



# Communication Systems

## JOTRON VHF/AM RECEIVER MODULE RA-7202



### COMPLETE RECEIVER:

Covers all channels from 118 to 137MHz. (Optional 156 MHz).  
Fixed frequency operation field programmable (local or remote).  
Input voltage from 21.6 to 31.2 VDC or 115 VAC / 230VAC auto select.  
Local control of all operating aspects directly from operators panel.  
Remote control via RS232/RS485 selectable serial data bus.  
Up to 128 units on the same 2 wire remote line - RS 485.

Built in NOISE Blanker. SW selectable on/off.  
Built in AUDIO AGC. SW selectable on/off.  
Built in automatic test equipment (BITE) continuously checking important parameters. Readout on local display and/or remotely by serial line.

Alarm signal shown on front panel and available on remote lines. Alarm signal may be used to enable an other receiver for an automatic main/standby system.

### FEATURES:

"Meets or exceeds EN 300 676 specification".

### LED display

With 8 characters normally shows the operating frequency. A push-button selects different measurements available internally in the receiver. Measurements include voltages, IF and LNA Current, Synthesiser lock detect, AGC level, line level and temperature. Set-up of the remote address etc. can also be selected from the front panel. In case of an alarm, the cause of the alarm will automatically be shown in the display to ease service.

### User friendly frequency change

By 3 push-buttons. The increment/decrement is dependent of the selected channel spacing. It will normally be 25 kHz or optionally 12.5 kHz/8.33 kHz. The speed of the frequency change will be dependent on how long the button has been pressed, in this way the frequency can be varied fast over a wide range. When the desired frequency is found, pushing the enter button selects the frequency.

### Squelch button

On/off selection, the level is adjusted with the front panel controls, or via remote control.

### Remote/local switch

Select between local and remote operation. The front panel controls are used to adjust the output level on the audio line.

### Audio volume

For adjustment of the local loudspeaker output level.

### LED indicators

The "ON" LED indicates power on. The "AC" LED indicates that the unit is operated from AC power supply.

Alarm indication warns that an internal error has occurred, display shows details. Standby indication shows that the unit is kept in standby by an other (main) unit.

### Settings

Line level, squelch level, remote address, brightness, store/recall frequencies can be set from front panel or via remote control.

**JOTRON Electronics a.s**

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com

# Specifications VHF/AM Receiver RA-7202

## RECEIVER REAR PANEL CONNECTIONS:

### Remote connection (15 pins D-SUB)

600 ohm line output. Level adjustable from front panel, or via remote. Squelch status (open / closed), 5 V TTL.

Squelch level adjustment from remote. Signal strength output (AGC) for automatic selection of best receiver.

Alarm output (0V = alarm, 5V = OK). Alarm if internal measurements are out of range.

AC/DC (0V = AC, 5V = DC). Indicates AC or DC operation of the receiver.

Receiver mute input. Receiver is muted if this signal is kept low. Used in transceiver configuration. Select input. (0V = Receiver is active, 5V=Receiver is

Standby). Used in main/ stand-by configuration. Squelch relay output. Open if the squelch is off.

RS-232 databus.

### Data connection (9 pin D-SUB)

RS-485 databus, for interconnection between units and connection to peripheral equipment.

12VDC output for peripheral equipment (remote unit, tone detector, filters, etc.).

### DC Input

DC input. 21.6 to 31.2 VDC.

### AC Input

AC input 230VAC  $\pm$  10% or 115VAC  $\pm$  10%.

### Antenna input

Antenna input. N-type connector.

### St. By Receiver antenna output

Antenna output to standby receiver, switched by an internal coaxial relay. If unit is de-selected, has an alarm or loose power, the antenna input will switch to antenna output.

