

# DIGITAL RADIO DATA SYSTEM (RDS) DECODER

## RDS Decoder LXT-10 / 12 / 22



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## MAIN OPERATING MODES:

- A- Normal Tuner Mode** : FM Receiver and decoder work as your key commands.
- B- Self Scan Mode** : Tuner scans all frequencies with saved set values and send all frequencies data via RS232 connection.
- C- RC (Remote Control) Mode** : Tuner frequency can be changed remotely. Raw rds group and rf data transmitted via rs232 and ethernet port.

You may select Main Operating Mode, if you hold <Mode> pressed during the power from < Off> to < On> position.

Self Scan or RC mode is optional. This selection must be defined on order. Default devices configured as 'Self Scan' mode.

### A- NORMAL TUNER MODE

There are 10 working modes on LCD. You can use <Mode> key to select modes. Working modes between 1..5 are for settings. Other modes are for follow up.

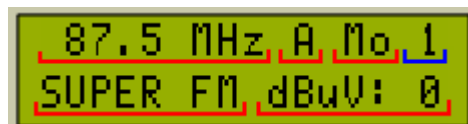
Logo & Start welcome screen when you turn on for a few seconds



MGY Co. Ltd.  
RDS Decoder V.13

#### Mode 1: Main Screen

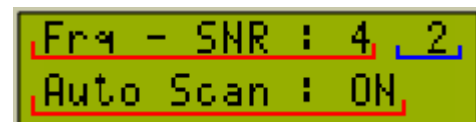
- 87.5 – 108 MHz Frequency : <+> / <-> key for controlling the frequency. Channel spacing is setted as 100 kHz for Europe countries.
- <A> Auto Search is setted as <on>. You can change to manual from <Mode 2>
- <Mo> ; <St> Mono / Stereo data received from tuner
- RDS PS Name is viewed as 8 chars.
- RSSI (Received Signal Strength Indicator) is measured with units of dB $\mu$ V in 1 dB increments with a maximum of approximately 75 dB $\mu$ V.



87.5 MHz A Mo 1  
SUPER FM dBuV: 0

#### Mode 2: Auto Scan / Seeking and SNR setting

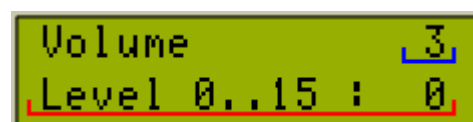
- Auto Scan / Seeking setted as <ON> or <OFF> via <-> key pressing. If <OFF> selected, frequency increased or decreased 100kHz
- Signal-to-Noise-Ratio (SNR) may be adjusted between 0..7 values via pressing <+> key. Important for valid seek channels.



Frg - SNR : 4 2  
Auto Scan : ON

#### Mode 3: Volume Setting

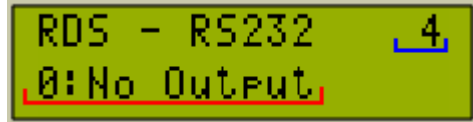
- Volume may be setted between 0..15 values via <+> or <-> key.



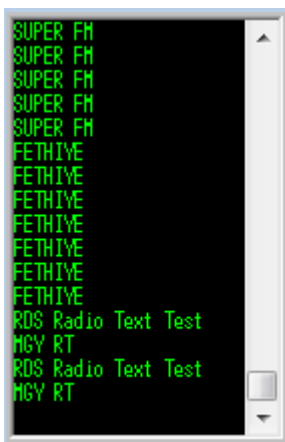
Volume  
Level 0..15 : 0

**Mode 4:** RS232 Output Format setting

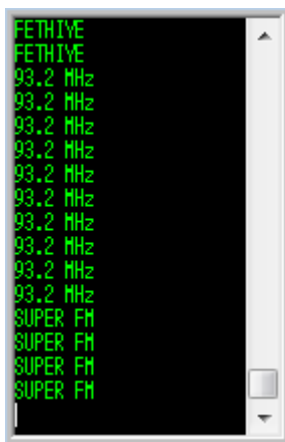
User may select RS232 9600 baud text data output format via <+> or <-> key. Sample output images as below.



