MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

SmartGen 6.0

RDS/RBDS Encoder
with LAN, USB & RS-232 Connectivity

UECP Compatible

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Introduction

DEVA Broadcast Ltd. is an international communications and high-technology manufacturing organization, its corporate headquarters and facility located in Burgas, Bulgaria. The company serves the broadcast and corporate markets worldwide – from consumers and small businesses to the largest global organizations. It is dedicated to the research, design, development and provision of advanced products, systems and services. DEVA launched its own brand back in 1997 and has nowadays evolved to become known as a market leader and internationally reputed manufacturer of user-friendly, cost-effective and innovative broadcast products.

Creativity and innovation are deeply woven into DEVA corporate culture. Through successful engineering, marketing and management our team of dedicated professionals creates future-oriented solutions to improve customers' performance. You may rely that all issues communicated to our crew would be addressed accordingly. We pride ourselves on our pre and post-sales support and purchase services, which along with the outstanding quality of our radio gear have won us due respect and the market authority position.

DEVA best-of-breed solutions have become the best sellers for our partners. The strategic partnerships which have been formed with industry leaders during all these years that we have been operating on the broadcasting market, have proved us a reliable business partner and a valuable asset, as our dealers worldwide would confirm. In constant pursuit of precision and long-term satisfaction, DEVA enhances the reputation of our partners and clients alike. Furthermore, we have already a proven merit as a credible partner provider.

Our portfolio offers complete line of high quality and competitive products for FM and Digital Radio, Radio Networks, Telecommunication Operators and regulation authorities. For almost two decades of intensive software and hardware development, we have achieved a unique price-performance and endurance of our product lines. Our company's multitude of equipment and services is in line with the latest technologies and key trends. The most recognizable characteristics attributed to DEVA products are their clear-cut, streamlined design, easiness of use and cost-effectiveness: simplicity of forms but multiplicity of functions.

For us there is no stage when we deem that we have reached the most satisfactory level in our work. Our engineers are in constant pursuit of new ideas and technologies to be captured in DEVA solutions. Simultaneously, a strict control is being exercised at each step of any new development. Experience and hard work are our fundament but the continuous improving process is what we never leave aside. DEVA participates on a regular basis in all landmark broadcasting events, not only to promote its products, but to exchange valuable know-how and experience. We are also engaged in international large-scale projects involving radio and audio solutions which makes us even more competitive on the global market.

All DEVA products are developed and produced in accordance with the latest ISO 9001 quality control standards.

General Information

Manufactured to meet the highest standards in broadcasting, SmartGen 6.0 encoder furnishes all the mandatory for this high class equipment features, at competitive price.

Since all DEVA's products are manufactured to be user friendly in terms of operation, SmartGen 6.0 comes with simple and reliable programming software: "SmartGen RDS/RBDS Encoders Manager" and a password protected WEB interface for remote connection.

The local (RS232, USB) and remote (TCP/IP, UDP/IP) interfaces permit fast and full integration of the RDS/RBDS encoder to the station's other functions, including message streams for digital radio and Webcasting. The LCD (2x40) text display and Intuitive Navigation menu are used for on-site navigation through the menus, quick access to the parameters and the functions and for altering of their values. In addition, the display visualizes the incoming raw data from the station, just as the radio of your listeners does.

The need of highly-accurate time source is satisfied not only by the supported SNTP but also by the built-in GPS Module. The used GPS technology provides means for synchronizing the unit with UTC and makes the sub-second timekeeping possible and easy to achieve.

Another impressive feature of SmartGen 6.0 is the SNMP agent software component, which reports information via SNMP to one or more administrative computers (managers). SmartGen 6.0 complies with SNMPv2C. The function SNMP traps or E-mail notification on user-defined alerts is also available.

SmartGen 6.0 is supplied with two separate outputs – one for RDS+MPX and one for RDS only. The two General Purpose Inputs are with user-defined functionality, allowing easy integration of SmartGen 6.0 to the station's needs. The four General Purpose Outputs are also user-defined and allow easy management of external devices, when needed.

Based on the latest RDS technology, SmartGen 6.0 guarantees fully digital synthesis of the RDS signal, with excellent quality and spectral purity. This advanced device is a cost-effective solution for sending of TMC, EWS Services and song tagging via the supported RT+ function. The device can 'parse' scrolling text, automatically breaking the phrases into word groups.

Supporting all RDS Applications, in conformity with the European CENELEC and the United States NRSC standards, SmartGen 6.0 is fully compatible with UECP EBU SPB490 Version 7.05.

In line with the latest technology, SmartGen 6.0 is proved and reliable hardware for 24/7/365 operation.

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Product Features

- Fully Digital Synthesis of RDS signal with excellent quality and spectral purity
- Fully independent RDS decoder for self-monitoring purposes
- Front panel LCD Display and Buttons for operating without a computer
- Remote configuration via ASCII or UECP protocols through RS-232, LAN, USB
- Supported Network Protocols: HTTP, FTP, SNMP, SMTP, UPnP, UDP and TCP
- 4x user-defined GPO, allowing easy management of external devices when needed
- 2x General Purpose Inputs with user-defined functionality
- Includes the TA function for traffic message priority override
- Alert notifications on user-defined events via SNMP traps or E-mails
- Real time clock Schedules for Scrolling Text and text lists
- Custom HTML formatted E-mail templates with dynamic variables
- SNTP & GPS module for automatic synchronization of the built-in clock
- Supports European CENELEC and United States NRSC standards
- Attractive price and very good price-performance ratio
- Full support of Open Data Applications
- Supports RT+ for songs and content tagging
- PS & Radio Text Scrolling Options
- Supports TMC (Traffic Message Channel)
- Compatible with EWS (Emergency Warning System)
- Embedded WEB server for interactive supervision
- Fully compatible with UECP EBU SPB490 Version 7.05
- MPX Loopthrough & Sidechain Modes
- Internal or external Pilot / MPX synchronization
- Very Intuitive UECP Configuration Software
- Remote RDS viewer to visualize broadcasted data
- Proved and reliable hardware for 24/7/365 operating
- Easy Installation and Setup
- LAN, USB & 2x RS-232 Interfaces
- Embedded SNMP agent permitting active management tasks
- Interfaces with all popular radio automation systems
- Built-in dedicated 19kHz source for internal sync
- Built-in failsafe bypass relay
- Separate outputs for RDS+MPX and for RDS only
- Works with any FM exciter and stereo generator
- Internal data diagnostics and transmission safeguards
- 19” Professional Case for high RF immunity

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TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS	
Chassis Dimensions	1U x 19” x 7”; 44x485x178mm
Shipping Weight	2kg
Power Supply	Internal 100–240V; 50–60Hz
Pilot/MPX Input	Yes
MPX/RDS Output	0 to 4095 mV
Inputs/Outputs	2x GPI, 4x GPO user-defined functionality
Communication Port	2x RS232, USB, LAN
Synchronization	External (Pilot or MPX), Internal, Auto
Synchronization Monitoring	Yes
RDS Level adjustment	Digitally controlled
Phase adjustment	Yes, 0 ÷ 359.9°
Separate outputs for RDS+MPX and for RDS only	Yes
Command to activate the RDS SCA	Yes
Side Chain Mode, Loop through mode, Bypass feature	Yes
RDS Subcarrier	100% Digitally Generated Shape Bypass: 0 dB
Pilot synchronization	Input Level: -50dBu to +12dBu Frequency: 19kHz, ±3Hz
EN50067 compliant	Yes
Accurate Clock Time (CT) Sync with Internet Connection	Yes
Remote TA actuation for Traffic Announcements	Yes
GPS module for automatic synch of the built-in clock	Yes
Fully independent RDS decoder for self-monitoring purposes	Yes
Firmware can be upgraded remotely via any WEB browser	Yes
Front-panel LCD displays all programmed data	Yes
Data may be entered on-site with Front-panel Buttons	Yes
Operating Temperature	0°C ÷ 55°C
RDS FEATURES	
Group supported	All
Group Sequence	Configurable
PS	6 DSN x 4 PSN
PI	6 DSN x 4 PSN
PTY	RDS/RBDS
AF Method A	25
AF Method B	up to 100
RT	Yes, 10 messages
RT rate adjustment	Group Sequence
RT+ for songs and content tagging	Yes

TP	Yes
TA Control	Command, Contact closure, Software
PTYN	Yes
EON	4 PSN
CT	Yes
TMC, EWS, IH, TDC	Yes
Free Format Groups (FFG)	Yes
Open Data Application (ODA)	Yes
64-character Dynamic PS shown on all RDS/RBDS Radios	Yes
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
COMMUNICATION	
Communication Interfaces	2x RS-232, USB, LAN
Connection with Automation Software	Yes
Network Connectivity	2x TCP ports; 2x UDP ports
Configuration	Embeded Web Server, SmartGen Encoders Manager, SNMP and Front-panel
Password Protection	Yes
ASCII Protocol	Yes
Alert notifications on user-defined events via SNMP traps or E-mails	Yes
Embedded SNMP agent permitting active management tasks	Yes
Custom HTML formatted E-mail templates with dynamic variables	Yes
Supported Network Protocols:	HTTP, FTP, SNMP, SNTP, SMTP, UPnP, UDP, TCP
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

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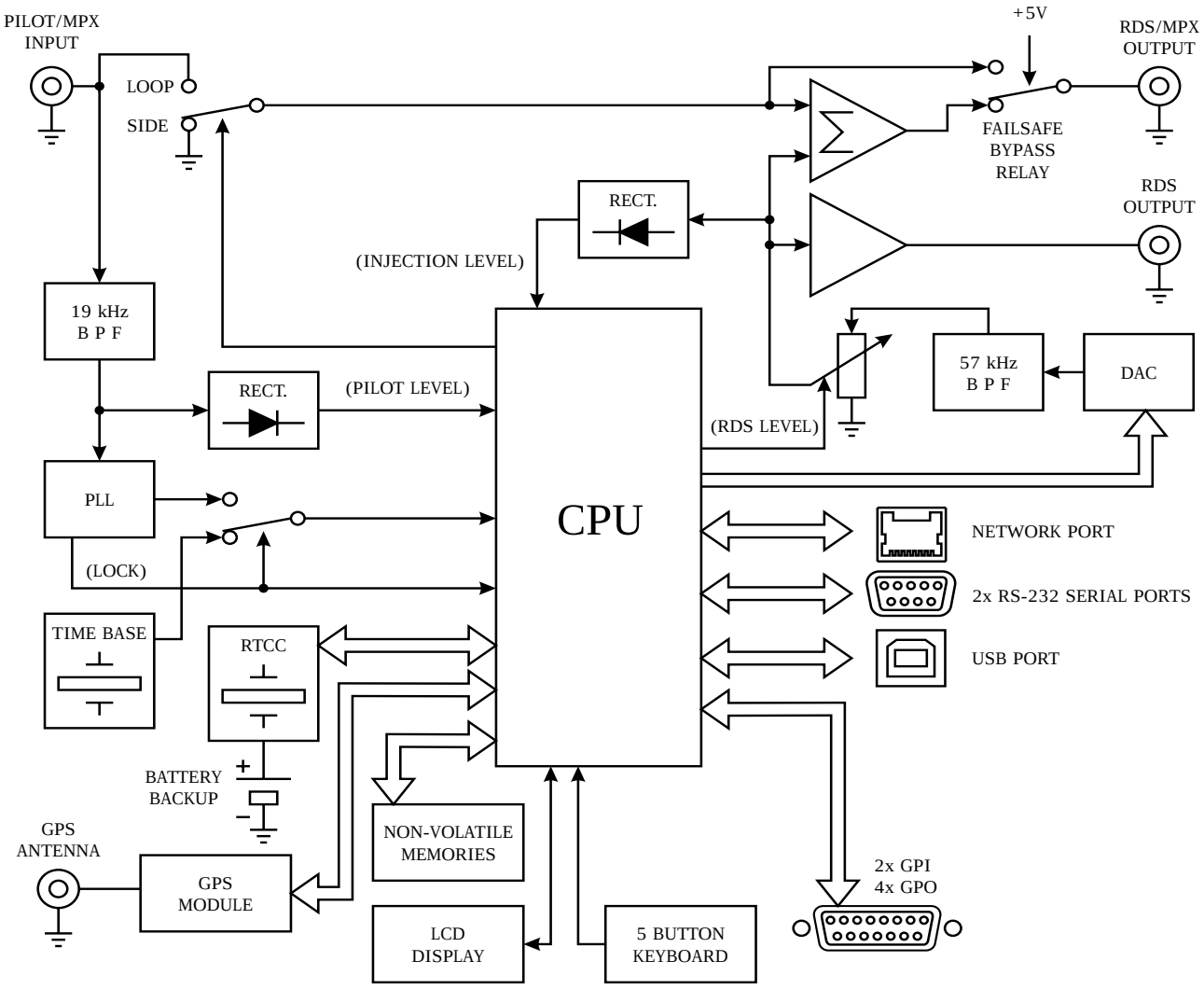
BLOCK DIAGRAM



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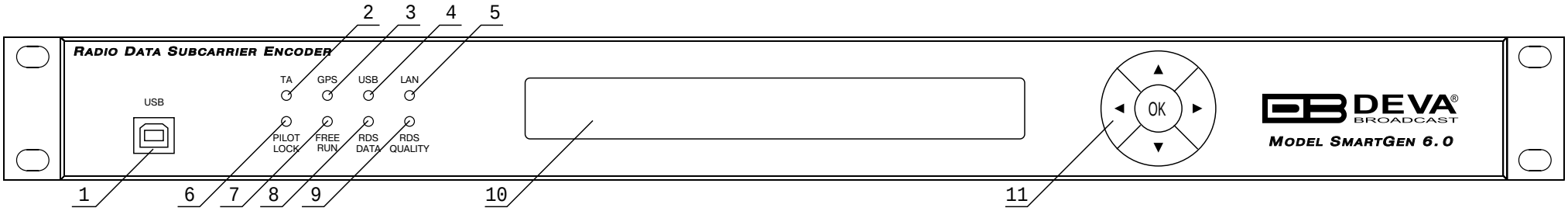
FRONT PANEL



1. **USB Connector** - B-Type, for interconnection with PC / USB 2.0 Communication Port
2. **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.
3. **GPS** – When GPS is set as Time Sync Source and GPS fix is available, the light will be flashing.
4. **USB** – Indicates that USB connection has been established
5. **LAN** – Will be lit when an Ethernet connection is established. The same indicator will blink when there is an Ethernet activity.
6. **PILOT LOCK** - This LED lights when the encoder has locked to the 19 kHz stereo pilot signal from the stereo generator, either in the sidechain or the loop-through mode of encoder operation.
7. **FREE RUN** - When no 19 kHz pilot is present at the PILOT OR MPX INPUT, the encoder defaults to a crystal-controlled internal time base. This enables RDS transmissions with monaural programming. The FREE RUN LED shows that the encoder has defaulted to its internal time base.
8. **RDS DATA** - This LED flashes dimly as RDS data is being transmitted, serving as an indication that the encoder is operating normally. Even when no dynamic data is being sent, the various RDS groups of static identifiers are updated continually.
9. **RDS Quality** –When the device is operating normally the indicator will not be lit. When there is presence of BER in the RDS signal, or the lack of such on the output, the LED indicator will flash.
10. **LCD Display**
11. **Navigational Buttons** – UP and DOWN, LEFT and RIGHT and OK buttons are used to navigate through the LCD menus selecting various functions and parameters.

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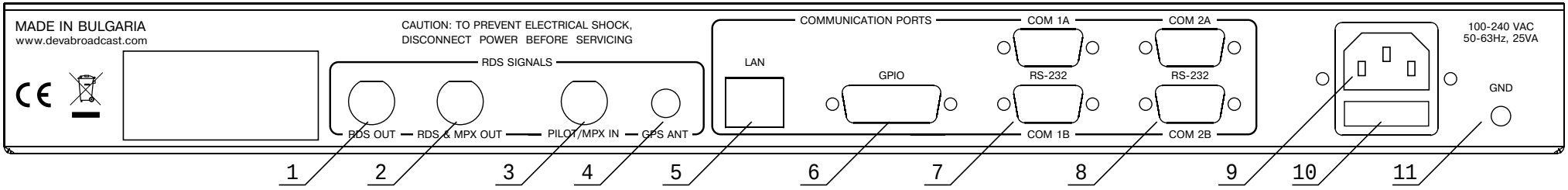
REAR PANEL



1. **RDS OUT** – BNC Connector RDS signal only
2. **RDS/MPX OUTPUT** - BNC Connector for RDS/MPX output signal
3. **PILOT/MPX IN** – BNC Connector Input for PILOT/MPX IN
4. **GPS ANT** - Consumer-standard SMA connector for GPS Antenna input
5. **LAN** - RJ-45 TBASE100 connector for TCP & UDP connections;
6. **GPIO PORTS** – DB-15 Female, General Purpose Input/Output Ports
7. **COM 1A/1B Port** – 2 x RS-232 COM PORT – DB-9 MALE/FEMALE
8. **COM 2A/2B Port** – 2 x RS-232 COM PORT – DB-9 MALE/FEMALE
9. **Mains connector**, 110-240VAC, IEC 60320 C14 type;
10. **Fuseholder** – 1A;
11. **GND Pin** - Chassis Earth Ground

ATTENTION: Please have in mind that the DB-9 MALE/FEMALE connectors of COM Port 1A and 1B cannot be used simultaneously. The same rule is also applicable for COM Ports 2A and 2B.

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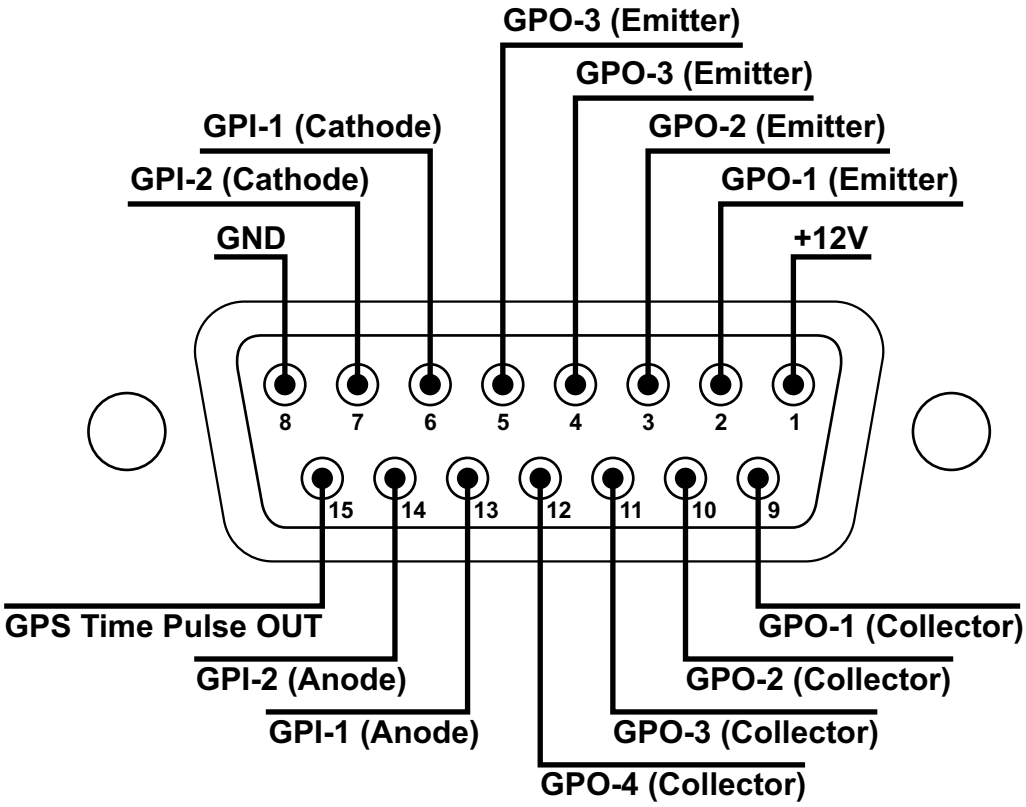
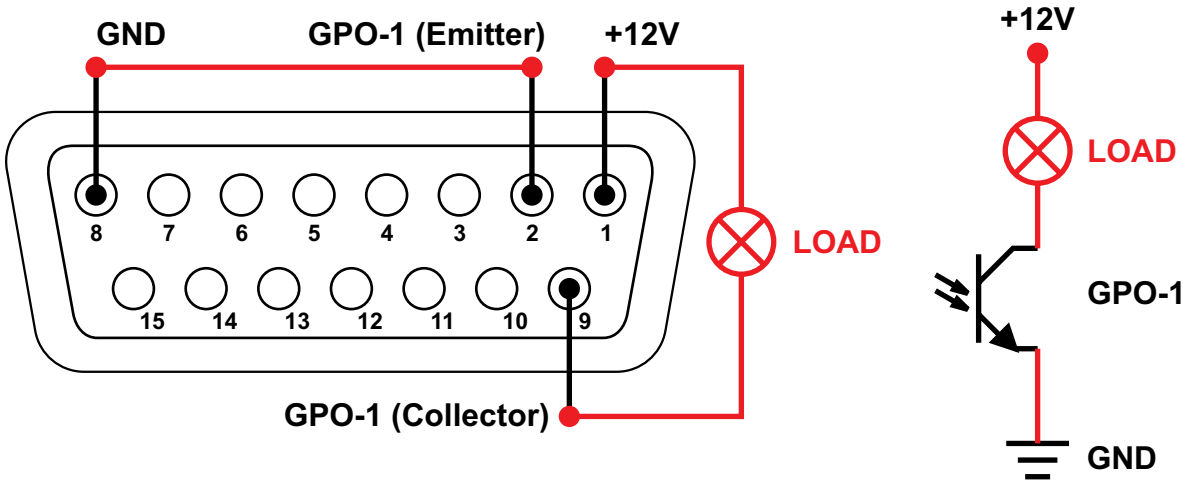
REAR PANEL GENERAL PURPOSE PORTS

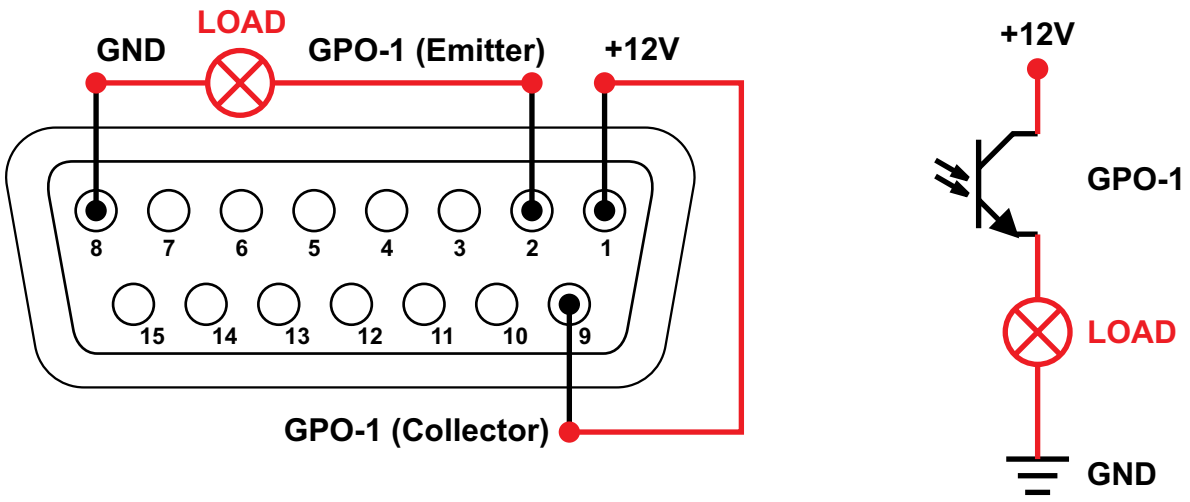
Connector Pinouts



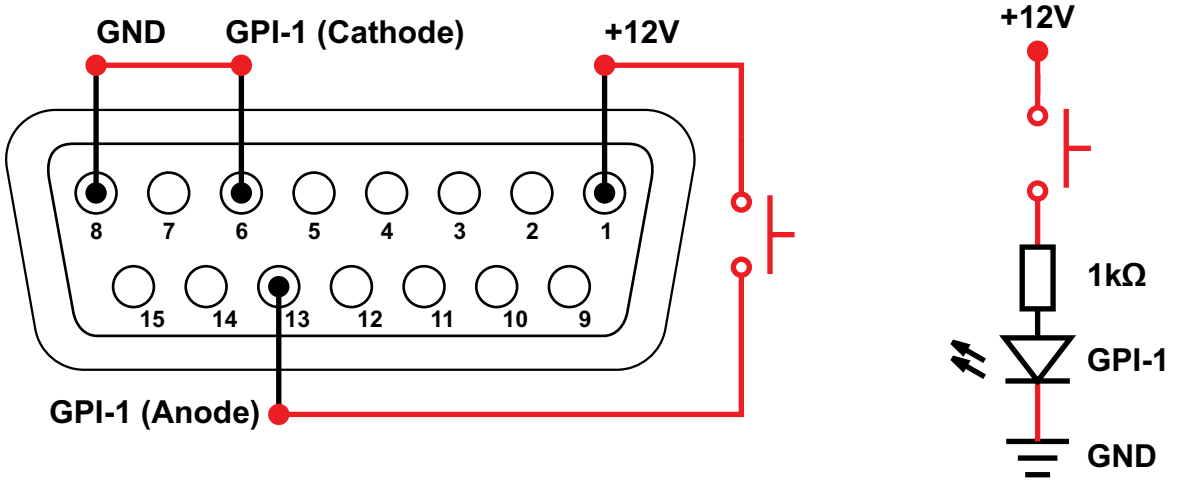
GPO – Active +



GPO – Active 0



GPI to a normally open momentary push-button



Electrical Characteristics of Optocouplers

Vec < 6V	Ic < 50mA
Vce < 70V	Pd < 150mW

Before you start

SAFETY WARNING

Always observe the safety precautions!

The following safety precautions provide important information intended to prevent personal injury to the operator and others, and property damage.

- The servicing of electronic equipment should be performed only by qualified personnel only;
- Before removing the covers, SmartGen 6.0 must be switched off and the power cable unplugged;
- Never touch the wires or the electrical circuits;
- Use insulated tools only;
- Never touch the metal semiconductor. It might carry high voltages;
- For removing and installing electronic components, follow the recommendations for handling MOS components.

OPERATING RECOMMENDATIONS

For normal operation of SmartGen 6.0, we recommend following the instructions listed below.

- Install the unit in places with good air conditioning. SmartGen 6.0 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;
- Locate the device away from abnormally high RF fields;
- Use only checked power supply cables. We strongly recommend the usage of shielded cables;
- Connect SmartGen 6.0 only to reliable power supply sources. 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;
- For the normal remote operation of the unit, connect SmartGen 6.0 to a good quality Internet connection;
- For the normal operation of SmartGen 6.0, check if the network settings past through all the required data traffic.

RADIO FREQUENCY INTERFERENCE (RFI)

Although we have made provision for SmartGen 6.0 installation in the immediate proximity of broadcast transmitters, please do practice some care using the unit near abnormally high RF fields.