## TECHNICAL SPECIFICATIONS, RECEIVER UNIT:

<b>Frequency range:</b>	118 – 137MHz (156 MHz optional)
<b>Channel separation:</b>	25 kHz, optionally 12.5 kHz / 8.33 kHz
<b>Stability:</b>	25kHz version : $\pm 2.5$ ppm 8.33kHz version : $\pm 1.5$ ppm(TCXO ref). $\pm 1$ ppm 0 - 40°C
<b>Frequency selection:</b>	25 kHz step, or 12.5 kHz / 8.33 kHz steps
<b>Sensitivity:</b>	10 dB SINAD at 1 $\mu$ V pd, m = 0,30 .Weighted to ITU-T
<b>Squelch:</b>	Adjustable from min. 1 $\mu$ V pd, to 25 $\mu$ V Hysteresis: < 3 dB. Opening/closing: < 60 ms
<b>Adjacent channel selectivity:</b>	> 70dB 25kHz / >60dB at 12,5 kHz/8.33kHz operation
<b>Cross modulation:</b>	> 85 dB
<b>Spurious response immunity:</b>	> 80 dB
<b>Intermodulation immunity:</b>	> 75 dB ref. 1 $\mu$ V EMF.2 interfering signals > 100kHz offset from receiving signals
<b>Blocking/Desensitisation:</b>	> 90 dB @ >1MHz
<b>Image Rejection:</b>	100dB
<b>RF input impedance:</b>	50 $\Omega$
<b>AGC:</b>	< 3 dB from - 107 to + 15 dBm input signal Attack time: <50 ms, Recovery time: <200 ms
<b>Spurious radiation:</b>	< 2nW(: <-57dBm) to 1GHz. < 20nW(: <-47dBm) to 4GHz
<b>Audio response:</b>	25 kHz operation: +1/ - 3dB rel. to 1 kHz, 300 Hz - 3.400 Hz < -25 dB at 5.000 Hz 8.33kHz operation: +1/ - 3dB rel. to 1 kHz, 300Hz - 2.500 Hz < -25 dB at 3.200 Hz
<b>Total Harmonic Distortion:</b>	< 5% at 90% mod.1 mV, 1 kHz
<b>AF intermodulation:</b>	> 40 dB
<b>S/N ratio:</b>	> 40 dB, 100 $\mu$ V, 30% 1 kHz
<b>Audio output impedance:</b>	600 $\Omega$
<b>Supply voltage:</b>	230/115VAC $\pm$ 10 AUTO selection 21.6 - 31.2 V DC
<b>Noise Blanker:</b>	Software switchable
<b>Audio AGC:</b>	<1dB 30% - 90% modulation. Software switchable
<b>Operating temperature:</b>	-20 to +55°C
<b>Storage temperature:</b>	-40 to +70°C
<b>Power consumption:</b>	Less than 10 watt
<b>Size:</b>	W: 71mm, H: 128mm, D: 230mm
<b>Weight:</b>	1,7kg

JOTRON Electronics a.s

P.O.Box 54, NO-3280 Tjodalving, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com



# Communication Systems

## JOTRON VHF/AM TRANSMITTER MODULE TA-7450/7425/7410



### COMPLETE TRANSMITTER:

Covers all channels from 118 to 137MHz (Optional 156 MHz).

Fixed frequency operation field programmable (local or remote).

Input voltage from 21.6 to 31.2 VDC or 115VAC/230VAC.

Local control of all operating aspects directly from operators panel.

Remote control via RS232/RS485 selectable serial databus.

Up to 128 units on the same 2 wire remote line - RS 485.

Built in automatic test equipment (BITE) continuously checking important parameters.

Built-in coaxial antenna relay for main/standby configuration.

Alarm signal shown on front panel and available on remote lines.

Alarm signal may be used to enable another transmitter for automatic main/standby system.

### FEATURES:

"Meets or exceeds EN 300 676 specification".

### LED display

With 8 characters normally shows the operating frequency. A push-button selects different measurements that are available internally in the transmitter. Measurements includes voltages, current, output

power, reflected power, line level, temperature and modulation. Setup of the remote address etc. can be selected from the front panel. In case of an alarm, the cause of the alarm will automatically be shown on the display to ease service.

