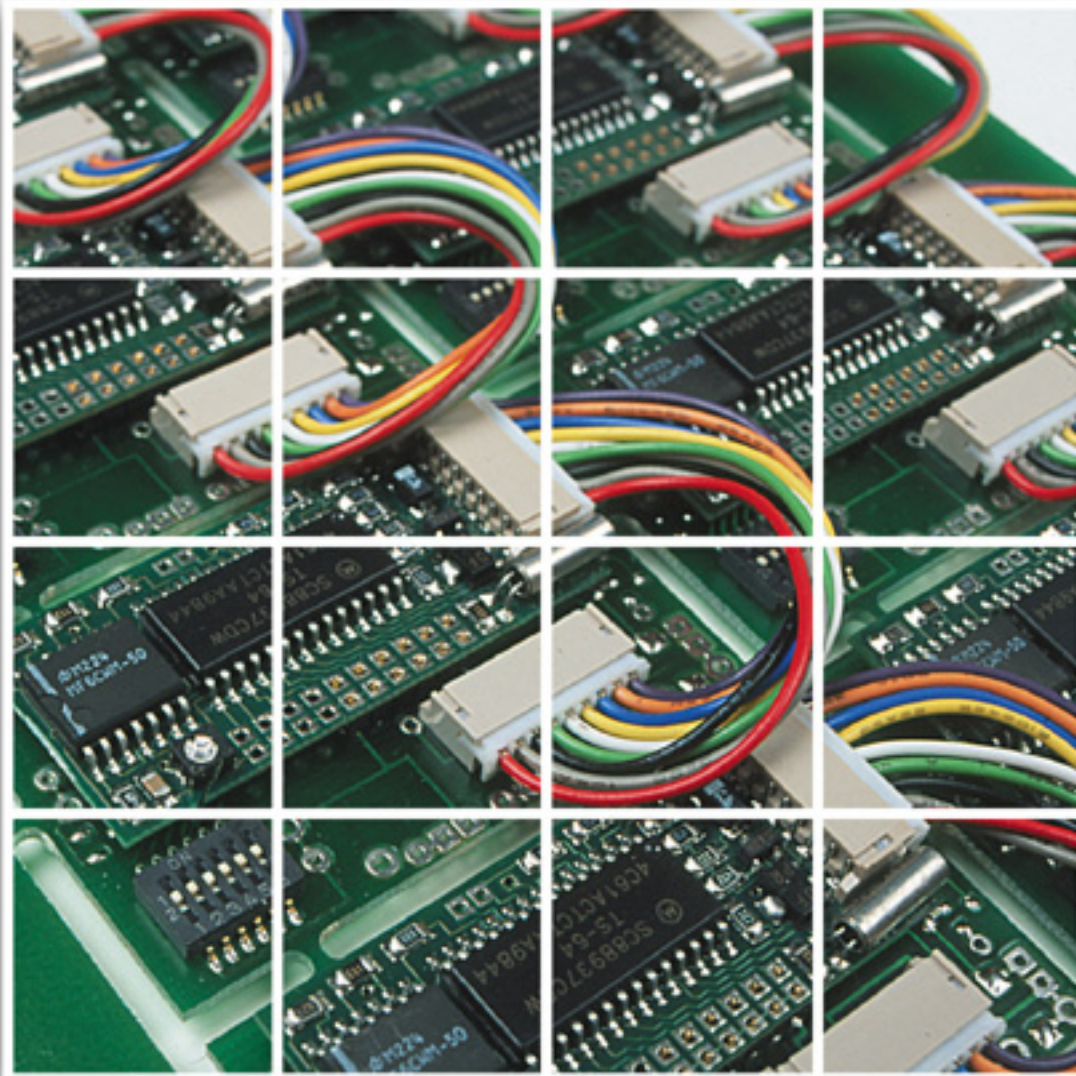


COMMUNICATIONS SPECIALISTS, INC.

2002-2003

**Tone Signaling
Product Catalog**



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ENCODER-DECODERS, CTCSS, DCS

Also known as: PL™, DPL™ Call Guard™, Channel Guard™, Digital Channel Guard™

TS-64 Microminiature CTCSS Encoder Decoder

\$54.95

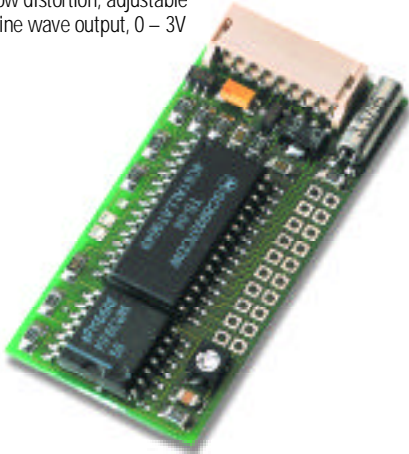
- Programmable CTCSS encoder-decoder for use in FM transceivers. Small size makes it ideal for handhelds and mobiles. A mini plug and socket, with color coded wires attached, allows easy hookup, double-sided tape is supplied for mounting.