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!

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 REQUIREMENT

The SmartGen 6.0 mounts in a standard 19-inch equipment rack and requires only 1¾ 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.

HEAT DISSIPATION

Having very low electricity consumption, the SmartGen 6.0 itself generates negligible heat. The unit is intended for operation within an ambient temperature range, extending from freezing to 120°F/50°C. But because adjacent, less efficient equipment may radiate substantial heat, be sure that the equipment rack is adequately ventilated to keep its internal temperature below the specified maximum ambient.

Connecting AC Power

FUSEHOLDER

The Fuse holder can be found right under the Mains connector.

Before connecting the AC Power, make sure that the mains supply at your location is in accordance with SmartGen 6.0's Power Supply Factory Settings - 100÷240 VAC, 1 Amp Fuse.

CAUTION: Permanent damage will result if improper AC supply voltage is applied to SmartGen 6.0 device. Your warranty does not cover damages caused by applying improper supply voltage, or use of an improper fuse.

POWER CORD

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

Because the unbalanced PILOT OR MPX INPUT and the RDS OR MPX OUTPUT of the SmartGen 6.0 are chassis-ground-referenced, a mains frequency or RF 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 well remedy such a situation, although the chassis somehow must be returned to earth ground for safety. Generally, being screwed-down in the equipment rack will satisfy the safety requirement.

Selection of Operating Modes

SIDECHAIN MODE

In order to derive timing information from the 19kHz stereo pilot, the rear-panel PILOT OR MPX INPUT connector monitors the output of the stereo generator. 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.

When sidechain operation mode is chosen the RDS OR MPX OUTPUT contains only the RDS sub carrier, the composite MPX signal is not routed through SmartGen 6.0. This operating mode preserves the multiplex signal integrity and assures uninterrupted program transmission, in case of encoder failure event. Originally SmartGen 6.0 is configured for sidechain operation.

LOOP-THROUGH MODE

When the SmartGen 6.0 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 6.0

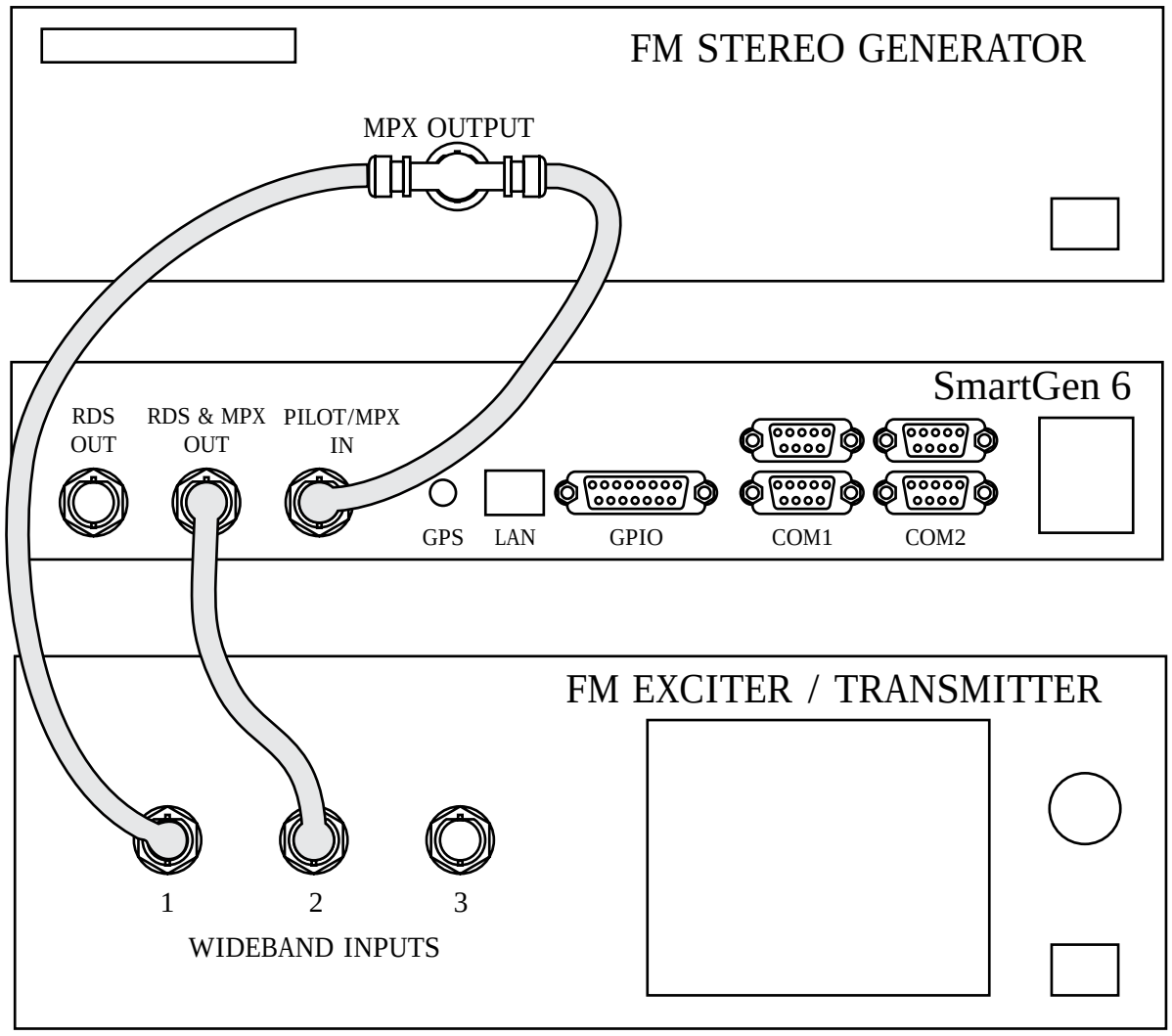
IMPORTANT CONNECTION CONSIDERATIONS!

Before installed in the signal path, the SmartGen 6.0 must be properly configured for the desired operating mode: sidechain or loop-through. Use SmartGen Encoders Manager, Web Interface (see “Advanced RDS” on page 57) or the LCD Menu (see “LCD Menu Explained” on page 50) to confirm that the encoder is properly configured before connecting the unit to other air-chain equipment.

Also, it is important that the operating software be installed on the PC before the SmartGen 6.0 is connected to the encoder for programming the ‘static’ message registers and operating defaults. In addition, we strongly 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.

SIDECHAIN MODE (RECOMMENDED)

1. Connect a BNC 'T' adapter to the composite/MPX output of the stereo generator;
2. Using a suitable cable, connect one side of the 'T' adapter directly to the wideband (composite/ MPX) input of the FM exciter;
3. Using a suitable cable, connect the other side of the 'T' adapter to the PILOT OR MPX INPUT of SmartGen 6.0;
4. Cable the RDS OR MPX OUTPUT of the encoder to the second wideband (subcarrier) input of the FM exciter.



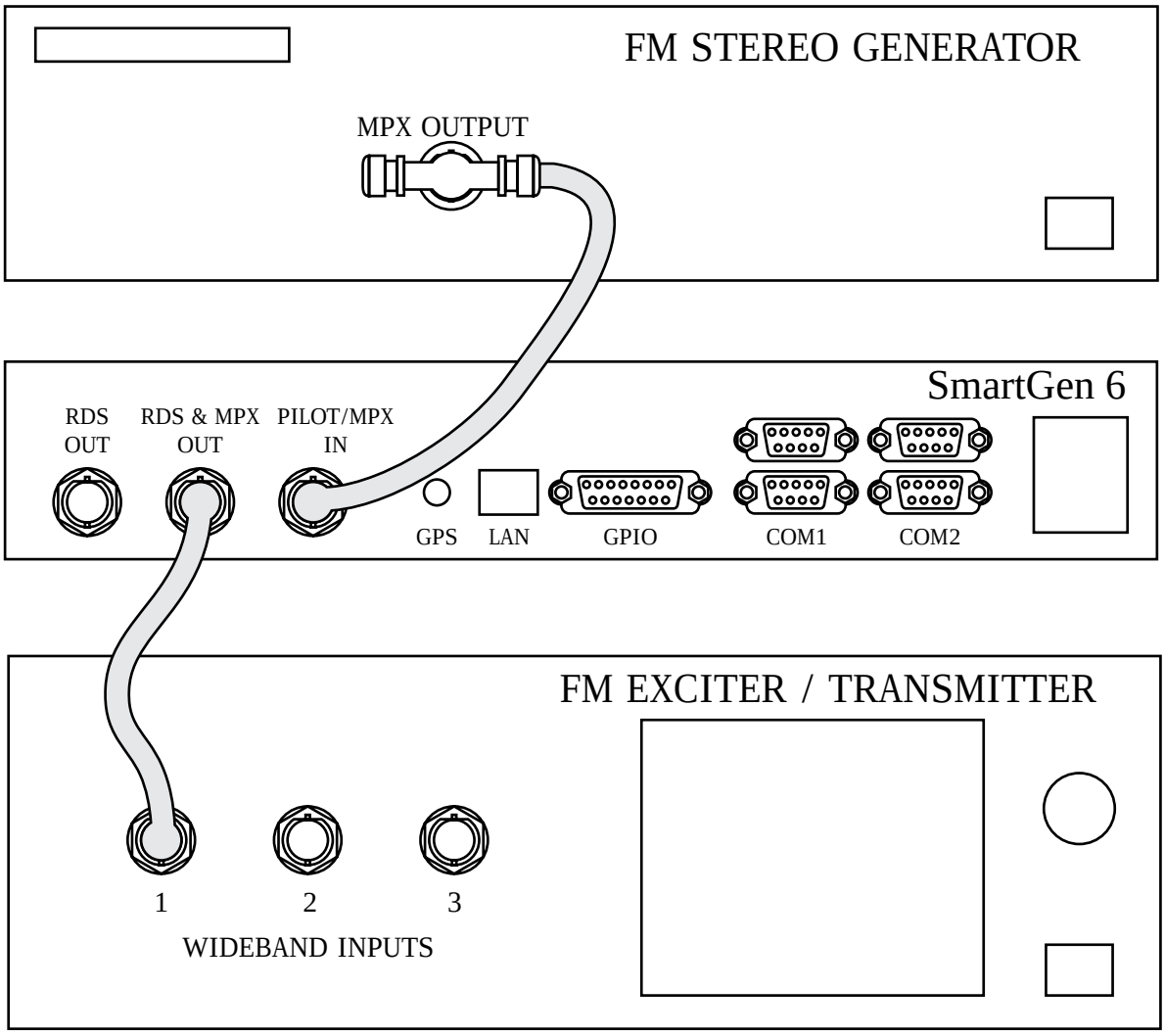
"Sidechain" Encoder Connection

NOTE: We strongly recommend the usage of the Sidechain operating mode.

PLEASE HAVE IN MIND that in the event of power failure, the pilot tone will appear on the RDS OR MPX OUTPUT and will be summarized in the FM exciter, because of the incorporated failsafe bypass relay. This case scenario is unacceptable, and in order to be prevented, it is recommended the RDS OUT to be used in this configuration.

LOOP-THROUGH MODE

1. Connect the output of the stereo generator directly to the PILOT OR MPX INPUT of SmartGen 6.0;
2. Connect the RDS OR MPX OUTPUT of the encoder to the composite/MPX wideband input of the FM exciter.



Loop-Through Encoder Connection

ACTIVATING THE TA FLAG

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 means to access this flag with a manual switch closure, which will doubtlessly prove as much faster, convenient and reliable than software control of the TA function.

A run of twisted-pair cable may be taken from one of the GPIs, part of DB15 on the rear panel (see “Rear Panel” on page 14) of the encoder to a normally open momentary (spring-return!) push-button switch located conveniently at the announcer’s operating position. In order for the configuration to be successful, the GPI should be set to work as a TA flag switch.

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. Furthermore, the safety mechanism, known as “TA Timeout”, may also be activated. This is possible happen when the time for which the TA flag is exceeds the one set, and then TA flag RDS data will be disabled. Please note that the value set for the TA will remain ON.

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Data Interconnection

USB PORT

Used for local communication/connection and set-up via PC. When connected to your PC the USB port will be identified as a COM port. In order for communication to be established, the speed of the USB should be set to 115200 bps. This value is fixed and cannot be changed.

RS-232 COM PORTS

The two rear-panel RS-232 COM MALE/FEMALE PORTS might be connected directly to station automation equipment for dynamic messaging, 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.

ASCII Communication syntax is explained in section "ASCII Programming Syntax" on page 81".

COMPUTER OR TERMINAL REQUIREMENTS

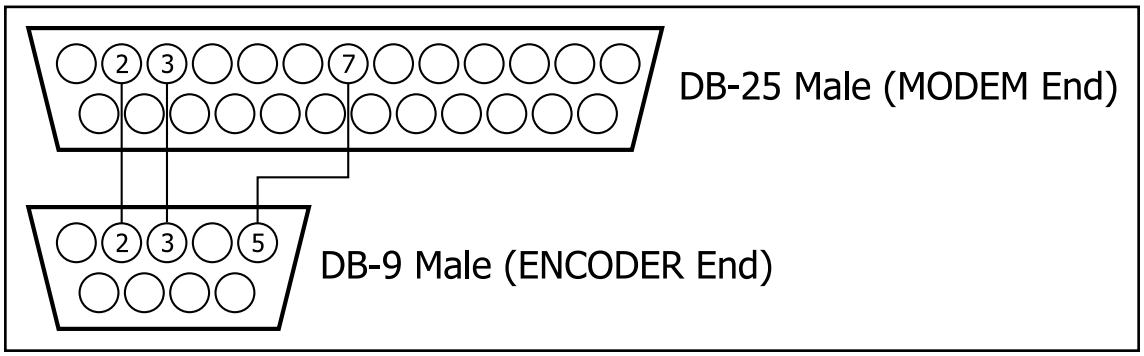
For fast and easy encoder programming via the serial COM, USB or LAN port, Windows®-based RDS Data-Entry Software routines have been supplied on a CD-ROM. This software also may be downloaded from the DEVA Broadcast Ltd. Website. Alternatively, the encoder may be addressed with any computer running a 'terminal emulation' program, 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 bps. Set the terminal (or terminal program) for: 9600 bps / 8 Data Bits / No Parity / 1 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 6.0.

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 81".

MODEM LINK

As an addition to the LAN connection, a modem link may also 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 was connected directly to the controlling system. The figure below indicates the proper pin connections for the cable used to connect the SmartGen 6.0 to a conventional external modem. The three conductors shown are the only ones required.



Encoder/Modem Connections

Subcarrier Injection Level

When *sidechain* operation mode is chosen, the RDS subcarrier is the only signal that appears at the rear-panel 'RDS & MPX OUTPUT' or 'RDS OUT' connector. As some exciters require a higher 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.

If *loop-through* operation mode is chosen, the composite/MPX program signal that is fed to the PILOT OR MPX INPUT appears with unity gain at the RDS OR MPX OUTPUT. The typical peak-to-peak level of the Composite/MPX program signal is up to 20dBu. The same 0-4V RDS subcarrier level range is available/evident in this mode.

SETTING SUBCARRIER AMPLITUDE

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.

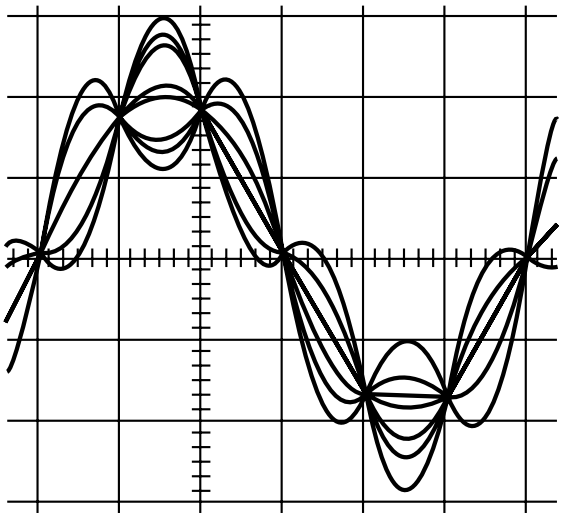
NOTE: If using a mod-monitor that does not have separate subcarrier measurement ability, keep in mind that mod-monitors are peak-responding for total modulation readings near 100% modulation, but may be average-responding for measurements at low levels of modulation. Because the RDS subcarrier is a complex, 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.

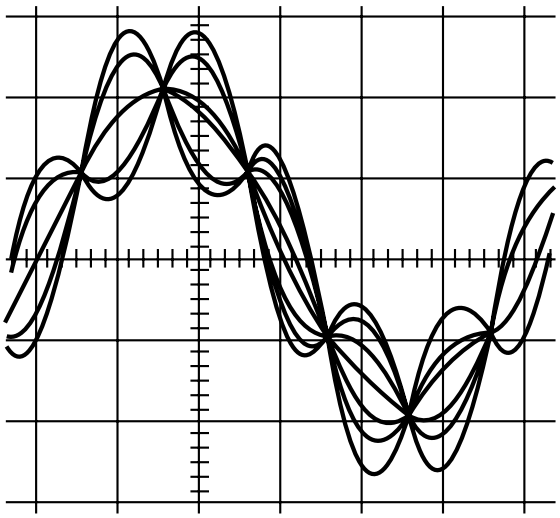
In the United States, the FCC permits an extra 5% modulation for each subcarrier, with total modulation not to exceed 110% even with two or more subcarriers.

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 6.0 in accordance with the UECP ver.7.05, allows adjustment of the phase shift between the PILOT tone and RDS in the range of 0 - 359.9° with 0.1° increments. 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 6.0 simply bridges the output of the stereo generator and does not load or otherwise compromise the composite/MPX signal.

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Navigation Through LCD Menu

THE BASICS

Upon power-up, the LCD screen will display DEVA's company logo and model of the device.

After a few seconds this information will be replaced with the Site Name and in a while, the initial screen will disappear, replaced by SmartGen's main screen with all the mandatory RDS readings.

This is the starting point of the navigation process. Prior to proceed any further in the menu structure, it is important the basic functionality of the navigational menu to be known:

- Keyboard – UP-DOWN, LEFT-RIGHT and OK buttons, placed on the right of the LCD screen, are used to navigate through the menus selecting various functions and parameters of SmartGen 6.0
- Main Menu structure – simplified up-and-down basis, expanded with left-to-right branches.

NOTE: By continuously pressing the OK button you will be reverted directly to the main screen, nevertheless of the current menu screen.

MENU STRUCTURE

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

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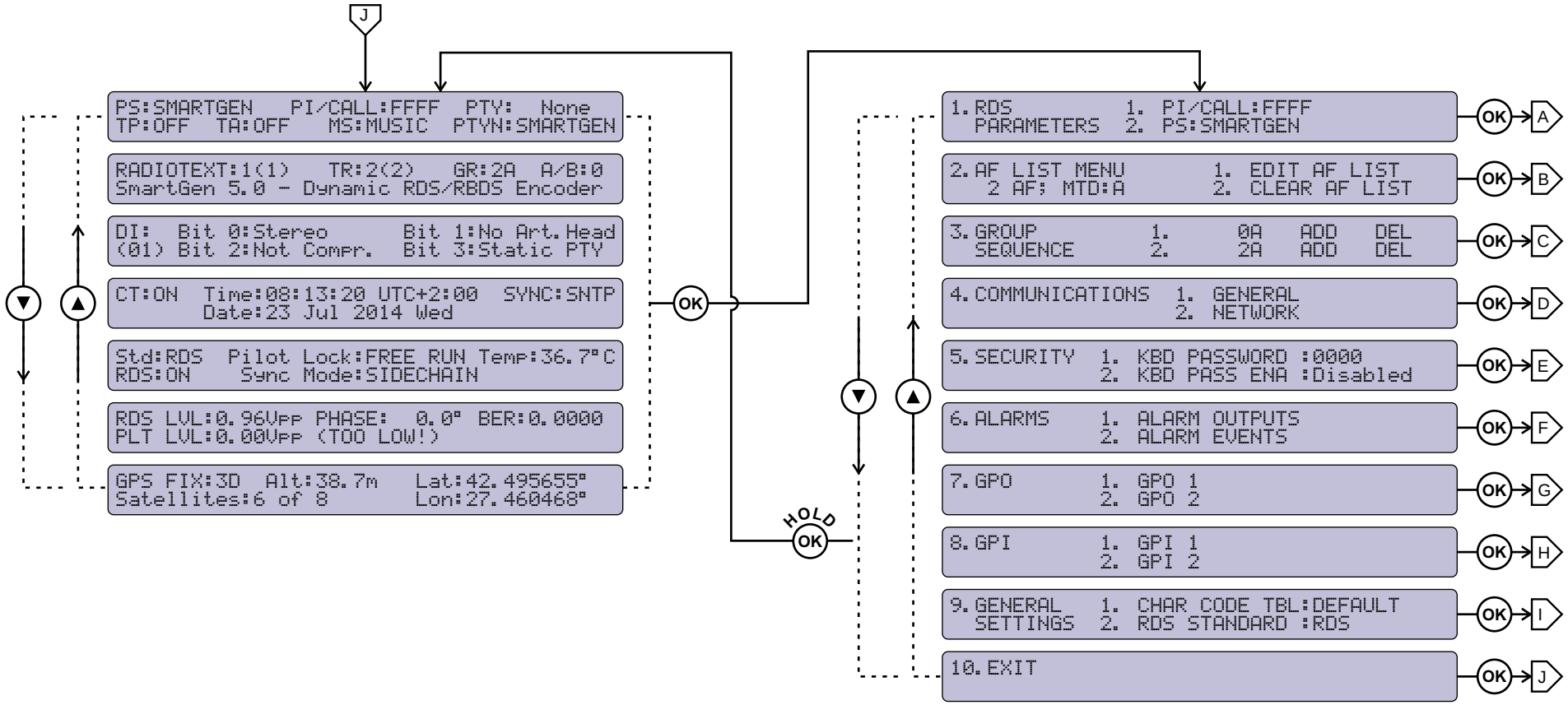

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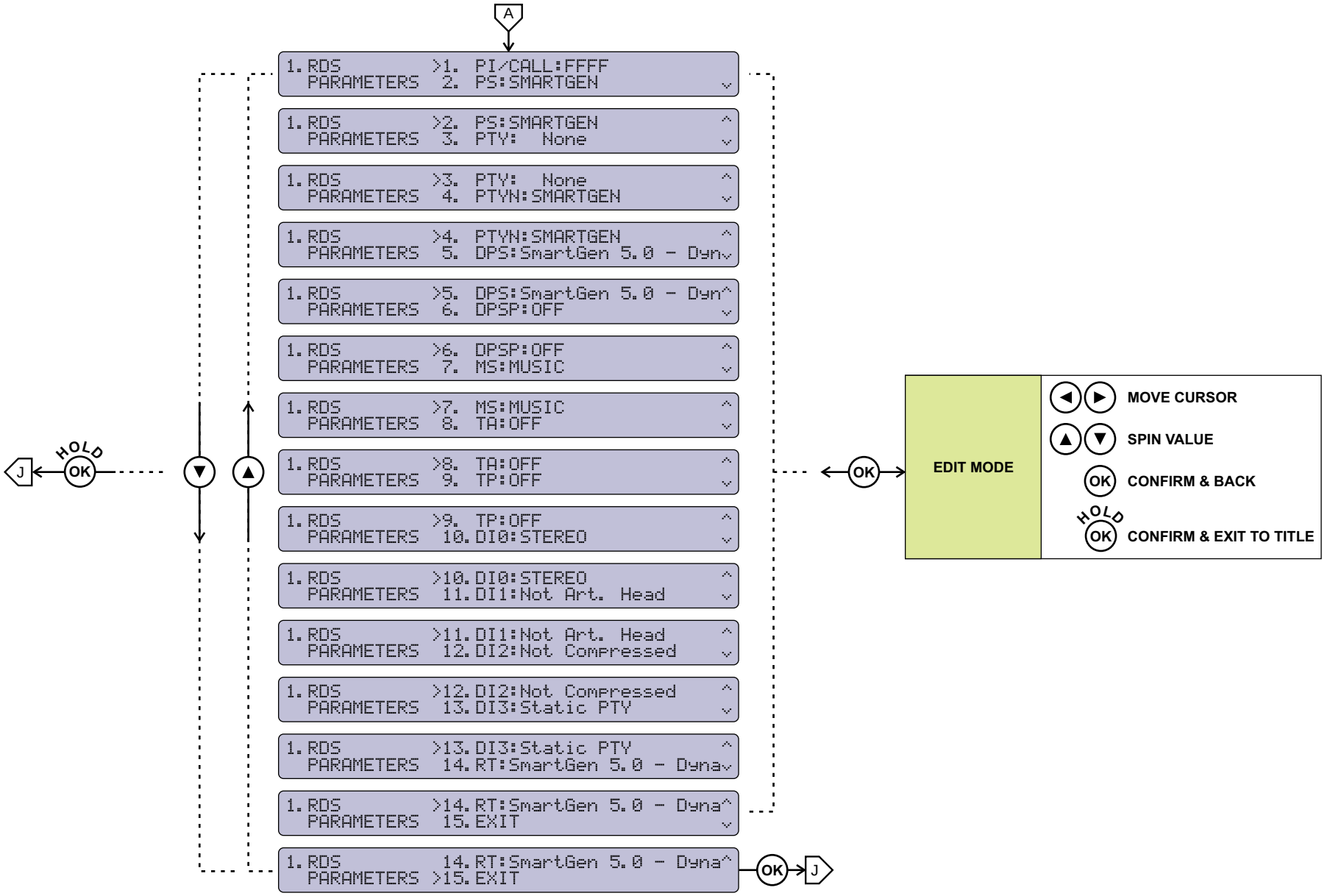

