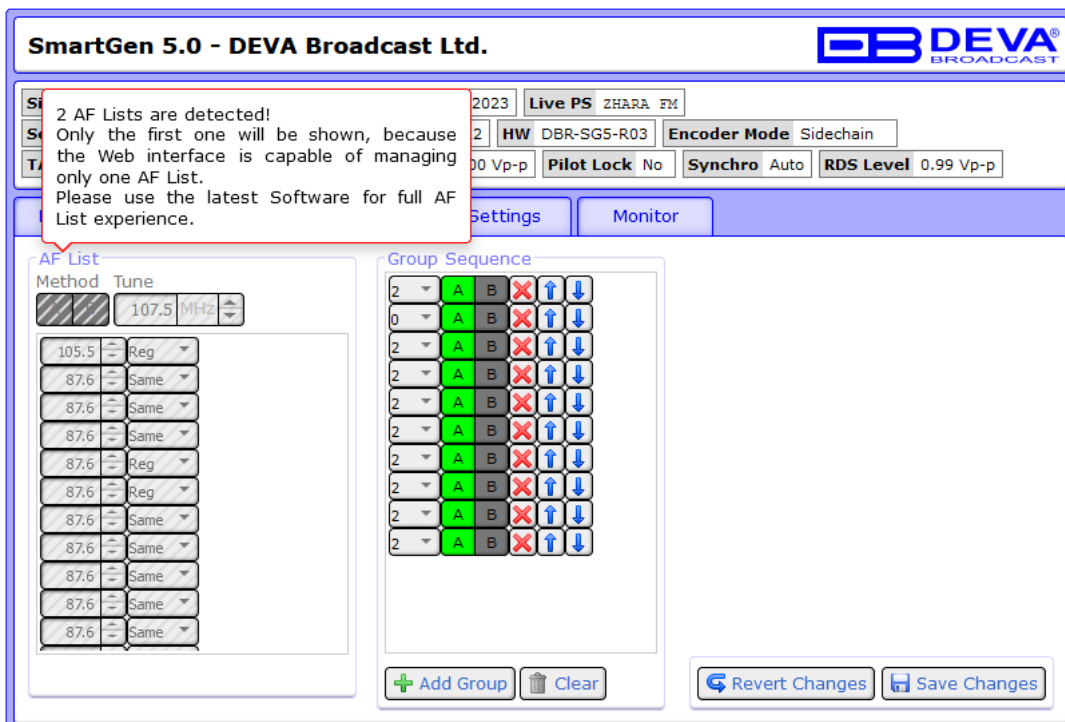
**AF List**  
 Method: A, B

**Group Sequence**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 0 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |

+ Add AF | Clear | + Add Group | Clear | Revert Changes | Save Changes

At the left side is shown AF List. At the right side is shown Group Sequence. To add new AF Method or Group sequence, follow the instructions below. If more than one AF list is detected, the following message will appear:



**SmartGen 5.0 - DEVA Broadcast Ltd.**

2 AF Lists are detected!  
 Only the first one will be shown, because the Web interface is capable of managing only one AF List.  
 Please use the latest Software for full AF List experience.

Site Name: SmartGen 5.0 | Device Time: 2023 | Live PS: ZHARA FM  
 Serial Number: 05B91C58 | FW: 02.11.1431 2016/04/28 10:20:33 | HW: DBR-SG5-R03 | Encoder Mode: Sidechain  
 TA Input: OFF | Pilot Status: Too Low | Pilot Level: 0.00 Vp-p | Pilot Lock: No | Synchro: Auto | RDS Level: 0.99 Vp-p