Features

- Field programmable to 64 tones from 33.0 Hz to 254.1 Hz
- Crystal controlled for high accuracy and stability
- Reverse burst (160ms) encode for squelch tail elimination
- Time-out timer, programmable to 8 settings
- Busy channel lockout with busy tone when time-out time is exceeded
- High-pass tone rejection filter included (3 pole, >330Hz)
- Solid state receiver muting with automatic monitoring, provides high or low outputs
- Immune to RF

Specifications

- Size: .78" x 1.7" x .25"
- 5 – 28vdc, unregulated @ 9ma
- Decode sensitivity: 15mv, impedance 60K ohms AC coupled
- Decodes off discriminator output, impedance 1 meg, response time 150ms nominal
- Encode frequency accuracy ±.05Hz max. over -30° C to +65° C temp. range
- Encode tone, low impedance, low distortion, adjustable sine wave output, 0 – 3V



TS-64DS DIP Switch Programmable CTCSS Encoder-Decoder

\$57.95

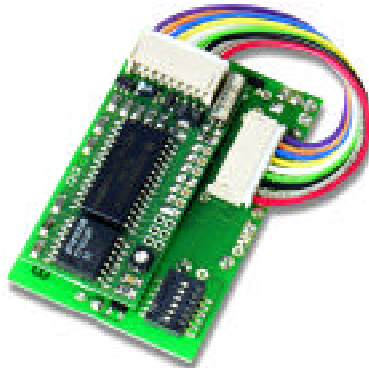
- Same circuit as the TS-64, but with an on-board DIP switch to allow tone selection without soldering jumpers. All 64 tones are accessible via the 6 position mini DIP switch. The TS-64DS measures 1.25" x 2.0" x .30".



TSU-64DS Universal Plug-On Type CTCSS Encoder-Decoder

\$57.95

- Same circuit as the TS-64. Chassis pins extend from the bottom of the board. This facilitates direct plug-on to special application boards that are designed to be plugged into many popular radios (see PLUG-IN BOARDS below). Also features an on-board DIP switch to allow tone selection without soldering jumpers. Size: 1.25" x 2.0" x .30".



DCS-23 Microminiature DCS Encoder-Decoder

\$59.95

- Compatible with all digital tone coded squelch systems used in Land Mobile radios. Field programmable by wire jumpers to all 512 octal codes, as well as transmit and receive data polarity. Installs with mounting tape and on-board mini plug and wire set.



Features

- Immune to RF
- Crystal controlled CMOS microprocessor for low voltage operation
- High pass filter included
- Multi-code switching capability (w/diodes)
- Solid state receiver muting with automatic monitoring, provides high or low outputs
- Auto squelch tail elimination
- Open collector transistor for PTT keying
- Test code to set transmit modulation level

Specifications

- Size: 1.36" x 1.18" x .25"
- Voltage: 5 – 28vdc, unregulated @ 8ma.
- Temp. Range: -30° C to +65° C
- Sensitivity: Better than 15mv
- Signal to noise: better than 4db Sinad
- 171 ms decode time
- Input Z, 60k, AC coupled
- Output Z, 2.2k, AC coupled
- Golay 23 bit digital word at 134.4 Hz data rate

Direct Plug-In Tone Boards

Aerotron

Aerocom Six, Eight, Mpac, etc.

TS-64A

\$65.50

General Electric

MVP

TS-64MVP

\$62.95

Mastr II

TS-64MSTII

\$66.95

Johnson

PPL Series (6040, 6050, 6060, etc.)

TS-64JP

\$63.50

Motorola

Micor

Mitrek

Syntor

Regency

U-Series Repeaters, BTH-201B

Standard

C790L, C890L, 766L, 867 and other mobile's w/2 plugs

Wilson

WU100R, WU151R, WU154SR

TS-64MCR

\$66.95

TS-64MITREK

\$62.95

TS-64SYNTOR

\$67.95

TS-64R

\$65.50

TSS-64

\$62.50

TS-64R

\$65.50

ENCODERS, CTCSS

SS-64 \$28.95 DIP Switch Programmable CTCSS Encoder

• Programmable CTCSS (sub-audible) encoder interfaces with all FM transceivers. Small size makes it perfect for handhels and mobiles. On-board six position DIP switch for easy tone selection of 64 EIA and non-standard tone frequencies. Installs with mounting tape and on-board mini plug and wire set.

SS-64RDS \$38.95 With remote DIP switch allowing the user to change tones externally.

Features

- Compatible with all CTCSS (sub-audible) systems
- Reverse Burst capability, for squelch tail elimination
- Immune to RF
- Multi-tone switching capability (with added circuitry)

Specifications

- Size: .66" x 1.08" x .21"
- 6 - 28 VDC, unregulated @ 6.3 ma.
- Low impedance, low distortion, adjustable sine wave output: 0 to 2V
- Frequency accuracy $\pm .025$ Hz
- Temp range: -30°C to +65°C
- Start up time less than 10ms



TE-32 \$49.95 Multi-Tone CTCSS Encoder

• Fully enclosed CTCSS encoder provides 32 EIA tones from 67.0 to 203.5 Hz. plus an off position. High impact plastic case with mounting bracket/hardware, and 3' long shielded cable for radio interface. Perfect for base station/mobile applications requiring multiple encode tones.



