ICOM introduces the next generation digital amateur radio system – the D-STAR system. The D-STAR system provides digitally modulated voice/data communication and high-speed data access over the air. This project has been developed in collaboration with JARL (Japan Amateur Radio League) and is supported by the Japanese Telecommunications Administration. ICOM has begun field tests on D-STAR.

**Fundamental Plan of the D-STAR System**

The D-STAR system brings the advantages of high-speed digital modulation to Amateur Radio. All of the transmissions including voice and pictures are digitally encoded. Digitally modulated voice is transmitted at 8 kbps and digital data is transmitted at 128 kbps (max.) from terminal to terminal or to a repeater. Repeaters can be linked up with a 10 Mbps backbone in the 10 GHz band, providing a multi-site repeater system. The transceiver can have an Ethernet cable port, which provides direct connection to a PC, router, hub or other network devices. The resulting system seamlessly transmits high-speed IP compliant data and digital voice. Amateur radio operators now have a system that will allow them to explore the benefits of wireless high-speed integrated digital connections. Potential applications are only limited by your imagination, but certainly emergency services and amateur Digital TV quickly come to mind.

**Features of the D-STAR System**

- Digitally-modulated voice and data communication
- High-speed 64–128 kbps data access
- Complies with IP connection
- Repeaters can handle both digital and analog voice
- System operates on multi-site and backbone connection
**D-STAR FEATURES**

Versatility and expansion of the system is achieved through local repeaters and backbone relays.

**DIGITAL REPEATER**

Because the digital repeater is indispensable for the practical use of a digital transceiver, ICOM has also developed a digital repeater for the D-STAR system.

The features of the digital repeater:

- Full-duplex voice service (20 MHz shift)
- Time division multiplexing on data mode
- Repeater handles analog (FM) voice and switches over to digitally modulated voice, and vice versa when necessary
- Multi-site repeater system with 10 Mbps backbone in the 10 GHz band
- Repeater accepts 10Base-T Ethernet cable connection
  - Remote control capability from PC over a network
  - Gateway function from the air to a wired network

Application example:

- 128 kbps Internet access
- Digital Voice Mobile to traditional Analog FM HT Connection
- Nation-wide high-speed backbone system
- Amateur Digital TV

ICOM’s digital repeaters, 10 GHz and 1.2 GHz.

ICOM’s Microwave Backbone Digital Repeaters (10 GHz, 1.2 GHz) and Parabolic Antenna
Features

The ID-1 is a digital transceiver, based on the JARL D-STAR standard for digital amateur radio in Japan. Digitally-modulated voice mode (8 kbps, GMSK), high-speed digital data communication (128 kbps, GMSK) as well as analog voice mode communication (FM) are possible. By connecting the ID-1 to a PC with a USB cable and 10BASE-T Ethernet cable, full operation can be carried out by the PC. Also, wireless Internet access can be made easily over the air. And with the optional remote controller, standard voice operation is possible.

Specifications

- **Frequency:** 1200 MHz Amateur radio band
- **Mode:** FM (Analog voice), GMSK (Digitally modulated voice/data)
- **Data rate:** 8 kbps (Voice), 128 kbps (Data)
- **Codec:** G723.1
- **Data Interface:** IEEE802.3 (10Base-T) IP Compliant
- **Control Interface:** USB
- **Output Power:** 10W/1W
- **Sensitivity:** FM (typical) 0.16µV, 8 kbps GMSK voice 0.32µV, 128 kbps GMSK data 1.3µV
- **Switching Time:** 10 ms (Digital mode)
- **GMSK Modulation:** Quadrature Modulator

Controller View Of The PC Display
JARL D-STAR SPECIFICATIONS

- Frequency
  Utilizes amateur radio bands, in which modulation and bandwidth in both audio and data modes are allowed. The backbone relay between repeaters utilizes 5.6 GHz band or higher, to obtain the required bandwidth.

- Output Power
  Within the maximum output power that is allowed for an amateur radio station.

- Transmission Speed And Bandwidth
<table>
<thead>
<tr>
<th>Mode</th>
<th>Transmission speed</th>
<th>Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>8 kbps or less</td>
<td>Less than 9 kHz</td>
</tr>
<tr>
<td>Data</td>
<td>128 kbps or less</td>
<td>Less than 130 kHz</td>
</tr>
<tr>
<td>Relay</td>
<td>10 Mbps or less</td>
<td>Less than 10.5 MHz</td>
</tr>
</tbody>
</table>

- Carrier Frequency
<table>
<thead>
<tr>
<th>Mode</th>
<th>Transmission Speed</th>
<th>Frequency Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>8 kbps</td>
<td>20 kHz</td>
</tr>
<tr>
<td></td>
<td>2.4 kbps</td>
<td>10 kHz</td>
</tr>
<tr>
<td>Data</td>
<td>128 kbps</td>
<td>160 kHz</td>
</tr>
</tbody>
</table>

- Transmitter-receiver Spacing
  Off-set frequency of digital repeater is same as analog FM repeater. Data communication utilizes simplex mode.

These specifications are subject to change without notice. Featured technology is only available in Japan. This system has not been approved in other countries. This device may not be sold or leased, or offered for sale or lease, until approval has been obtained in each country. What has been presented in this brochure are concepts that are being developed.

ICOM America, Inc.
2380 - 116th Ave NE, Bellevue, WA 98004 • 425-454-8155
Tech support: 425-454-7619
Web: www.icomamerica.com, or amateur@icomamerica.com
Brochure request by mail: 425-450-6080
Online brochure: www.icomamerica.com

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