Settings | **Monitor**

**AF List**  
 Method: [shaded] | Tune: 107.5 MHz

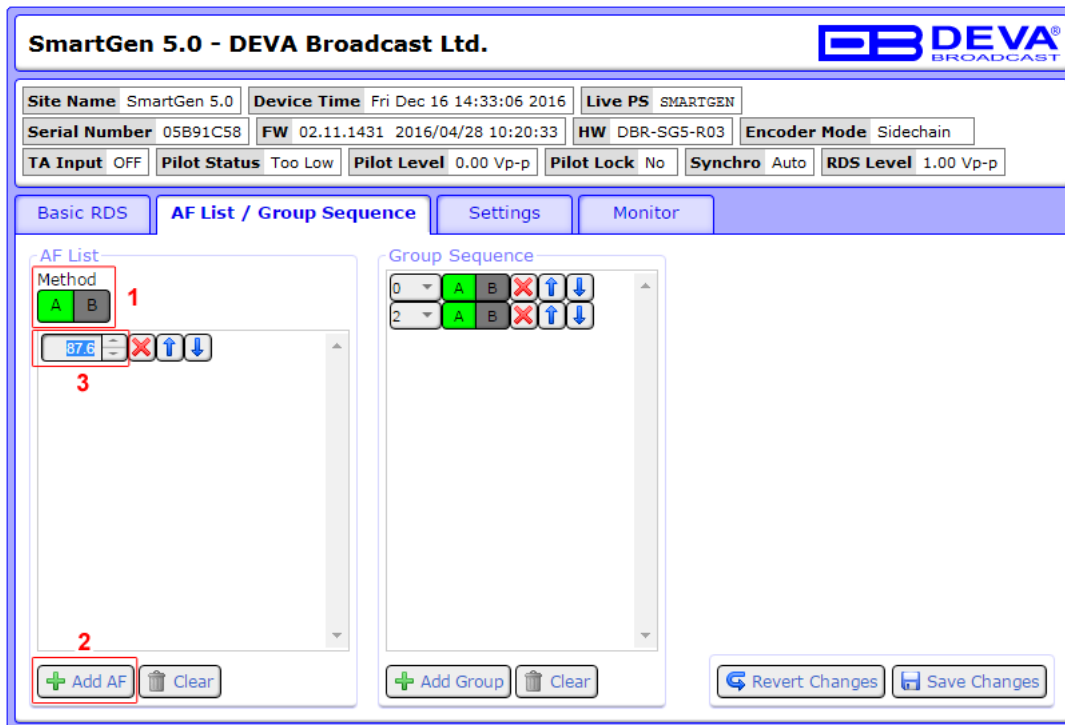
|       |      |
|-------|------|
| 105.5 | Reg  |
| 87.6  | Same |
| 87.6  | Same |
| 87.6  | Same |
| 87.6  | Reg  |
| 87.6  | Reg  |
| 87.6  | Same |
| 87.6  | Same |
| 87.6  | Same |
| 87.6  | Same |
| 87.6  | Same |

**Group Sequence**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 2 | A | B | X | ↑ | ↓ |
| 0 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |
| 2 | A | B | X | ↑ | ↓ |

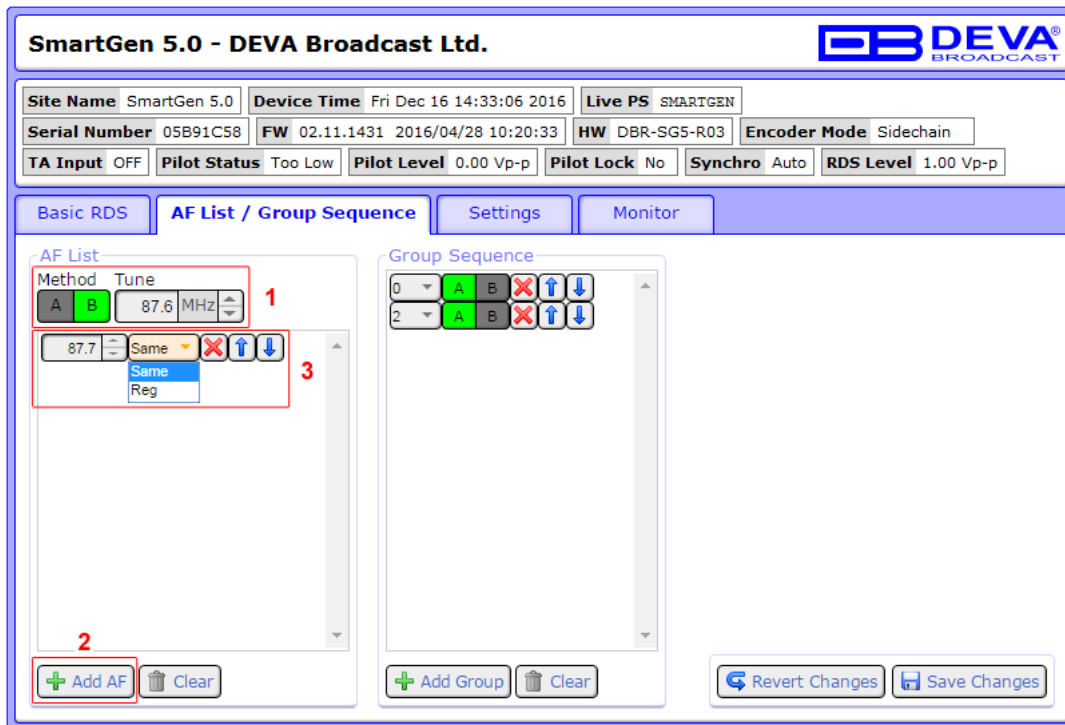
+ Add Group | Clear | Revert Changes | Save Changes

