



HV Sistemas S.L.

**Concept
Design
Development
Manufacture**

Trustworthy radio data transmission



INDUSTRIAL CONTROL

**Automation remote control,
sewage water purifier,
Drinkable water supply,
Video signal transmission.**

**ELECTRICITY GENERATION
AND DISTRIBUTION**

LABOUR SAFETY

**Zone control, Alarms, Machine
control**

TELEMETRY

**Process supervision, Environmental
control , Data transmission,
Sensors.**



SCADA

**Incorporation into open architecture
systems, Transparent communication**



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Trustworthy radio data transmission

transparent modem FFSK P9802

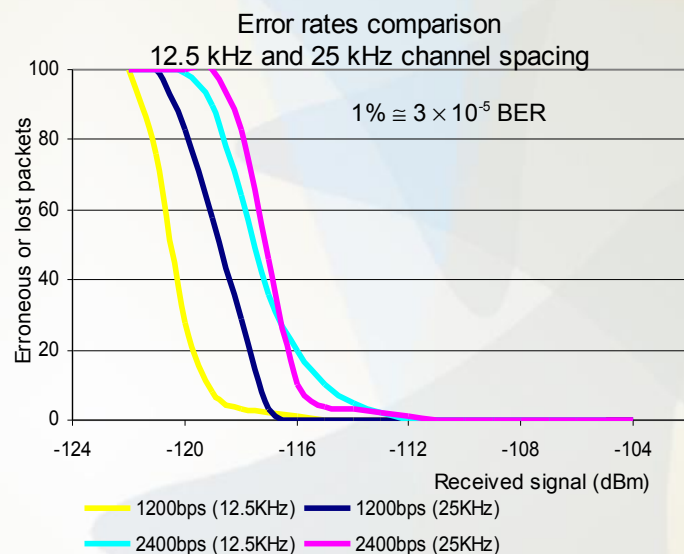


This modem makes possible communication between data terminals through a radio infrastructure when the serial data rate is not critical. Easily adaptable to professional mobile radio equipments.

Its concept makes possible the immediate incorporation in existing networks

It can be supplied with Reed-Solomon Forward Error Correcting (FEC), that makes possible to correct and recover data that could have been changed.

Due to its simplicity and easiness of configuration, this is the most used modem in communications between PLCs, PCs or industrial terminals.



Specifications*

| | |
|-------------------------|---|
| Supply voltage | 10-16 V d.c. with overvoltage protection by fuse and diode – others under request |
| Supply current | 50 mA |
| Data over radio rate | 1200 ó 2400 bps |
| Modulation | FFSK |
| Frequencies | 1200 – 1800 Hz @ 1200 bps, 1200 – 2400 Hz @ 2400 bps |
| Data frame format | Synchronous, HDLC subset |
| Error correction | Optional for some versions, FEC Reed-Solomon |
| RX audio level | 25 – 1000 mV RMS |
| TX audio level | 0 - 1000 mV RMS |
| PTT polarity | Positive or Negative |
| Carrier detect polarity | Positive or Negative |
| Data interface | RS232 or RS422/RS485 |
| Serial data rate | 300, 600, 1200, 2400, 4800, 9600, 19200 ó 38400 bps |
| Serial data format | Asynchronous, 7 or 8 data bits, parity odd, even or none |
| Buffer size | 4096 bytes TX and 4096 bytes RX |
| Radio connector | SUB-D male 9 pin |
| Data connector | SUB-D female 9 pin |
| Size | 124 x 76 x 32 mm (excluding connectors) |

