



ARD-2 ACARS / NAVTEX DECODER & DISPLAY UNIT



If you think that data reception of aircraft ACARS and marine NAVTEX is only for experienced professional commercial operators, the ARD-2 may cause you to think again. This decoder & display unit has been designed with both the newcomer and experienced "go anywhere and everywhere" operators in mind.

The ARD-2 provides **portable operation** from **internal batteries** or external 12V d.c. **without the need for a computer**. The built-in LCD provides two lines of text with up to 32 characters of text per line and a scroll back buffer of 512 characters.

Imagine sitting at an airfield with the ARD-2 in one hand and a hand-held receiver in the other (such as the AR8000) with just a single connecting cable between them... its that simple. As ACARS activity is highest during take off and landing, you will see first-hand 'what is happening'... 'who & what' is going 'where & when' !

The ARD-2 is just as capable at home offering reception of ACARS and NAVTEX. NAVTEX traffic (audio signal from a short wave receiver tuned in SSB such as the AR7030) is every bit as interesting with search & rescue, weather warnings and other routing traffic being regularly transmitted.

Getting started could not be easier, the ARD-2 is as simple as connecting audio from a suitable radio receiver and switching on:

- 1) Connect the AOR AR5000 to the AF IN of the ARD-2 using the supplied lead.
- 2) Select the local ACARS VHF airband primary frequency in AM mode: 131.550 MHz in the USA, Canada & Pacific, 131.450 MHz in Japan and 131.725 MHz in Europe.
- 3) Adjust the volume of the AR5000 to the 11 o'clock position.
- 4) Switch on the ARD-2 and away it goes, text

Specification

Model	ARD-2 ACARS/NAVTEX decoder
Power Supply	12V dc or 4 x AA battery cell
Current Consumption	Max. 280mA
Fuse	1A instantaneous
Decode Signal	
ACARS	Modulation MSK Carrier 2400 Hz Bit rate 2400 bps Code type NRZi Length of 1 character 7 bit+1 parity
NAVTEX	CCIR Rec476-2B Mark 1615 Hz Space 1785 Hz Shift 170 Hz Bit rate 100 bps Length of 1 character 7 bit
Display	
Control	LCD 16 character x 2 line LED 4 x Mode Selection (green) 1 x DECODE (red)
Key	4 x Mode Selection 1 x Scroll UP 1 x Scroll DOWN 1 x Back Light ON/OFF 1 x Decode Restart
Audio signal	
Input	3.5 mm mono jack Input impedance 1k OHM Input level 0.2 - 2V p-p External speaker 3.5mm mono jack Earphone socket: two, each on front and rear panel
Serial Interface	
	Connector: D-Sub 9-P male Baud rate: 9600 bps Data length: 8 bit Stop bit: 1 Parity: None Flow control: RTS hard flow
Operating temp	0 - 45° C
Dimensions	158L x 109W x 53H mm excl projections
Weight	330g excl. batteries

E&OE

- ☆ 'Go-anywhere' portable ACARS / NAVTEX decoder with built-in LCD
- ☆ Simple to operate
- ☆ Operation from 4 x AA internal batteries or 12V external d.c.
- ☆ COM connector for RS232

will be decoded automatically by the ARD-2 and displayed on the LCD two lines at a time.

NAVTEX is easy too... select NAVTEX-E, tune the AR5000 to a NAVTEX frequency (such as 518 kHz), select SSB... and a whole new world opens up. Changing receive data mode is easy, just press one of the four mode keys:

- [1] ACARS-1 mode (default) - airband ACARS
- [2] ACARS-2 mode, raw data output, ideal for computer control - airband ACARS
- [E] NAVTEX-E English language - marine NAVTEX
- [J] NAVTEX-J Japanese character set for use in the coastal waters around Japan, requires connection to an external PC which supports the Japanese character set.

A built-in speaker with volume control allows you to monitor activity and assess what is going on, this is particularly useful for fine tuning of NAVTEX and enables you to shut the sound off completely when not required. A LEVEL control provides threshold adjustment to achieve the best capture of weaker signals for improved differentiation between noise and data.