## How to add a new AF Method A



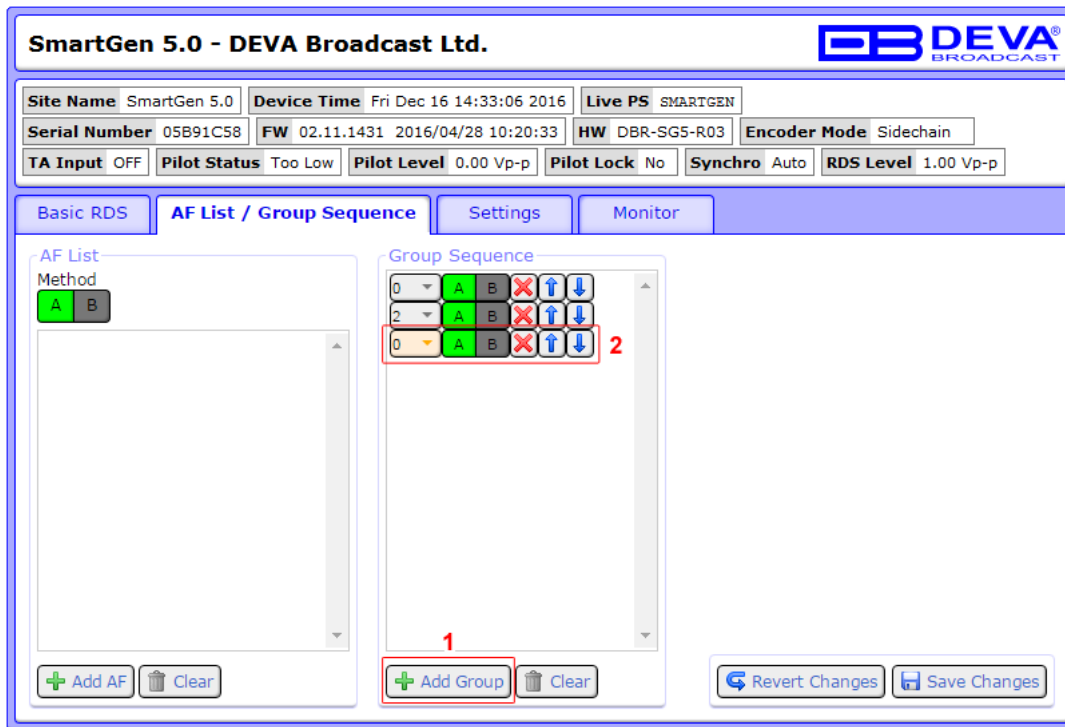
1. Select Method A;
  2. Press [+Add AF];
  3. Specify frequency by typing it in the relevant field, or via the [Up] and [Down] buttons, placed on the right of the frequency box;
- Repeat steps from 2 to 3 for all AF Method A to be added;
4. Press [Save Changes].

## How to add a new AF Method B



1. Select Method B and tuning frequency (Tune);
  2. Press [+Add AF];
  3. If not already done that, specify frequency by typing it in the relevant field, or via the [Up] and [Down] buttons, placed on the right of the frequency box. Then from the drop-down menu specify Same or Reg;
- Repeat steps from 2 to 3 for all AF Method B to be added;
4. Press [Save Changes].

## Add Group Sequence



1. Press [+Add Group];
2. Select the group number from the drop-down menu. Then from specify method to be used – A or B;  
Repeat steps from 1 to 2 for all Groups to be added;
3. Press [Save Changes].

