

INTRODUCTION TO RADIOTELETYPE

Shortwave radio is filled with many exotic voices, but the excitement doesn't end here! There are many interesting stations that transmit text. Universal can help you upgrade your monitoring station to copy these "non-voice" modes.

MORSE CODE (CW)

One common non-voice mode is called Morse code (CW). Morse code is still used extensively by amateurs, coastal stations and the military. A few maritime coastal stations you may hear include:

VHP4	Canberra, Australia
UKA	Vladivostok, Russia
VPS60	Cape D'Aguilar, Hong Kong
JOU	Nagasaki, Japan
UMV	Murmansk, Russia
D4A6	Sao Vincente, Cape Verde
TIM	Limon, Costa Rica
SUH3	Alexandria, Egypt
LZW42	Varna, Bulgaria
A9M	Manama, Bahrain
LFB2	Rogaland, Norway

Many countries continue to utilize CW for unclassified military traffic. Stations you might log:

FUX	Fr. Navy	St. Denis, Reunion
GYU	Royal Navy	Gibraltar
CTU2	Port. Navy	Monsanto, Portugal
NAM	US Navy	Norfolk, USA
ZSJ4	S.Afr. Navy	Silvermine, S. Africa
FUV	Fr. Navy	Djibouti, Jibuti
4XZ	Israeli Navy	Haifa, Israel
EBA	Span. Navy	Madrid, Spain

Morse is also used by some aeronautical, commercial, and diplomatic stations as well as by amateur radio operators.

RADIOTELETYPE (RTTY)

Another mode by which text is transmitted is called radioteletype (RTTY). Most RTTY transmissions heard on shortwave use a RTTY format called "Baudot". The Baudot format represents each character with a series of 5 bits. Each bit is either a MARK (1) or a SPACE (0). Your radio will receive the MARK tone and the SPACE tone. The distance between the two frequencies is called the "shift". Common shifts on shortwave include 170, 425 and 850 Hz. There are hundreds of regular (Baudot) RTTY stations that can be heard, even on a modest shortwave receiver. The major types include:

Press Stations

Many commercial and government press agencies transmit "press" on RTTY... often in English. There is no faster way to get the news... it's like having a free wire service in your home! Press stations transmitting English include:

3MA33	China News Agency - Taiwan
VNA30	Vietnamese News Ag. - Vietnam
BZR66	Xinhua News Agency - China
LRO2	Telam Press - Argentina
SUA289	Middle East News Ag. - Egypt
YIX70	Iraqi News Agency - Iraq
HML60	KCNA News Agency - N.Korea
9BC22	Iranian News Agency - Iran
6VK317	PANA News Agency - Senegal
YZJ5	TANJUG Press- Serbia

Weather Stations

RTTY is used by aeronautical and weather stations worldwide. While some stations transmit "plain text", most transmit weather data using special "synoptic" codes. We offer the *Radio Data Code Manual* to help you decode, identify and understand these transmissions. Some RTTY weather stations you can expect to hear include:

UGE2	South Shetland Islands
FJY4	St. Paul & Amsterdam Islands
RUZU	Antarctica
TZH	Mali
TNL77	Congo
3BT4	Mauritius
LOK	South Orkney Islands
GHH	St. Helena Island

Military Stations

Many military stations use uncoded RTTY to pass non-sensitive traffic. Transmissions pertaining to weather, maneuvers and some clerical matters can be monitored. A sampling of military stations you may hear include:

NBA	US Navy	Balboa, Panama
MKD	Royal AF	Akrotiri, Cyprus
OBC	Peru Navy	Callao, Peru
ZRH	S.African Navy	Capetown, RSA
MKG	Royal Navy	London, England
NKW	US Navy	Diego Garcia

Other Services

Other services using radioteletype on shortwave include: diplomatic, research, commercial and maritime concerns. Radio amateurs also utilize several teletype modes.