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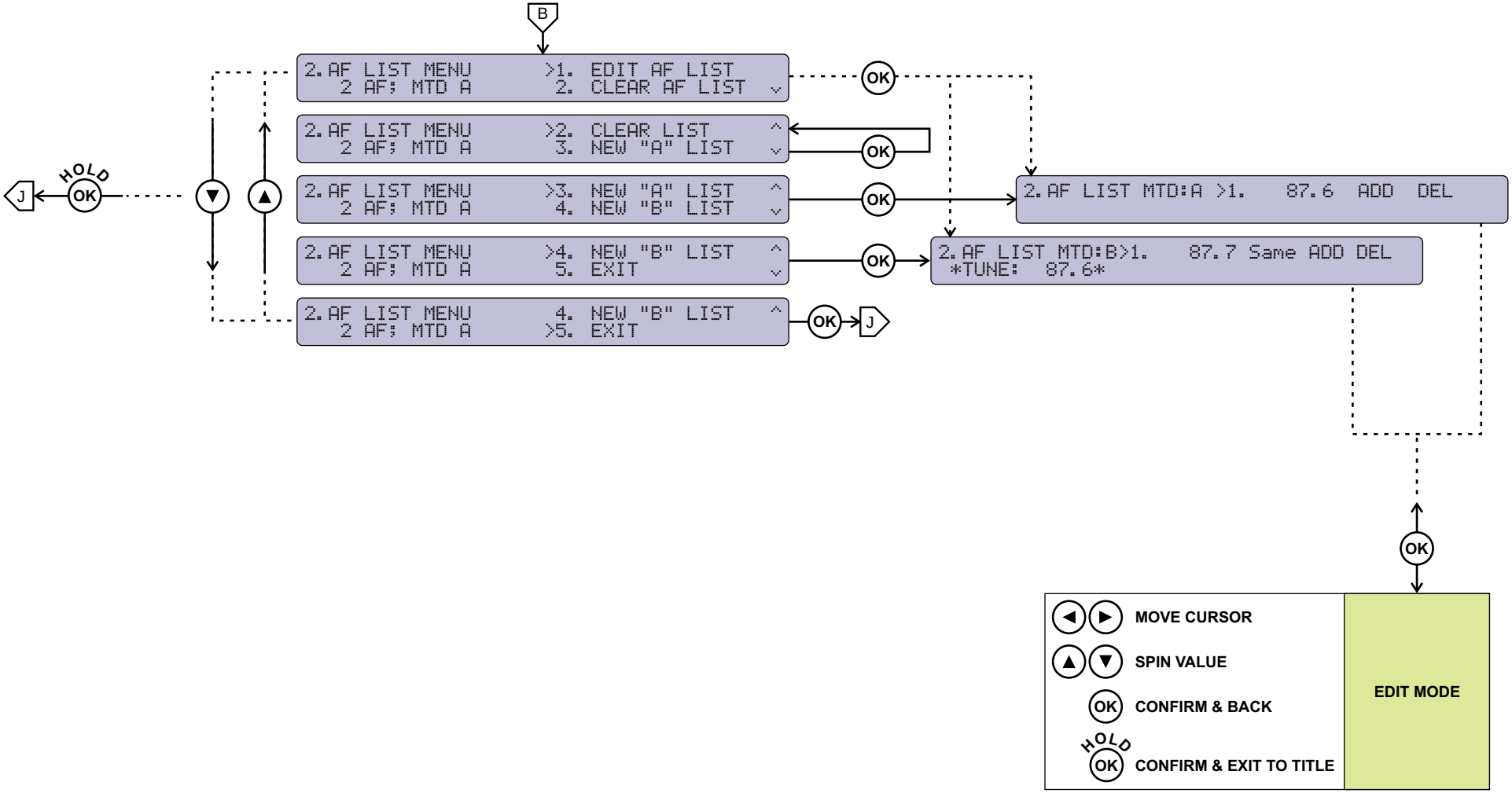

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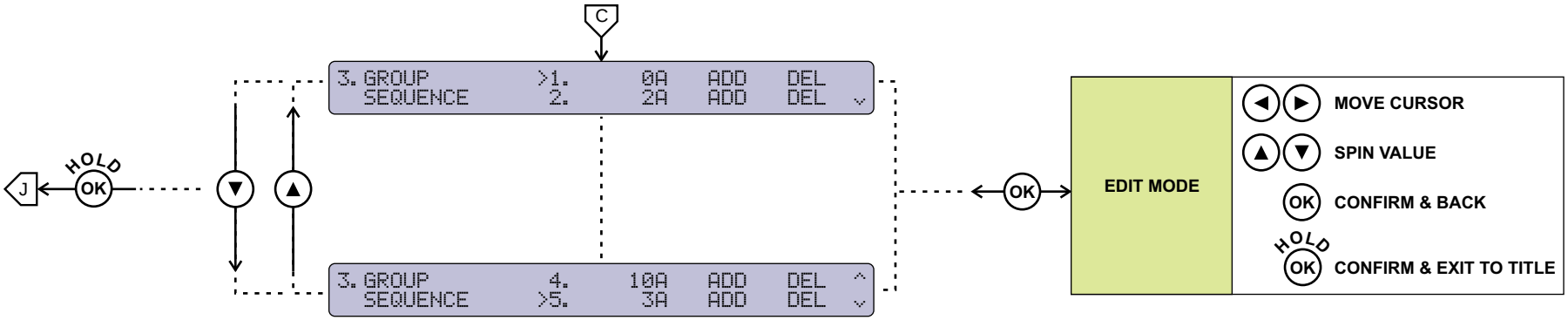

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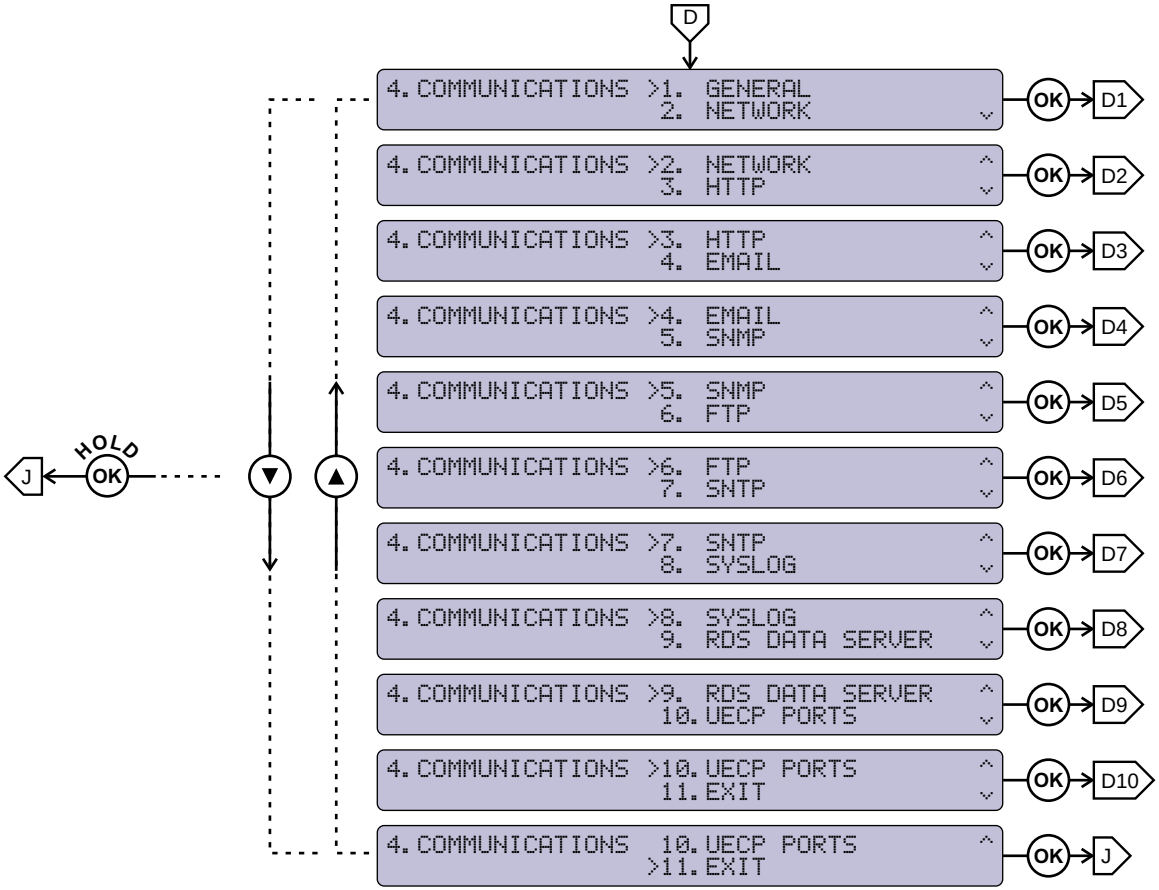

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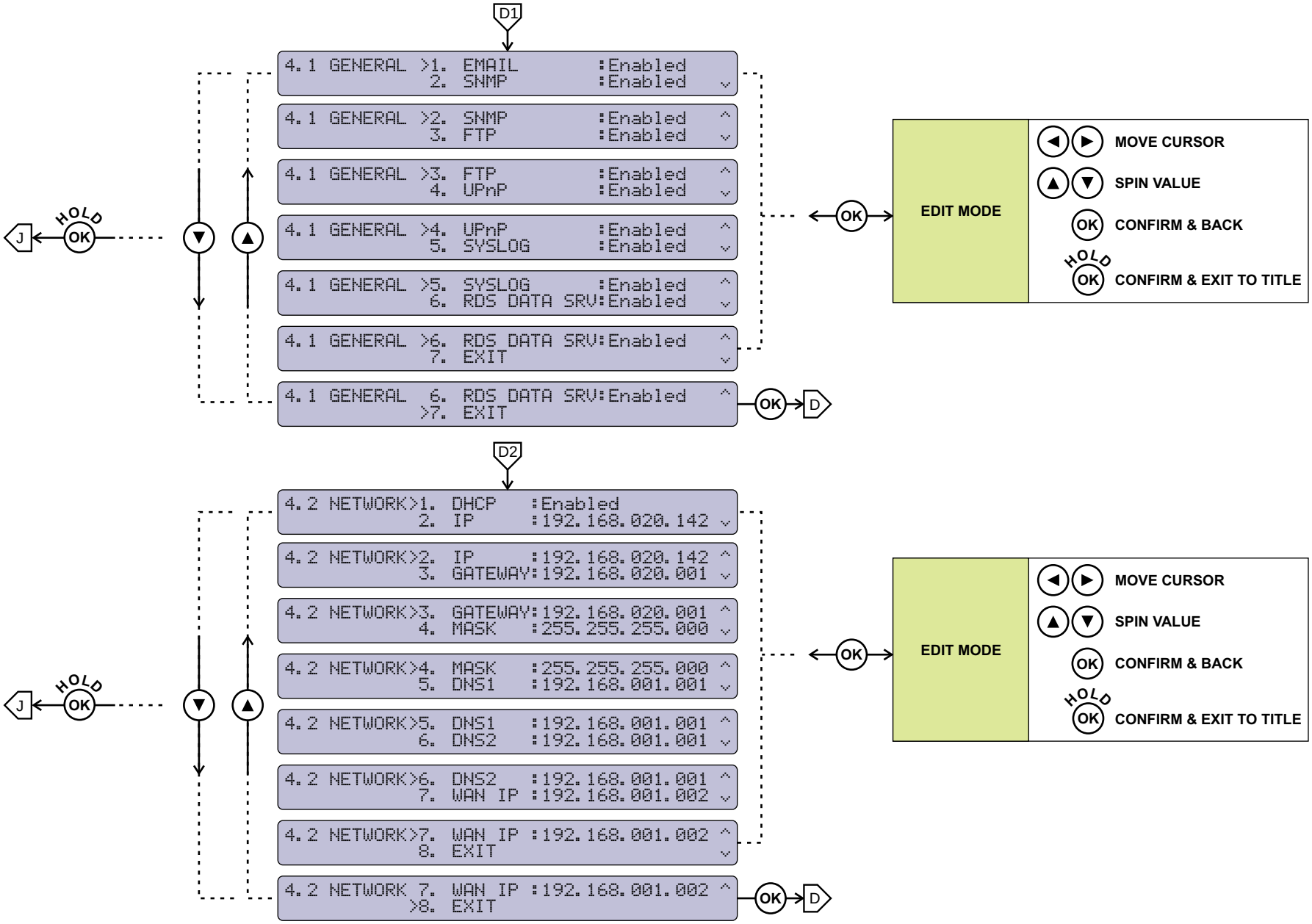

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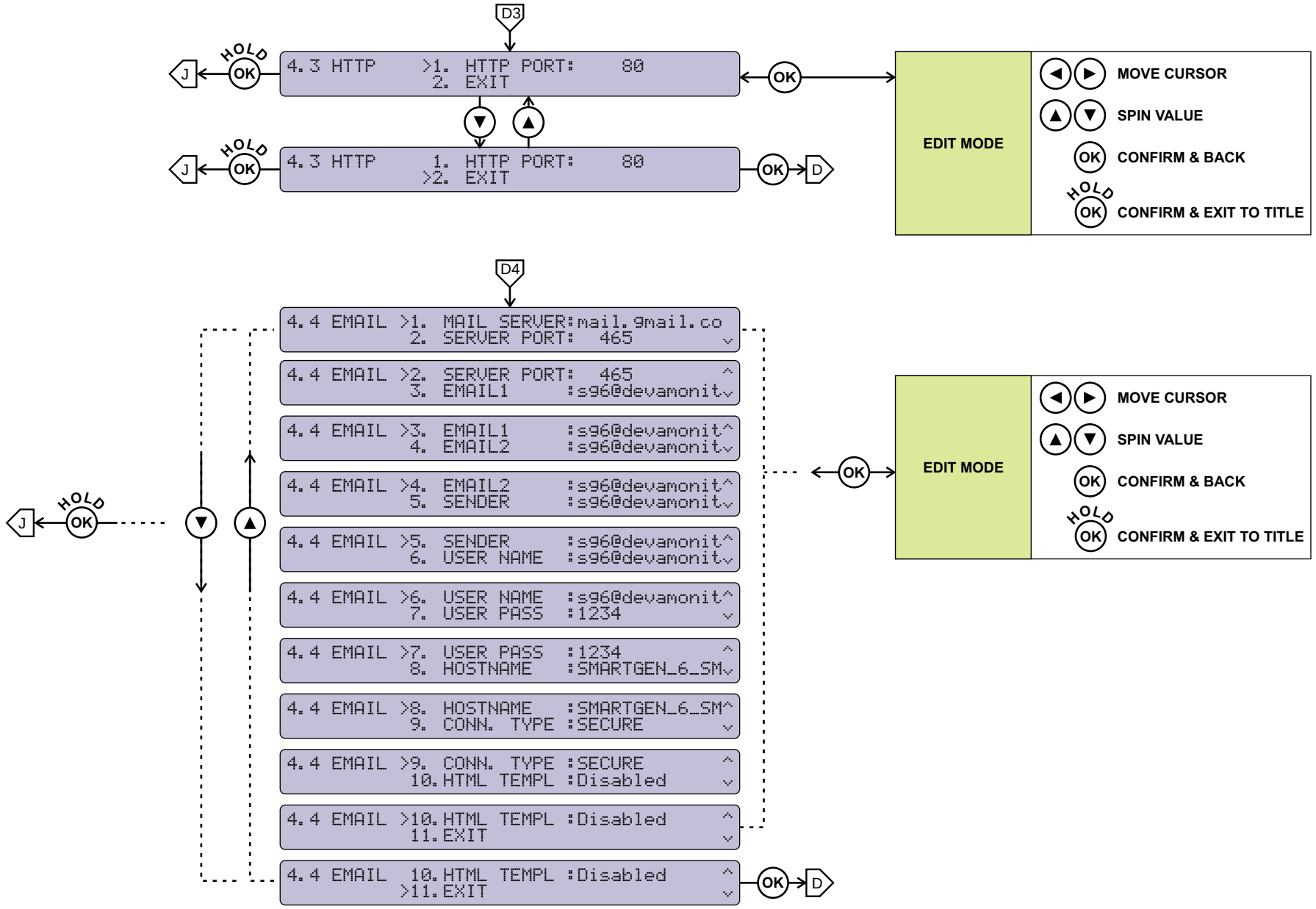

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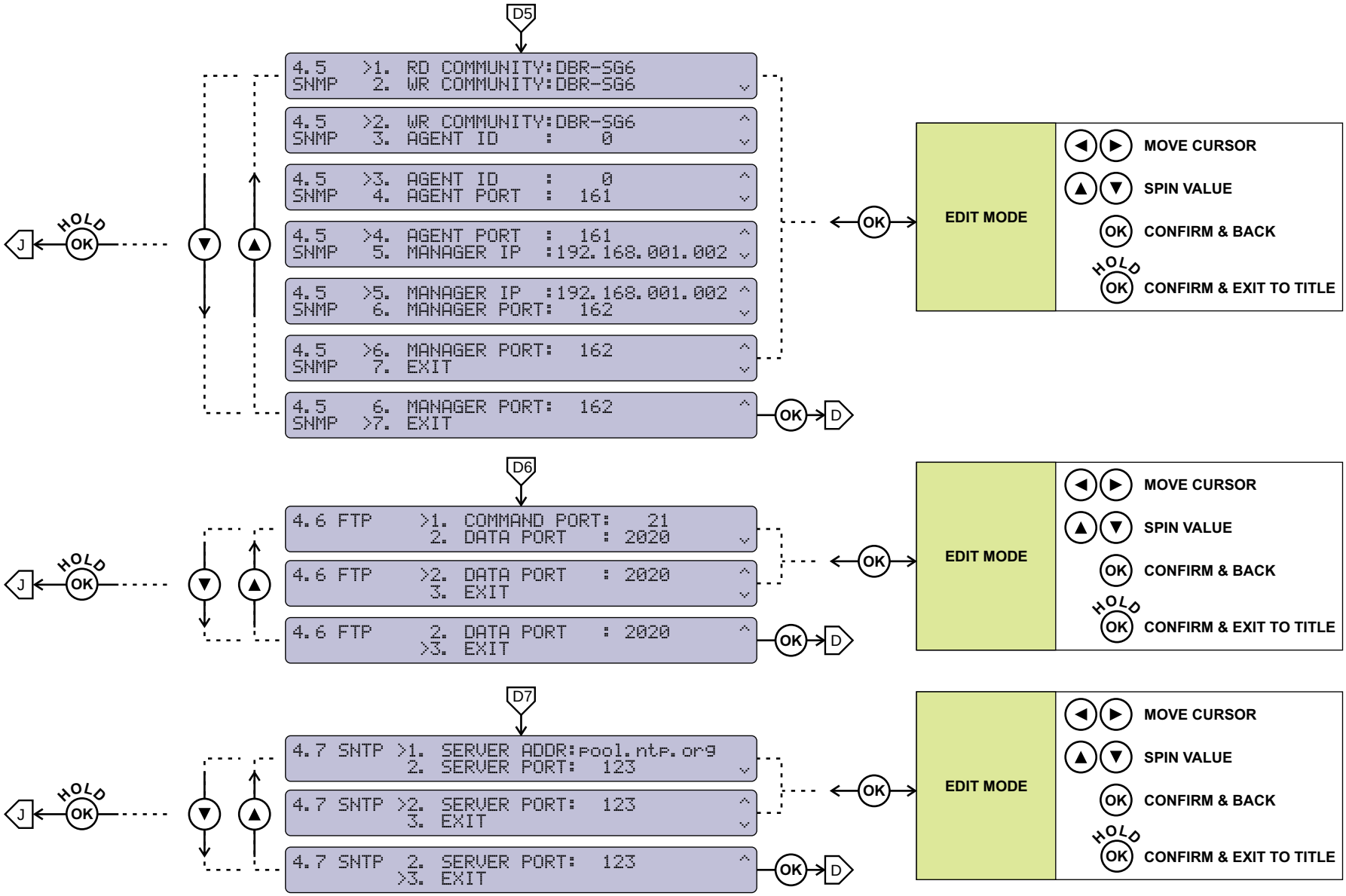

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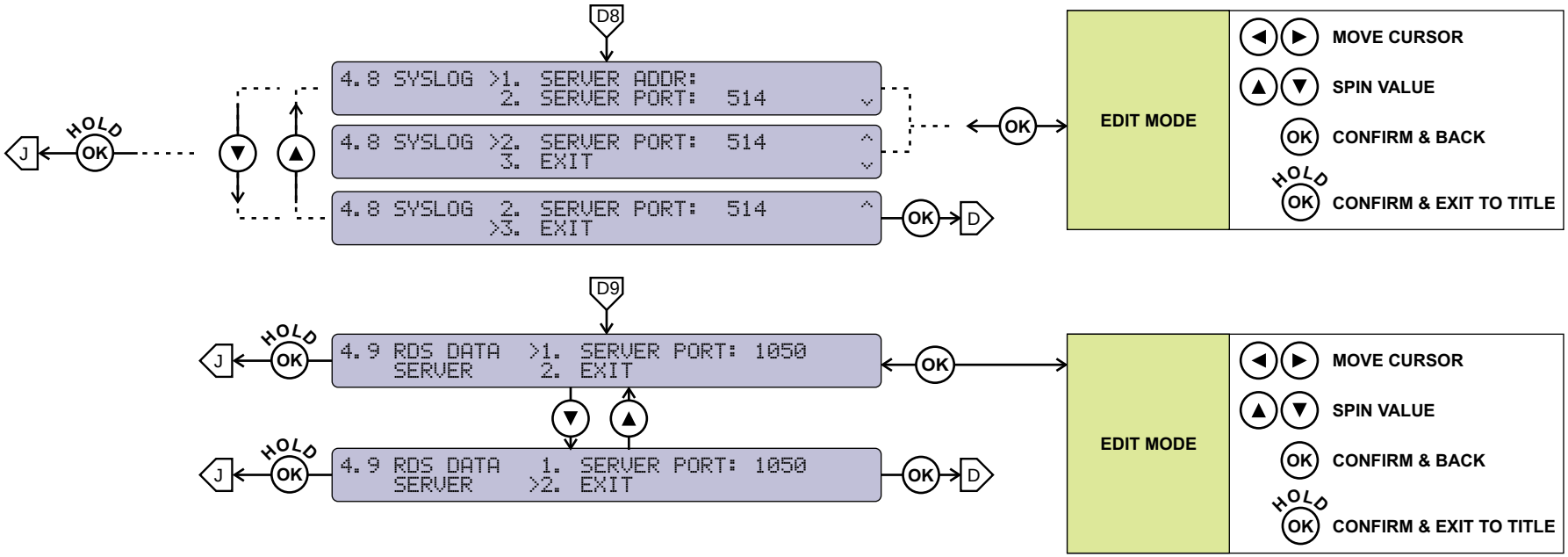

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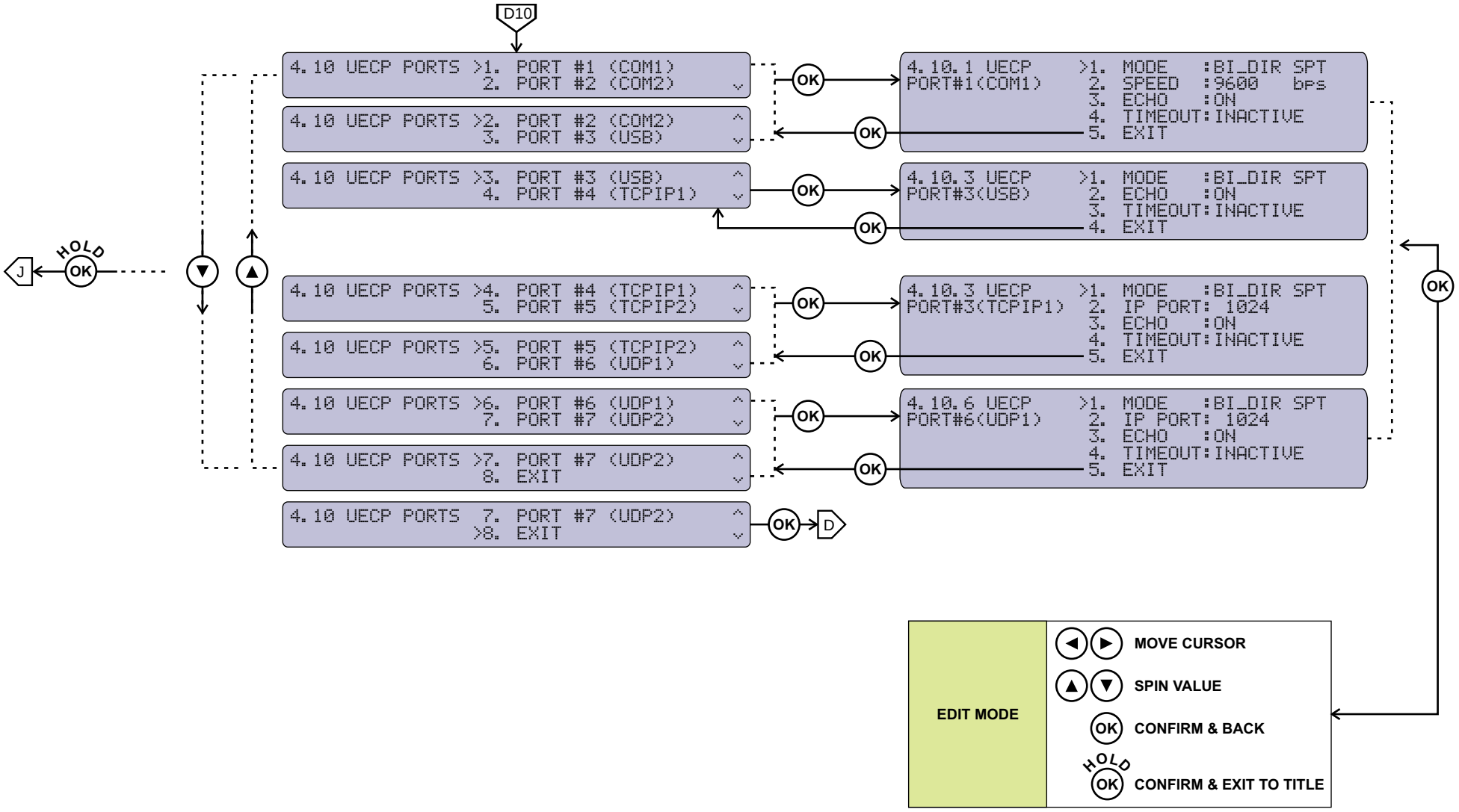

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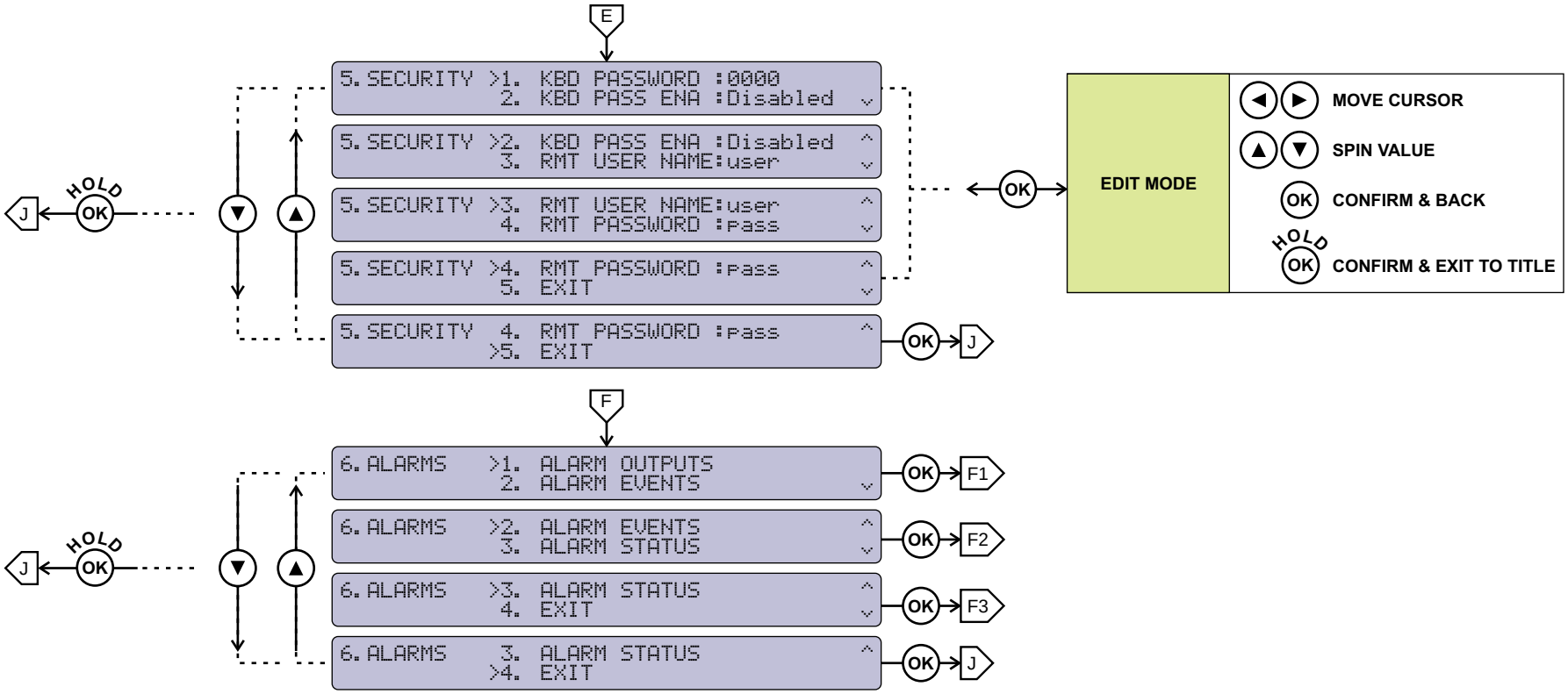