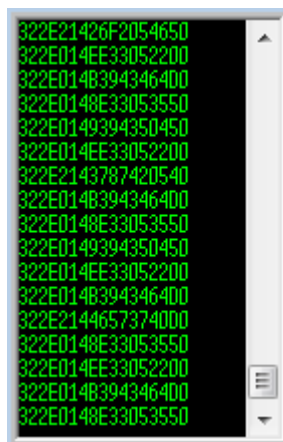
- 0- No Output
- 1- PS (Program Service) Name
- 2- RT (Radio Text)
- 3- CT (Clock Time)
- 4- All row groups (compatible with RDS Monitor Fow Windows)
- 5- Custom Desing (in future)



Mixed Output



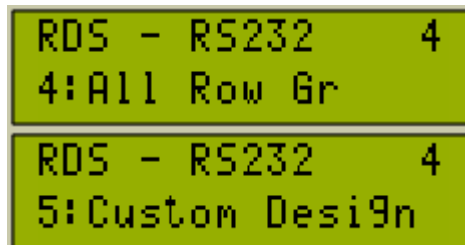
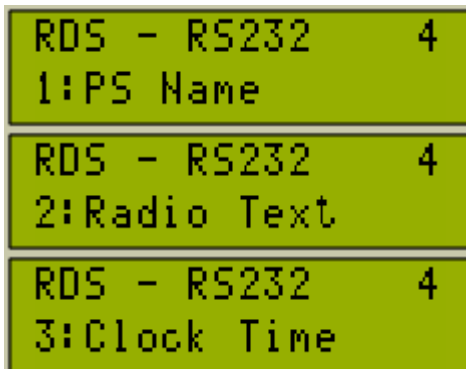
PS Name Output



All Row Groups



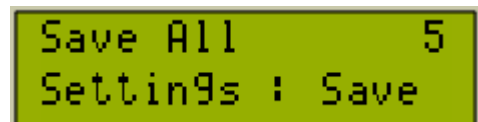
Mixed Output



**Mode 5:** Save All Settings

- You can save all setted values at Modes between 1.. 4 on receiver via <+> or <-> key pressing.

When you rePowered the tuner, all last saved settings will be applied. Frequency, seeking, SNR value, volume level, RS232 output format.



**Mode 6:** PS Name, PI Code M/S follow up

- PS (Program Service) Name – 8 Char
- PS full word counter. <1..9> Max value is 9.
- PI Code – Hexadecimal – 4 Char
- Audio Level – Left / Right
- Music / Speech



PS: SUPER FM 3 6  
PI: 322E Mus

**Mode 7:** TP / TA – PTY follow up

- TP (Traffic Program) signal – On / Off
- TA (Traffic Announce) signal – On/Off
- PTY (Program Type) – 0..31

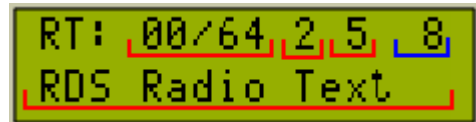


TP: OFF 7  
TA: OFF PTY: 0

**Mode 8:** RT (Radio Text) follow up

RT is a message of up to 64 chars.

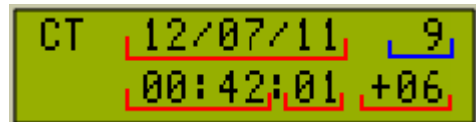
- <00/64> Displayed char of RT on LCD
- <2> Received RT pack (4 chars) 0x1..0xF (16 packs)
- <5> RT flow speed on second line of LCD. The speed value is between (0..9) and <0> is slowest speed. Speed vaue changable via <+> and <-> key.