SPECIAL RTTY MODES

Most RTTY stations transmit in the standard Baudot format previously discussed, but there are many other formats (protocols) used on SW. Another less popular format is ASCII in which each character is sent as a series of 7 bits. Most RTTY equipment can decode ASCII. Another more prevalent protocol is called TOR (Telex-Over-Radio). This is often referred to as Sitor A/B, ARQ, FEC or AMTOR. This mode is in wide use by maritime users and is also gaining popularity among the diplomatic and amateur services. This mode allows the sender and receiver to enjoy nearly error-free communication. The Info-Tech, M-6000 and the Universal M-900, M-7000 and M-8000 do a superlative job decoding this type of transmission. Other more exotic modes such as ARQ-M2, ARQ-E/E3, FEC-A, FEC-S, SWED-ARQ, ARQ-S, Piccolo, and Frequency Division Multiplex (VFT) are available to listeners utilizing our more advanced multimode demodulators.

EQUIPMENT

A good communications receiver is required for successful RTTY listening. Examples of acceptable receivers would be: Yaesu FRG-7/100/7000/7700/8800, Lowe HF-150/225, Kenwood R-1000/2000, Icom R-70/71A/72A and Drake R7/7A, SW8. Optimum receivers for RTTY would include the W-J HF1000, Japan Radio NRD-345/515/525/535/535D/545DSP, Drake R-8/A/B, Kenwood R-5000, Lowe Europa and Icom R-8500/9000.

There are three methods used to copy radioteletype. All methods require receiver audio.

RTTY Readers

RTTY/CW readers are self-contained devices that decode and display the text on a 10 (or greater) character LED "billboard" display. ADVANTAGES: • Low price and • Compact size. DISADVANTAGES: • "Copy" is clearly not as good as on a "dedicated" unit, • Small displays, • Usually decode only basic modes, • Usually lack desirable features or controls, • Not suitable for advanced listening applications. CONCLUSION: • An easy inexpensive way to break into RTTY, but not suitable for serious RTTY work. NOTE: The Universal M-400/450 overcomes most of the usual reader disadvantages with: a two line display, printer port and wide variety of reception modes.

Computer Interfaces

Many personal computers can be made to copy RTTY with the addition of two things: 1. A computer interface 2. Special software. ADVANTAGES: • Low cost if you already own a computer, • Displays to screen of computer, • Many units will also transmit (for HAM use). DISADVANTAGES: • Overall performance is usually superior to a reader, but dramatically inferior to dedicated units, • Many computers emit serious RFI (interference) thus destroying the signal you are trying to copy. CONCLUSION: • If you already own a computer, this will be an inexpensive way to try RTTY. The computer-interface route will be adequate for the casual RTTY listener, but may fall short for the serious RTTY DXer. NOTE: The Universal M-1200 Decoder Card offers performance and features usually found only in dedicated units.

Dedicated Units

A dedicated unit is a self-contained free standing device designed expressly for the accurate reception of CW and RTTY modes. Examples would include: Info-Tech M-200F, M-600A, M-6000, Universal M-900, M-7000 and M-8000. DISADVANTAGES: • Dedicated units cost more. ADVANTAGES: • Clearly superior performance over readers or computer interfaces, • Full video display (video monitor not included), • Often include desirable extra features and controls including scope output, automatic threshold control, unshift on space, multiple scroll inhibit, screen dump, loop keying, RS232C output, selective calling, autostart, etc. • Work well for advanced applications including reception of Arabic, Russian third-shift Cyrillic and exotic modes. • Usually better equipped for satellite RTTY reception. • Do not suffer from potentially serious RFI problems usually associated with computer based systems. CONCLUSION: Although a dedicated unit costs more, this is certainly the preferred route for the serious RTTY listener. Universal Radio stocks used models at considerable savings. Please send a self-addressed stamped envelope to receive our *Used List* or view it on our web page.

REFERENCE MATERIAL

Quality equipment alone is *not* enough to be a successful radioteletype monitor. Knowledge, patience and experience are required. A good reference library of radioteletype books and lists is essential. Tuning RTTY without references is typically unproductive. We offer the finest and largest selection of books on RTTY to be found anywhere.