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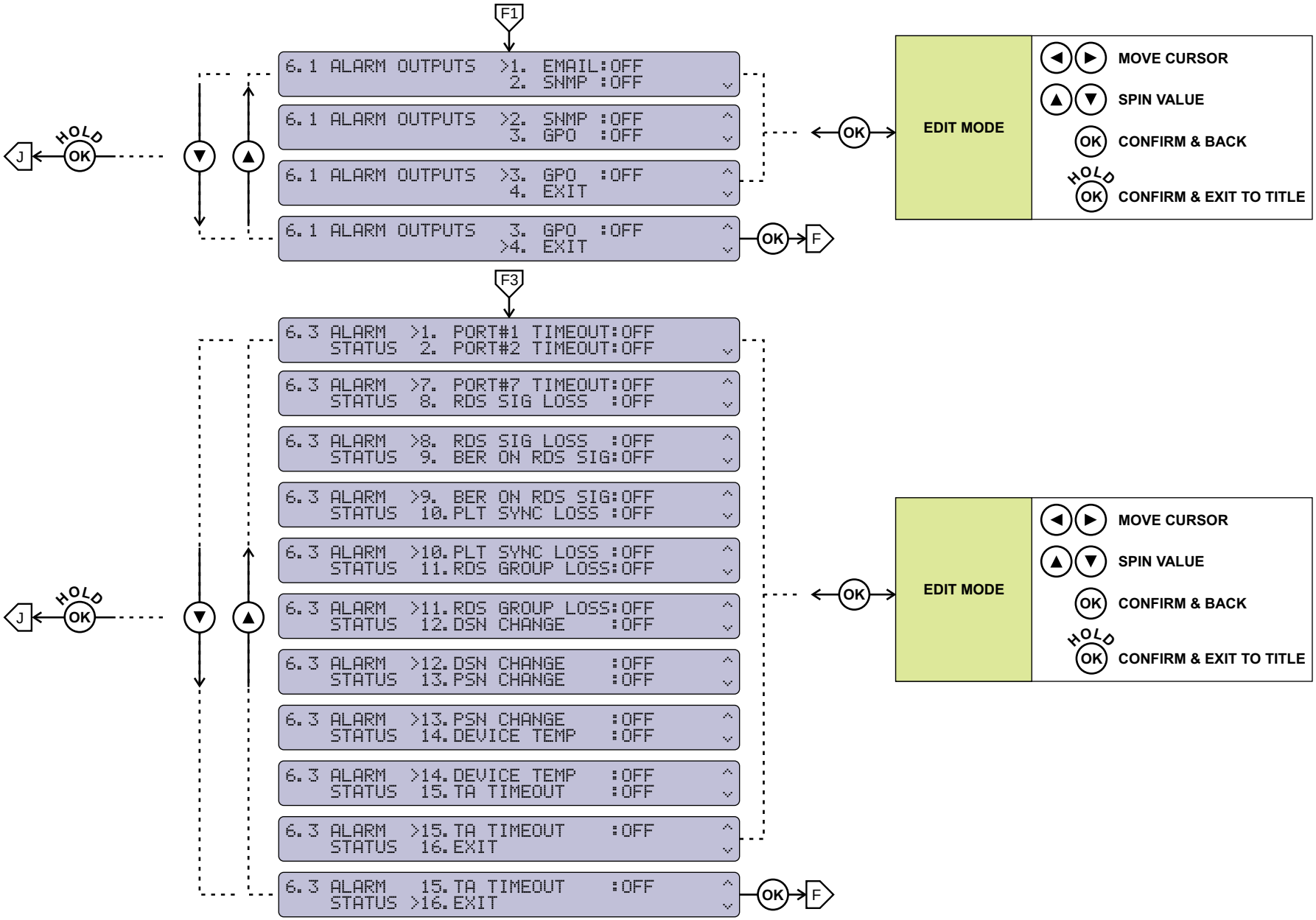

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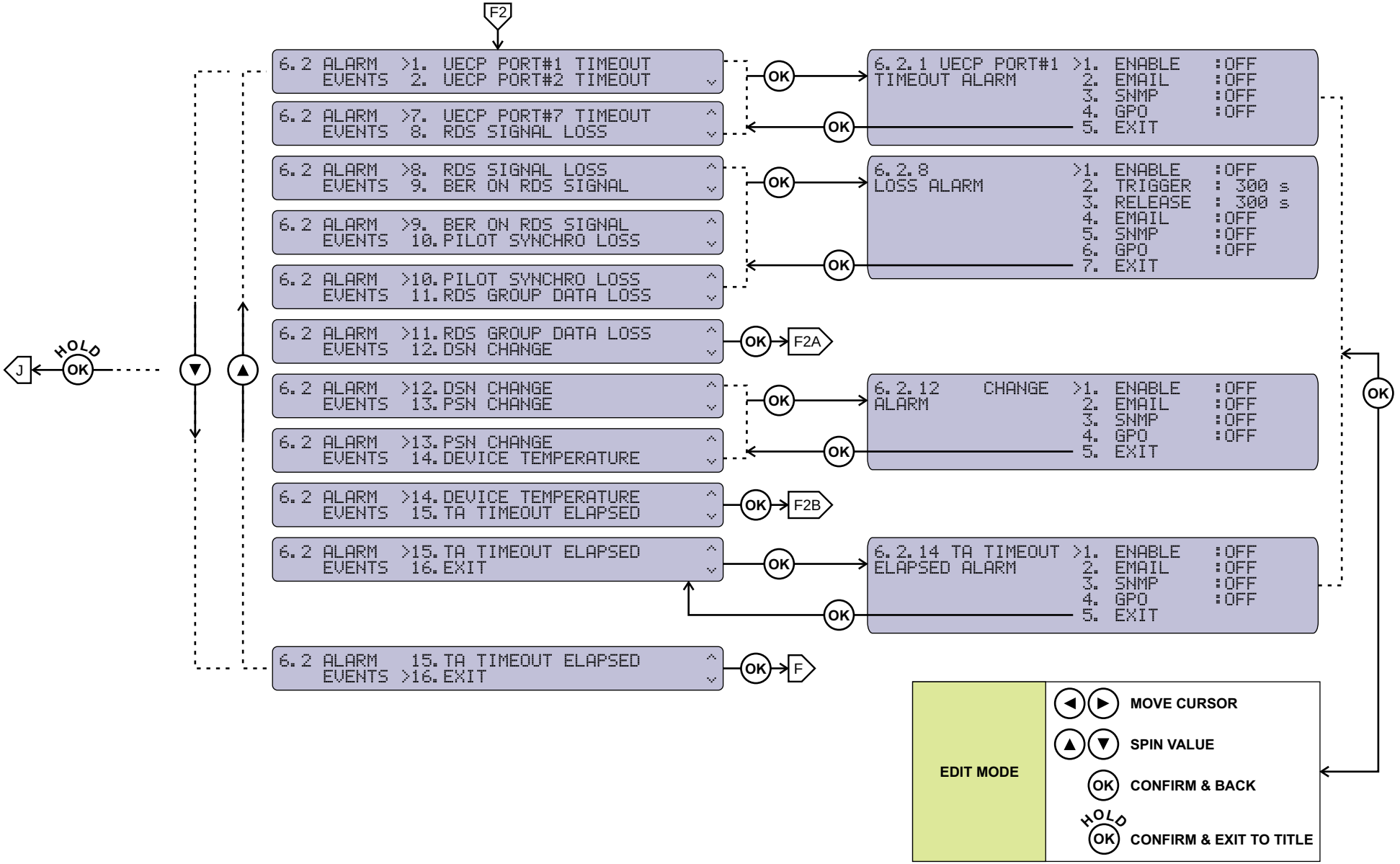

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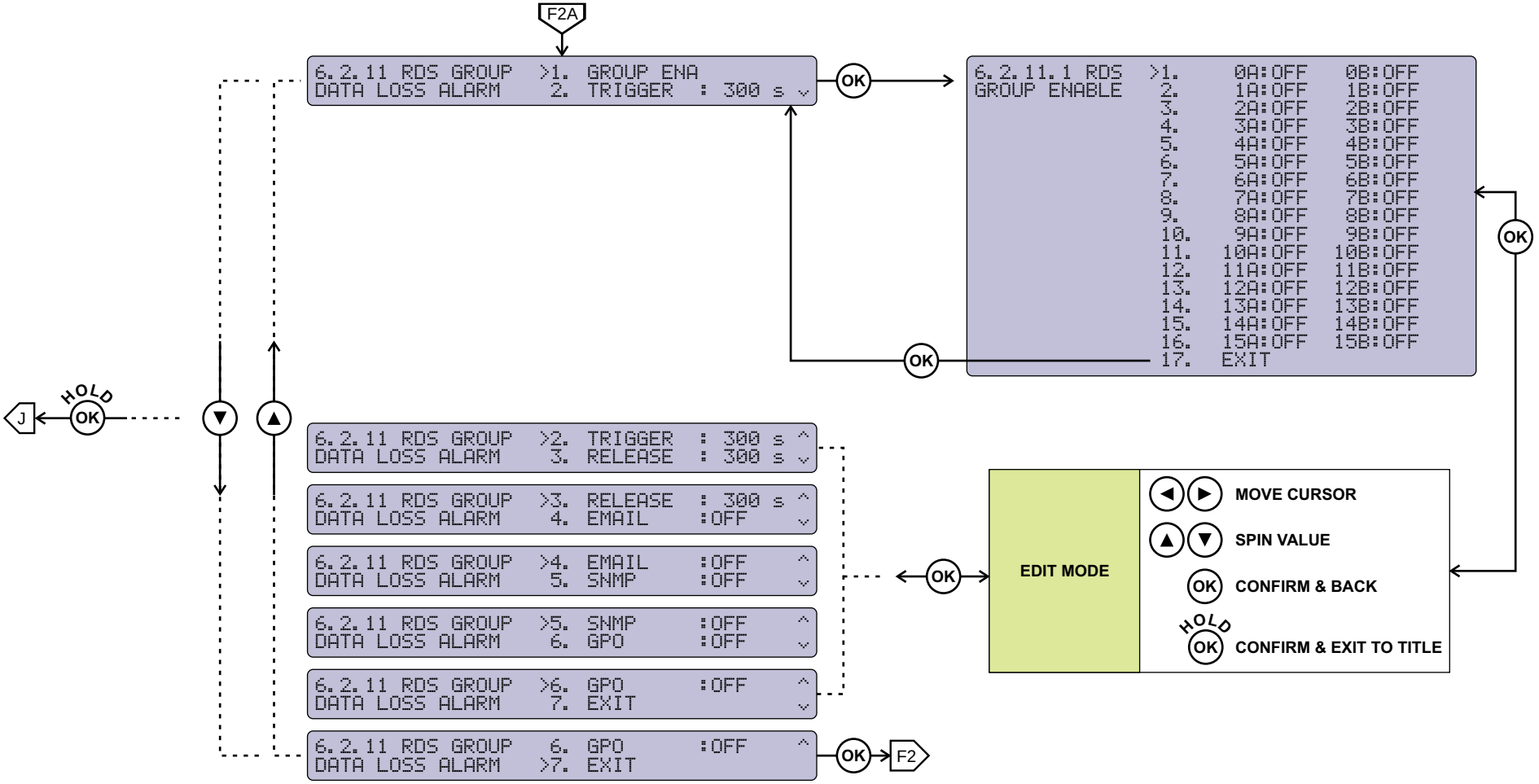

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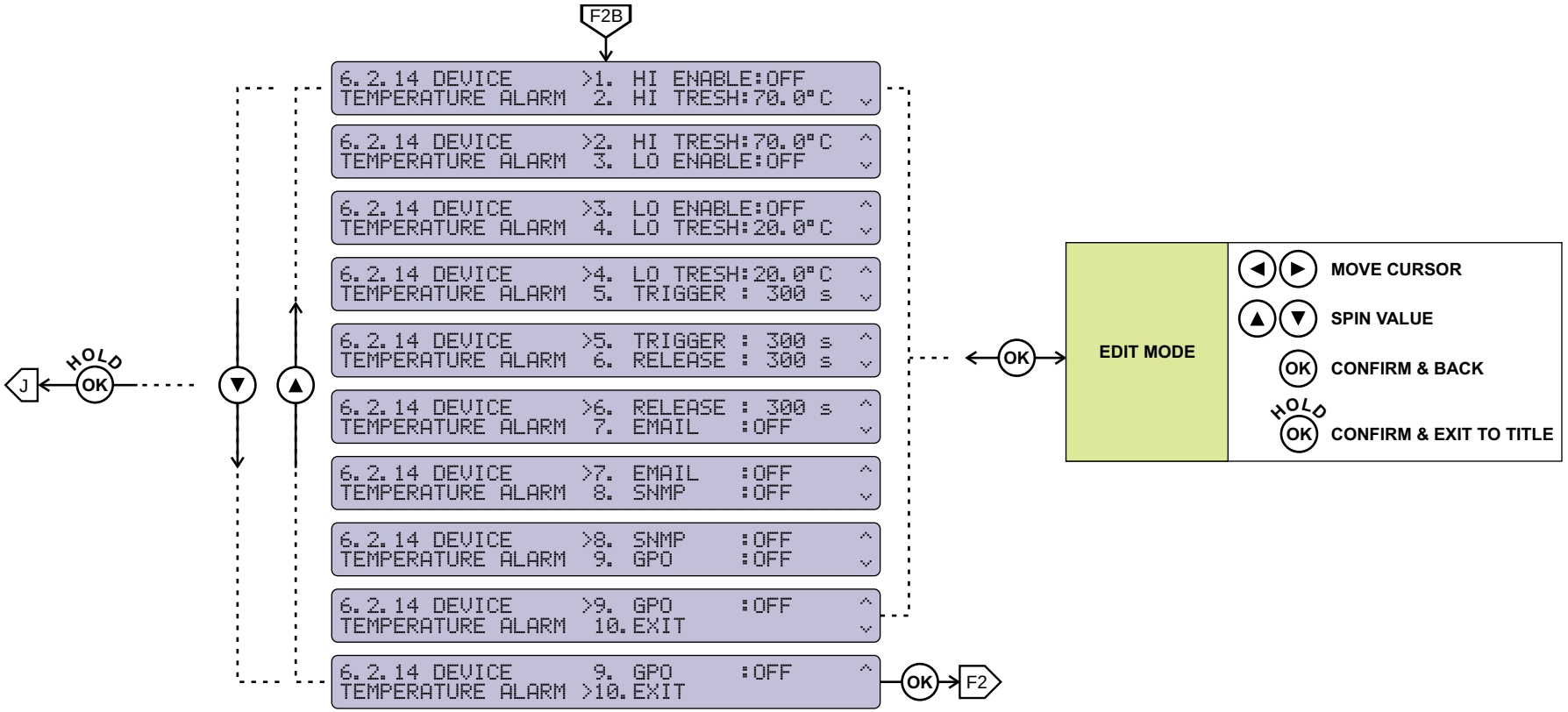

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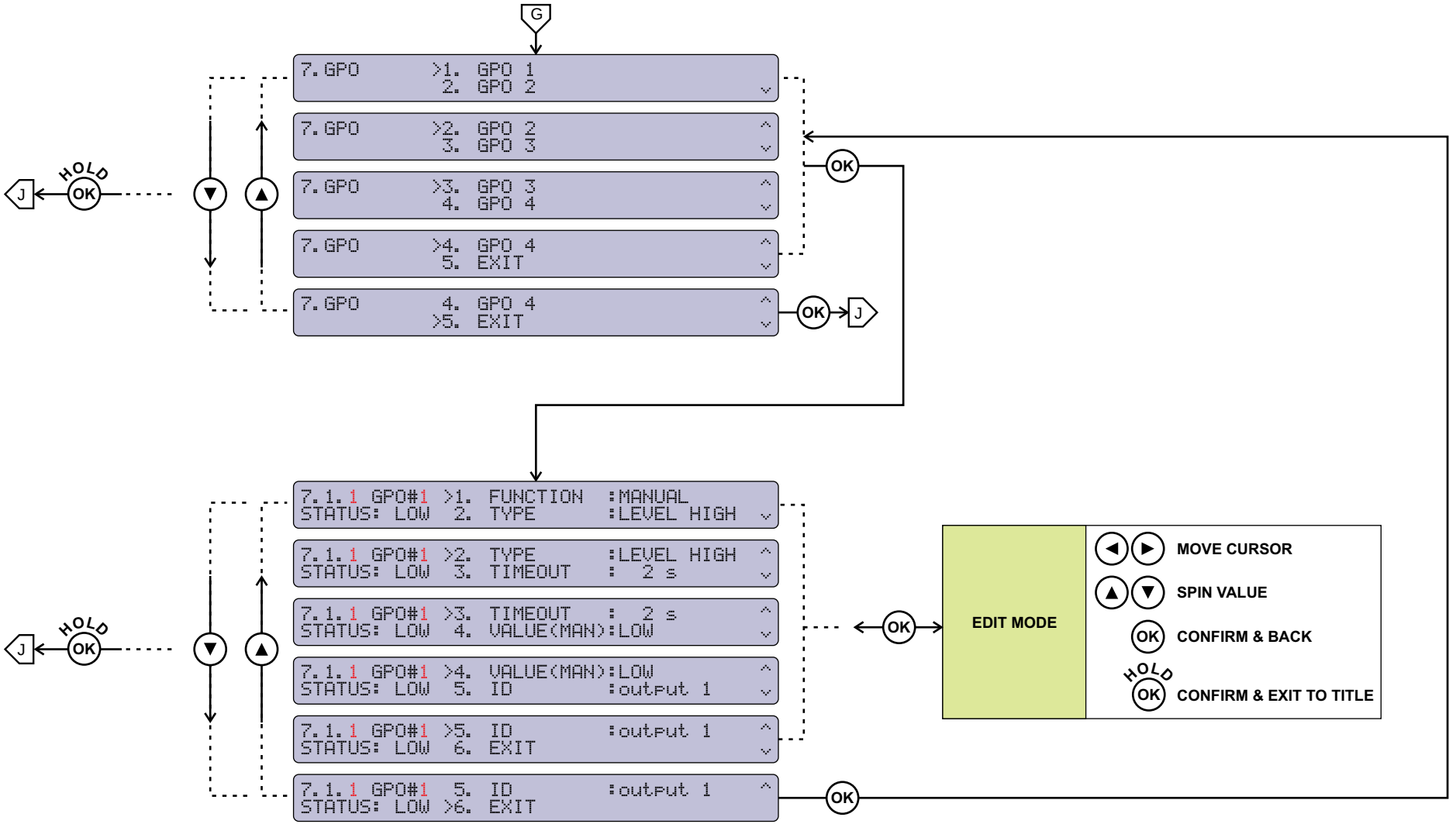

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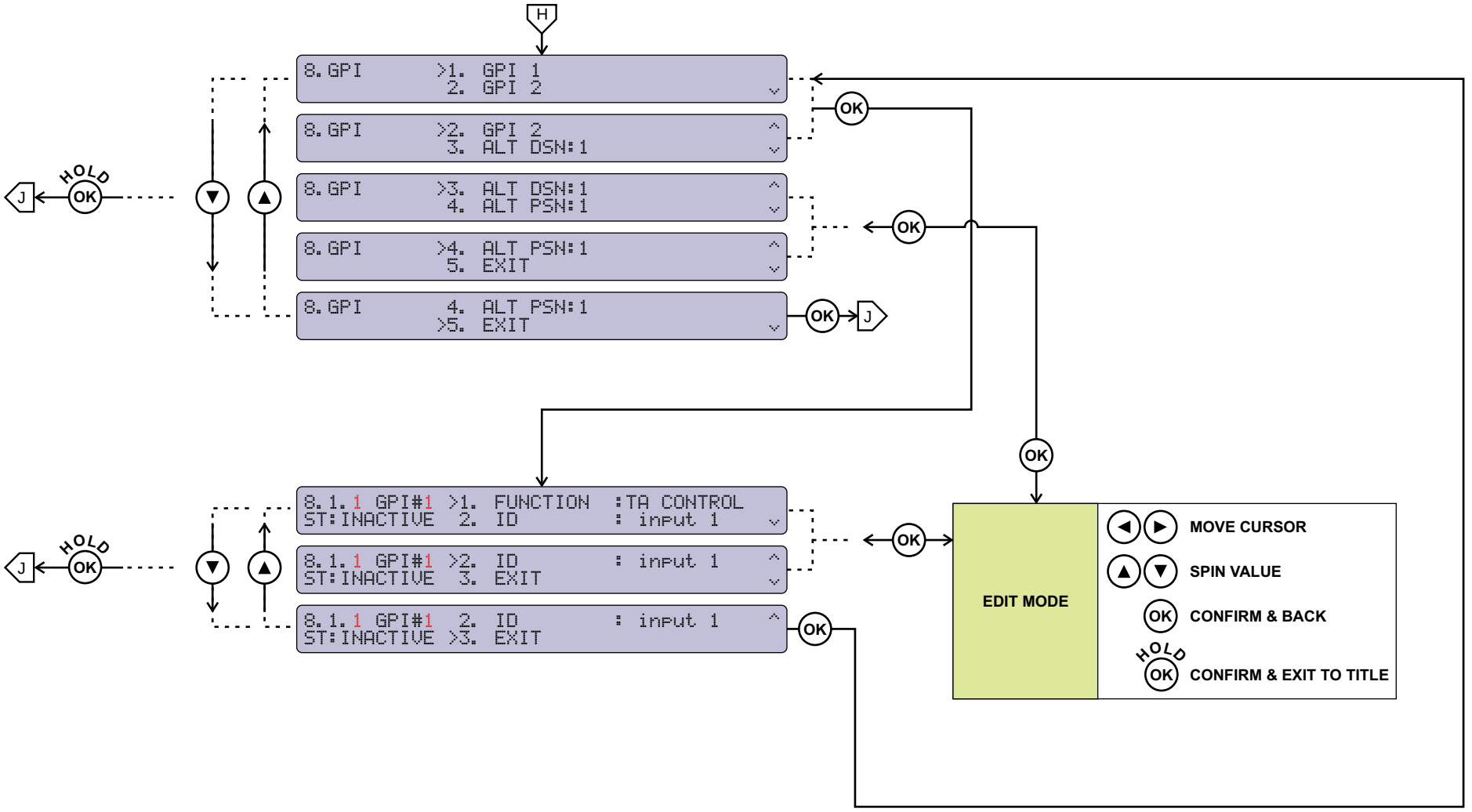

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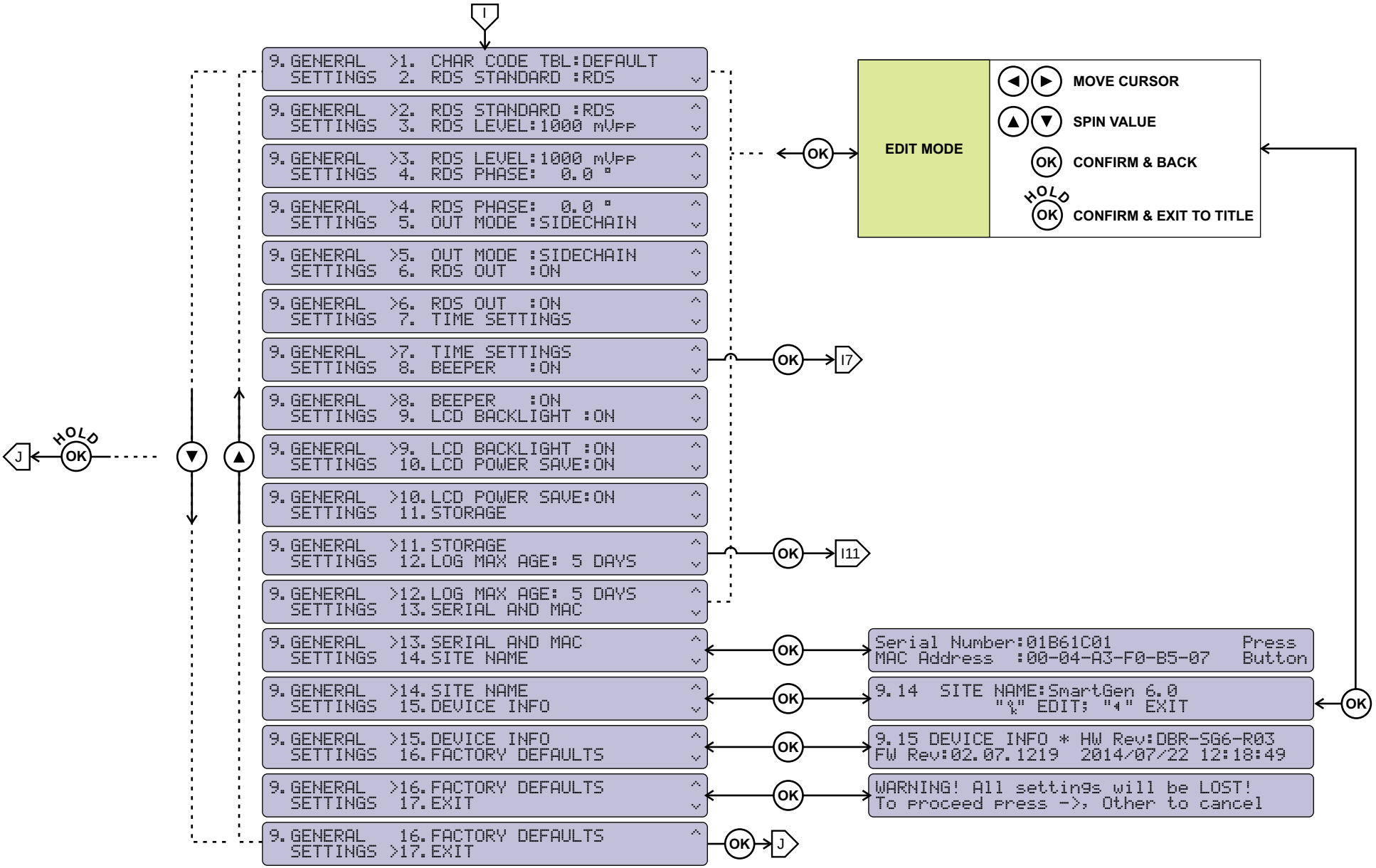