### User friendly frequency change

By 3 push buttons. The increment/decrement is dependent on the selected channel spacing. It will normally be 25 kHz or optionally 12.5 kHz/8.33 kHz. The speed of the frequency change will be dependent on how long the buttons have been pressed, in this way the frequency can be varied fast over a wide range. When the desired frequency is found, pushing the enter button selects the frequency.

### Remote/local switch

Select between local and remote operation. The front panel controls are used to adjust the audio line input sensitivity.

### Settings

Line level, modulation level, keying mode, AGC time constant, mute on/off and output power can be adjusted from front panel or via remote control.

### Hi/Low

Select between high and low RF output.

### PTT

Local key button.

### LED indicators

ON indicate presence of DC voltages (unit is switched on). OUT is lit when transmitter is keyed. SWR is lit when SWR is 3:1 or more. ALARM indicate that the internal BITE system has detected an error. The display will show which error caused the alarm. LOW indicate that low RF output power is either selected or caused by excessive internal temperature or high SWR. REM is lit when unit operates in remote mode. ST.BY. is lit when unit is held in standby mode by an other (main) unit.

JOTRON Electronics a.s

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com

# Specifications VHF/AM Transmitter TA-7450/7425/7410

## TRANSMITTER REAR PANEL CONNECTIONS:

### Remote connector (15 pins D-SUB)

600 ohm line input. (w/line loop keying).  
Alarm output (0V= alarm, 5V= ok):  
Alarm if internal measurements are outside limits.

Select input (Open or 0V=Transmitter active, 5V=Transmitter standby): May be used with another transmitter in a main/standby configuration.

Relay output: Relay contact that is activated when the transmitter is keyed.

Local key input: Keying (PTT) for local operation.

Remote key input (PTT) in remote position. Pos og neg key ( up to  $\pm 48V$ ).

RS-232 databus.

Monitor output (for tape recorder or test of transmitter performance).

### Data connector (9 pin D-SUB)

RS-485 databus. For interconnection between units and connection to periperal equipment.

12VDC output for periperal equipment (remote unit, tone detector, filters, etc.)

### DC Input:

DC input. 21.6-31.2 VDC.

### Antenna Input

Antenna input: Standard 'N'-type connector.

### Standby transmitter or receiver antenna output

Antenna output to standby transmitter (or receiver if connected as Transceiver), switched by an internal coaxial relay.

## TECHNICAL SPECIFICATIONS, TRANSMITTER UNIT:

<b>Frequency range:</b>	118 - 137 MHz (Optional 156MHz)
<b>Channel separation:</b>	25 kHz/12.5 kHz/8.33 kHz selectable
<b>Stability:</b>	25 kHz version: $\pm 2.5$ ppm 8.33 kHz version: $\pm 1.5$ ppm ( $\pm 1$ ppm 0 - 40°C)
<b>Offset freq.:</b>	Up to 4 carrier offset, according to ICAO Annex 10
<b>Modulation:</b>	AM up to 95%. Adjustable from front panel
<b>Harmonic emission:</b>	< 80 dBc. < 250nW with external filter
<b>Standing wave ratio:</b>	1: Infinity. Output is reduced automatically with severe mismatch
<b>Output power:</b>	Max. 50W. Adjustable. (TA-7425: Max. 25W, TA-7410: Max 10W)
<b>Antenna connector:</b>	50 $\Omega$ N - connector
<b>T/R relay:</b>	Built in. Keyed relay contacts available for external equipment
<b>Keying time:</b>	Less than 20 ms
<b>Line input:</b>	600 $\Omega$ , -20 to +10 dBm. Sensitivity adjustable from front panel or via remote control
<b>Mic input:</b>	Dynamic. Sensitivity 2.5mV
<b>LF compression (VOGAD):</b>	30 dB, with less than 3dB change in modulation level
<b>Limiter:</b>	Limiting amplifier prevents modulation above 95%
<b>Audio response:</b>	25 kHz operation: +1/ - 3dB rel. to 1 kHz, 300 Hz - 3.400 Hz < -25 dB at 5.000 Hz 8.33kHz operation: +1/ - 3dB rel. to 1 kHz, 300Hz - 2.500 Hz < -25 dB at 3.200 Hz
<b>Distortion:</b>	Less than 5% at 90% modulation
<b>Hum and noise level:</b>	Better than 45dB below at 90% modulation
<b>Supply voltage:</b>	21.6 - 31.2 V DC, RF power reduced when voltage is below 27 VDC
<b>Duty cycle:</b>	100% at ambient temperature below 40°C
<b>Operating temperature:</b>	-20 to +55°C
<b>Storage temperature:</b>	-40 to +70°C
<b>Power consumption:</b>	280VA @ 50W RF, 90% modulation
<b>Size:</b>	W: 142mm, H: 128mm, D: 230mm
<b>Weight:</b>	3.0kg