## SETTINGS

**SmartGen 5.0 - DEVA Broadcast Ltd.**

Site Name: SmartGen 5.0 | Device Time: Fri Dec 16 14:33:27 2016 | Live PS: SMARTGEN

Serial Number: 05B91C58 | FW: 02.11.1431 2016/04/28 10:20:33 | HW: DBR-SG5-R03 | Encoder Mode: Sidechain

TA Input: OFF | Pilot Status: Too Low | Pilot Level: 0.00 Vp-p | Pilot Lock: No | Synchro: Auto | RDS Level: 1.00 Vp-p

Basic RDS | AF List / Group Sequence | **Settings** | Monitor

**Output**

Level: 1000 mVp-p | Phase: 0.0° | Encoder Mode: Sidechain | Synchro Source: Auto

Site Name: SmartGen 5.0 | Factory Defaults: Restore Defaults | Reboot Device: Reboot Device

**Firmware Update**

Current Firmware Version: 02.11.1431 2016/04/28 10:20:33 | Firmware File: [ ] [Upload]

Revert Changes | Save Changes

Contains information as regards the encoder's information and allows set-up of the encoder's **Output** and **Site Name**. **Factory defaults**, **Reboot Device** and **Firmware update** could also be performed via this tab.

The RDS Level is digitally adjusted. Section Output allows **Level**, **Phase**, **Encoder Mode** (Side-chain or Loop-through) and **Synchro Source**. The Synchro Source selects the synchronization source of the RDS subcarrier - Auto, Internal or External.

Section **Site Name** – is mainly used for informational services. It allows custom name to be set, so as the encoder could be more distinctive.

Pressing the [Factory Defaults] button will return the device to its factory defaults.


Pressing the [Reboot Device] will reboot the device.

Firmware Update contains information of the Current Firmware Version, and also allows the device's Firmware to be updated.

## FIRMWARE UPDATE

To update the device firmware, please follow the next steps:  
Select the new firmware file by pressing the [...] ('Browse') button;  
Press the "Upload" button;  
Wait for the process to complete.

## MONITOR

**SmartGen 5.0 - DEVA Broadcast Ltd.**


|               |              |              |                                |             |             |
|---------------|--------------|--------------|--------------------------------|-------------|-------------|
| Site Name     | SmartGen 5.0 | Device Time  | Fri Dec 16 14:33:46 2016       | Live PS     | SMARTGEN    |
| Serial Number | 05B91C58     | FW           | 02.11.1431 2016/04/28 10:20:33 | HW          | DBR-SG5-R03 |
| Encoder Mode  | Sidechain    |              |                                |             |             |
| TA Input      | OFF          | Pilot Status | Too Low                        | Pilot Level | 0.00 Vp-p   |
| Pilot Lock    | No           | Synchro      | Auto                           | RDS Level   | 1.00 Vp-p   |

Basic RDS

AF List / Group Sequence

Settings

Monitor

Group Detector

Total Groups: 1407444 % Count Reset Counters

|    | 0    | 1 | 2    | 3 | 4  | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----|------|---|------|---|----|---|---|---|---|---|----|----|----|----|----|----|
| A: | 703k |   | 703k |   | 2k |   |   |   |   |   |    |    |    |    |    |    |
| B: |      |   |      |   |    |   |   |   |   |   |    |    |    |    |    |    |

Device Uptime

Uptime: 1 day, 10:46:29

**Total Groups** Indicator – all received groups are systematized into a table, representing the percentage/quantity of the groups in the received RDS/RBDS signal. The user selects how the “Total groups received” data should be represented: as Percents (%) or as Count, by selecting the corresponding button.

[Reset Counters] – will reset the table content.

**Device Uptime** – measures the time that the RDS/RBD Encoder has been working.

## APPENDIX A

### RDS: EUROPE VS AMERICA

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The European Broadcasting Union (EBU) and its member countries originated the concept of “Radio Data” transmission. The European RDS specification, CENELEC Standard EN50067, was first published in 1984. It was revised in 1986, 1990, 1991 and 1992.

European RDS has grown in use following initial adoption of the Standard. RDS is nearly universal throughout Europe; it is almost impossible to find a European FM broadcasting station that does not carry a radio data subcarrier.

The popularity of RDS in Europe is very much in contrast with initial reluctance on the part of US broadcasters to embrace this technology. This can be ascribed to material differences in broadcasting practices.

Almost without exception, FM broadcasting in the United States is ‘detached’ and independent - each station originates its own programming. America’s National Public Radio might be considered as an exception, though for most of the broadcast day even NPR stations originate, or at least schedule, their own programs.

Most of European broadcasting is similar to the concept of network radio that was common in the US prior to the 1950s. In Europe, a central program originator may have many transmitting facilities of modest power situated throughout the country, at several different frequencies to blanket a designated service area. The European disposition, toward lower-power transmitters can be found on the “local radio” level, as well.