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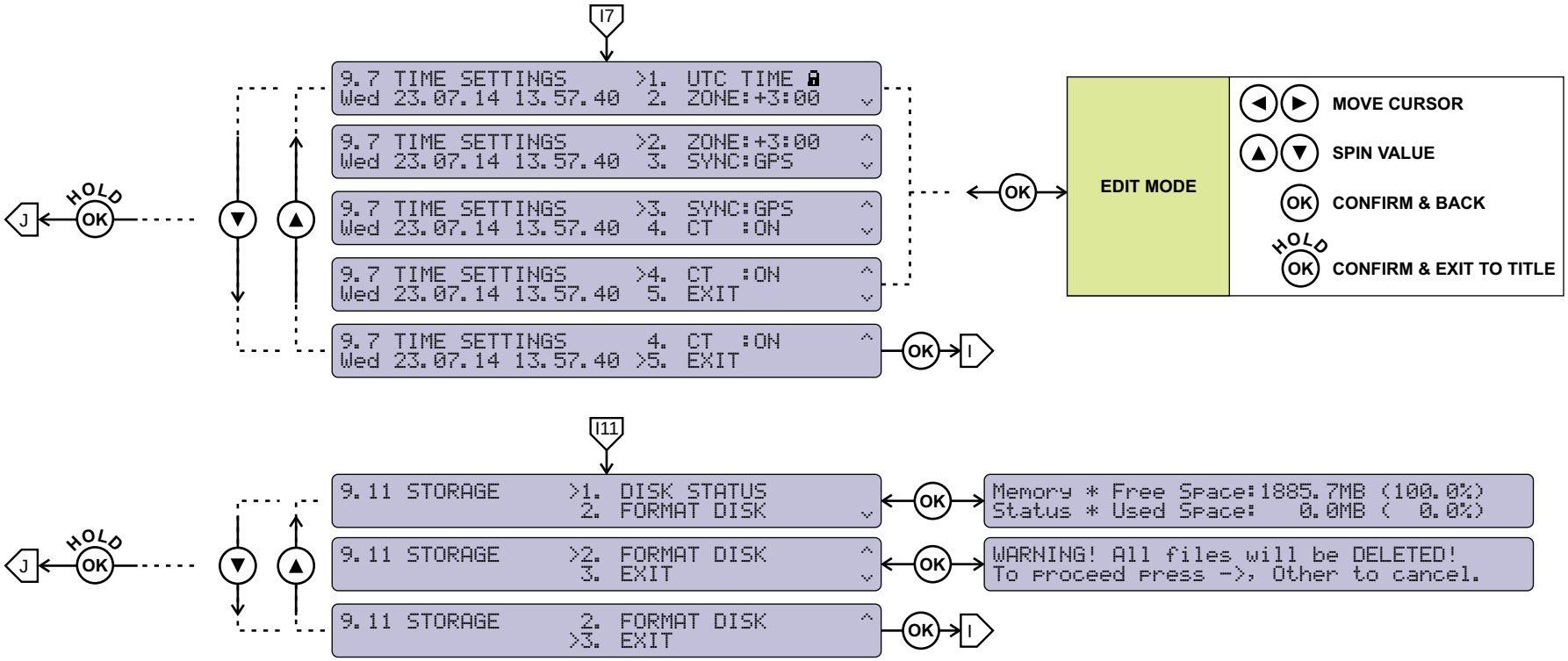


LCD MENU EXPLAINED

Main Screen with Mandatory RDS Readings

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

RadioText Preview

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

DI

This screen shows Decoder Information (DI), which unites several flags. See "RDS Applications Supported" on page 94 or consult the RDS/RBDS Standard for in-depth explanation.

Date & Time

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

Decoding Standard, RDS Output, Pilot Lock, Operatimg Mode, Temperature

This screen shows the most important switches of the RDS Encoder.

Standard (Std) - RDS or RBDS

Pilot Lock:

- *LOCK* - locked to the 19kHz stereo pilot signal.
- *FREE RUN* - defaulted to the internal time base.

RDS Output (RDS) - indicates when the RDS output signal is switched "On" or "Off".

Sync Mode - *SIDECHAIN* or *LOOPTHROUGH* (see "Selection of Operating Modes" on page 21)

Temperature (Temp) - shows the internal temperature of the device.

RDS Level, Pilot Level, Phase, BER

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

GPS Information

This screen monitors the device's current location.
GPS Fix: The current condition of the GPS fix and type.
Alt : The current altitude.
Lat, Lon: The current location of the device - Longitude and Latitude in degrees.
Satellites: The number of satellites used out from the satellites in view.

KEYBOARD LOCK

To prevent unauthorized local access, the SmartGen 6.0 offers password protected keyboard locking. By default the keyboard is unprotected. To enable this function, using the front panel navigational menu, go to 5. 2. and change ENABLED to YES. From 5. 1. set the preferred 4 digit password. Once the keyboard password is enabled, the following symbol will indicate it 🔒.

Once the keyboard lock function is enabled, every attempt to use it will require a password: ENTER PASSWORD: 0***. Access will be denied upon false entry.

NOTE: Keyboard lock will not prevent from navigating through the Main Screen. Only the 'Editing option' will be locked.

RESTORE FACTORY DEFAULTS

SmartGen 6.0 can 'Restore Factory Defaults' from its non-volatile memory, when an emergency recovery is necessary. Hopefully this function will never be used. If needed, though, below is an explanation on the procedure:

- Disconnect/Remove all external appointments except the Mains Power.
- Using the front panel navigational menu, go to 9. 16. and press the OK Button. The following Screen should be displayed:

- Press the RIGHT Button in order to confirm the 'Restore Factory Defaults' command. See "Factory Defaults" on page 87 for detailed listing of the Factory Settings.

WARNING: Perform Emergency Recover with caution, as the remote users would not be aware that the unit was restored to its factory defaults, hence they may cease communication with the device.

Programming Options

ADVANCED PROGRAMMING FOR STATION AUTOMATION

Developed as a fully 'interactive' RDS encoder, the SmartGen 6.0 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 6.0 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 6.0 encoder. Commands require proper preambles, or headers, so that the SmartGen 6.0 interprets dynamic data as valid command sets.

SIMPLIFIED WINDOWS® DATA-ENTRY SOFTWARE

To help get RDS on-air quickly, a very simple and intuitive Windows® interface has been included on the CD-ROM that comes with the SmartGen 6.0 encoder. 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.

SNMP

The built-in SNMP agent offers another way to get access to the most important device settings and measured values, and on the other hand makes possible that the device send alarm messages in the form of SNMP Traps. All of the variables and traps are described in standardized manner in the SmartGen6.mib file, which is used by the SNMP manager. The corresponding MIB file is available at download section.

A more convenient way to view and test the SNMP functionality of the device is to use some SNMP manager software.

SNMP might be used to do (view) device settings. SNMP does not provide an opportunity to get any logged data in log files. FTP protocol should be used for this purpose.

WEB Configuration

SmartGen 6.0 can be accessed through Internet using any kind of WEB browser. No additional software for this purpose is required.

To access the device's Web Interface it is necessary to know the IP address of the device and the assigned password (see "Navigation Through LCD Menu" on page 30).

Open a new WEB Browser and enter the device's IP address in the address field then press "Enter". Depending on the used browser, a port might be required. It is appended right after IP address. The default value being: 80.

ATTENTION: Depending on Internet Protocol Settings, the assigned IP address may not be visible outside your local network, thus the 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 being: **user** and **pass**.

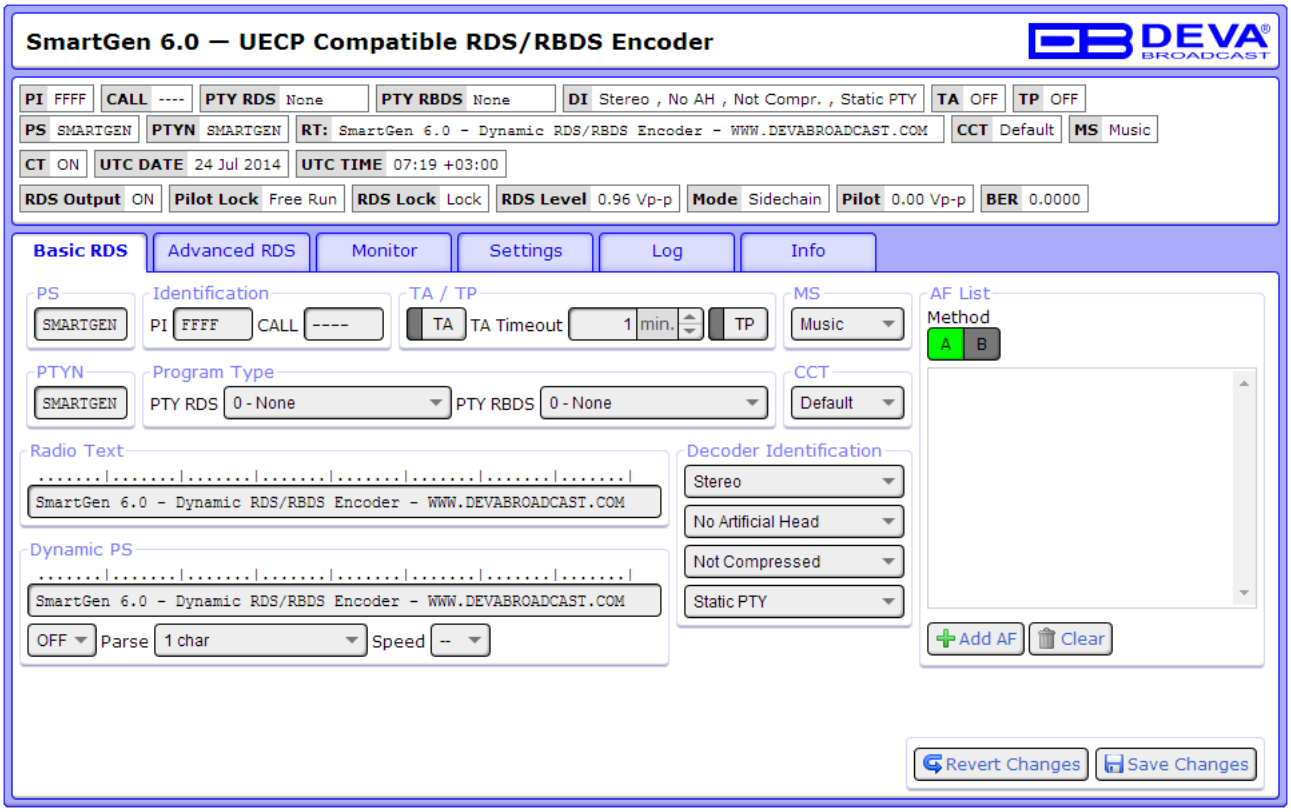
NOTE: The current settings are referred to Main PSN in the Current DSN.

The Web Interface is visually divided into two sections:

- Top – Monitoring section – visualizes the currently broadcasted information. This section is a constant part of the interface window, thus allowing reading at a glance of all necessary readings. Please note that the information is not editable.
- Bottom – This part of the interface window contains all editable readings and device functional buttons. It is divided into several sub-sections (tabs). On the bottom of each section are available two buttons – 'Revert changes' and 'Save changes'.
-

Please note that in order for all the changes to be saved the 'Save changes' button should be pressed. Otherwise, the old values will be applicable.

BASIC RDS



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

PI Code Calculator

The PI code is your station's 'digital address'. This 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 Web Interface. 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 callsign will be calculated automatically into CALL box.

When PI calculator fails to calculate PI or CALL the corresponding box will be filled with '----'.

Program Type (PTY)

PTY Selection identifies the station's programming format from a list. There are two lists, one for the European RDS system and one for the American RBDS specification, hence, open the appropriate drop-down list and select suitable PTY.

TA Timeout

An optional safety feature is built into the SmartGen 6.0 to guard against an extended software-activated TA flag. For example, presuming that the TA flag has been activated via software command and the data link is suddenly lost. A command that deactivates TA flag would not be received, and the TA flag would remain raised indefinitely. As this is not acceptable, an automatic timeout option has been included for software-activated TA flags.

In order for this function to be used – the interactive TA button should be enabled. The timeout can be set from 1 to 255 minutes. This will automatically deactivate the TA flag after the programmed time has elapsed.

NOTE: The Timeout should not be used to define the actual period that the TA flag is raised. The TA flag must be reset to zero immediately following a traffic announcement. Again, it's best to use the manual switch option for this command as described in "Activating the TA Flag" on page 25.

Dynamic PS

DPS is proprietary setting, which not conform with RDS/RBDS Standard. Because of driving safety considerations, broadcasters have, from the start, been discouraged from making the PS "dynamic"; that is, to send long messages in a succession of 8-character frames. As a matter of note, it remains a violation of both the CENELEC and the NRSC standards to flash or scroll the PS display. Nevertheless, this nefarious practice of "Scrolling-PS" has become very common, both in the US and abroad.

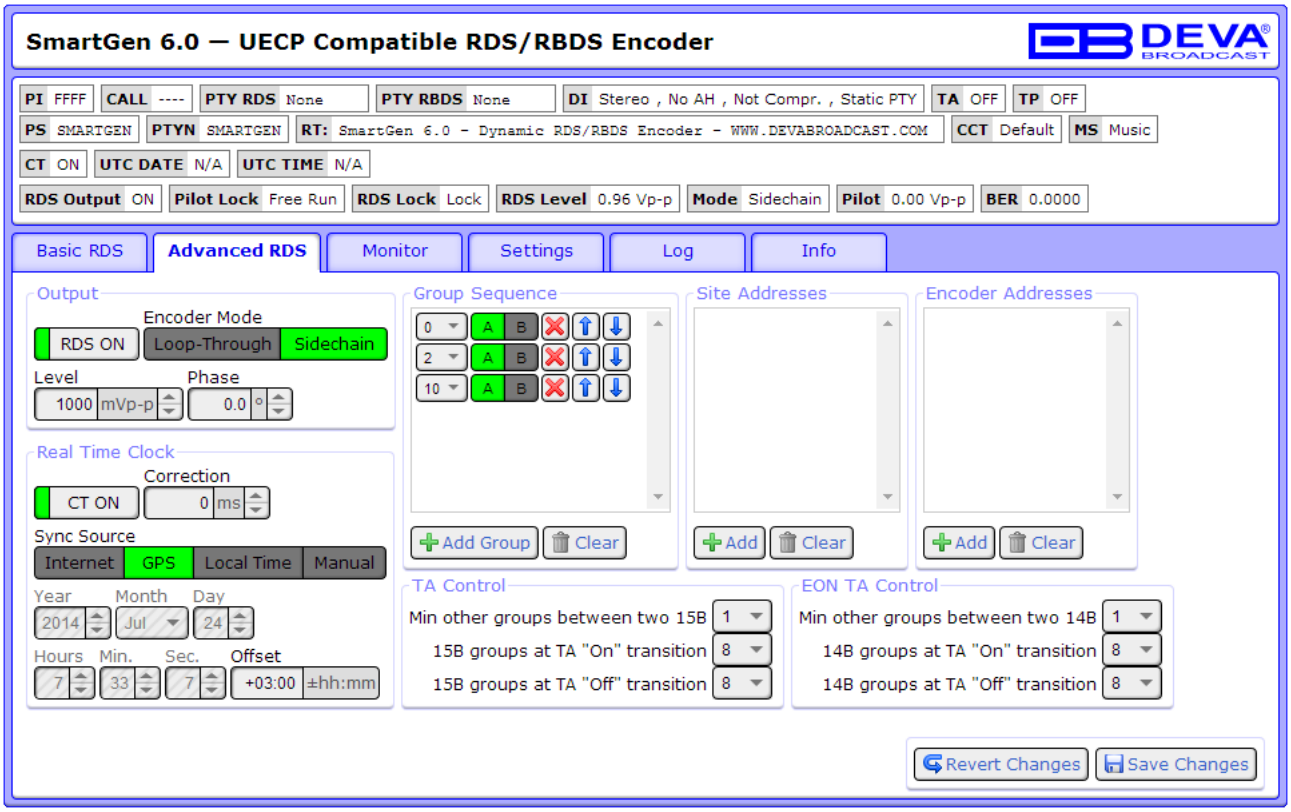
The Dynamic PS can hold up to 64 characters of text, which can be made to scroll across the RDS radio faceplate. Left undisturbed, the encoder will scroll the same message endlessly.

Parsing is the encoder's "smart" mode of message transmission. Parsing breaks messages down into meaningful character groups for efficient display on the 8-character alphanumeric readout common to all RDS receivers.

When Parse is set to 0 (words centered) or 9 (words left justified) parsing sends short words together. Longer words, up to and including 8 characters, are sent individually. Words that exceed 8 characters are "sidestepped" through two or more consecutive displays.

When Parse is set between 1 and 8 the message is scrolled 1 to 8 characters at a time without divisions into word groups.

ADVANCED RDS



Here you will find information on all advanced RDS settings.

As it is explained in “Selection of Operating Modes” on page 21, two types of operating modes are available. Once the SmartGen 6.0 is set, the preferred mode should be specified in the “Output” section of the encoder.

The “Real Time Clock” function provides several types of Sync sources that you can choose from. The need of highly-accurate time source is satisfied not only by the supported SNTP (Simple Network Time Protocol), but also by the built-in GPS Module. The used GPS technology provides a means for synchronizing the unit with UTC. Once the preferred ‘Sync Source” is selected, the Time Zone Offset should be set manually (Local time excluded, as the values will be automatically assigned from the browser’s time).

All needed settings for the Group Sequence, TA and EON TA Control are also applied through this tab of the WEB interface.

Site Address & Encoder Address - The encoder has two address lists, one of acceptable site addresses and the other of acceptable encoder addresses. The site address list includes “0” (the global site address), the unique site address and any additional site group addresses. The encoder address list includes “0” (the global encoder address), the unique encoder address and any additional encoder group addresses. For detailed explanation about Encoder Addressing refer to the UECP Specification.

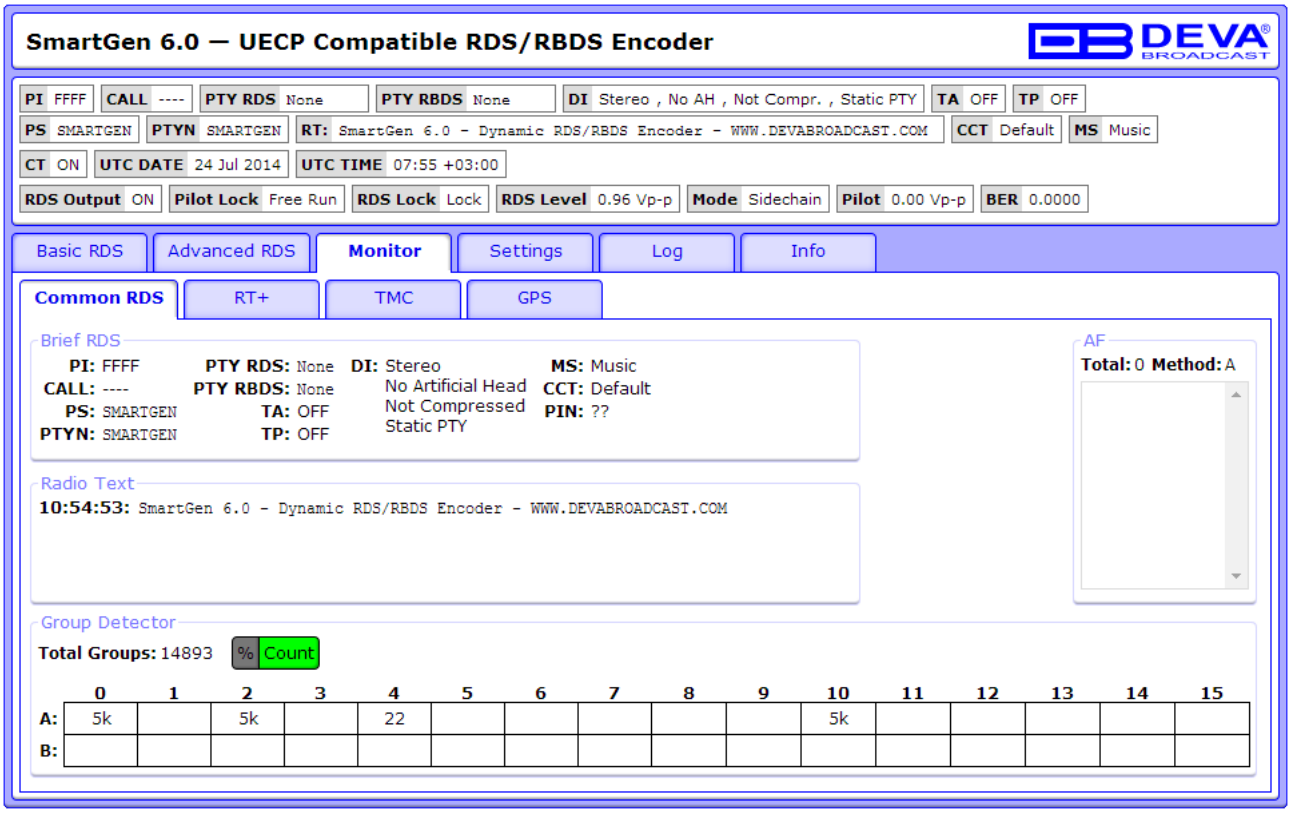
Main Group Sequence has a direct impact over the transmission of RDS groups, their succession and repetition rate. Unless some special case it is good practice to include into Group Sequence at least 0A, 2A and 10A groups, because they carry the basic RDS information - PS, TA, MS, DI, AF, RT and PTYN.

NOTE: Group Sequence cannot be empty. Group 4A, 14B and 15B are not allowed in Group Sequence, they are generated automatically. Groups 2A and 2B could not coexist.

MONITOR

This tab visualizes the currently broadcasted information, thus allowing reading at a glance of all necessary readings. Please note that the information is not editable. This section of the WEB interface is divided into several subsections – Common RDS, RT+, TMC and GPS. Each explained in details below.

Common RDS



Brief information on all the RDS readings is found here. The currently broadcasted Radio Text is also evident. A great addition to SmartGen 6.0's functionalities is the 'Radio Text' section, where the last 20 broadcasted RT are are listed.

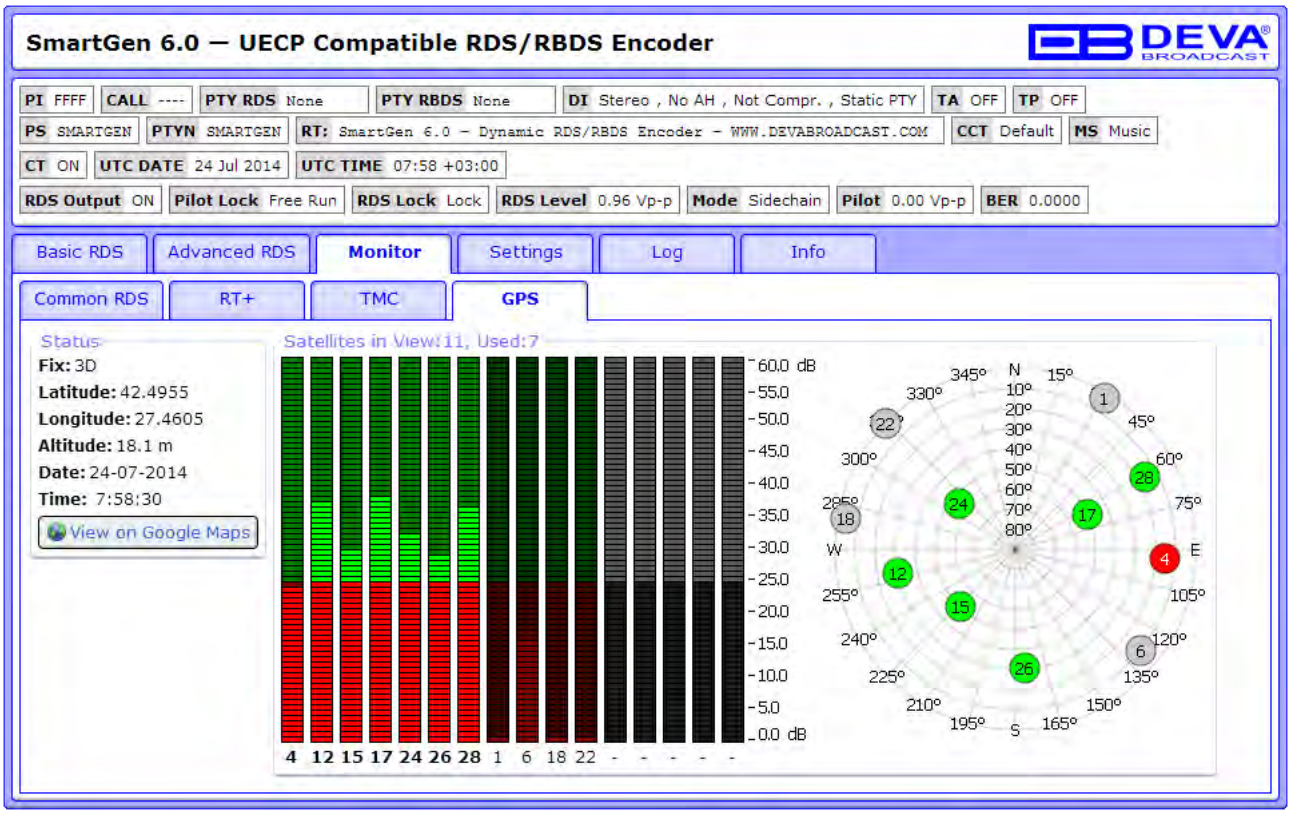
Group detector - all received groups are systematized into a table, representing the percentage/ quantity of the groups in the received RDS/RBDS signal. The user selects how the 'Total groups received' data should be represented: as Percents (%) or as Count, by selecting the corresponding button.

'AF' - List of the alternative frequencies is found on the right part of the screen.

RT+ and TMC

If your Radio station has RT+ or TMC – SmartGen 6.0 will display the information from those ODA Groups.

GPS



GPS should be chosen as 'Sync Source' in order for the GPS to be available. The 'Sync Source' is set in the "Advanced RDS" tab (see "Advanced RDS" on page 57).

Status

This section contains information about the GPS attributes – Fix, Latitude, Longitude, Altitude, Date, Time. 'View on Google Maps' option is also available.