UNIVERSAL M-900v2 VF



The Universal M-900 was designed for the hobbyist or maritime user who wants an affordable compact unit that copies all the basic HF transmission modes. The M-900 receives Morse code to listen to maritime coastal stations or amateur radio operators (autorange 6 to 35 WPM). It also decodes regular Baudot RTTY still used by some international press agencies, weather stations and aeronautical concerns (45, 50 and 74 baud). Both SITOR A & B modes are included so you can read a vast amount of maritime and international diplomatic traffic. The FEC-A European press mode has recently been added (96, 144 and 192 baud). Facsimile is the transmission of pictures, charts, maps, press photos, and marine information. The M-900 VF yields high resolution facsimile images to the printer port and medium resolution to the monitor. It operates in line mode for weather map reception and gray mode for press photos in 16 shaded levels. (60, 120 and 240 LPM. 288 or 576 IOC. R to L or L to R. Positive or Negative). LED indicators include: mark [MK], space [SP], error, data, squelch [SQ] and limiter [LIM]. In the RTTY mode the six push buttons control: normal-reverse [N/R], squelch [SQ], case change [CASE], shift up [UP], shift down [DN] and unshift on space [UOS]. The status line shows the operating parameters and features a tune for max. indication. In FAX mode the six push buttons control positive-negative polarity [POL], framing [FR], start [RUN], line-gray mode [MODE], IOC [IOC] and direction. Standard print features include multiple scroll inhibit (MSI), over print inhibit (OPI), automatic C/R & L/F and 8K print buffer. A DIP switch allows you to set a 40 or 80 character video line, a 16 or 22 line video page, a 50 or 60 Hz video refresh rate, high-tones or low-tones and a 9 or 24 pin printer. Power input is a 2.5 mm jack, audio input is a mini jack, video out is an RCA jack and the parallel printer port is a DB-25. For performance, price, size and ease of use, the M-900 is hard to beat! A complete system will require the following components: your receiver, audio cable and a composite video monitor. A dot matrix parallel printer is optional.

SPECIFICATIONS

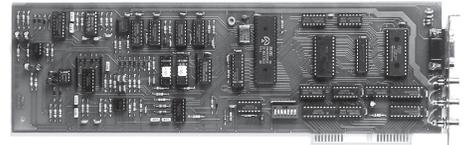
Physical 9"x3.75"x13.25" 5 Lbs.
 Power 12-16 VDC @ 800 ma
 Audio Input 4 to 600 ohms
 Printer Output Parallel ASCII 8 bit Centr.
 Video Output Composite 75 ohms

PRICING

M-900v2 VF List Price \$549.00
M-900v2 VF Discount Price
 Order #2042 **\$449.95**
 Shipping/Handling/Insurance \$8.00



UNIVERSAL M-1200



The Universal M-1200 Card requires just one full-size slot in a PC. This board contains three separate demodulators (FAX, Morse and RTTY) to ensure legible reception even under adverse reception conditions. Variable and standard shifts are supported. Reception modes include: Morse Code, Baudot RTTY, SITOR, FEC-A, ARQ-M2, ARQ-E, ARQ-E3, ARQ-6-90, ASCII and Packet. The VHF-UHF user has capability to monitor the ACARS aviation teletype mode, plus POCASAG (512 baud) and GOLAY modes. Decoding of CTCSS and DCS is also supported. Many user features are available to enhance your radioteletype listening. Multiple Scroll Inhibit (MSI) removes blank lines, Automatic Threshold Control (ATC) provides reception during mark-only or space-only reception. Over Print Inhibit (OPI) prevents overprinting on your printer. Advanced RTTY enthusiasts will appreciate the *Databit* and *Literal* modes, helpful in protocol identification. The video quality of your FAX intercepts will amaze you. FAX images as well as text traffic can be saved on to disk for later retrieval or analysis. Operation is easy through on-screen menus, status indicators and help windows. A *datascope* feature operates in both RTTY and FAX modes. Audio input for a single receiver is via a DB9F I/O jack or an RCA phono jack. Scope output is also available (DB9F). Note: For some non-HF modes, direct connection to the receiver's detector may be required. The M-1200 comes with an informative manual and 3 1/2" diskette. One year limited warranty. Made in the U.S.A.

Universal M-1200 Order #1200 \$399.95 (+\$7)

NOTICE

Pending clarification of current telecommunications law, the sale of this device is currently restricted to qualifying commercial, government or export customers.