RT: 00/64 2 5 8  
RDS Radio Text

**Mode 9:** CT (Clock Time) follow up

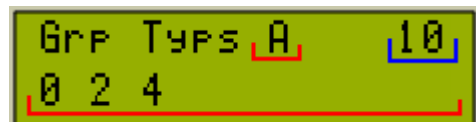
- <12/07/11> Date format (dd/mm/yy)
- <00:42> Time format (hh:mm)
- <:01> Seconds value not received from RDS
- UTC (Coordinated Universal Time) - Half Hours



CT 12/07/11 9  
00:42:01 +06

**Mode 10:** Received RDS Groups

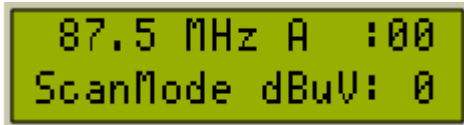
- Group Type is <A> or <B> and you may select it to follow up via <+> or <-> key.
- Received groups are listed on second line of LCD



Grp Typs A 10  
0 2 4

## B- SELF SCAN MODE

When you selected Self Scan Mode, tuner starts to listen from saved frequency. After each 10 seconds tuner reports all picked data from this frequency via RS232 output. Then tuner seeks for next frequency as your saved settings. Saved SNR Level will be used on scan operation. Or you can create a scanned frequency list and save it via rs232 by using software.



RS232 serial data output format :

```
; | 0xFE -> START of Message
; | 0x17 -> MEL Message Length
; | 0x01 -> MEC Message Command Code
; | | 1.Byte : Frequency <0 – 205 = 87.5 – 108.0>
; | | 2.Byte : RSSI Level dBuV
; | | 3.Byte : 0b00000000
; | | 7.Bit : 0:Mono 1:Stereo
; | | 4.Pick period value as seconds
; | | 5.Received RDS Groups count in defined period (High)
; | | 6.Received RDS Groups count in defined period (Low)
; | | 7.Byte : PI Code High
; | | 8.Byte : PI Code Low
; | | 9.Byte : RDS Data
; | | 7.Bit : TP 0:OFF 1:ON
; | | 6.Bit : TA 0:OFF 1:ON
; | | 5.Bit : 0:Speech 1:Music
; | | 4..0 Bit : PTY
; | | 10.Byte : Audio Level Left (4 bit) + Right (4 bit)
; | | 11.Byte : PS Letter 8
; | | 12.Byte : PS Letter 7
; | | 13.Byte : PS Letter 6
; | | 14.Byte : PS Letter 5
; | | 15.Byte : PS Letter 4
; | | 16.Byte : PS Letter 3
; | | 17.Byte : PS Letter 2
; | | 18.Byte : PS Letter 1
; | | 19.Byte : Recived Groups (A Type High)
; | | 20.Byte : Recived Groups (A Type Low)
; | | 21.Byte : Recived Groups (B Type High)
; | | 22.Byte : Recived Groups (B Type Low)
; | 0xss -> Sum of Data bytes (Only last byte)
; | 0xFF -> END of Message
```

Sample Data Pack

```
FE 17 01 00 00 88 0A 00 72 32 2E 2A 00 46 45 54 48 49 59 45 20 A0 00 00 00 5D FF
```

Ethernet unit will transmit this pack to a web server as http cooman line.