Satellites in View

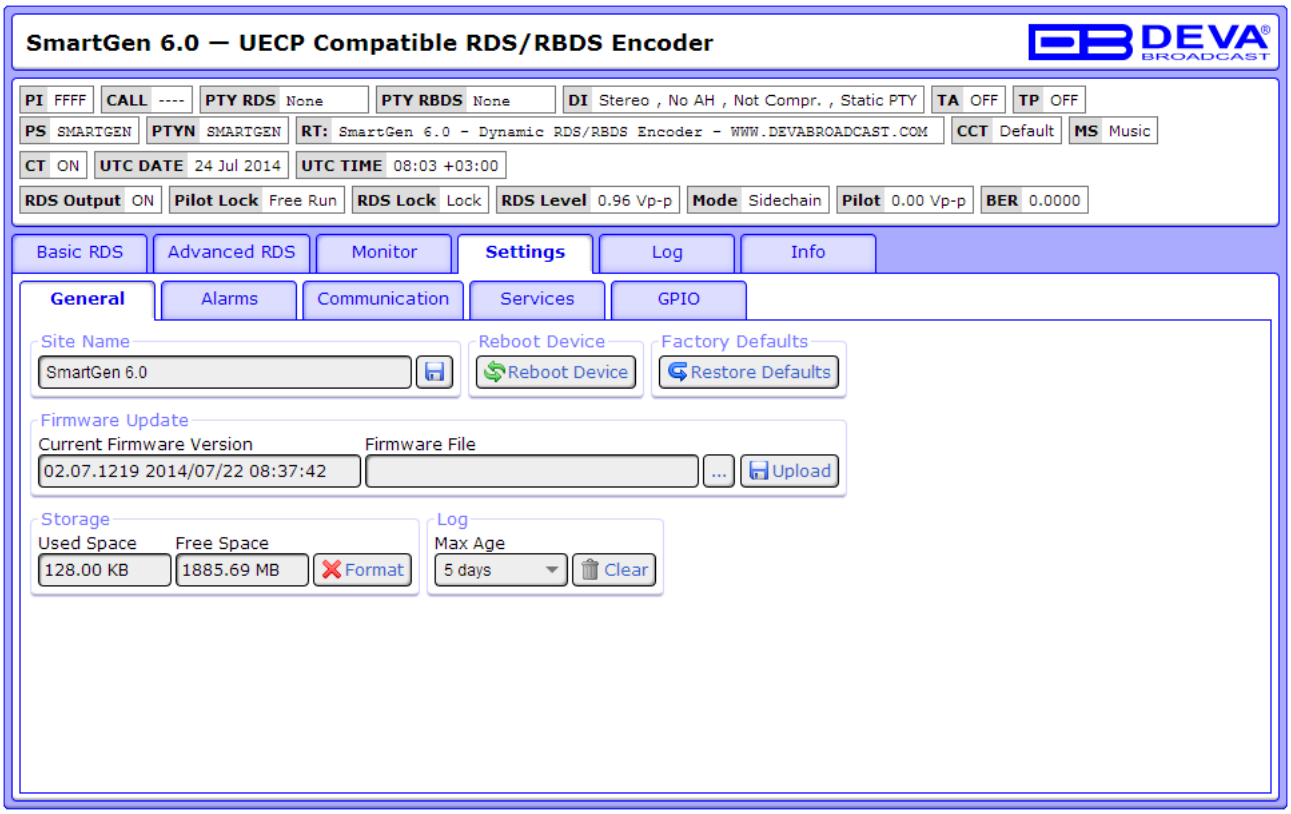
This section contains information about satellites in view. The LED indicators show the reception quality for every satellite. The number beneath every LED is Satellite ID.

Sky View is an alternative representation of "Satellites in View". Every satellite is represented as a 2D point in space, according to Elevation, Azimuth and signal quality of the satellite. Sky View gives a general idea of how satellites are scattered through the visible sky. The bigger the distance better the Dilution of Precision. Satellites with insufficient signal quality are colored in red. The satellites that are not being used are also evident and are colored in grey.

NOTE: A click on the 'Sky View' will hide/show the inner grid and the azimuth and elevation labeling.

SETTINGS

General

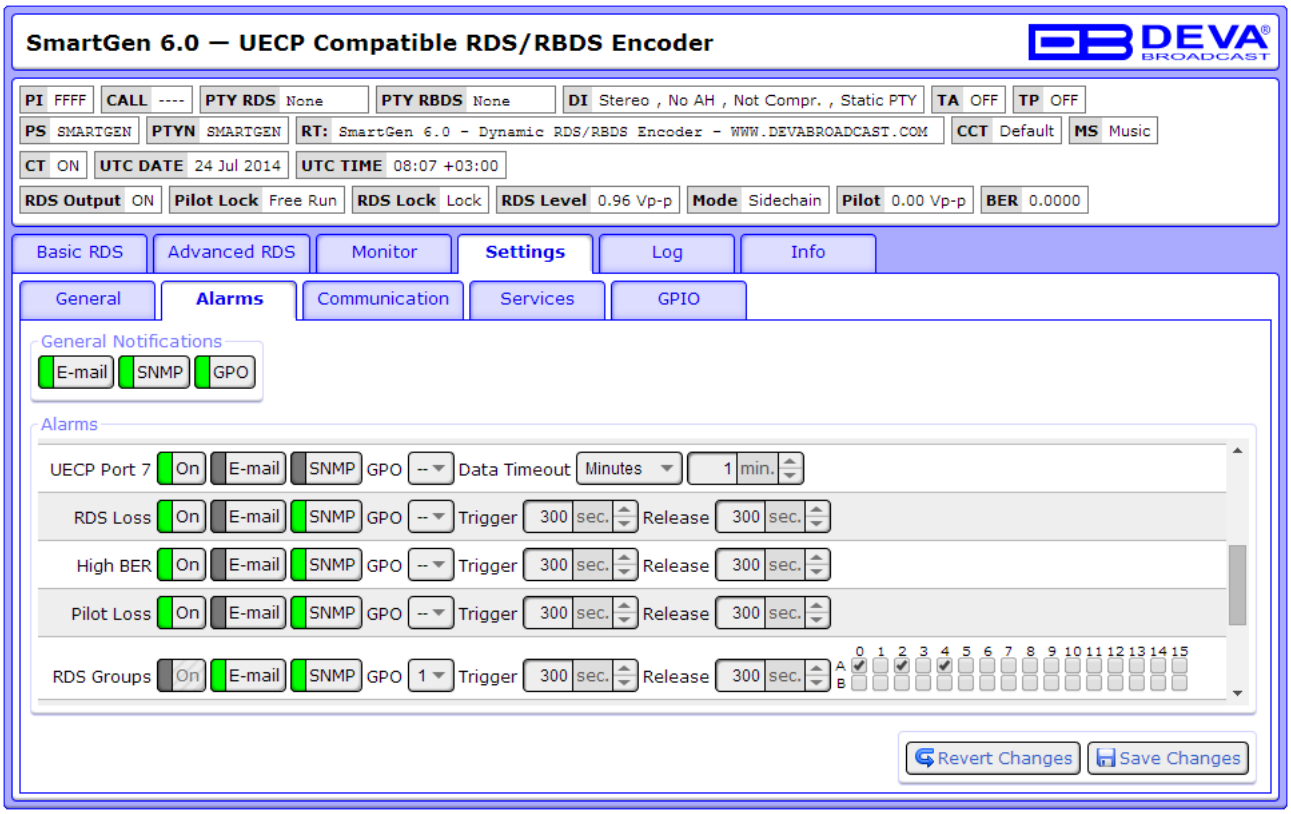


All general settings are applied through this section. From here you can specify the Site Name for easy identification of the unit. You can also easily Update the Firmware, Format the Storage or even to Reboot the device or Restore it to its Factory Defaults.

Site Name – if changed, the name will be used as a title of the WEB Interface. It will also be used as an alias for the UPnP and LCD Display.

The Log Files Maximum Age is also specified through here.
NOTE: Log files older than the specified will be permanently deleted.

Alarms



General Notification – Generally enables the type of notification/s to be used in case an alarm event is generated.

NOTE: Please note that if the types of alarm notification are generally enabled (from section 'General Notifications'), nevertheless whether the alarm is turned on, an alarm notification will not be received and the event will be stored in the Log files of the unit.

Alarms - This section allows the alarms to be enabled and set at the preferred parameters. Please have in mind that in order for an alarm to be activated the "On" button should be enabled/ selected. Once all needed settings are applied the "Save Changes' button should be pressed.

The setup for all parameters is simplified. Below is an explanation on the procedure depending on the Alarm:

UECP Ports 1 to 7

- Enable the ON button;
- Select the preferred alarm method(s) – E-mail, SNMP or GPO. In order for the GPO notification to be enabled, the GPO port number should be specified from the drop-down menu;
- Specify the 'Data Timeout' after which an alarm event should be generated.

RDS Loss, High BER, Pilot Loss

- Enable the ON button;
- Select the preferred alarm method(s) – E-mail, SNMP or GPO. In order for the GPO notification to be enabled, the GPO port number should be specified from the drop-down menu;
- Specify the 'Trigger' (waiting time before Active Alarm is generated) and 'Release' time (waiting time before Idle Alarm is generated) after which an alarm event should be generated.

RDS Groups

- Select the preferred alarm method(s) – E-mail, SNMP or GPO. In order for the GPO notification to be enabled, the GPO port number should be specified from the drop-down menu;
- Specify the 'Trigger' (waiting time before Active Alarm is generated) and 'Release' time (waiting time before Idle Alarm is generated) after which an alarm event should be generated.
- Selected the groups for which the alarms should be generated.

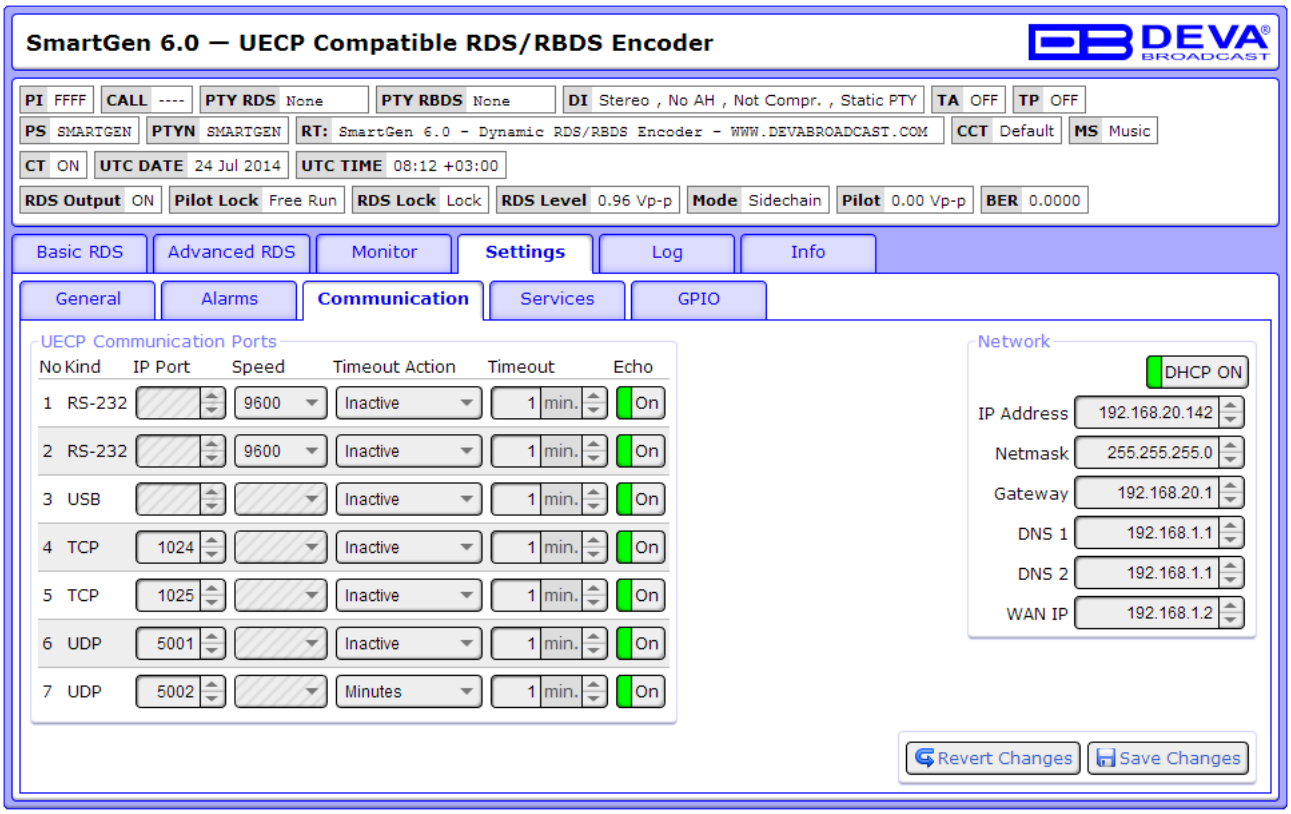
TA Timeout, DSN and PNS Change

- Enable the ON button;
- Select the preferred alarm method(s) – E-mail, SNMP or GPO. In order for the GPO notification to be enabled, the GPO port number should be specified from the drop-down menu;

Temperature

- Select the preferred alarm method(s) – E-mail, SNMP or GPO. In order for the GPO notification to be enabled, the GPO port number should be specified from the drop-down menu;
- Specify the 'Trigger' (waiting time before Active Alarm is generated) and 'Release' (waiting time before Idle Alarm is generated) time after which an alarm event should be generated;
- Specify 'Low' and 'High' temperature. In order for an alarm to be generated, the 'Low' and 'High' buttons should be enabled (turned on).

Communication



UECP Communication Ports - here are listed all available communication ports. Have in mind that the different ports have some limitations as regards the settings to be applied. Below is a table indicating the settings to be applied for each of the communication ports.

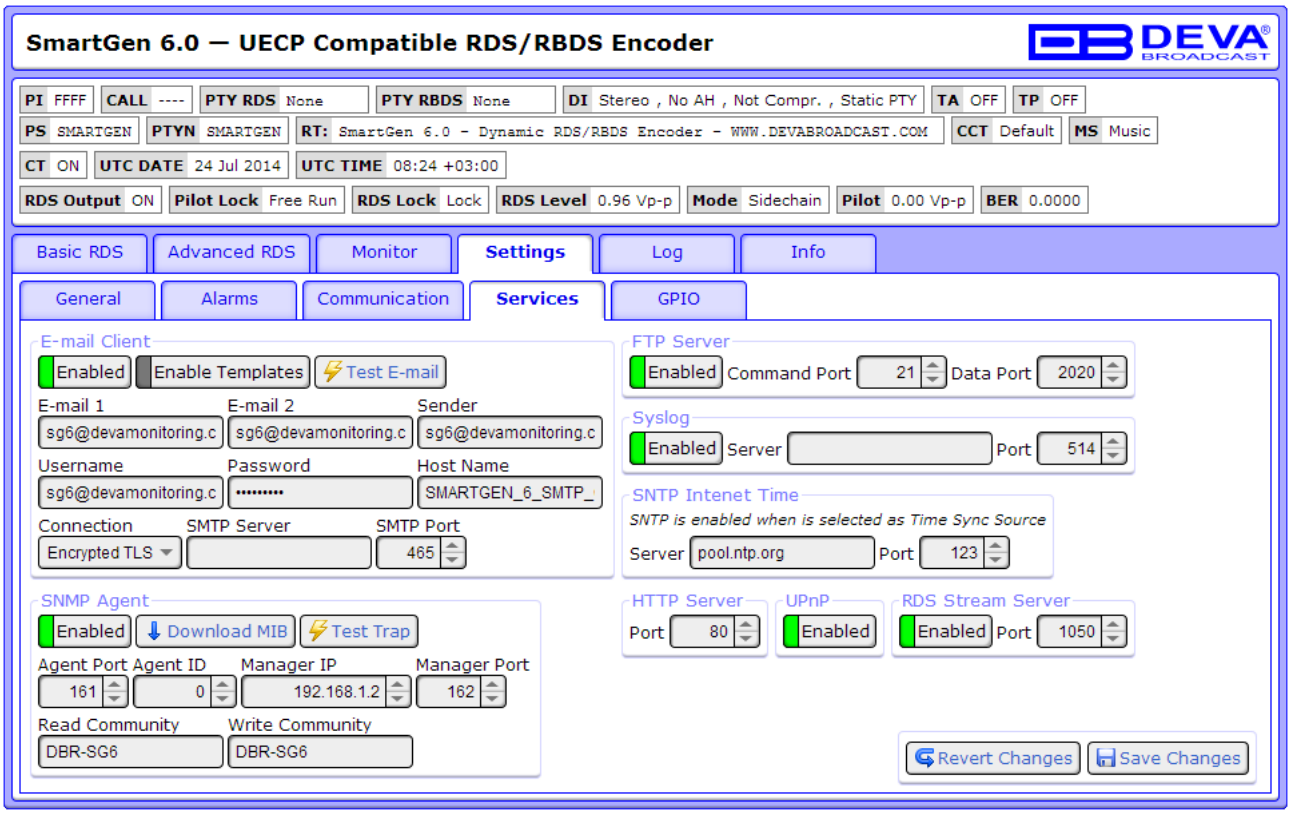
UECP Communication Ports	Settings				
	IP Port	Speed	Timeout action	Timeout	Echo
RS-232	✘	✓	✓	✓	✓
USB	✘	✘	✓	✓	✓
TCP	✓	✘	✓	✓	✓
UDP	✓	✘	✓	✓	✓

Timeout action – the following actions are available – Inactive, No Action, Minutes. In order for the communication port to be active "Minutes" should be set as Timeout Action.

Echo – This button enables/disables the local echo for the corresponding port.

Network section – The network addresses could be set manually (static IP) or automatically via a DHCP server. To set a static IP, Netmask, Gateway, DNS addresses and WAN IP, the DHCP should be disabled. In order for the built-in DHCP client to be activated, the function should be enabled. When the DHCP client is activated, all assigned values will be shown in the relevant fields.

Services



E-mail Client - In this section of the WEB interface you can Enable/Disable the e-mail client and HTML Templates, and apply all needed for e-mail settings. Enable Templates – enables the HTML formatted e-mail feature. (For further information please refer to "HTML formatted e-mail feature" on page 100)

Enter the desired alarm recipients in E-mail 1 and/or E-mail 2 fields. Fill in your e-mail account settings: Sender, Username and Password, Server, SNMP port and connection type.

We recommend you to use the 'Test' button and generate a test e-mail, which upon success will be delivered to the specified E-mail 1 and/or E-mail 2.

Example of Test E-mail Message:

```
SmartGen 6.0 Test Message.
Please do not reply to this e-mail.
```

SNMP Agent

Specify Agent ID, Agent Port, Read/Write Communities, Manager IP, Manager Port and session timeout. Agent ID is used for identification of the device among others, when an SNMP notification is being sent.

Once all needed settings are applied, use the Test button to generate a test notification, which upon success will be received by the SNMP Manager.

Press the 'Download' button to download the latest available SmartGen 6.0 SNMP MIB file.

NOTE: The MIB file may vary from one firmware revision to another. Downloading this file from the device, guarantees that you have the proper MIB file.

FTP Server
Enable/Disable the FTP Server. Specify the Command and Data Ports to be used.

Syslog
Enable or disable the Syslog feature. Specify Server address and port to be used.

SNTP Internet Time – Synchronizes automatically SmartGen 6.0 clock to a millisecond with the Internet time server. Enable this function in order to use it. (Specifying the server closest to your location will improve the accuracy).

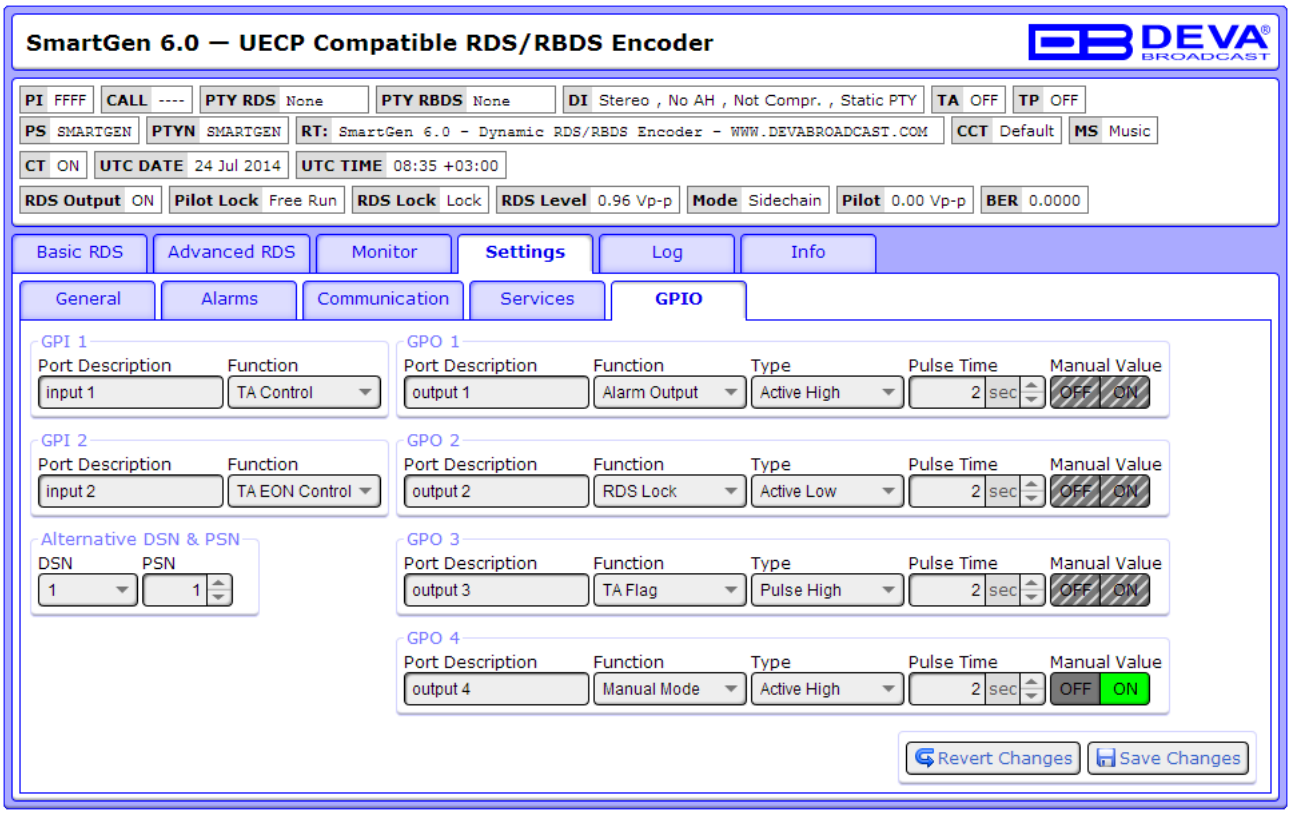
NOTE: SNTP is enabled when is selected as Time Sync Source

HTTP Server - Enable/Disable the HTTP Server. Specify the Server Port.

UPnP - Enables/Disables the UPnP discovery function.

RDS Stream Server – SmartGen 6.0 has a built-in, independent decoder. There is also a TCP IP server that streams rough RDS data obtained from the integrated RDS decoder. It is very convenient when RDS broadcasting control is needed.

GPIO



The general purpose outputs/inputs settings are applied through this page.

Port Description and Function for each of the GPIs could also be set individually. You can choose between the following functions: Not assigned, DSN Selection, PSN Selection, TA control, TA EON Control.

Alternative DSN and PSN can also be specified. They are used when DSN Selection, PSN Selection functions are selected.

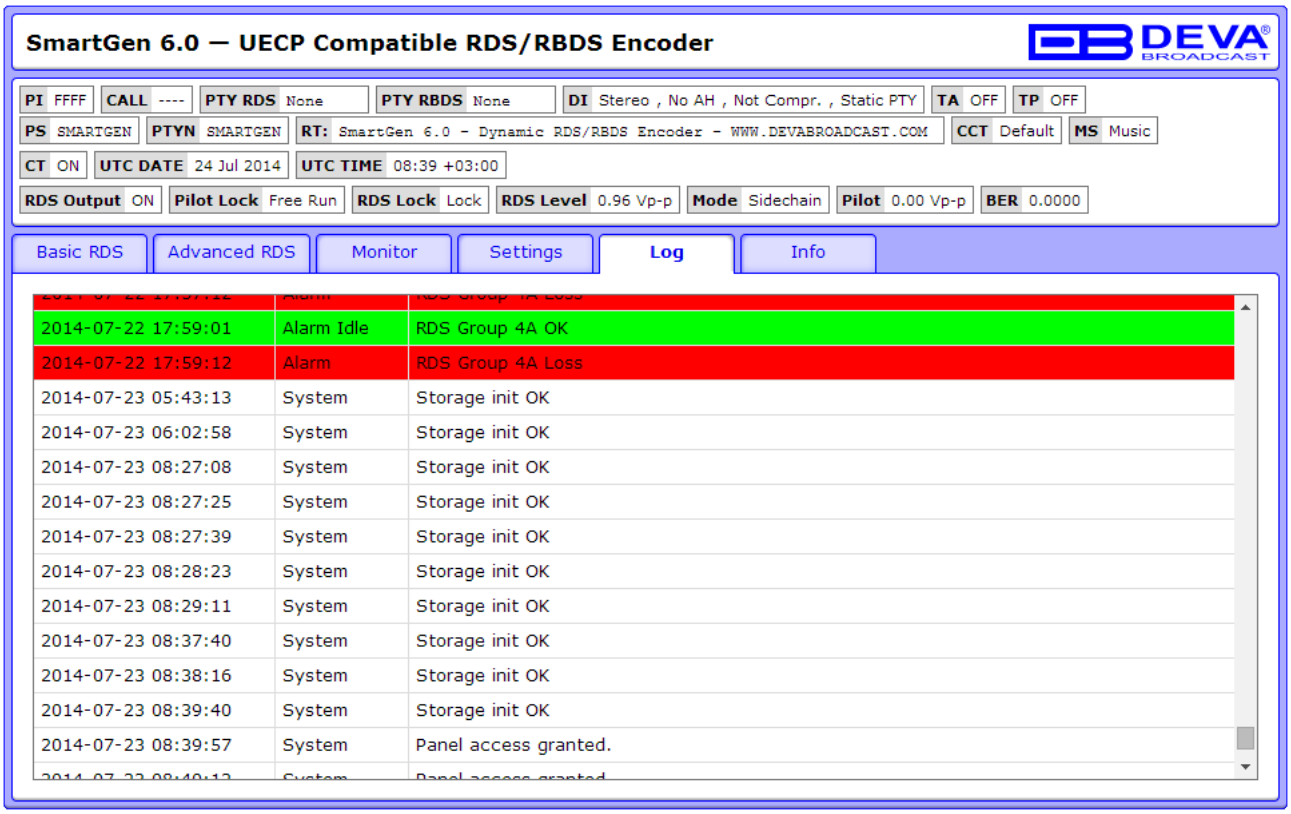
Alternative DSN can be assigned with values from 1 to 6 (6 DSNs are available in SmartGen 6.0) and when GPI with DSN selection is activated, the DSN will become current, and Main PSN will be selected for this (alternative) DSN.