The European concept of a service area equates to the US broadcaster’s market. The subtle difference between these designations further characterizes broadcasting practices and ethics. RDS benefits the European broadcaster through almost an altruistic endeavor to be of service to his listeners. The US broadcaster is marketing his programming and is primarily interested in how he can create additional revenue from RDS.

### THE RDS SYSTEM

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RDS is a digital data channel, transmitted as a low-level subcarrier above the range of the composite stereo program signal in the FM baseband. The data transmission (baud) rate is comparatively low, yet it is quite robust because of data redundancy and effective error correction.

It is not within the scope of this Manual to cover the details of RDS subcarrier coding and modulation. For this, the reader is directed to the Specification appropriate to his location either the CENELEC EN50067 Specification for Europe or the United States NRSC Specification. Since the Manual will deal with specific implication of RDS implemented with the SmartGen 5, it is assumed that the user is familiar with the RDS concept.

## APPENDIX B.1

### PTY Code Description Used in RBDS Mode – North America

| PTY   | Short Name       | Description   |
|-------|------------------|---|
| 1     | News             | News reports, either local or network in origin.  |
| 2     | Information      | Programming that is intended to impart advice.  |
| 3     | Sports           | Sports reporting, commentary, and/or live event coverage, either local or network in origin.  |
| 4     | Talk             | Call-in and/or interview talk shows either local or national in origin.   |
| 5     | Rock             | Album cuts.   |
| 6     | Classic Rock     | Rock oriented oldies, often mixed with hit oldies, from a decade or more ago.   |
| 7     | Adult Hits       | An up-tempo contemporary hits format with no hard rock and no rap.  |
| 8     | Soft Rock        | Album cuts with a generally soft tempo.   |
| 9     | Top 40           | Current hits, often encompassing a variety of rock styles.  |
| 10    | Country          | Country music, including contemporary and traditional styles.   |
| 11    | Oldies           | Popular music, usually rock, with 80% or greater non-current music.   |
| 12    | Soft             | A cross between adult hits and classical, primarily non-current softrock originals.   |
| 13    | Nostalgia        | Big-band music.   |
| 14    | Jazz             | Mostly instrumental, includes both traditional jazz and more modern “smooth jazz.”  |
| 15    | Classical        | Mostly instrumentals, usually orchestral or symphonic music.  |
| 16    | Rhythm and Blues | A wide range of musical styles, often called “urban contemporary.”  |
| 17    | Soft R and B     | Rhythm and blues with a generally soft tempo.   |
| 18    | Foreign Language | Any programming format in a language other than English.  |
| 19    | Religious Music  | Music programming with religious lyrics.  |
| 20    | Religious Talk   | Call-in shows, interview programs, etc. with a religious theme.   |
| 21    | Personality      | A radio show where the on-air personality is the main attraction.   |
| 22    | Public           | Programming that is supported by listeners and/or corporate sponsors instead of advertising.  |
| 23    | College          | Programming produced by a college or university radio station.  |
| 24    | Spanish Talk     | Call-in shows, interview programs, etc. in the Spanish language   |
| 25    | Spanish Music    | Music programming in the Spanish language   |
| 26    | Hip-Hop          | Popular music incorporating elements of rap, rhythm-and-blues, funk, and soul   |
| 27-28 | Unassigned       |   |
| 29    | Weather          | Weather forecasts or bulletins that are non-emergency in nature.  |
| 30    | Emergency Test   | Broadcast when testing emergency broadcast equipment or receivers. Not intended for searching or dynamic switching for consumer receivers. Receivers may, if desired, display “TEST” or “Emergency Test”. |
| 31    | Emergency        | Emergency announcement made under exceptional circumstances to give warning of events causing danger of a general nature. Not to be used for searching - only used in a receiver for dynamic switching.   |