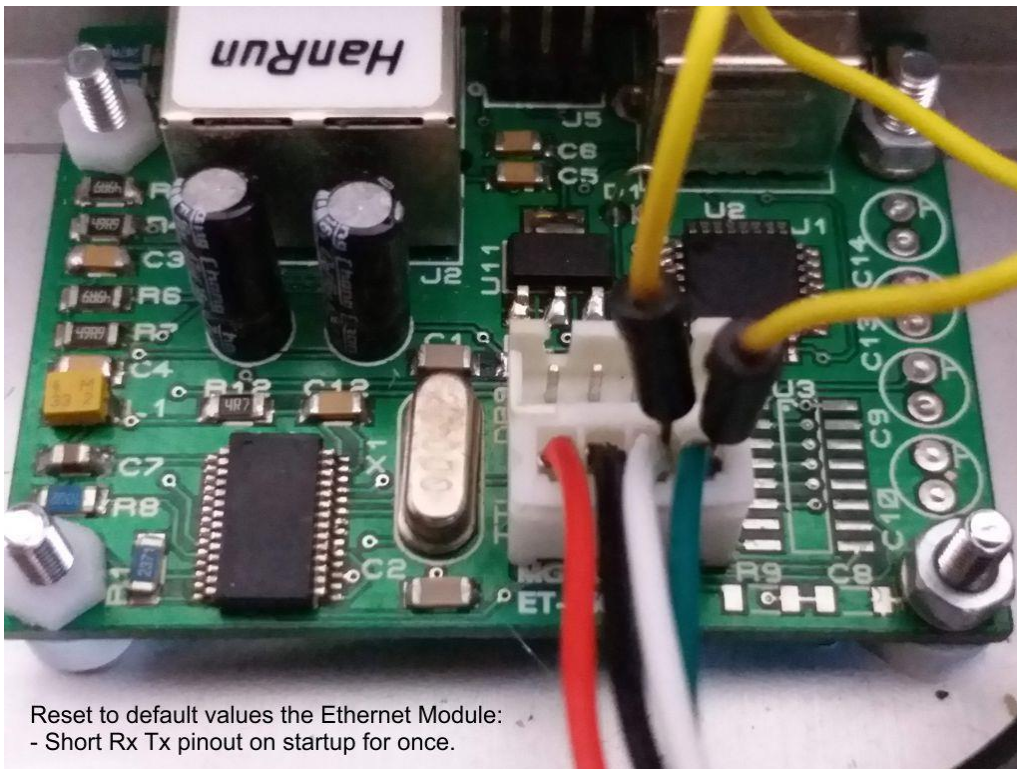
It works as a web client to transmit data and uses dynamic ip. You can find the unit ip from lan and connect to it from 80 port as an web server for parameter settings.

### Ethernet module default values:

```
dynamic ip selected
myip: 192.168.1.29
gwip: 192.168.1.1
netmask: 255.255.255.0
host: www.mgy.com.tr (fixed)
script: /cgi-bin/decoders.cgi?id=999;d=
```

```
<TELNET> commands < password is not necessary >
-ver:?
-saved_ip:?
-myip:?
-mac:?
-script:?
-host:?
-pw:      [default: 123456]
```

```
<TELNET> commands < password is necessary >
-rst:?
-static:?      [default: -static:?]
-dynamic:?
-newpw:        [default: 123456]
-myip:         [default: 192.168.1.29]
-gwip:         [default: 192.168.1.1]
-netmask:      [default: 255.255.255.0]
-mac:          [default: 00:22:14:05:BB:BB]
-script:?      [default: /cgi-bin/decoders.cgi?id=999;d=]
```



Reset to default values the Ethernet Module:  
- Short Rx Tx pinout on startup for once.

### C- RC (Remote Control) MODE

When you select and order the RC Mode, flow rds data lines continuously from rs232 or Ethernet as below:



```
0B5122C36E696E67;5A;00;89.7;18.05.01.13.41.28
<RawRDS>;<RDSLevel>;<BlockErrorRate>;<Frequency>;<TimeStamp><LF>
```

RDSLevel is in hexadecimal, and is the RDS Level in percent, where 100% is 75kHz deviation.  
BlockErrorRate is in hexadecimal. with 0x00 equal to 0%, and 100% is 0x64.  
The error rate is in percent, with 0x00 equal to 0%, and 100% is 0x64.  
TimeStamp is YY.MM.DD.hh:mm:ss (TimeStamp is transmitted as 00.00.00.00.00.00 on basic models)  
Use TCP port 1001 or RS232 for tuner command and data transfers.