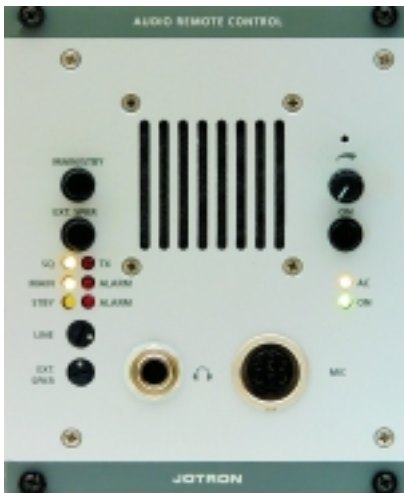
JOTRON Electronics a.s

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com



# Communication Systems

## JOTRON REMOTE RADIO CONTROL SYSTEM



The **ARC** is an Audio Remote Control that uses only a two/ four-wire telephone line to transfer RX audio, TX audio and PTT. For additional control signals (alarm i.e.) more wires must be added. The unit can handle Audio and PTT for two transceivers (i.e. main/standby pair). It can be used alone, as a single channel control for an Rx/Tx Main/Standby set, or together with the DRC, ORC or RCU for complete remote control of all operating aspects. The ARC has a built in loudspeaker, external loudspeaker amplifier as well as an output for headset, and voice recorder. It has a built in power supply that can be powered both by 110VAC and 230VAC with automatic switch over to 24VDC if AC fails.



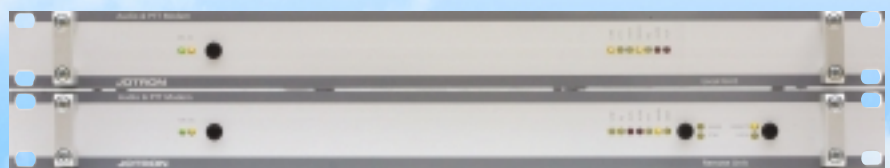
The **DRC** is a Data Remote Control unit giving the remote operator access to all features of the Jotron 7000 and 9000 family of ground to air communication system. It can be used alone or together with the ARC, as a complete remote control unit with audio, PTT and access to all the radio features. The DRC operates with an RS-485 serial line. This line can be up to 2km depending on the quality of the line. If longer distances are required the unit can be connected to an RS-485 modem which will then transfer the data on a standard telecommunication line.



The **ORC** is an Operators Remote Control unit that lets the operator select between preset frequencies on one or more radio units. Note that the frequencies must be stored in the radios. A text string can be "attached" to each frequency to ease rapid selection of frequency. The ease of operation is further enhanced by the simple keyboard consisting of only 3 pushbuttons: Scroll up, Scroll down, and Select. The ORC unit is connected to the radio units by means of a RS-485 serial line.