UNIVERSAL ACT-1



Much of the routine traffic once heard on VHF aeronautical voice channels has been replaced with a text transmission format called ACARS. ACARS stands for *Aircraft Communications Addressing and Reporting System*. This VHF teletype mode is used to transmit data and messages between commercial aircraft and airport ground stations. These transmissions at 131.55 MHz, can be heard on any scanner with the VHF aircraft band. Now you can combine your scanner and PC with our ACT-1 to decode this information that is on the air every day. The ACT-1 simply plugs into your PC's serial port. The user friendly DOS software includes mouse support. You can view, filter, print and save this interesting aeronautical text traffic. You can also view, search and print previously logged data files. Minimum system requirements: serial port and hard drive. Get in on the aero action with the ACT-1.

ACT-1 Order #0032 \$99.95 (+\$6)



ARD-2



The new AOR ARD-2 is the "go anywhere" decoder for ACARS and NAVTEX. It provides portable operation from 4 internal AA cells (not supplied) or external 12 VDC, and a computer is not required. ACARS is the VHF teletype mode audible on most scanners. NAVTEX stands for Navigational Telex, sent predominantly on the longwave frequencies of 518 and 424 kHz, audible on most shortwave communications receivers. The ARD-2 has two NAVTEX modes: NAVTEX-E for English and NAVTEX-J for the Japanese character set, used in coastal waters around Japan. Incoming text is displayed on the 16 character by 2 line LCD display. A built-in speaker with volume control allows you to monitor activity. A separate level control provides threshold adjustment to achieve the optimum input level. A 9600 baud DB9 serial port is provided for optional use with a personal computer.

ARD-2 Order #3763 \$299.95 (+\$7)



AIRMASTER 2000

The new LowE Airmaster 2000 is a Windows-based PC interface designed strictly for VHF ACARS decoding. The demodulator is built into a DB25 connector for direct connection to a computer serial port. The Airmaster 2000 software is loaded onto your PC harddrive. Requires Windows 3.1 or 95.
AM2000 Order #0923 \$129.95 (+\$6)

UNDERSTANDING ACARS

To learn more about the ACARS, we suggest the book *Understanding ACARS* by Ed Flynn. Please see page 88 of this catalog.



UNIVERSAL M-8000v7



The Universal M-8000v7 features capabilities not available in other decoders. The M-8000v7 offers tremendous power to let you listen to the exciting world of radioteletype and FAX on shortwave, VHF and satellite! The VGA color output permits the presentation of more information than ever before. The incoming text is displayed in a 26 line, 80 character format. A detailed double status line indicates all current demodulator and decoder settings. The lower left corner displays five bar-graph type tuning bars. A horizontal window at the bottom of the screen shows a continuously updated, spectral display. A square window in the lower right corner features a simulated X-Y tuning scope. The M-8000 decodes all the "standard modes" plus ARQ-M2/4 (TDM), ARQ6-90, FEC-A, FEC-S, ARQ-E, ARQ-E3, ARQ-S, SWED-ARQ, POL-ARQ and Piccolo used by diplomatic, military and aeronautical concerns worldwide. The M-8000 has calibrated variable Baudot speeds with calibrated variable shifts. The new GMDSS or Global Marine Distress and Safety System mode has recently been added. The M-8000 has five user programmable sel-cals. Program in one, two or three words (or codes) which will automatically activate your printer when they are received. Think of the potential for this feature! The M-8000 can be completely controlled by a terminal or computer permitting full automation. The M-8000 itself is automated, utilizing a microprocessor to control shift tune and selection. Press a key and the M-8000 tunes the mark, finds the space, and displays the approximate shift. The M-8000 offers a user selectable initialization format and ten multi-function memories to store your most frequently used operating parameters. Manual tuning is facilitated by on-screen bargraph tuning indicators for level, mark and space plus a simulated tuning scope. Other features include: printer & video squelch, High-Low Tone select, 60, 85 and 1200 Hz shifts, six ASCII shifts, parity select and three position AGC. Instructive LEDs for: Mark, Space, Buffer, CW Lock, Squelch, Idle, Sync., Sel-Cal, Data, Tuning Error and Data Error (helpful in determining correct speed, protocol and sync.). Other refinements you have come to expect include: ATC, UOS, built-in diagnostics, speed readout, external scope output plus serial and parallel printer ports. 16.4"W x 3.5"H x 12.5"D. Gray metal cabinet. Can be mounted in standard 19 inch rack with optional mounting kit #0292. 9 Lbs. (15 Lbs. ship). 115/230 VAC, 50/60 Hz. Manufactured in the U.S.A. by Digital Electronic Systems. The M-8000 requires a VGA analog color video monitor (640 x 480 or better). Complete owner's manual with schematic.