* Specifications subject to change without notification



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Trustworthy radio data transmission

transparent modem GMSK P9907

NSN 5895-33-204-4689

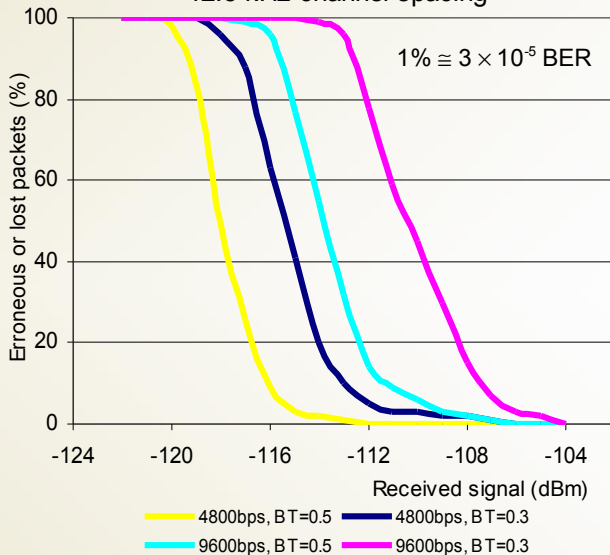


Transparent modem P9907 makes possible the communication between data terminals in radiocommunication network where better serial data rate is required.

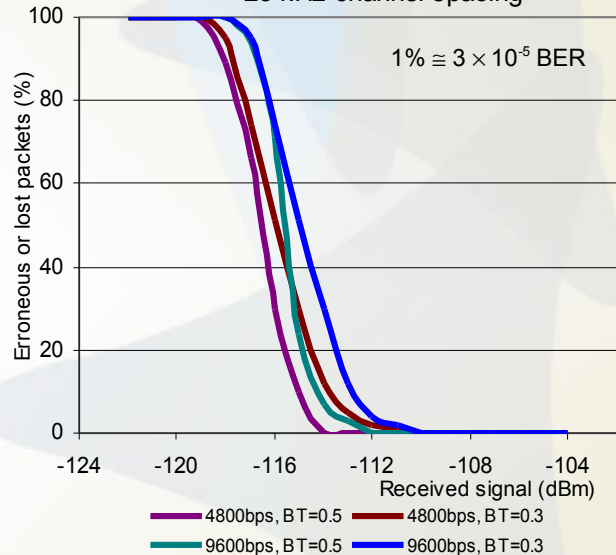
Its configuration options makes it an optimal solution for a wide range of data transmission scenarios.

Easily adaptable to professional mobile radio equipments.

Error rates comparison
12.5 kHz channel spacing



Error rates comparison
25 kHz channel spacing



Specifications*

Supply voltage
Supply current
Data over radio rate
Modulation
Data frame format
RX audio level
TX audio level
PTT polarity
Carrier detect polarity
Data Interface
Serial data rate
Serial data format
Buffer size
Radio connector
Data connector
Size

10-16 V d.c. with overvoltage protection by fuse and diode – others under request
50 mA
4800 ó 9600bps
GMSK, BT 0.3 or 0.5
Synchronous, HDLC subset
25 – 1000 mV RMS
0 - 1000 mVRMS
Positive or Negative
Positive or Negative
RS232 or RS422/RS485, version depending
600, 1200, 2400, 4800, 9600, 19200 ó 38400 bps
Asynchronous, 7 or 8 data bits, parity odd, even or none
2048 Bytes TX and 2048 bytes RX
SUB-D male 9 pin
SUB-D female 9 pin
124 x 76 x 32 mm (excluding connectors)

* Specifications subject to change without notification

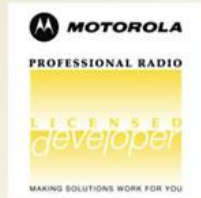
HV SISTEMAS S.L. – www.hvsistemas.com
Los Charcones 17A - 19170 – El Casar – Guadalajara – Spain
Tf +34 949 336 806 – Fax +34 949 336 792