For communication over two or four-wire leased telephone line the Audio & PTT Modem can be used.

The Audio & PTT Modem (APM) is designed for use in ground to air communication systems that requires long distance remote control of audio, PTT and control signals through a two or four-wire leased telephone line. The system consists of one local and one



remote unit. Both units are 1HU (19 inches) The remote unit will be located together with the radio units and the local unit will be located together with a Voice Switch, ARC or similar. The APM uses in band tones for transfer of Squelch and PTT. Alarm/Main & Stby and Main/Stby selection uses FSK data. All inputs are opto-couplers working over a range from 5V to 48V. All outputs are dry relay contacts. The local unit does also have

a relay output for indication of possible line fault. The APM has automatic line level compensation to ensure optimal performance ( for line loss of up to 20dB) It has a built in power supply that can run on both 110VAC and 230VAC as well as 24VDC with automatic switch over from AC to DC if AC fails. The unit also has an antenna changeover relay for change between main/standby to radios.

**JOTRON Electronics a.s**

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com



# Communication System

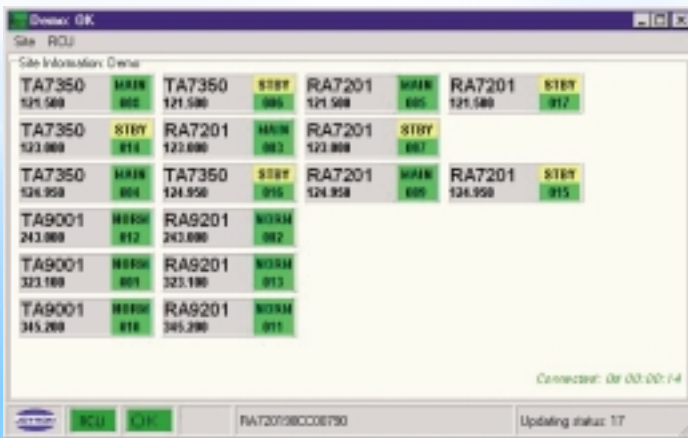
## RCU with RACS- REMOTE ACCESS AND CONTROL SYSTEM

The RCU acts as a remote interface unit between radio units on a site and a central computer or VCCS. One RCU can handle up to 128 radio modules at the same location. The unit will continuously monitor all operating aspects of the connected modules and give an alarm if any unit reports an error. The RCU communicates with the central control system on a RS-232 serial link, either direct or by a modem and leased or dialup lines. Communication with the local radio units is on a multi-drop RS-485 bus.



### TECHNICAL SPECIFICATIONS:

- Power supply: ..... 11V-28V
- Current consumption: ..... Less than 50mA
- Signalling standard:..... RS 485 and RS 232
- Data configuration RS 232: ..... 1 start bit, 8 data bit and 1 stop bit
- Data configuration RS 485: ..... 1 start bit, 8 data bit, 1 address mark and 1 stop bit



The Jotron RACS program gives complete remote access and control of all operating parameters of radio units connected up to an RCU unit. All features as well as BITE information is accessible. The program is designed to run on a PC with Microsoft Windows 95/98/2000 or WindowsNT. Communication to the different sites is by leased lines,

dial-up, satellite or any other means of communication capable of transferring modem signals. Number of maps and sites is only limited by the storage capacity of the PC being used. All maps and site information is easy edited for personal preferences. The program is delivered with the RCU unit.