Once connection is established, to control the tuning you send a simple command R:xxxx\r\n to the device. You receive the tuned data from receiver after each command at least once.

```
R:xxxx\n (xxxx represents the tuned FM frequency. e.g. 0891 = 89.1 MHz; 1079 = 107.9 MHz)
R:SAVE\n (Save the tuned frequency on tuner permanently)
R:LOAD\n (Load the saved or default frequency)
R:GOUP\n – R:GODW\n (Tune Up or Tune Down)
R:BACK\n (Back to Manual Mode – Valid for Scan Mode too)
R:INFO\n (Get tuned frequency values)
```

Ethernet Unit Works as a server from 192.168.1.29

- Data Communication port is TCP 1001
- Data stream input port is UDP 1101
- Control commands port is TCP 23

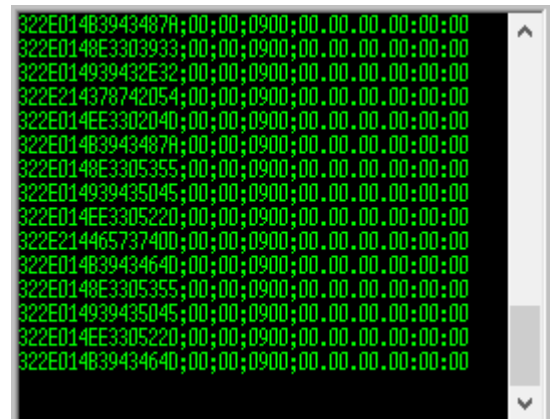
Ports can not be changed.

You can use telnet for communication.

UDP data stream input is developed for rds encoders.

Command lines are as belowe (\n or enter):

```
-pw:123456\n
-newpw:.....\n (max 10char)
-ip:?\n (returns ip address)           -rst\n
-ip:192.168.1.29\n                   -tcp:?
-mac:?\n (returns mac address)       -tcp:1001\n
-mac:00:22:14:03:04:05\n           -udp:?
-ver:?\n (returns version of firmware) -udp:1101\n
```



Please enter <?> value to view the saved value.

You need the pw entrance for updating the values.

If you enter the pw value, you can edit the ip, mac, newpw values.

If you enter wrong pw after a valid pw, editability will be removed.

If you enter the wrong pw more than 5 times, you need to manually restart the unit for editing.

Use TCP port 23 for Ethernet module command transfers.

When you need to reset the Ethernet unit to default values, bypass the serial rx-tx pins during startup.

And the default Ethernet unit values as below:

```
-pw:123456           -tcp:1001           -mac:00:01:02:03:04:05
-ip:192.168.1.29    -udp:1101
```

**TECHNICAL SPECS:**

Model	: LXT-10
Band Limits	: 87.5 – 108.0 MHz
Channel Spacing	: 100 kHz
Tuner Type	: Digital Signal Processor <DSP>
Data Output	: RS232-C asinchronous
Data Speed	: 9600 baud
Connection	: DB9
Audio Out	: Stereo
Volume Level	: -30 dBFS <0..15>
AGC	: Enabled
De-Emphasis	: 50 µs
RSSI	: max 75 dBuV
Dimendions	: 15 x 20 x 6 cm
Weight	: 240 gr
Power Supply	: 12 VDC – 350 mA

Note: Some of the models has On/Off button instead of aerial connection and aerial is combined with earphone.