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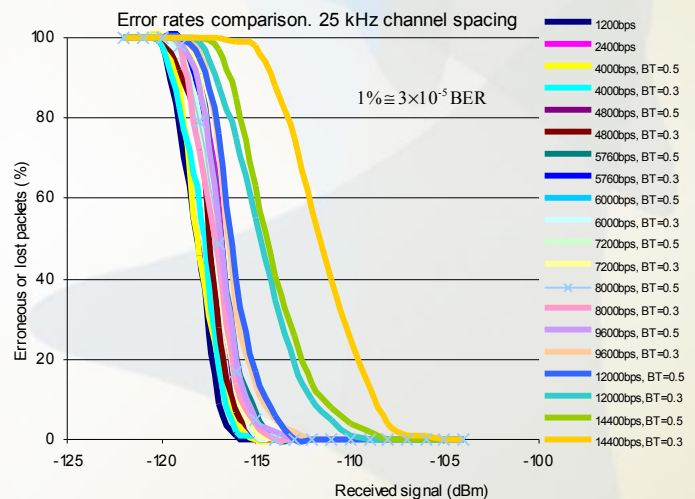
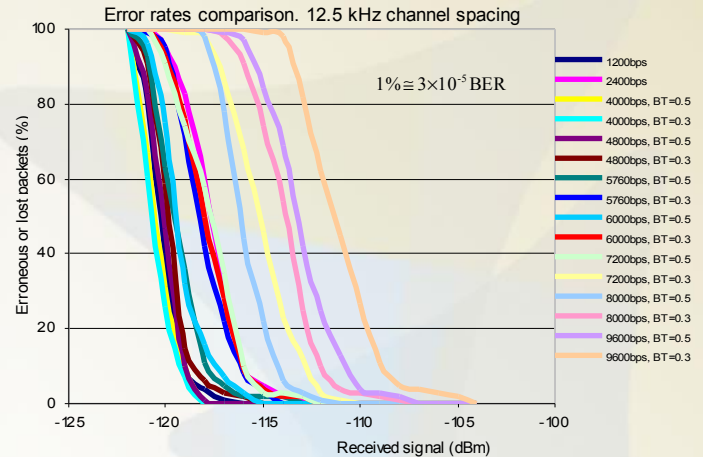
Trustworthy radio data transmission

internal multimode modem FSK/FFSK/GMSK P8402 for PROIS Motorola radios



This modem is designed to be using with Motorola PROIS radios.

Its DSP-based architecture makes it very flexible, adaptable to specific functions tailored to customer's needs. Like the external version (multimode modem P8501) it uses the same hardware for all operating modes. Among its configuration options, stands out the optional silencing of data frames, or the transmission in a specific data channel and the possibility of giving priority to voice over data or to data over voice. Thanks to the open philosophy that characterizes our product range, it can be easily incorporated into existing networks.



Specifications*

Power supply
Modulation

From radio, though PROIS connector
FFSK (1200/1800Hz @ 1200bps, 1200/2400Hz @ 2400bps)
GMSK (BT selectable 0.3 or 0.5)

Data over radio baud rate

FSK (selectable mark and space frequencies)
1200 ó 2400bps using FFSK modulation, 0-600, 0-1200 bps using FSK modulation

Data over radio protocol

4000, 4800, 5760, 6000, 7200, 8000, 9600, 12000 or 14400 using GMSK modulation

Data interface

Synchronous, HDLC subset, selectable NRZ or NRZI coding, selectable randomizer

Buffer size

RS-232 or RS422/RS485 version depending. Raw in FSK modes
4096 bytes total, than can be assigned to receive or transmit buffer in 256 bytes increments (for example, 3072 bytes for receive and 1024 bytes for transmit).

Serial baud rate

300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 ó 115200bps, selectable

Serial data format

Asynchronous, 8 bits, no parity, even parity or odd parity

Other functionalities

Group code, independently selectable for TX and RX

Transmit inhibit on radio busy

Data over voice or voice over data priority

Channel change for data transmission, with optional return to previous or to preset channel

Size

Standard PROIS board for use with Motorola Professional Series mobile radios, and Motorola Professional portable radios with no keyboard

* Specifications subject to change without notification



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Trustworthy radio data transmission