**NOTE:** These definitions can differ slightly between various language versions.

## APPENDIX B.2

### PTY Code Description Used in RDS Mode – Europe, Asia

| PTY | Short Name          | Description  |
|-----|---------------------|--|
| 1   | News                | Short accounts of facts, events and publicly expressed views, reportage and actuality.   |
| 2   | Current affairs     | Topical program expanding or enlarging upon the news, generally in different presentation style or concept, including debate, or analysis.   |
| 3   | Information         | Program the purpose of which is to impart advice in the widest sense.  |
| 4   | Sport               | Program concerned with any aspect of sport.  |
| 5   | Education           | Program intended primarily to educate, of which the formal element is fundamental.   |
| 6   | Drama               | All radio plays and serials.   |
| 7   | Culture             | Programs concerned with any aspect of national or regional culture.  |
| 8   | Science             | Programs about the natural sciences and technology.  |
| 9   | Varied              | Used for mainly speech-based programs usually of light-entertainment nature, not covered by other categories. Examples include: quizzes, games, personality interviews.  |
| 10  | Pop                 | Commercial music, which would generally be considered to be of current popular appeal, often featuring in current or recent record sales charts.   |
| 11  | Rock                | Contemporary modern music, usually written and performed by young musicians.   |
| 12  | Easy Listening      | Current contemporary music considered to be “easy-listening”, as opposed to Pop, Rock or Classical, or one of the specialized music styles, Jazz, Folk or Country. Music in this category is often but not always, vocal, and usually of short duration. |
| 13  | Light classics      | Classical Musical for general, rather than specialist appreciation. Examples of music in this category are instrumental music, and vocal or choral works.  |
| 14  | Serious classics    | Performances of major orchestral works, symphonies, chamber music etc., and including Grand Opera.   |
| 15  | Other music         | Musical styles not fitting into any of the other categories. Particularly used for specialist music of which Rhythm & Blues and Reggae are examples.   |
| 16  | Weather             | Weather reports and forecasts and Meteorological information.  |
| 17  | Finance             | Stock Market reports, commerce, trading etc.   |
| 18  | Children’s programs | For programs targeted at a young audience, primarily for entertainment and interest, rather than where the objective is to educate.  |
| 19  | Social Affairs      | Programs about people and things that influence them individually or in groups. Includes: sociology, history, geography, psychology and society.   |
| 20  | Religion            | Any aspect of beliefs and faiths, involving a God or Gods, the nature of existence and ethics.   |
| 21  | Phone In            | Involving members of the public expressing their views either by phone or at a public forum.   |
| 22  | Travel              | Features and programs concerned with travel to near and far destinations, package tours and travel ideas and opportunities. Not for use for Announcements about problems, delays, or roadworks affecting immediate travel where TP/TA should be used.    |
| 23  | Leisure             | Programs concerned with recreational activities in which the listener might participate. Examples include, Gardening, Fishing, Antique collecting, Cooking, Food & Wine etc.   |
| 24  | Jazz Music          | Polyphonic, syncopated music characterized by improvisation.   |
| 25  | Country Music       | Songs which originate from, or continue the musical tradition of the American Southern States. Characterized by a straightforward melody and narrative story line.   |
| 26  | National Music      | Current Popular Music of the Nation or Region in that country’s language, as opposed to International ‘Pop’ which is usually US or UK inspired and in English.   |
| 27  | Oldies Music        | Music from the so-called “golden age” of popular music.  |
| 28  | Folk Music          | Music which has its roots in the musical culture of a particular nation, usually played on acoustic instruments. The narrative or story may be based on historical events or people.   |
| 29  | Documentary         | Program concerned with factual matters, presented in an investigative style.   |
| 30  | Alarm Test          | Broadcast when testing emergency broadcast equipment or receivers. Not intended for searching or dynamic switching for consumer receivers.. Receivers may, if desired, display “TEST” or “Alarm Test”.   |
| 31  | Alarm               | Emergency announcement made under exceptional circumstances to give warning of events causing danger of a general nature. Not to be used for searching - only used in a receiver for dynamic switching.  |

## APPENDIX C

### RDS APPLICATIONS SUPPORTED

---

Following is an alphabetical list of the RDS applications supported by SmartGen 5. The standardized RDS application abbreviation is followed by an expansion of the application name and a short explanation of the function.

#### **AF**

List of Alternative Frequencies: In order holes in the coverage area to be filled, list of all frequencies where identical program could be heard simultaneously can be included by the network broadcaster or one with low-power rebroadcast transmitters (translators). The RDS receiver (particularly the upscale car radio) constantly searches for the best signal that carries the same program. The radio will re-tune without noticeable interruption, when a better signal is found. The principal utility of this RDS function is with European radio networks and US stations with 'translators.'

#### **CT**

Clock Time and date: Time and date codes should use Coordinated Universal Time (UTC) and Modified Julian Day (MJD). If  $MJD = 0$ , the receiver should not be updated. The listener, however, will not use this information directly and the conversion to local time and date will be made in the receiver's circuitry. CT is used as time stamp by various RDS applications and thus it must be accurate.

#### **DI**

Decoder Information: This is one of several 'flags' that convey yes/no or other very basic data. This flag helps the receiver to indicate whether the broadcast is monaural or is 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.