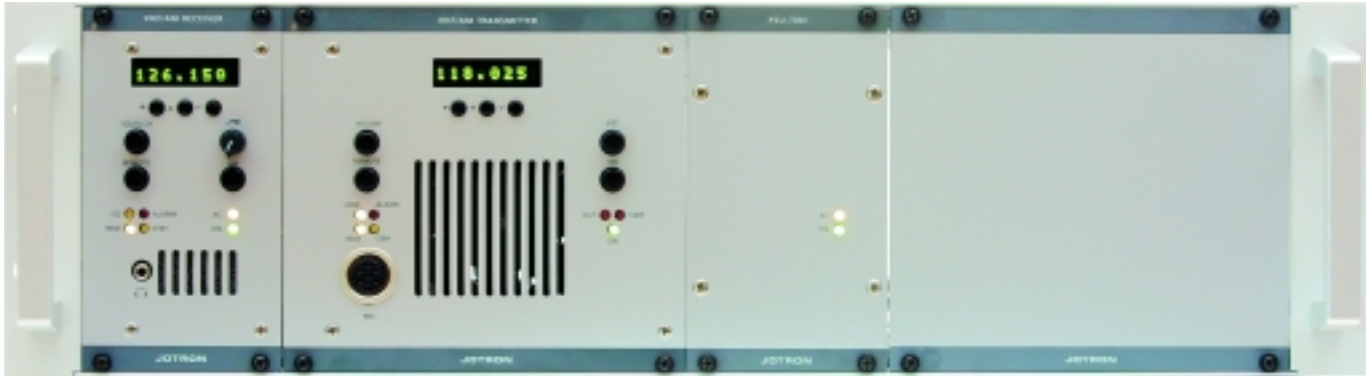
**JOTRON Electronics a.s**

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com



# Communication Systems

## JOTRON VHF/AM TRANSCEIVER TR-7550/TR-7525/TR-7510



- **Microcomputer Controlled Transmitter and Receiver**
- **Adjustable RF Output Power Multichannel or Programmable Fixed Channel Operation**
- **Adjustable RF Power Output**
- **Selectable channel spacing 25 kHz, 12.5 kHz or 8.33 kHz**
- **Remote and/or Local Control of All Functions**
- **Built-in Coaxial Relay For Antenna and Control Transfer to Standby Units**
- **RS-485 Multidrop Data Bus**

### FEATURES:

#### LED display

With 8 characters normally show the operating frequency. A push-button selects different BITE measurements available internally in the receiver and transmitter. In case of an alarm, the cause for the alarm will automatically be shown on the display to ease service.

#### User friendly frequency change

By 3 push-buttons. The increment/decrement is dependent of the selected channel spacing. Set-up of the transceiver is also selected with these buttons.

#### Programmable SingleChannel

Units can be programmed to operate on a single channel or allow change between up to 99 pre-programmed channels. Re-programming of single-channel frequency can be done by remote lines.

#### RS-485 Multidrop Databus

Enable remote control and monitoring of up to 128 units through a single connection. All units individually addressable.

#### Squelch button

On/off selection, the level is adjusted with the frontpanel pushbuttons.

#### Remote/Local switch

Select between local and remote operation. The output level on the audio line of the receiver part and the input sensitivity

on the audio line of the transmitter part is adjusted with frontpanel pushbuttons.

#### Audio volume

For adjustment of the local loudspeaker output level.

#### PTT

Transmit button for local operation.

#### LED indicators

AC/DC power availability, Alarm, High SWR, Low Power Output, Remote Control, Standby operation, Squelch, Transmit.