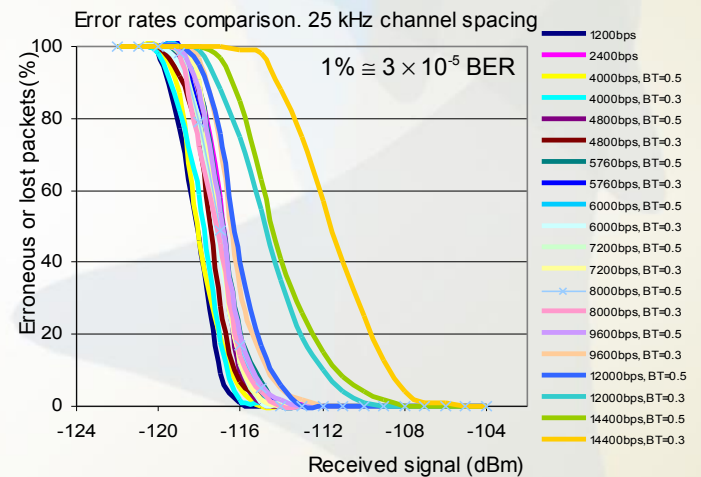
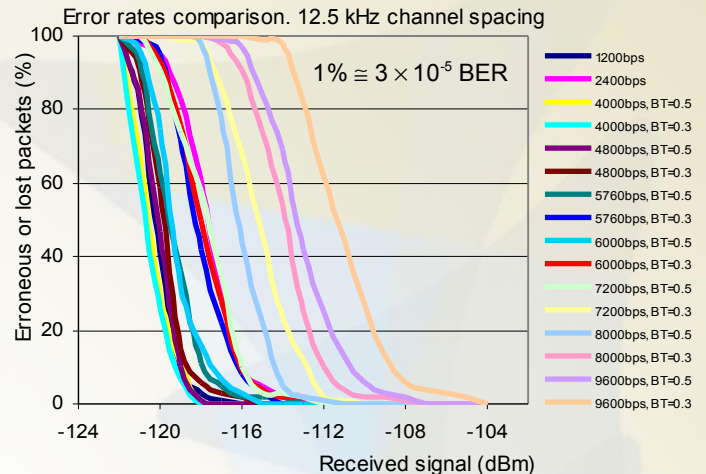
multimode modem FSK/FFSK/GMSK P8501



This modem is the external equivalent of the P8402 internal multimode modem

Its DSP-based architecture makes it very flexible, adaptable to specific functions tailored to customer's needs. Like the internal version (multimode modem P8402) it uses the same hardware for all working modes.

Thanks to the open philosophy that characterizes our product range, it can be easily incorporated into existing networks



Specifications*

| | |
|---------------------------|---|
| Power supply | 8-32 Vdc, 100mA maximun |
| Modulation | FFSK (1200/1800Hz @ 1200bps, 1200/2400Hz @ 2400bps) GMSK (BT selectable 0.3 or 0.5) |
| Data over radio baud rate | FSK (selectable mark and space frequencies) 1200 ó 2400bps using FFSK modulation, 0-600, 0-1200bps using FSK modulation |
| Data over radio protocol | 4000, 4800, 5760, 6000, 7200, 8000, 9600, 12000 ó 14400 using GMSK modulation |
| Data interface | Synchronous, HDLC subset, selectable NRZ or NRZI coding, selectable randomizer |
| Buffer size | RS-232 or RS422/RS485, version depending 4096 bytes total, than can be assigned to receive or transmit buffer in 256 bytes increments (for example, 3072 bytes for receive and 1024 bytes for transmit). |
| Serial baud rate | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 ó 115200bps, selectable |
| Serial data format | Asynchronous, 8 bits, no parity, ever parity or odd parity |
| Other functionalities | Group code, independently selectable for TX and RX Transmit inhibit on radio busy |
| Dimensiones | 63 x 30 x 88 mm (excluding connectors) |