Alternative PSN – can be assigned with values from 1 to 255 and activation of the GPI with PSN selection. This PSN (if available) will become main PSN for the current DSN.

Function, type and pulse time for each of the GPOs could be set individually. You can choose between the following functions: Alarm Output, Manual mode, RDS Lock, TA Flag, TA EON Flag and TP Flag. 'Type' is used for specifying of the active level. When an alarm is generated the output can change the level to Active High/Low or to generate Pulse High/Low.

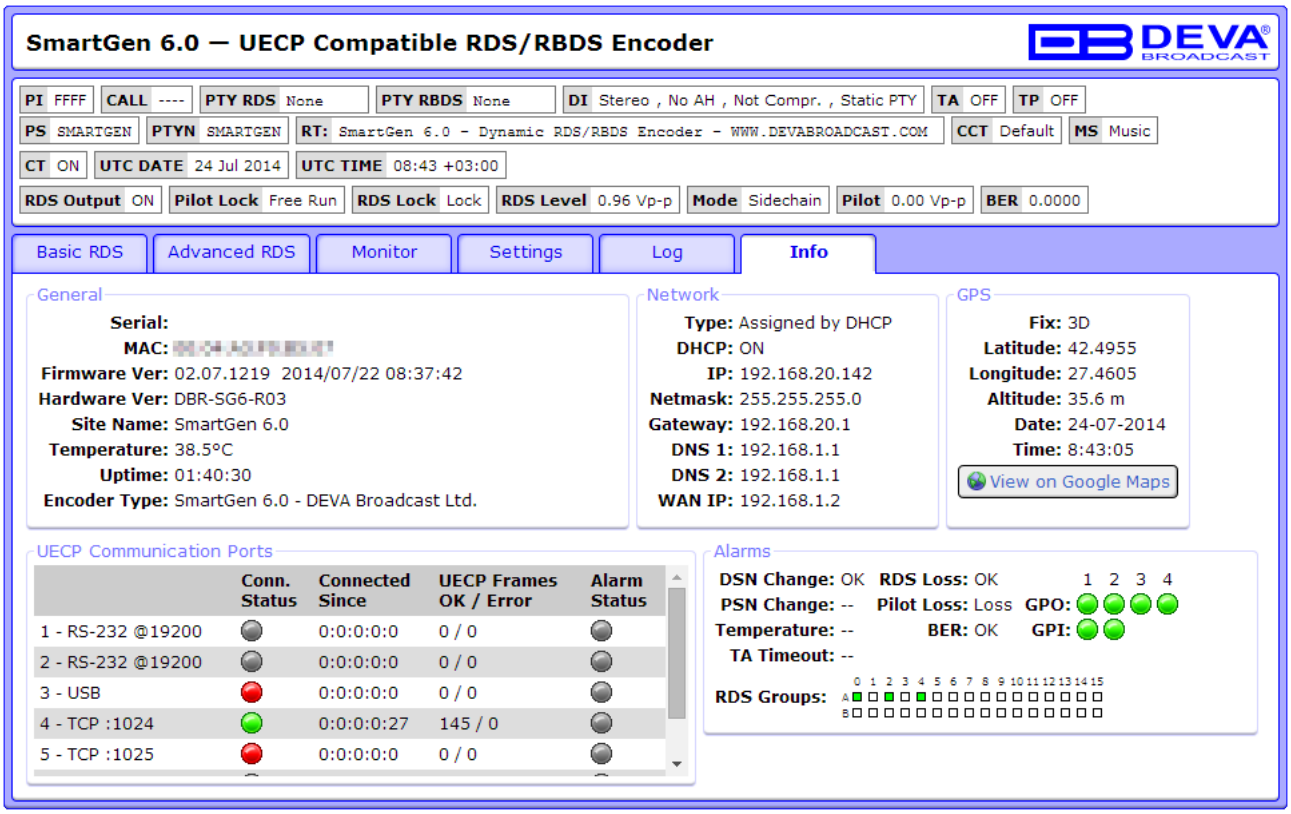
Please note that if the GPO's function is not assigned as "Alarm GPO" and the same is chosen as a preferred alarm, notifications will not be indicated, nevertheless one is being generated.

Log



Here are listed all the Device System Events. The logs are saved in the internal device memory and can be downloaded via the built-in FTP server. (see “Log Files Maximum Age” on page 60)

Info



The 'Info' tab shows the alarm status of each parameter, along with the basic device and network status (IP address, MAC, etc.), GPS (if it is selected as Time Sync Source), UECP Communication ports.

What Is RadioText Plus ?

RadioText Plus or RT+ allows the RDS feature RadioText (RT) to be understood by FM RDS receivers. RT+ is based on RDS RT messages and is backwards compatible with standard RT. It enables FM RDS receivers to recognize designated elements of RadioText messages. Such an element can, for example, be programme-associated metadata such as the Title and the Artist of the currently playing song, or it can be 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.

RT+ is based on RDS RT messages and is completely backwards compatible to the RT. All additional information necessary for implementing the RT+ service is carried in the RDS group 3A and in an appropriate RDS ODA group (see table below).

RT+ information elements		
RT Message	RT+ identification	RT+ tags
RDS group 2A/B	RDS group 3A	RDS ODA group xA

RT+ TAG

When an RT message like “You are listening to “House of the rising sun“ by Eric Burdon” is sent out, the RT+ information elements Title and Artist are marked by two RT+ tags.

An RT+ tag consists of three elements:

- RT Content Type
- Start Marker pointing to the position (inside the RT message) of the first character of that RT+ information element
- Length Marker indicating the additional length (in addition to the character at the start position) of that RT+ information element

The Content Type is taken from a list with 64 entries. For the example given above the two tags are as follows:

RT Content Type	ITEM.TITLE
Start Marker	22
Length Marker	22

RT Content Type	ITEM.ARTIST
Start Marker	50
Length Marker	10

Start Marker and Length Marker can be derived from the following scheme below:

```
You are listening to “House of the rising sun“ by Eric Burdon
0----0----1----1----2----2----3----3----4----4----5----5----6---
0----5----0----5----0----5----0----5----0----5----0----5----0---
```

NOTE: The addresses of the RT characters range from 0 to 63, so the start marker can take the same values.

The length marker is ranging from 0 to 63 and from 0 to 31 respectively. If two RT+ elements are contained in the RT, they shall not overlap. The tag information sent out shall not change during the lifetime of the associated RT. More details you can find in “[1] RadioText Plus Specifications”.

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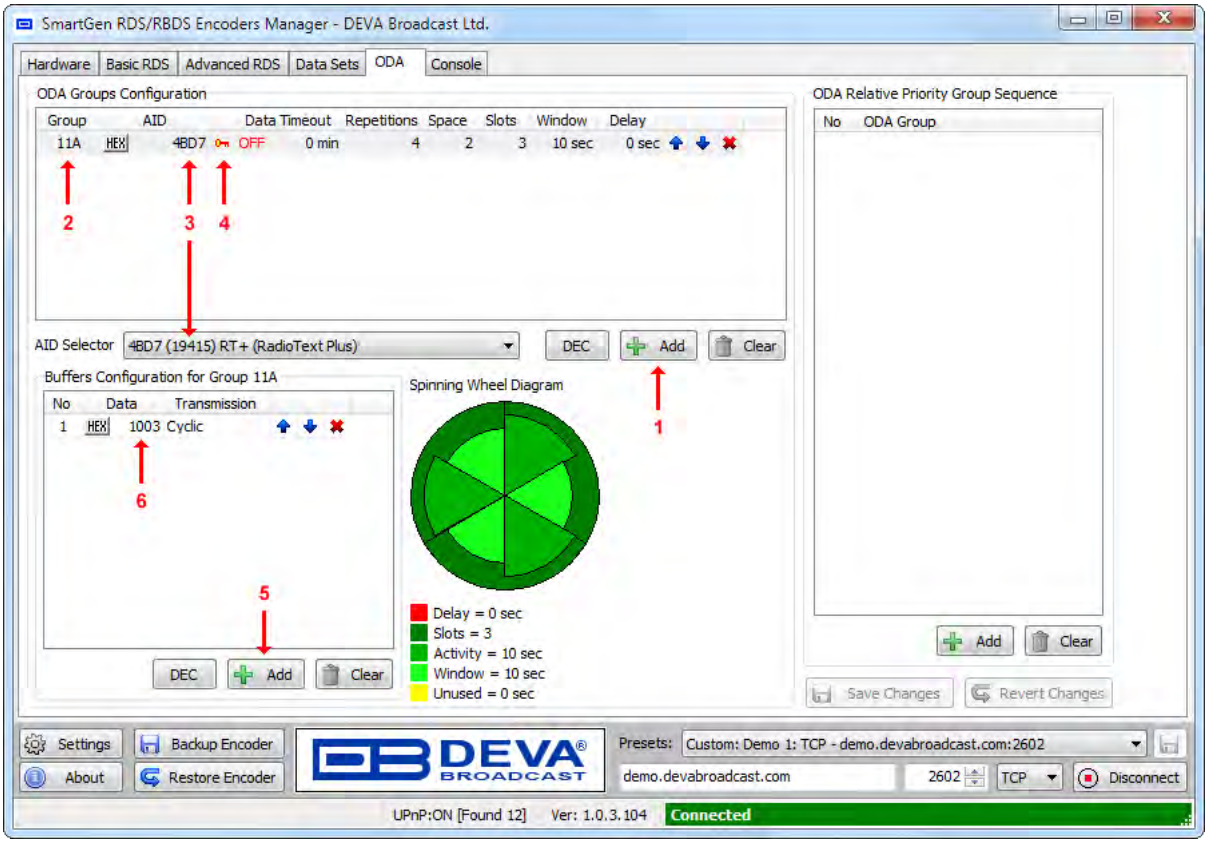
How to configure SmartGen to broadcast RT+?

SETUP AS RDS ODA WITH UECP COMMANDS.

Since RT+ is an ODA application and SmartGen have full UECP support this way of configuring and feeding of RT+ data is strongly recommended. Thus you can take an advantage of the great flexibility provided by the UECP protocol. The SmartGen Encoders Manager application software has very intuitive and user friendly graphical interface so you can make this kind of setup very easy and quick. To do this start the SmartGen Encoders Manager and then connect to the device. Click on Advanced RDS tab and then click on ODA tab.

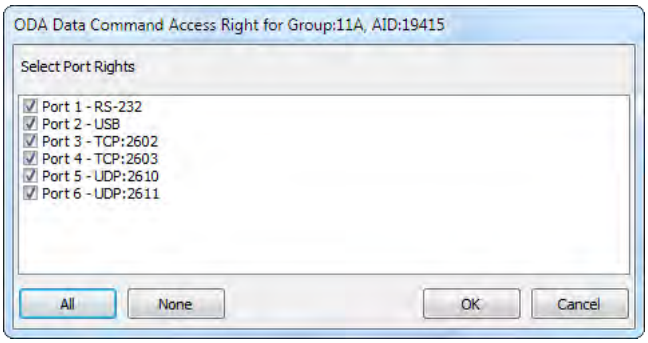
Click the “Add” button to add new ODA application to ODA list as is shown on the Picture 1.

The RT+ can be sent with groups 5A, 6A, 7A, 8A, 9A, 11A, 12A and 13A. In this example we will use group 11A. In the field ODA enter 11A, for AID choose 4BD7 (hexadecimal), which is ODA AID for RadioText+. You can leave the rest of the fields unchanged since they configure more sophisticated methods of transition of ODA, which is not an object of this article.



Picture 1

Note the red key picture next to AID field. Click on that key to see the dialog with ODA data Command Access Rights. Choose Port(s) on which ODA data should been accepted (see the Picture 2). Click OK to exit.

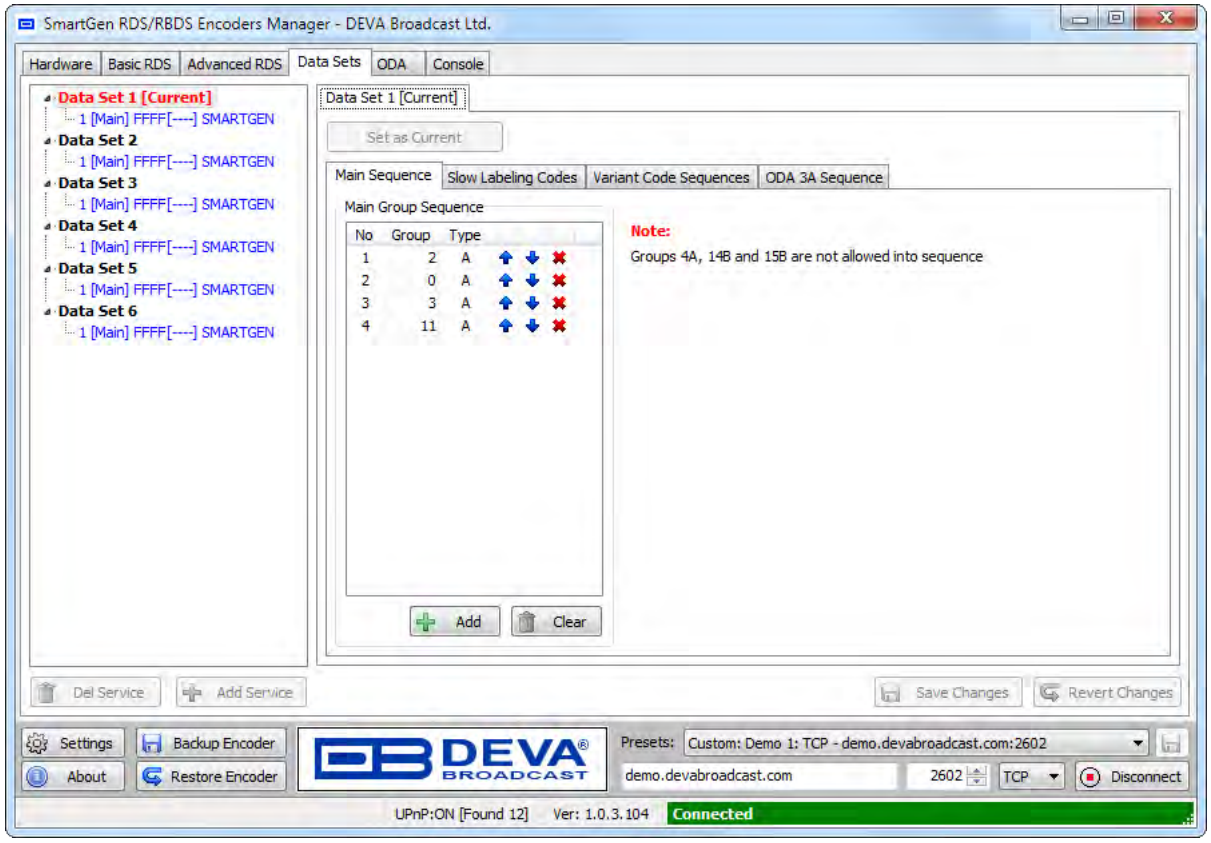


Picture 2

In the ODA Buffers Configuration you can add a set of messages to be carried by RDS group 3A along with ODA signaling. The additional information consists by fields CB flag and Server Control Bits (SCB) and Template number (see also "[1] RadioText Plus Specifications"). Setting value for this field is not obligatory for the encoder to start transmission of this ODA.

The next step is to go to Data Sets tab and select the red colored Current Data Set. Add the ODA signaling group type 3A and selected group type for RT+ data (11A in this example) in the Main group Sequence. Group 2A contains RT itself.

NOTE: You can add every group type more than once in the group sequence and thus provide the desired ratio between transmitted RDS groups.



After this setup is done the encoder is ready to accept and transmit RadioText+ as ODA with UECP commands ODA data (MEC 46h) and ODA free-format group (MEC 42h). More details on UECP protocol you can find at "[2] RDS Universal Encoder Communication Protocol Version 7.05".

SETUP WITH ASCII COMMANDS

In the new firmware revisions (02.03 and above) of SmartGen RDS/RBDS Encoders was introduced a direct ASCII support for configuring and providing a "live" data for RadioText+. There are several ASCII commands to do this. First we must choose the RDS group to carry the RadioText+ data.

In this example we choose RDS group 11A. As we mention earlier the suitable groups for RT+ are 5A, 6A, 7A, 8A, 9A, 11A, 12A and 13A.

First step in configuration process is to establish connection to your SmartGen by terminal program or by Console tab of SmartGen Encoders Manager. Type `SQC?↵` in console window to see the current group sequence. The group 11A, and group 3A (used for RT+ signaling) must be added to the group sequence. Simply type:

`SQC=0A,2A,3A,11A↵`

and the new group sequence will contain RDS groups 3A and 11A. Group 2A contains RT itself and group 0A – PS. These two group types (2A and 0A) are obligatory for the group sequence.

The next step is to set the chosen RDS group (11A) as RT+ data group. Type:

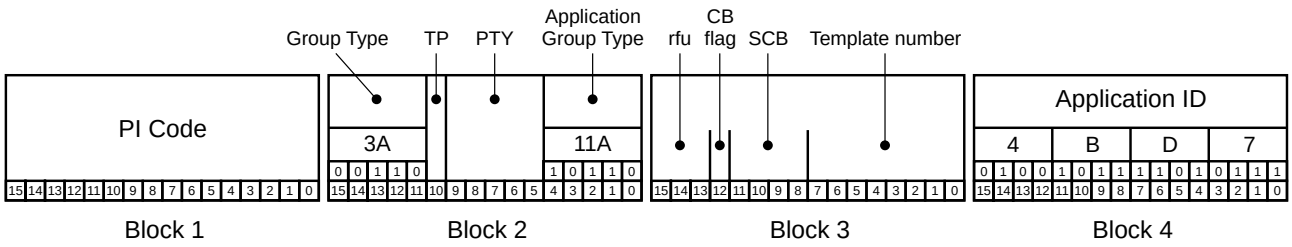
`RT+GROUP=11A↵`

By issuing this command the RT+ will be linked with RDS group 11A. Note that RT+ data will be accepted only on port, on which this command is received. This setting can be changed with SmartGen Encoder Manager (ODA tab, see Picture 1 and Picture 2). Although it is possible to configure more than one port to feed RT+ data to the encoder this will result to inconsistency of RT+ data.

To add additional message data to be carried in block 3 of RDS group 3A such as CB flag and Server Control Bits (SCB) and Template number, type the following:

`RT+TPL=XXXXX↵`

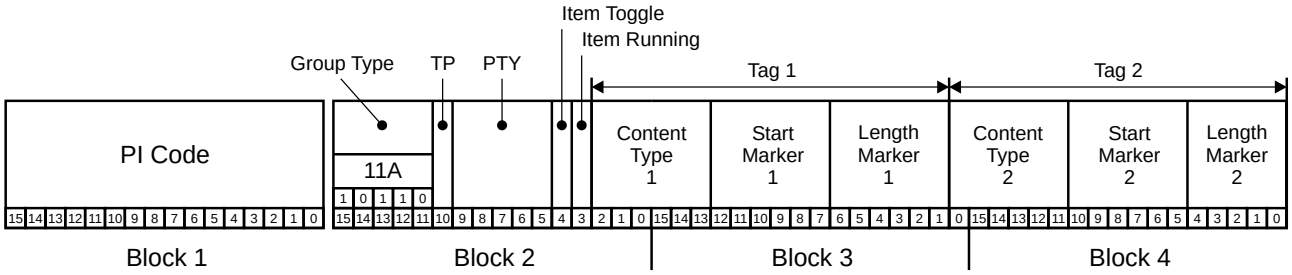
Here `XXXXX` is decimal number between 0 and 65535, and represents the data in block 3. The data encoding is in RT+ specification. This information is not mandatory for encoder to start RadioText+ transmission. If this command is not used the Message bits in RDS group 3A will remain zero.



After accomplish these settings the SmartGen is ready to accept and transmit RadioText+ data. Type:

`RT+TAG=04,22,22,01,50,10,0,0↵`

Here are 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 in minutes). The accepted values for each field is as follows (00-63, 00-63, 00-63, 00-63, 00-63, 00-31, 0-1, 0-255). After setting the tagging with this command the SmartGen will start to transmit group 11A according to the specified group sequence. If no timeout has been set transmission of this data will continue to the moment of new data arrival or power loss (the RT+ tagging data are volatile, but RT+ configuration remains). If timeout is set then in case of timeout elapsing the transmission of RDS group 11A (in this example) will stop. In the picture below is shown coding of RT+ tagging data in given application group (11A in our case).



NOTE: The Item Toggle bit could not be set manually, because it is toggled every time the RT+TAG= command is issued.

References

[1] RadioText Plus Specifications
- http://tech.ebu.ch/docs/techreview/trev_307-radiotext.pdf

[2] RDS Universal Encoder Communication Protocol Version 7.05
- http://www.rds.org.uk/2010/pdf/UECP_7_05_100224_pw53.pdf

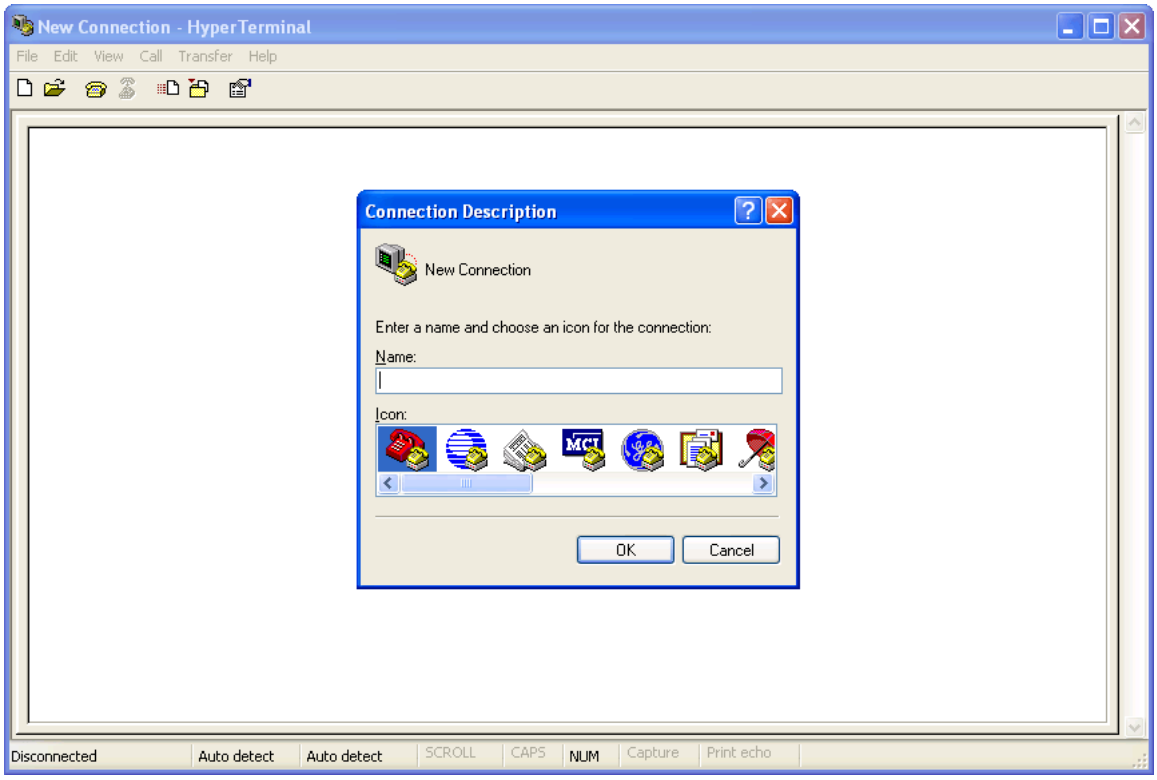
Terminal Configuration

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 Hilgraeve, Inc., developed for Microsoft and supplied with the Windows® XP operating system. The program can be purchased as an addition to the newest Windows® versions. It is supposed 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. Download this from http://www.hilgraeve.com/hyperterminal/ .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 6.0 Encoder until the HyperTerminal program has been configured properly.

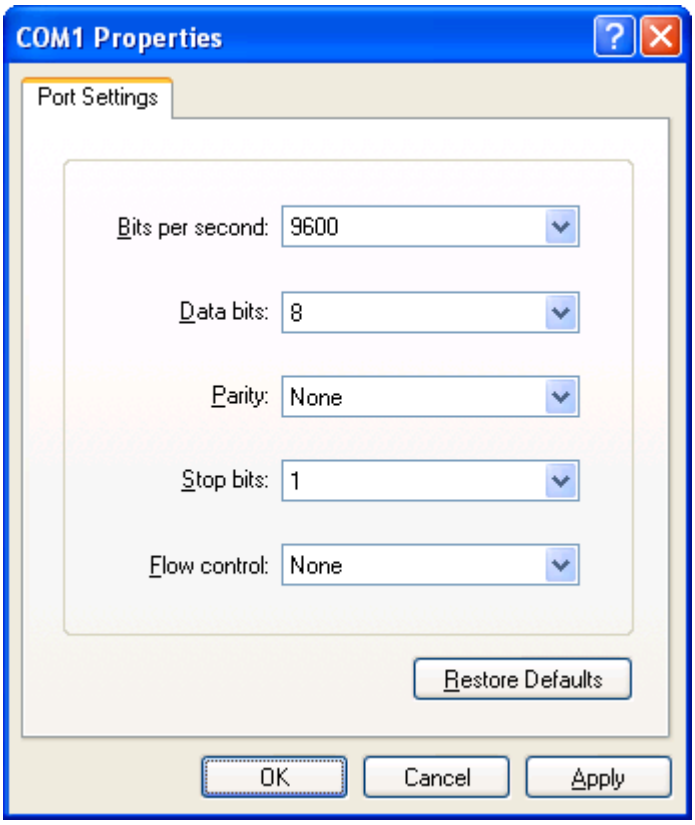
HyperTerminal is started under Windows® XP with the command routine: `Start/Programs/Accessories/Communications/HyperTerminal`. Double-click: HyperTrm.exe. This brings up the main HyperTerminal screen with a Connection Description window for naming your encoder communications program. How this connection 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 6.0, 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.