- Standard Baudot Shifts - 170/425/850
- Extended Baudot Shifts - 60/85/1200
- ASCII Shifts - 85/170/425/850/1200
- Diversity Reception
- ARQ - Multi-channel watch.
- Speed Readout: Indicates the incoming RTTY transmission rate.
- Auto Baud: Automatic Baud rate selection
- Auto Shift: Automatic Shift Selection
- Auto Tune: Automatic Baud, Shift, Sense
- Beep At: 1-Keypress 2-SelCal 3-Bel char.
- OPI Over Print Inhibit feature.
- Direct Entry of Baud and Shift
- Sel-Cals: 5 programmable sel-cals for automatic printer start-stop on receipt of keywords
- External Scope Output
- On-Screen Simulated Tuning Scope
- Screen Print and Screen Saver
- Spectral Display

- User adjustable filtering control
- VGA Color display (user selectable colors)
- Support for laser printer (HPII compatible)
- High Res. FAX with false color feature.
- MSI Multiple Scroll Inhibit: Eliminates blank space on screen and/or printer.
- ATC Automatic Threshold Control for improved copy during fading.
- AGC Automatic Gain Control
- UOS Unshift On Space auto shift to letters case after blank received.
- Self Test: Built-in diagnostics
- Squelch selectable for screen and/or printer.
- Input Gain Control
- Status Line with five on-screen tuning bars.
- Four Alphabets: ITA2, MIL, TELEX, Cyrillic
- Remote Terminal Operation
- Real-Time Clock/Calendar
- Quality shielded metal cabinet.

LIMITED WARRANTY

Standard Manufacturer Warranty: 1 Year

Optional Extended Warranty To: 3 Years
Order #2718 \$49.00

PRICING

M-8000v7 List Price \$1599.00

M-8000v7 Discount Price

Order #0087 \$1399.00

Shipping/Handling/Insurance \$15.00

RECEPTION MODES

- **Morse Code** with auto speed ranging. 5 to 120 W.P.M.
- **RTTY Baudot - Standard Speeds:** 45, 50, 57, 75 and 100 baud.
- **RTTY Baudot - Non-Standard Speeds:** 20 to 250 baud.
- **RTTY ASCII**
75, 110, 150, 300, 600, 1050, 1200, 1800 baud.
- **Sitor A - (ARQTOR, Amtor A)**
- **Sitor B - (FECTOR, Amtor B)**
Collective and Selective
- **VFT (Frequency Division Multiplex)**
8, 12, 16 or 24 channel
- **Piccolo**
Multi-tone teleprinter code.
- **ARQ-M2 (TDM)**
Two Channel 86, 96 and 100 baud.
- **ARQ-M4 (TDM)**
Four Channel 172, 192 and 200 baud.
- **ARQ-E**
48, 64, 72, 86, 96, 144 and 192 baud.
- **ARQ-E3**
48, 64, 72, 86, 96, 100, 192 and 200 baud.
- **ARQ-S**
4, 5, 6 or 7 character groups.
- **ARQ6-90**
200 baud
- **SWED-ARQ**
3, 9 or 22 character groups.
- **FEC-A**
96, 144 and 192 baud.
- **FEC-S**
96, 100, 144, 192 and 200 baud.
- **POL-ARQ**
100 baud.
- **Packet**
300 and 1200 baud (AX.25 Protocol)
- **FACTOR**
100 and 200 baud
- **GMDSS**
100 baud.
- **ACARS**
VHF aviation mode.
- **POCSAG 512 and Goley**
- **Facsimile (FAX) - AM & FM**
60, 90, 120 and 240 LPM.
- **Russian Third Shift Cyrillic**
Cyrillic Characters Displayed to Video.
- **Literal Mode**
This feature uses special symbols to represent normally non-printing characters. (To Video Port only)
- **Databit Mode**
This feature converts the incoming data stream into zeros and ones.

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