#### **ECC**

Extended Country Code: RDS uses its own country codes. The first most significant bits of the PI code carry the RDS country code. The four bit coding structure only permits the definition of 15 different codes, 1 to F (hex). Since there are much more countries to be identified, some countries have to share the same code which does not permit unique identification. Hence there is the need to use the Extended Country Code which is transmitted in Variant 0 of Block 3 in type 1A groups and together with the country identification in bits b15 to b12 of the PI code render a unique combination. The ECC consists of eight bits.

## **EON**

Enhanced Other Networks information: This feature can be used to update the information stored in a receiver about program services other than the one received. The alternative frequencies-PS name, Traffic Program and Traffic Announcement identification as well as Program Type and Program Item Number information can be transmitted for each other service. The relation to the corresponding program is established by means of the relevant Program Identification. Linkage information, consisting of four data elements, provides the means by which several program services may be treated by the receiver as a single service during times a common program is carried. Linkage information also provides a mechanism to signal an extended set of related services.

## **EWS**

Emergency Warning System: The EWS is intended to provide coding for warning messages. These messages will be broadcasted only in case of emergency and will be evaluated by special receivers.

## **FFG**

**Free Format Groups:** A provision has been included in the SmartGen 5 to transmit proprietary data directly within a legitimate RDS group. This is a special use of the encoder for non-standard applications.

## **IH**

In House application: This refers to data to be decoded only by the operator. Some examples noted are identification of transmission origin, remote switching of networks and paging of staff. The applications of coding may be decided by each operator itself.

## **M/S**

Music / Speech Switch: This flag simply indicates whether music or speech is the primary broadcast programming. The purpose of this function is not well explained in the respective Standards; hence it comes as no surprise that it is not widely used.

## **ODA**

Open Data Applications: The Open Data Applications feature allows data applications, not previously specified in EN 50067, to be conveyed in a number of allocated groups in an RDS transmission. The allocated groups are indicated by using type 3A group which is used to identify to a receiver the data application in use in accordance with the registration details in the EBU/RDS Forum - Open Data Applications Directory and the NRSC Open Data Applications Directory.

## **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 authorities in most countries, but in the US it 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.

## **PIN**

**Program Item Number:** The code enables the designed to use this feature receivers and recorders to respond to the preselected by the user program item(s). This feature is used via scheduled program time, to which in order to avoid ambiguity is added the day of the month.

## **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 the automobile receivers. Because of driving safety considerations broadcasters are generally discouraged from scrolling messages in this field. As a matter of fact, it is a violation of both the CENELEC and the NRSC standards to scroll the PS display, although the practice has become universally common.

## **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 ["PTY Code Description Used in RBDS Mode – North America" on page 68](#) and ["PTY Code Description Used in RDS Mode – Europe, Asia" on page 69](#).

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.

## **PTYN**

**Program TYpe Name:** The PTYN feature allows the predefined by the RDS/RBDS Standard PTY to be further described using user-defined text (e.g. PTY=4: Sport and PTY=8: Football). The PTYN is not intended to change the default eight characters of PTY which will be used during search or wait modes. Its purpose is to show in details the program type once tuned to a program. If the broadcaster is satisfied with the default PTY name, it is not necessary to use additional data capacity for PTYN. The Program Type Name is not intended to be used for automatic PTY selection and must not be used for giving sequential information.

## **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 by pressing an INFO button on the receiver. This function is not available on many automobile radios for safety reasons, which has precipitated the frowned-upon practice of scrolling the PS field instead.

Most radios have limited alphanumeric display capability, so the 64 characters of RadioText 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.

## **RT+**

RadioText Plus is “semantic analogue radio”. It allows the RDS feature RadioText (RT) to be read by the FM RDS receiving terminals. Based on the RDS RT messages, RT+ is completely backwards compatible with RT. The usage of RT+ allows the listener/user to derive additional benefits from the RDS Radio Text service. It enables FM RDS receivers to “read” Radio Text (to recognize designated objects and make them manageable) by user’s direct access to specific elements of the Radio Text messages. For example, that element could be programme associated metadata like Title and Artist of the currently playing song or a news headlines. This provides the listener with an “mp3-player feeling” while listening to analogue FM radio. The elements can also carry additional service messages or information about the Radio Station such as the telephone number or the web address of the Radio Station’s hotline. These objects, or more accurately RT+ information elements carried in the RDS RadioText (RT) messages, are identified by their location within the RT messages and by the class code of their content type. Once an information element is received and understood, a receiver is able to, for example, store the different RT+ information elements and the listener may then select and request a specific content type from the radio’s memory at an instant in time that suits the listener’s needs. Thus the listener is no longer forced to watch the RT information passing (scrolling) by. Moreover, RT+ offers selected RT message elements to car drivers on a static display, without risk of distracting the attention of the driver. Furthermore, RT+ is well suited for mobile phones with built-in FM receivers: telephone numbers can be directly used to initiate calls, and web addresses can be used to start browsing the web content offered by the radio programme provider. Last but not least, RT+ is also used for satellite radio broadcasting via DVB-S. It may be adopted by DRM and DAB in the future, too.