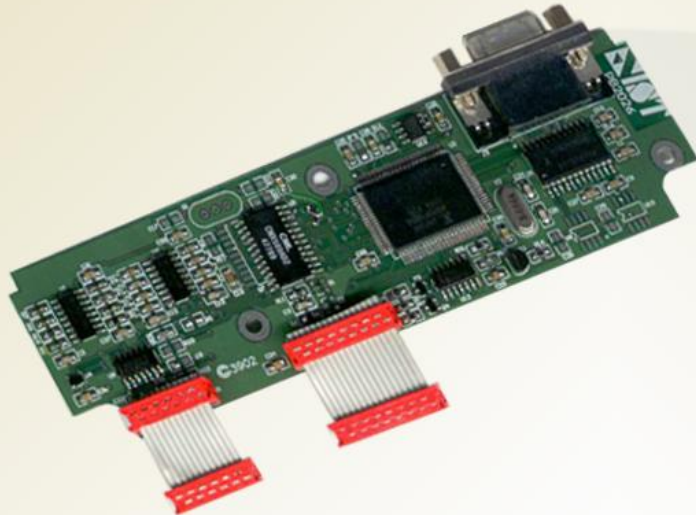
* Specifications subject to change without notification



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Trustworthy radio data transmission

transparent internal modem GMSK P8204 for radio TAIT T2000



The GMSK P8204 modem has been specially developed for TAIT T2000 series II radios.

The modem is built as an internal accessory board and includes the necessary connectors for an easy installation inside the radio transceiver.

This modem uses GMSK modulation (Gaussian Minimum Shift Keying) and supports radio baud rates between 4800 y 14400 bps.

This modem is transparent, i. e. it does not require to add information in its data terminal communications. The same message structure provided by the data terminal to the transmitting modem is send to the data terminal attached to the receiving modem.

Specifications*

| | |
|------------------------------|--|
| Power supply | 5V d.c., supplied by radio transceiver though accessory connector |
| Supply current | <100 mA |
| Modulation | GMSK (Gaussian Minimum Shift Keying) |
| Radio baud rate | 4800, 6400, 7200, 9600, 12800 or 14400bps, user selectable (maximum usable data rate over radio depends on radio bandwidth and channel spacing) |
| Data over radio frame format | Synchronous, HDLC subset, NRZI coded and randomized. Fully compatible with P9907 modem at 4800 and 9600 bps radio baud rates |
| RS-232 baud rate | 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200bps, user selectable |
| RS-232 data format | Asynchronous, user selectable 7 or 8 bits; no parity, parity odd or even, 1 or 2 stop bits |
| RS-232 data connector | Female DB-9, DCE |
| RS-232 buffer size | RX: 2048 bytes, TX: 768 bytes |
| TX output level | As per 60% deviation |
| RX input level | As per 60% deviation |
| Transceiver connection | Internal to transceiver accessory connectors S13 and S14, using supplied cable and connectors |
| Transceiver compatibility | All Tait T2000 Series II transceivers, except trunked radios |

• Specifications subject to change without notification



HV Sistemas S.L.

Trustworthy radio data transmission

Transparent internal modem FFSK P8205 for radio TAIT T2000



The modem is build as an internal accessory board for the radio transceivers TAIT T2000 series II, and includes the necessary connectors for easy installation inside the transceiver.

This modem uses FFSK (Fast Frequency Shift Keying) modulation, and supports radio baud rates of 1200 and 2400bps.

Its not necessary to carry out any special configuration in the radio transceivers.

The only physical level convention used is the RS-232 communications standard, i.e., asynchronous data transmission at a established baud rate and data format.

Specifications*

| | |
|-------------------------------------|--|
| Power supply | 5V d.c., supplied by radio transceiver though accessory connector |
| Supply current | <100 mA |
| Modulation | FFSK (Fast Frequency Shift Keying), 1200/1800Hz @ 1200bps, 1200/2400Hz @ 2400bps |
| Radio baud rate | 1200 y 2400bps user selectable |
| Data over radio frame format | Synchronous, HDLC subset, NRZ or NRZI coded. Fully compatible with P9802, P8402 and P8501 modems |
| RS-232 baud rate | 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200bps, user selectable. |
| RS-232 data format | Asynchronous, user selectable 7 or 8 bits; no parity, parity odd or even, 1 or 2 stop bits |
| RS-232 data connector | Female DB-9, DCE |
| RS-232 buffer size | RX: 2048 caracteres, TX: 768 bytes |
| TX output level | As per 60% deviation |
| RX input level | As per 60% deviation |
| Transceiver connection | Internal to transceiver accessory connectors S13 and S14, using supplied cable and connectors |
| Transceiver compatibility | All Tait T2000 Series II transceivers, except trunked radios |

* Specifications subject to change without notification



HV Sistemas S.L.