Sockets are provided on the front and rear panels for external speaker and earphone

connection etc. A 9-pin **RS232** socket is also provided to enable **connection to a computer** for improved comfort when viewing for extended periods of time (Windows95™ Hyper-Terminal may be easily configured), the RS232 connecting lead is supplied with the ARD-2.

Don't get left behind... take a close look at the



What is ACARS...

ACARS which stands for **Aircraft Communications Addressing and Reporting System** is a digital system transmitted over the VHF aircraft band around 131 MHz AM. Traffic is handled by a computer network, in the USA Aeronautical Radio Inc (ARINC) are responsible but in other countries different organisations are responsible. Not all aircraft are equipped with ACARS but the mode is becoming more widely used.

Data does not simply comprise of text messages (although the request for tickets and shower facility at airport terminals have been noted). A series of sensors on the aircraft automatically collate information from the management unit and control units, these relate to height, speed, outside temperature, wind, fuel, engine performance etc, this information being transmitted by ACARS along with general positional data and more.

The ACARS data is processed into **packets** of serial data for efficient handling. The transceiver on-board the aircraft checks the frequency before transmission to ensure that it is clear then produces the short burst of data lasting less than one second.

Transmission takes place from air to ground (downlink) and from ground to air (uplink). A flurry of data may be passed at take-off and landing (termed DEMAND MODE as it is triggered by events) but positional transmissions may only occur occasionally, up to an hour apart so it is best to catch transmissions close to a major airport or flight paths to and from. General transmissions during flight (such as weather reports) may not be specifically acknowledged at the time of transmission (to minimise congestion) but reception will be acknowledged when the next transmission occurs.

Primary ACARS frequencies are: 131.550 MHz in the USA, Canada & Pacific (secondary being 132.025, 129.125 MHz), 131.450 MHz in Japan and 131.725 MHz in Europe.

For transmission efficiency, many abbreviations and codes are used. Further reading is recommended by book or internet:

Understanding ACARS by Ed Flynn, Copyright Fred Osterman and published by Universal radio Research, 6830 Americana Pkwy. Reynoldsburg, Ohio 43068, USA. ISBN 1-882123-36-0

ACARS-Link, About ACARS <http://www.grove.net/~acarslink/about.htm>

Sample of typical abbreviations used by ACARS:

AL (or FL)	Flight level
CZ	Cruising speed
DP	Dew point
HD	Heading
WX	Weather
ADF	Automatic direction finding
ALT	Altitude
CPT	Captain
ENG	Engine data
FOB	Fuel on board
GND	Ground
OAT	Outside air temperature
TRB	Turbulence
POSWX	Position weather
WXRQ	Weather request

What is NAVTEX...

NAVTEX which stands for **NAVigational TelEX** is a well organised international digital system transmitted over the short wave bands.

Coastal stations regularly broadcast traffic lists of names of ships for which it holds messages, weather reports etc. This automated system now enables marine traffic to log on to a coastal stations mailbox and download its data without human intervention.

Each transmission is coded by category and station identified by a four character group at the start of the transmission B(1) B(2) B(3) B(4).

B1	Station identifier
B2	Subject of message
B3 & B4	Message type

Example of B1:

G	Cullercoats, UK
S	Niton, UK
R	Reykjavik, Iceland

When geographically separated, the same letter may be allocated to more than one coastal station without any problems occurring.

Example of B2:

A	Navigational warnings
B	Meteorological warning
C	Ice reports

It is possible for shipping to program what will be received and what will not, certain categories of urgent transmission cannot be locked out.

Primary NAVTEX frequencies are 518 kHz and 424 kHz but other frequencies are used. In the coastal waters around Japan NAVTEX-J may be encountered where Japanese characters may be decoded by the ARD-2 and displayed on a PC which supports this character set.

For transmission efficiency, many abbreviations and codes are used. Further reading is recommended by book or internet:

<http://www.navcen.uscg.mil/marcomm/gmdss/navtex.htm>



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