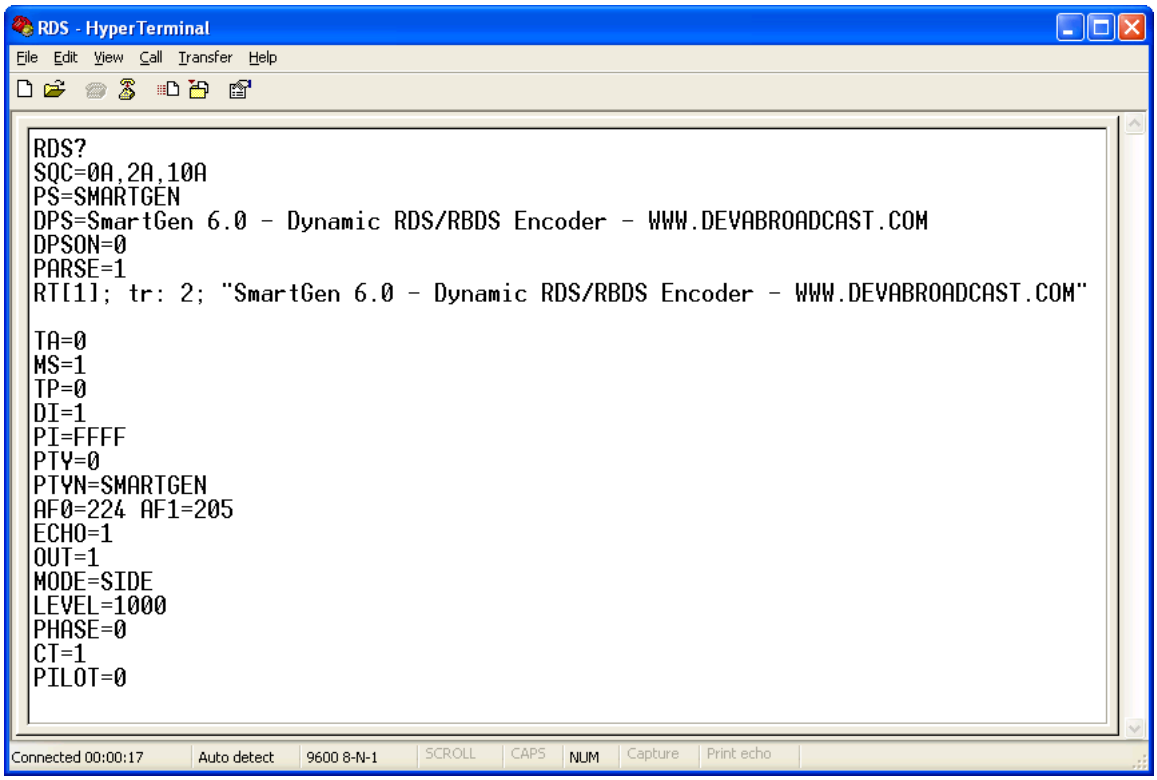
When COM port setup is complete the computer may be connected to the encoder COM port. Next, skip to Power-Up, below.

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 verifies connection.

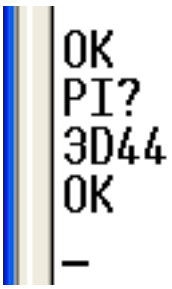
Type: `RDS?↵` . This will cause the encoder to send back the contents of all ID, flag and message registers, which (shown here) are the data entered previously (see "Basic RDS" on page 55)

`RDS?` can be used at any time to make the encoder 'spill its guts'. This exercise does not interrupt or interfere with encoder operation.



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?↵`

In conformity with the defined in the UECP Protocol Encoder Access rights, for each of the UECP pots where this function has been forbidden, the encoder could respond with `ACCESS DENIED`.



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 6.0 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 6.0 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↵`

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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.

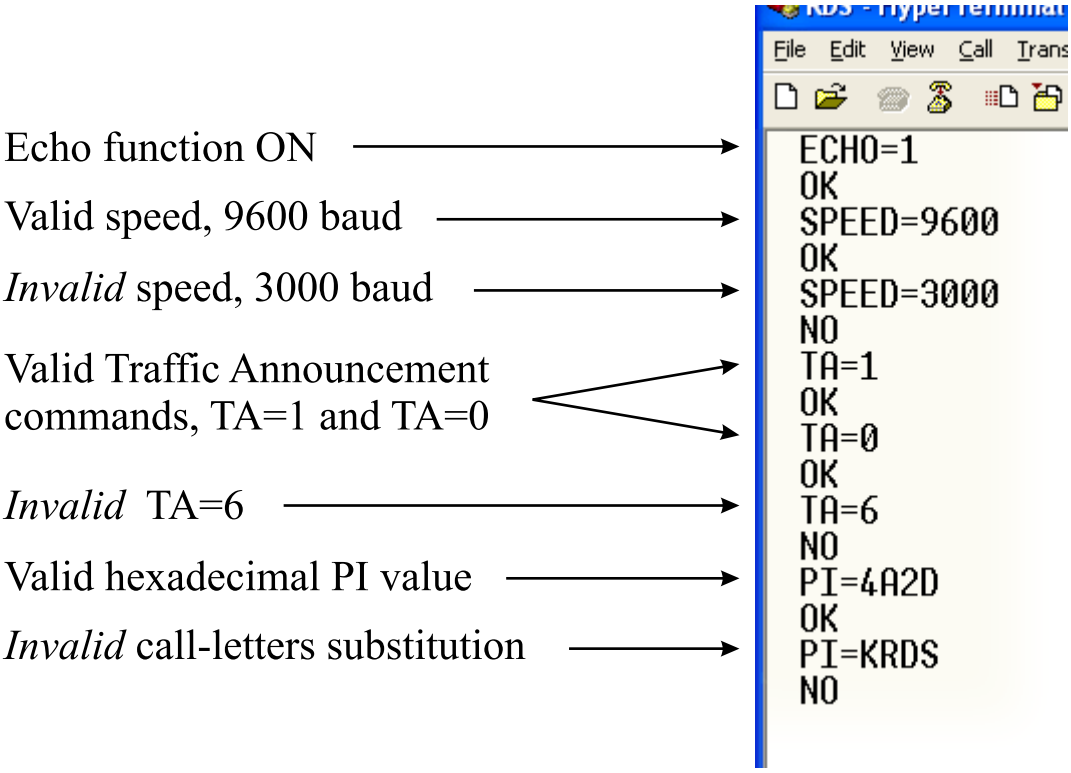
Take time to type deliberately and slowly. Even at 9600 bps, some delays are inherent in the communications between the computer and the encoder. One characteristic of typing too quickly will be the omission of line feeds in responses returned from the encoder.

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 6.0 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 79.

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 the factory defaults (see "Factory Defaults" on page 87). 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 6.0 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 DCHP Client. This is useful when information about Network Settings is needed at a glance; instead of interrogate each one Network Parameter.

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Listing of Encoder Commands and Prompts

COMMAND	DESCRIPTION
PI	Program Identification, 4 digit HEX number (station's "digital address")
PS	Program Service Name, 8 (max) ASCII characters (station's "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)
PARSE	Dynamic PS Method, 0 to 9 0 = centered, 9 = left justified, 1-8 = N characters at a time
DPSS	Dynamic PS scrolling speed, 1 to 9 (1 = slow, 9 = fast) **WARNING**: The current Group Sequence will be obliterated (lost) and replaced with a new one, containing 0A and 2A groups only. **NOTE**: This command has no "GET" variant.
PTY	Program Type, 0 to 31 (describes station's 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
DPSTEXT	Dynamic PS and Radiotext will be set simultaneously, 64 ASCII characters (max). **NOTE**: This command has no "GET" variant
DYNTAG	Returns all dynamic tag settings. To set dynamic tag command string type:<ITEM.DURATION>=DURATION
CTBL	Character Code Table, 0 to 3 (0 = default, 1 = G0, 2 = G1, 3 = G2)
SPEED	COM Speed, 75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps. **NOTE**: SPEED could be get/set only on RS-232 connection
AFA	Sets Alternative Frequencies List using method A. Up to 25 comma delimited Frequencies in range 87.6 to 107.9 MHz. **EXAMPLE**: AFA=101.8, 99.9
AFB	Sets Alternative Frequencies List using method B. Up to 100 comma delimited Frequencies in range 87.6 to 107.9 MHz. **EXAMPLE**: AFB=101.8T, 99.9S, 90.5R. Tuning Frequency is denoted with following 'T' (e.g. 101.8T). Tuning Frequency must be entered always first. Same Program is denoted with following 'S' (e.g. 99.9S). 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)
G	G=BBBBCCCCDDDD, 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. **EXAMPLE**: SQC=0A, 2A, 10A. **NOTE**: 4A, 14B, 15B are not allowed. 2A and 2B could not coexist. Group Sequence could not be empty!!!

RT+GROUP	Set group type for broadcasting of Radiotex+. The RT+ could be sent using groups 5A, 6A, 7A, 8A, 9A, 11A, 12A and 13A. **EXAMPLE**: RT+GROUP=11A. **NOTE**: Before using the RT+ group command, you should be sure that the RDS group 3A and the selected RT group exist in the group sequence of the RDS encoder.
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). **EXAMPLE**: RT+TAG=04,22,22,01,50,10,1,1
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
TIME	UTC Time, HH:MM:SS (HH=hour, MM=Minutes, SS=Seconds)
DATE	Date, DD.MM.YY (DD=Day, MM=Month, YY=YEAR)
CT	Switch transmission of 4A group ON or OFF, 0 = OFF, 1 = ON
CT.OFFSET	Local Time offset, -15:30 to +15:30, in multiples of half hours
CLOCKSYNC	Switch clock synchronization between all possible sources, 0 = OFF, 1 = SNTP, 2 = GPS. **EXAMPLE**: CLOCKSYNC=1 or CLOCKSYNC=SNTP
RDSMON	Returns all important received data from RDS monitor subsystem
SNTP.PORT	Sets SNTP server port, 0-65535
SNTP.ADDR	Sets SNTP server address, XXX.XXX.XXX.XXX or www.example.com
IP	IP Address, XXX.XXX.XXX.XXX
MASK	Subnet Mask, XXX.XXX.XXX.XXX
GATEWAY	Gateway, XXX.XXX.XXX.XXX
WANIP	WAN IP Address, XXX.XXX.XXX.XXX, required for FTP proper function
DNS	DNS Server, XXX.XXX.XXX.XXX
DHCP.ENA	Switch DHCP Client ON or OFF, 0 = OFF, 1 = ON
UPNP.ENA	Switch UPnP service ON or OFF, 0 = OFF, 1 = ON
SNMP.ENA	Switch SNMP Agent and trap service ON or OFF, 0 = OFF, 1 = ON
SNMP.RCOM	SNMP read community, up to 127 chars
SNMP.WCOM	SNMP write community, up to 127 chars
SNMP.AGID	SNMP Agent ID, 0-65535
SNMP.AGPORT	SNMP Agent port, 0-65535
SNMP.MANIP	SNMP Manager IP, XXX.XXX.XXX.XXX
SNMP.MANPORT	SNMP Manager port, 0-65535
FTP.ENA	Switch FTP server ON or OFF, 0 = OFF, 1 = ON
FTP.CMDPORT	FTP server command port, 0-65535, 21(default)
FTP.DATAPORT	FTP server data port, 0-65535
SMTP.ENA	Switch E-Mail service ON or OFF, 0 = OFF, 1 = ON
SMTP.ADDR	SMTP server address, XXX.XXX.XXX.XXX or mail.example.com

SMTP.PORT	SMTP server port, 25(default) or 1024-65535
EMAIL1	E-Mail recipient 1 address, up to 127 chars
EMAIL2	E-Mail recipient 2 address, up to 127 chars
SMTP.SENDER	E-Mail sender string, up to 127 chars
SMTP.UNAME	E-Mail Username string, up to 127 chars
SMTP.PASS	E-Mail Password string, up to 127 chars
SMTP.HOSTNAME	E-Mail Host name string, up to 127 chars
SMTP.CONNTYPE	E-Mail connection type, 0 or 1 (PLAIN or SECURE). 0 = plain, 1 = secure
HTMLEMAIL	Switch usage of HTML formatted E-mail messages ON or OFF, 0 = OFF, 1 = ON
SYSLOG.ENA	Switch SYSLOG service ON or OFF, 0 = OFF, 1 = ON
SYSLOG.ADDR	SYSLOG server address, XXX.XXX.XXX.XXX or www.example.com
SYSLOG.PORT	SNTP server port, 0-65535, 514(default)
RDSSRV.ENA	Switch RDS data server ON or OFF, 0 = OFF, 1 = ON
RDSSRV.PORT	RDS data server port, 0-65535, 1050(default)
IPPORT1	TCP Port 1, 1024-65535
IPPORT2	TCP Port 2, 1024-65535
IPPORT3	UDP Port 1, 1024-65535
IPPORT4	UDP Port 2, 1024-65535
HTTPPORT	HTTP(WEB) Port, 80(default) or 1024-65535. **NOTE**: 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
SITENAME	Device ID (Site Name) up to 24 chars
LOG.AGE	Device log file maximal age, 0 = infinite, 5, 10, 15, 20, 25 and 30 days
SYMBOL	**USAGE**
Use =	to SET parameter value, e.g.: PI=1234
Use ?	to GET parameter value, e.g.: TIME?
SPECIAL COMMAND	**DESCRIPTION**
RDS?	Returns all basic RDS data and settings
NET?	Returns all Network settings
FTP?	Returns all FTP settings
SNMP?	Returns all SNMP settings
SMTP?	Returns all SMTP settings
SNTP?	Returns all SNTP settings
SYSLOG?	Returns all SYSLOG settings
RDSSRV?	Returns all RDS raw data server settings
REV?	Returns firmware & hardware revision numbers
PILOT?	Returns the Status of the 19 kHz PLL **LOCK** – locked to the 19kHz stereo pilot signal **FREE** – defaulted to the internal timebase

PLTLVL?	Returns measured pilot level on MPX input
RDSLVL?	Returns measured RDS level on device outputs
TEMP?	Returns device internal temperature (deg C)
TAIN	Returns state of TA GPI (if assigned), NOT ASSIGNED, OFF or ON
TAEONIN?	Returns state of TA EON GPI (if assigned), NOT ASSIGNED, OFF or ON
DSN?	Returns current DSN
PSN?	Returns Main PSN of current DSN
PORTNUM?	Returns current port number
TOUT?	Returns TA timeout status, 1 = timeout occurred, 0 = no timeout
AF?	Returns the current AF list
LOG?	Display the device log file
GPS?	Display GPS Status
DSTAT?	Returns disk and file system status
ALMSTAT?	Returns alarms status
SERNUM?	Returns device serial number
ENCTYPE?	Returns encoder type string
AF.CLEAR	Clears the current AF list
SNTP.SYNC	Forces SNTP to synchronize immediately if SNTP is selected with CLOCKSYNC command, otherwise responds with “NO”
LOG.DEL	Delete log file
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
HELP	Show this help
RESPONSE	**MEANING**
OK	Command received by encoder properly formatted and understood
NO	Command improperly formatted or 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.

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Factory Defaults

GENERAL SETTINGS

RDS Standard	RDS
RDS Level	1000mVpp
RDS Phase	0.0°
Output Mode	Sidechain
Character Code Table	Default
RDS Output	On
COM1 Speed	9600 bps
COM2 Speed	9600 bps
Beeper	On
LCD Backlight	On
LCD Power Save	Off
Site Name	SmartGen 6.0
CT	On
RTC Synchronization Source	SNTP
Local Time Offset	0
RTC Correction	0
System Log Max Age	5 days

BASIC RDS SETTINGS

PI	FFFF
PTY	None
PS	SMARTGEN
PTYN	SMARTGEN
TA	OFF
TP	OFF
TA Timeout	1 min
MS	Music
DI(0)	Stereo
DI(1)	No Artificial Head
DI(2)	Not Compressed
DI(3)	Static PTY
RT	SmartGen 6.0 - Dynamic RDS/RBDS Encoder - WWW.DEVABROADCAST.COM
A/B Flag	On
Dynamic PS	Off
Parse	1 char
DPS Text	SmartGen 6.0 - Dynamic RDS/RBDS Encoder - WWW.DEVABROADCAST.COM
AF List	Empty

NETWORK SETTINGS

DHCP	Enabled
IP	192.168.20.2
Gateway	192.168.20.1
Subnet Mask	255.255.255.0
DNS1	192.168.20.1
DNS2	192.168.20.1
TCP PORT 1	1024
TCP PORT 2	1025
UDP PORT 1	5001
UDP PORT 2	5002

NOTE: Network Settings will not be affected when Factory Defaults are issued through TCP/ UDP Port.

NETWORK SERVICES

DHCP	Enabled
SNMP	Enabled
FTP	Enabled
EMAIL	Enabled
UPNP	Enabled
SYSLOG	Enabled
RDS Stream Server	Enabled

HTTP

HTTP Server Port	80
WEB Server Username	user
WEB Server Password	pass

SNMP

Read community	DBR-SG6
Write community	DBR-SG6
SNMP Agent ID	0
SNMP Agent Port	161
SNMP Manger IP	192.168.20.2
SNMP Manger Port	162

FTP

FTP Server Command Port	21
FTP Server Data Port	2020
WAN IP	192.168.20.2

SNTP

SNTP Server Port	123
SNTP Server Address	pool.ntp.org

SYSLOG

SYSLOG Server Address	(empty)
SYSLOG Server Port	514

SMTP

SMTP Server Port	465
SMTP Server	mail3.host.bg
EMAIL1	sg6@devamonitoring.com
EMAIL2	sg6@devamonitoring.com
SMTP Sender	sg6@devamonitoring.com
SMTP Username	sg6@devamonitoring.com
SMTP Hostname	SMARTGEN_6_SMTP_CLIENT
SMTP Connection type	Secure
HTML Templates	Disabled

RDS STREAM SERVER

RDS Stream Server Port	1050

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

GPIO

GPO-1..4	Manual Mode, Active High, 2s, OFF
GPI-1	TA Control
GPI-2	TA EON Control

ALARMS

All alarms are disabled.

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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.

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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 supplied with this product must be completed and returned to DEVA Broadcast Ltd. 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 delivery 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 one-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 Authorization (RA) number issued by DEVA Broadcast Ltd. prior to its return. An RA number may be obtained by calling the factory. The number should be prominently marked on the outside of the shipping carton.

B. Equipment must be shipped prepaid to DEVA Broadcast Ltd.. Shipping charges will be reimbursed for valid Warranty claims. 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.

APPENDIX A

RDS: EUROPE VS AMERICA

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

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 6.0, it is assumed that the user is familiar with the RDS concept.

APPENDIX A.1

ADDRESSING THE SMARTGEN 6.0

Applications, such as navigational assistance, roadside message billboards, song titles, stock market updates, etc. all require continuous on-line access to the RDS encoder by one or more service providers. Some of these applications may promise additional revenue to the station. The SmartGen 6.0 offers these capabilities and may be addressed by simple ASCII commands, either from station automation or directly from a connected computer.

In Europe, the RDS encoders could be linked to one another for network support applications. The Universal Encoder Communication Protocol (UECP) was developed by CENELEC to support such kind of operation, but over the years has seen decreased usage in favor of TCP/IP addressability or direct connection with station automation. The SmartGen 6.0 fully supports the UECP.

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APPENDIX B.1

RDS APPLICATIONS SUPPORTED

Following is an alphabetical list of the RDS applications supported by SmartGen 6.0. 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 (particularlythe 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.

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 "APPENDIX C.1" on page 98 and "APPENDIX C.2" on page 99.

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.

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APPENDIX C.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.
24-28	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.

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APPENDIX C.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.

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APPENDIX D

HTML FORMATTED E-MAIL FEATURE

Our practice shows that it is much more convenient for the user to have the ability to edit the content of the e-mail notifications. Thus, SmartGen 6.0 can generate a context-oriented E-mail notification with user-defined content. This function is irreplaceable when SmartGen 6.0 should be integrated into the kind of monitoring system that can receive E-mail messages/alerts, in a certain format, or when the user prefers to create his own template using the HTML formatting.

In order for this functionality/feature to be used, the same should be enabled via any of the available device interfaces. Once an alarm event is generated and E-mail and HTML Template are authorized, SmartGen 6.0 will search in the folder named "\smtp_templ" for a file with extension ".html". The name of the file should refer to the type of event that has occurred. Below you will find a detailed list of the default HTML files.

1	dsn_change.html
2	plt_sync_loss.html
3	plt_sync_ok.html
4	psn_change.html
5	rds_ber_ok.html
6	rds_group_0A_loss.html
7	rds_group_0A_ok.html
8	rds_group_0B_loss.html
9	rds_group_0B_ok.html
10	rds_group_10A_loss.html
11	rds_group_10A_ok.html
12	rds_group_10B_loss.html
13	rds_group_10B_ok.html
14	rds_group_11A_loss.html
15	rds_group_11A_ok.html
16	rds_group_11B_loss.html
17	rds_group_11B_ok.html
18	rds_group_12A_loss.html
19	rds_group_12A_ok.html
20	rds_group_12B_loss.html
21	rds_group_12B_ok.html
22	rds_group_13A_loss.html
23	rds_group_13A_ok.html
24	rds_group_13B_loss.html
25	rds_group_13B_ok.html
26	rds_group_14A_loss.html
27	rds_group_14A_ok.html
28	rds_group_14B_loss.html
29	rds_group_14B_ok.html
30	rds_group_15A_loss.html

31	rds_group_15A_ok.html
32	rds_group_15B_loss.html
33	rds_group_15B_ok.html
34	rds_group_1A_loss.html
35	rds_group_1A_ok.html
36	rds_group_1B_loss.html
37	rds_group_1B_ok.html
38	rds_group_2A_loss.html
39	rds_group_2A_ok.html
40	rds_group_2B_loss.html
41	rds_group_2B_ok.html
42	rds_group_3A_loss.html
43	rds_group_3A_ok.html
44	rds_group_3B_loss.html
45	rds_group_3B_ok.html
46	rds_group_4A_loss.html
47	rds_group_4A_ok.html
48	rds_group_4B_loss.html
49	rds_group_4B_ok.html
50	rds_group_5A_loss.html
51	rds_group_5A_ok.html
52	rds_group_5B_loss.html
53	rds_group_5B_ok.html
54	rds_group_6A_loss.html
55	rds_group_6A_ok.html
56	rds_group_6B_loss.html
57	rds_group_6B_ok.html
58	rds_group_7A_loss.html
59	rds_group_7A_ok.html
60	rds_group_7B_loss.html

61	rds_group_7B_ok.html
62	rds_group_8A_loss.html
63	rds_group_8A_ok.html
64	rds_group_8B_loss.html
65	rds_group_8B_ok.html
66	rds_group_9A_loss.html
67	rds_group_9A_ok.html
68	rds_group_9B_loss.html
69	rds_group_9B_ok.html
70	rds_hi_ber.html
71	rds_sig_loss.html
72	rds_sig_ok.html
73	ta_ok.html
74	ta_timeout.html
75	temp_hi.html
76	temp_low.html

77	temp_ok.html
78	uecp_port_1_data_ok.html
79	uecp_port_1_data_tout.html
80	uecp_port_2_data_ok.html
81	uecp_port_2_data_tout.html
82	uecp_port_3_data_ok.html
83	uecp_port_3_data_tout.html
84	uecp_port_4_data_ok.html
85	uecp_port_4_data_tout.html
86	uecp_port_5_data_ok.html
87	uecp_port_5_data_tout.html
88	uecp_port_6_data_ok.html
89	uecp_port_6_data_tout.html
90	uecp_port_7_data_ok.html
91	uecp_port_7_data_tout.html

NOTE: The SmartGen 6.0 will not be able to discover a valid file template and will use the built-in template containing plain text only, in the cases when:

- A file is deleted or renamed;
- The device's storage is deleted or formatted (as this procedure will delete all template files).

If you would like to continue using the HTML formatted E-mails, the "\smtp_templ" directory, along with the files (or only those that are needed) should be restored. This can be made via the FTP client application (properly applied FTP settings will be required). The templates can be downloaded from DEVA's website. The content of the „dsn_change.html" file is listed below:

```
<html><body>
<div>SmartGen 6.0 encoder from
<span style='color:red;'><!--#devAlias--></span> has changed to
DSN <span style='color:red;'><!--#DSN_Crnt--></span> (PSN Main
<span style='color:red;'><!--#PSN_Main--></span>) on <!--#TIME-->
<!--#DSN_ChgBy-->.
</div></body></html>
```

It defines the structure and the variable which are encircled with "<!--#" And "-->", thus indicating that these values will be replaced in the body of the message. For example:

SmartGen 6.0 encoder from Burgas (Bulgaria) has changed to DSN 3 (PSN Main 1) on 26 Jun 2014, 11:47:24 by GPI.

The used color indicators this message are displayed as a result of the HTML formatting. All valid HTML Text Formatting Tags can be applied.

The table below contains the currently available dynamic variables that can be included in the body of the HTML-formatted message. The exact spelling of the dynamic variables should be used (case sensitive matter here). It is also very important the encircling "<!--#" And "-->" to be used. If a spelling error is made, the SmartGen 6.0 will not recognize the variable and will replace it with "*** UNKNOWN TAG xxx ***", where the 'xxx' is used instead of the unknown tag (variable).

Dynamic Tag	Meaning	Example Substitution
devAlias	device alias (site name)	SmartGen 6.0
devSerN	device serial number	12345678
devFWVer	device firmware version	02.07.1206 2014/06/18 11:14:35
DSN_Crnt	current DSN	1
PSN_Main	main PSN	1
DSN_ChgBy	DSN is changed by	“with no change”, “on initialization”, “by GPI”, “by user UECP”, “by user WEB”, “by user SNMP”, “by script file”
PSN_ChgBy	PSN is changed by	
TEMP_CRNT	current device internal temperature	38.5
TEMP_HI	high threshold for the temperature alarm	30.0
TEMP_LO	low threshold for the temperature alarm	65.5
M_PILOT_STAT	pilot status	“Too Low”, “Too High”, “Normal”
M_PILOT_LEVEL	pilot level	1.78 Vp-p
M_RDS_LEVEL	RDS level (measured)	1.25 Vp-p
M_PLTLOCK	pilot lock	0, 1
M_RDSLOCK	RDS monitor (decoder) lock	0, 1
M_BER	monitored BER on RDS signal	0.0000
PI	PI/(CALL) “On Air”	1234
TIME	Time and Date	26 Jun 2014, 11:47:25

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APPENDIX E

ALARMS

The alarms are fast and reliable reporting mechanism in case of change in pre-defined parameters. Below you will find an explanation of the types of event that might trigger an alarm, the settings that should be applied and their properties.

Type of event	Enable	Trigger & Release	Thresholds	Description	NOTE
UECP data port timeout	YES	NO	NO	There are NO valid UECP messages for the time determined by UECP port timeout parameter.	Applicable for all UECP ports (1-7).
RDS loss	YES	YES	NO	Loss of the RDS at the output of the encoder.	Will be also triggered when the RDS signal is stopped, or when the level is manually set to 0mV by the user.
High BER	YES	YES	NO	Presence of BER in the RDS signal	If the device is operating normally, this alarm will not be triggered.
Pilot synchronization loss	YES	YES	NO	Loss of synchronization with the external pilot tone	
RDS group loss	NO	YES	NO	Loss (absence) of a specific RDS group/s in the RDS data stream for a pre-defined time	There is an ‘Enable flag’ for each of the RDS Group types
DSN change	YES	NO	NO	Change of the current DSN	
PSN change	YES	NO	NO	Change of the main PSN	
Temperature	NO	YES	YES	The internal temperature of the equipment is lower or higher than the specified threshold	High and Low threshold are enabled/ disabled separately
TA timeout	YES	NO	NO	TA timeout has occurred	

NOTE: The change of DSN and PSN can be a dynamic process, which makes the “Idle” status definition of alarms PSN change and DSN change impossible. Therefore, in case PSN and/or DSN alarm occurs and is finalized through one of the authorized channels (E-mail, SNMP), the alarm status will remain OK, and the GPO will not be triggered through these alarms.

Due to the diverse nature of the observed physical alarm events, the alarms cannot be completely unified.