**JOTRON Electronics a.s**

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com

# JOTRON VHF/AM TRANSCEIVER TR-7550/TR-7525/TR-7510

## TECHNICAL DATA:

<b>GENERAL:</b>	
<b>Frequency range:</b>	118 - 137 MHz. Optional to 156 MHz
<b>Channel separation:</b>	25 kHz / 12,5 kHz / 8.33 kHz.(Selectable)
<b>RF input impedance :</b>	50 $\Omega$
<b>Stability:</b>	$\pm 2.5$ ppm TCXO reference. 8.33kHz : $\pm 1.5$ ppm ( $\pm 1$ ppm 0 - 40°C)
<b>Frequency selection:</b>	25 kHz step, optional 8.33 kHz steps
<b>Supply voltage:</b>	115/230VAC $\pm 10$ / 21.6 - 31.2 VDC negative earth
<b>Duty cycle:</b>	100% at ambient temperature below 40°C
<b>Operating temperature:</b>	-20 to +55°C
<b>Storage temperature:</b>	-40 to +70°C
<b>Power consumption:</b>	Max. 300VA (TR-7550), Receiver only: Less than 10watt
<b>Size:</b>	Industry standard 19" Rack, 3U high
<b>Weight:</b>	Approx 9 kg
<b>RECEIVER:</b>	
<b>Sensitivity:</b>	10 dB SINAD at 1 $\mu$ V pd, m = 0,30. Acc. to ITU-T
<b>Squelch:</b>	Adjustable from 1 $\mu$ V to 25 $\mu$ V pd Hysteresis: < 3 dB. Opening/closing: < 50 ms
<b>Adjacent channel selectivity:</b>	> 70 dB at 25KHz, > 60dB at 8.33KHz
<b>Cross modulation:</b>	> 85 dB >100KHz frequency offset
<b>Spurious response immunity:</b>	> 80 dB
<b>Intermodulation immunity:</b>	> 75 dB ref. 1 $\mu$ V EMF. 2 interfering signals >100 kHz offset from receiving frequency
<b>Blocking/Desensitisation:</b>	> 90 dB @ 1MHz
<b>Image Attenuation:</b>	>100dB
<b>AGC:</b>	< 3 dB from - 107 to + 5 dBm input signal Attac time: 50 ms, Recovery time: 200 ms
<b>Spurious radiation:</b>	< 2nW
<b>Audio response:</b>	25 kHz: +1 / - 3 dB rel. to 1 kHz, 300 - 3400 Hz <-25 dB at 5000 Hz 8.33 kHz: +1 / - 3 dB rel. to 1 kHz, 300 <-2500 Hz -25 dB at 3200 Hz
<b>THD:</b>	< 5%
<b>AF intermodulation:</b>	> 40 dB
<b>S/N ratio:</b>	> 40 dB, 100 $\mu$ V, 30% mod, 1 kHz. Weighted ITU-T
<b>Audio output impedance :</b>	600 $\Omega$
<b>TRANSMITTER:</b>	
<b>Modulation:</b>	AM up to 95%
<b>Harmonic emission:</b>	< 80 dBc
<b>Standing wave ratio:</b>	1: Infinity. Output is reduced automatically with severe mismatch
<b>Output power:</b>	Max. 50W. Adjustable. (TA-7525: Max. 25W, TA-7510: 10W.)
<b>Antenna connector:</b>	50 $\Omega$ N - connector
<b>T/R relay:</b>	Built in. Keyed relay contacts available for external equipment
<b>Keying time:</b>	Less than 20 ms
<b>Line input:</b>	600 $\Omega$ , -20 to +10 dBm
<b>Mic input:</b>	Dynamic. Sensitivity 2.5mV. On front panel, or remote connector
<b>LF compression (VOGAD):</b>	30 dB, with less than 3dB change in modulation level
<b>Limiters:</b>	Limiting amplifier prevents over modulation
<b>Audio response:</b>	25 kHz: : +1/ - 3 dB rel. to 1 kHz, 300 Hz - 3.400 Hz <-25 dB at 5000 Hz 8.33 kHz: +1/ - 3 dB rel. to 1 kHz, 300 Hz - 2.500 Hz <-25 dB at 3200 Hz
<b>Distortion:</b>	Less than 5% at 90% modulation
<b>Hum and noise level:</b>	Better than 45 dB below at 90% modulation

JOTRON electronics a.s. reserves the right to change the design and/or the specification at any time without prior notice

**JOTRON Electronics a.s**

P.O.Box 54, NO-3280 Tjodalyng, Norway  
Tel: +47 33 13 97 00 Fax: +47 33 12 67 80  
E-mail: salesair@jotron.com Website: www.jotron.com