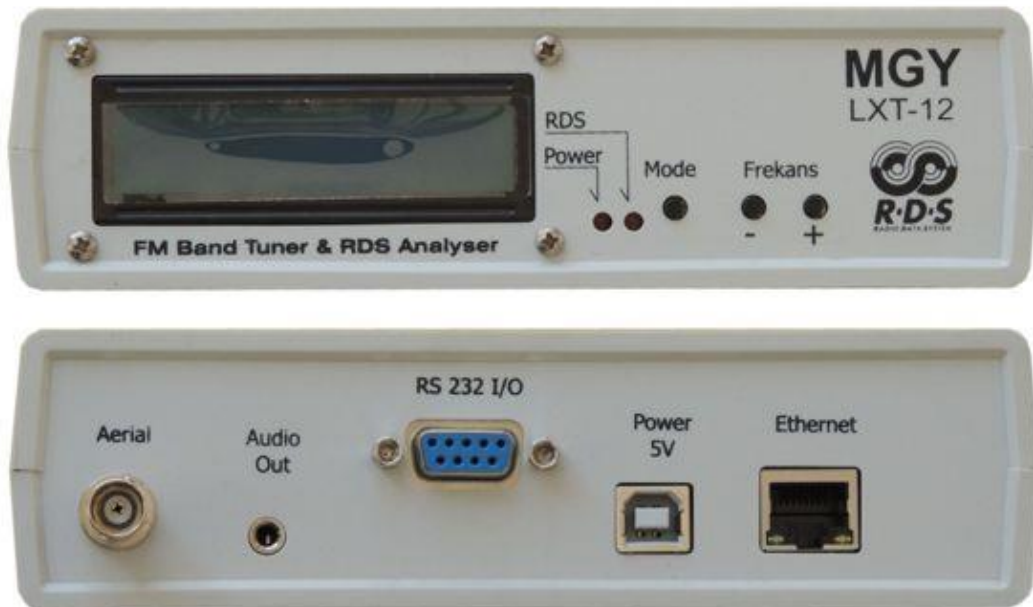




**TECHNICAL SPECS:**

Model	: LXT-12
Band Limits	: 87.5 – 108.0 MHz
Channel Spacing	: 100 kHz
Tuner Type	: Digital Signal Processor <DSP>
Data Output	: RS232-C asinchronous
Data Speed	: 9600 baud
Connection	: DB9 + RJ45 Ethernet Client
Audio Out	: Stereo
Volume Level	: -30 dBFS <0..15>
AGC	: Enabled
De-Emphasis	: 50 µs
RSSI	: max 75 dBuV
Dimendions	: 15 x 20 x 6 cm
Weight	: 240 gr
Power Supply	: 5 VDC – 350 mA

- Combined with ET-1509 Ethernet Module



**TECHNICAL SPECS:**

Model	: LXT-22
Band Limits	: 87.5 – 108.0 MHz
Channel Spacing	: 100 kHz
Tuner Type	: Digital Signal Processor <DSP>
Data Output	: RS232-C asinchronous
Data Speed	: 9600 baud
Connection	: DB9 + RJ45 Ethernet Client
Audio Out	: Stereo
Volume Level	: -30 dBFS <0..15>
AGC	: Enabled
De-Emphasis	: 50 µs
RSSI	: max 75 dBuV
Dimendions	: 500 x 60 x 180 mm – U1 Rack mount
Weight	: 800 gr
Power Supply	: 220 VAC – 4W

- Combined with ET-1509 Ethernet Module



Tuner2Web  
**FM Tuner to WEB**  
 Version 1.012 - 10.10.2019 - www.mgy.com.tr

SAVE SETTINGS    **START**    STOP    Com Port : COM3

Settings and Commands    Data List

Scan Mode  
Frequency List  
42 Adet

- 87,5
- 87,6
- 87,7
- 87,8
- 87,9
- 88,0
- 88,1
- 88,2
- 88,3
- 88,4
- 88,5
- 88,6
- 88,7
- 88,8
- 88,9
- 89,0
- 89,1
- 89,2
- 89,3

Select All

Read List    Write List

Set Frequency

87,5 MHz

Write Frq

Read Frq

Set Volume

0

Write Volume

Read Volume

RSSI controlled relay min/max

0 dBuV    0 dBuV

Write RSSI    Read RSSI

Read Current RSSI value

Auto Mode

FM Scan Manual

Write Mode

Read Mode

RS232 Mode

0:None

Write RS232

Read RS232

RC TelNet Cmd

R: 0900

Send TelNet

```
R:SAVE
R:LOAD
R:GOUW
R:GODW
R:0875
R:....
R:1080
R:BACK
```

Tuner2Web  
**FM Tuner to WEB**  
 Version 1.012 - 10.10.2019 - www.mgy.com.tr

SAVE SETTINGS    **START**    STOP    Com Port : COM3

Settings and Commands    Data List

Clear List     Save Frq Logs <Data\_yymmdd.log>     List as Station

Date Time	Frq MHz	RSSI dBmV	Stereo	L/R	RDS %	PI Code	TP	TA	M/S	PTY	PS	Received Groups