Trustworthy radio data transmission

industrial radiomodem P8503

This radiomodem presents a high reliability and flexibility due to the intelligent integration between radio and modem.

P8503 radiomodem has a wide range of user selectable options, that enables to optimize it for almost any application. This permits to keep the maximum data integrity, minimizing lost of data and thus providing high communications reliability.



This radiomodem works in a license-free band, making it easy to implement in different infrastructures.

In the other side, thanks to its different power options, makes possible to use the radiomodem for short distance (e.g., zone control, machines control or remote control in factory), and also in applications where the distance from transmission place to the control centre is larger. This is the case for telemetry applications, environmental supervision, data sensors transmission, remote control automation or supply and water purification where could be necessary to reach till 5 kilometres.

Specifications*

| | |
|-------------------|--|
| Power supply | 8 – 35V d.c. |
| Supply current | IDLE: < 10mA, RX: < 20mA, TX: < 300 mA |
| Frequencies range | 868.000 – 868.600 MHz, 868.700 – 868.800 MHz, 869.425 – 869.625 MHz |
| Power output | 25 mW at 868 MHz, 500 mW at 869 MHz |
| Antenna impedance | 50 ohm, SMA connector |
| Modulation | FSK, GFSK, OOK |
| Sensitivity | -118 dBm (1.2 kbps), -100 dBm (38.4 kbps) |
| Radio baud rate | 1200, 2400, 4800, 9600, 19200, 38400 bps, user selectable |
| Codification | Manchester, NRZ, NRZI randomized |
| Operating Modes | Point-to-point, point-multipoint |
| Data interface | RS-232or RS422/RS485, version depending |
| Serial data rate | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps, user selectable |
| Standards | EN 301489, EN 300220, EN 60950 |
| Size | 63 x 30 x 88 mm (excluding connectors) |

* Specifications subject to change without notification



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multiple inversion voice scrambler P8602

The Multiple Inversion Voice Scrambler P8602 is a equipment for use with Motorola Professional Series portable and mobile radios with PROIS interface.

This voice scrambler is based in a powerful digital signal processor, and its encryption mechanism is based in the spectral division of the voice spectrum, its inversion and trasposition.

It has 65536 possible keys, providing better security than the traditional split-band voice scramblers, within a similar price.



It also incorporates other functionalities like over the air reconfiguration thanks to its integrated modem, and can be also tailored to specific customer requirements.

Additionally, it has a very low power consumption, a very important factor for portable radios, and also provides an excellent recovered audio quality



Specifications*

| | |
|--------------------------------|--|
| Power supply voltage | From radio, through PROIS connector |
| Power supply current | 20 mA |
| Encryption method | Multiple band voice inversion and trasposition |
| Number of keys | 65536 |
| Internal modem | FFSK 2400 bps |
| Data encryption | Strong algorithm, 2 ³² possible keys |
| Passband | 300 - 3000 Hz ± 3 dB |
| Remote control functionalities | Remote key modification, Voice scrambler inhibit Radio inhibit Erase of all voice scrambler codes |
| Sizes | Standard PROIS board for mobile and portable professional series Motorola radios |
| Temperature operating range | -30°C a 60°C |

- Specifications subject to change without notification



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Repeater tone panel P8008-8TP



The P8008-8TP is a tone panel for controlling communitary radio repeaters, compatible with a wide range of repeaters in the market, easy to install and with great versatility in its configuration.

It incorporates a powerful digital signal processor which filters the audio signal, after taking out the subtone, determines its frequency and generates the new transmission subtone.