## **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.

## **TDC**

**Transparent Data Channels:** The transparent data channels consist of 32 channels, which may be used to send any type of data.

## **TMC**

**Traffic Message Channel:** This feature is intended to be used for the coded transmission of traffic information.

## **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.

## PRODUCT REGISTRATION CARD

- All fields are required, or warranty registration is invalid and void

Your Company Name \_\_\_\_\_

Contact \_\_\_\_\_

Address Line 1 \_\_\_\_\_

Address Line 2 \_\_\_\_\_

City \_\_\_\_\_

State/Province \_\_\_\_\_ ZIP/Postal Code \_\_\_\_\_

Country \_\_\_\_\_

E-mail \_\_\_\_\_ Phone \_\_\_\_\_ Fax \_\_\_\_\_

Which DEVA Broadcast Ltd. product did you purchase? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Product Serial # \_\_\_\_\_

Purchase date \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Installation date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

\_\_\_\_\_  
Your signature\*

\*Signing this warranty registration form you are stating that all the information provided to DEVA Broadcast Ltd. are truth and correct. DEVA Broadcast Ltd. declines any responsibility for the provided information that could result in an immediate loss of warranty for the above specified product(s).

**Privacy statement: DEVA Broadcast Ltd. will not share the personal information you provide on this card with any other parties.**

## WARRANTY TERMS AND CONDITIONS

**I. TERMS OF SALE:** DEVA Broadcast Ltd. products are sold with an understanding of “full satisfaction”; that is, full credit or refund will be issued for products sold as new if returned to the point of purchase within 30 days following their receipt, provided that they are returned complete and in an “as received” condition.

**II. CONDITIONS OF WARRANTY:** The following terms apply unless amended in writing by DEVA Broadcast Ltd.

**A.** The Warranty Registration Card must be completed and returned to DEVA Broadcast Ltd. within 10 days of delivery. Product registration can also be done digitally at <https://www.devabroadcast.com/members/product-registration>, after registering on our website, within 10 days of delivery.

**B.** This Warranty applies only to products sold “as new.” It is extended only to the original end-user and may not be transferred or assigned without prior written approval by DEVA Broadcast Ltd.

**C.** This Warranty does not apply to damage caused by improper mains settings and/or power supply.

**D.** This Warranty does not apply to damage caused by misuse, abuse, accident or neglect. This Warranty is voided by unauthorized attempts at repair or modification, or if the serial identification label has been removed or altered.

**III. TERMS OF WARRANTY:** DEVA Broadcast Ltd. products are warranted to be free from defects in materials and workmanship.

**A.** Any discrepancies noted within TWO YEARS of the date of purchase will be repaired free of charge, or the equipment will be replaced with a new or remanufactured product at DEVA Broadcast Ltd. option.

**B.** Parts and labor for factory repair required after the two-year Warranty period will be billed at prevailing prices and rates.

### IV. RETURNING GOODS FOR FACTORY REPAIR:

**A.** Equipment will not be accepted for Warranty or other repair without a Return Material Authorization (RMA) number issued by DEVA Broadcast Ltd. prior to its return. An RMA number may be obtained by placing an RMA request at <https://www.devabroadcast.com/rma>. The number should be prominently marked on the outside of the shipping carton.

**B.** Equipment must be shipped prepaid to DEVA Broadcast Ltd. Damage sustained as a result of improper packing for return to the factory is not covered under terms of the Warranty and may occasion additional charges.

### V. UPDATES TO THE TERMS OF SERVICE:

For the most up-to-date, valid, and accurate terms, conditions, and product documentation, please visit the official DEVA Broadcast Ltd. website downloads section at <https://www.devabroadcast.com/downloads/deva-documents>. Printed documents may not reflect recent amendments. Reviewing the current online versions ensures you have the latest information.