Useable CTCSS frecuencies

| Code | Frec. (Hz) | Code | Frec. (Hz) | Code | Frec. (Hz) | Code | Frec. (Hz) | Code | Frec. (Hz) |
|------|------------|----------------|------------|------|------------|------|------------|------|------------|
| XZ | 67.0 | ZA | 94.8 | 3B | 131.8 | | 171.3 | M1 | 203.5 |
| WZ | 69.3 | ZB | 97.4 | 4Z | 136.5 | 6A | 173.8 | 8Z | 206.5 |
| XA | 71.9 | 1Z | 100.0 | 4A | 141.3 | | 177.3 | M2 | 210.7 |
| WA | 74.4 | 1 ^a | 103.5 | 4B | 146.2 | 6B | 179.9 | M3 | 218.1 |
| XB | 77.0 | 1B | 107.2 | 5Z | 151.4 | | 183.5 | M4 | 225.7 |
| WB | 79.7 | 2Z | 110.9 | 5A | 156.7 | 7Z | 186.2 | 9Z | 229.1 |
| YZ | 82.5 | 2 ^a | 114.8 | | 159.8 | | 189.9 | M5 | 233.6 |
| YA | 85.4 | 2B | 118.8 | 5B | 162.2 | 7A | 192.8 | M6 | 241.8 |
| YB | 88.5 | 3Z | 123.0 | | 165.5 | | 196.6 | M7 | 250.3 |
| ZZ | 91.5 | 3 ^a | 127.3 | 6Z | 167.9 | | 199.5 | | 254.1 |

Specifications*

| | |
|---|---|
| Number of different networks | 8 |
| CTCSS input tone | Independently selectable |
| CTCSS output tone | Independently selectable |
| AF frequency response (input to output) | Better than 300 to 3500 Hz @ -3dB |
| AF input level | 100 to 2000 mV |
| AF output level | 0 to 750 mV |
| Carrier detect input voltage range | 3 to 40 Vdc |
| Carrier detect input polarity | Active low |
| PTT control output type | Open collector, 25V 100mA max |
| PTT control output polarity | Active low |
| Data port | RS232C, three wire, 2400 bps |
| Power supply voltage | 8 to 16 Vdc |
| Power supply current | 250 mA aprox |
| Operating temperature range | -10 to +70 °C |
| Size | 124 x 76 x 32 mm (excluding connectors) |

* Specifications subject to change without notification

HV SISTEMAS S.L. - www.hvsistemas.com
Los Charcones 17A - 19170 - El Casar - Guadalajara - Spain
Tf +34 949 336 806 - Fax +34 949 336 792



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remote control and general purpose board for PROIS radios



HV Sistemas P8603 is a general purpose board intended for use with Professional Series Motorola mobile radios. This board incorporates also a RS-232 (optionally RS-422 or RS-485) serial port in order to enable the radio to be controlled from an external computer. This board is available with several standard control protocols, and can also be custom tailored to incorporate different control protocols, proprietary protocols, or additional features.

Some of the basic control functions provided by this board for remote control and monitorization of the radio are:

- Channel monitorization (channel number, carrier detect status, PL/DPL detect status)
- PTT Activation/Desactivation
- Selcall coding through the serial port
- Selcall decoding with serial port output

Also, under customer requirements, other PROIS-supported functionalities can be added.

Optionally, the board can include a modem (FFSK or GMSK) in order to enable other kind of functionalities, like over radio monitorization and control, or presentation of information on the radio display.

Specifications*

| | |
|----------------------------------|---|
| Power supply | Internal from radio, through PROIS connector |
| Data interface | RS-232, with hardware or software flow control Optionally, RS-422 and RS-485 |
| Optional modem | Compatible with HV Sistemas P8402, with similar characteristics |
| Supported functionalities | Dependant on the board firmware, being possible to adapt it to customer specific requirements |
| Control protocol | Dependant on the board firmware, being possible to adapt it to customer specific requirements |
| Size | Standard PROIS board for use with Professional Series Motorola mobiles and keypad-less portables |

- Specifications subject to change without notification