Specifications

- Size: 5.25" x 3.3" x 1.7" (without bracket)
- Power: 6-28 vdc, unregulated @ 6.3 ma.
- Low impedance (15k ohms), low distortion adjustable sine wave output, 2V peak to peak
- Frequency accuracy $\pm .025$ Hz
- Temp range: -30°C to +65°C
- Output level flat to within 1.5db over entire range
- Start up time less than 10 ms.

TE-32D Multi-Tone CTCSS Encoder with LED Display \$99.95

• Same as the TE-32, but displays the full tone frequency in a half-inch high window.

Specifications

- Size: 5.25" x 3.3" x 1.7" (without bracket)
- Power: 7-28 vdc, unregulated @ 78 ma.
- Low impedance (15k ohms), low distortion adjustable sine wave output, 2V peak to peak
- Frequency accuracy $\pm .025$ Hz
- Temp range: -30°C to +65°C
- Output level flat to within 1.5db over entire range
- Start up time less than 10 ms.



CTCSS Tone Chart

CTCSS tones included in the SS-64 & TS-64

33.0*	71.9	123.0	183.5*
35.4*	74.4	127.3	186.2
36.6*	77.0	131.8	189.9*
37.9*	79.7	136.5	192.8
39.6*	82.5	141.3	196.6*
44.4*	85.4	146.2	199.5*
47.5*	88.5	151.4	203.5
49.2*	91.5	156.7	206.5*
51.2*	94.8	159.8*	210.7
53.0*	97.4*	162.2	218.1
54.9*	100.0	165.5*	225.7
56.8*	103.5	167.9	229.1*
58.8*	107.2	171.3*	233.6
63.0*	110.9	173.8	241.8
67.0	114.8	177.3*	250.3
69.4*	118.8	179.9	254.1

*Non EIA Standard Tones



TP-3200 Shared Repeater Tone Panel

• The TP-3200 provides complete tone and control interface between the repeater receiver and transmitter. Microprocessor controlled for excellent frequency accuracy and stability. DSP Algorithms are incorporated into the software for enhanced decode sensitivity and talk-off rejection. The TP-3200 also functions as a desktop CTCSS, DCS and DTMF decoder with its RS-232 port and advanced, comprehensive tone logging features for shop use. Programming is accomplished through its RS-232 port to a basic terminal or any PC with communications software.

Standard Features

- 51 CTCSS Tones
- 106 DCS Codes
- Supports 157 Repeater Subscribers
- Signaling Formats: CTCSS, DCS & DTMF
- On-Line Computer Help
- Guaranteed Remote Reset
- Air Time Loading & Analysis Graphs
- COS input, Polarity Selectable
- Non Volatile Memory retains programming even if power loss occurs
- Static & Lightning Protection built-in
- EMI Filtering for complete immunity to RF
- Ultra Low Current Drain for Solar & Battery operated sites, 100ma Nominal@ 12 vdc, 50ma with LEDs disabled
- Rear Panel Adjustments
- Will not False on Adjacent Tones, even those with Reverse Burst
- Pre-Paid Airtime Features
- Busy Channel Lockout prevents "Barge-Ins"
- Stuck Mic Identification
- Time-Out Warning Tones
- Five LED's Display Status
- Carrier Access Mode
- Pre-wired DB9 Interface Connector with 6' flying leads for easy hook-up
- Size: TP-3200RM 19" wide x 6" deep x 1.7" high
TP-3200D 5.4" wide x 5.8" deep x 1.4" high
- "Start-up Kit" includes Wall Mount D.C. Power Supply with DB9 Connector attached, two 10' RS-232 Computer Interface Cables and a 3 1/2" Communications Software Disk.

ALL TONES & CODES LISTED BELOW ARE INCLUDED IN THE TP-3200

51 CTCSS Tones

63.0	94.8	136.5	177.3	218.1
67.0	97.4	141.3	179.9	225.7
69.4	100.0	146.2	183.5	229.1
71.9	103.5	151.4	186.2	233.6
74.4	107.2	156.7	189.9	241.8
77.0	110.9	159.8	192.8	250.3
79.7	114.8	162.2	196.6	254.1
82.5	118.8	165.5	199.5	
85.4	123.0	167.9	203.5	
88.5	127.3	171.3	206.5	
91.5	131.8	173.8	210.7	

106 DCS Codes

017	053	125	172	251	315	411	462	565	712
023	054	131	174	252	325	412	464	606	723
025	065	132	205	255	331	413	465	612	731
026	071	134	212	261	332	423	466	624	732
031	072	143	223	263	343	431	503	627	734
032	073	145	225	265	346	432	506	631	743
036	074	152	226	266	351	445	516	632	754
043	114	155	243	271	356	446	523	654	
047	115	156	244	274	364	452	526	662	
050	116	162	245	306	365	454	532	664	
051	122	165	246	311	371	455	546	703	

DTMF Tones

0	*
1	#
2	A
3	B
4	C
5	D
6	
7	
8	
9	



TP-3200RM-A Single Mount Version with one TP-3200

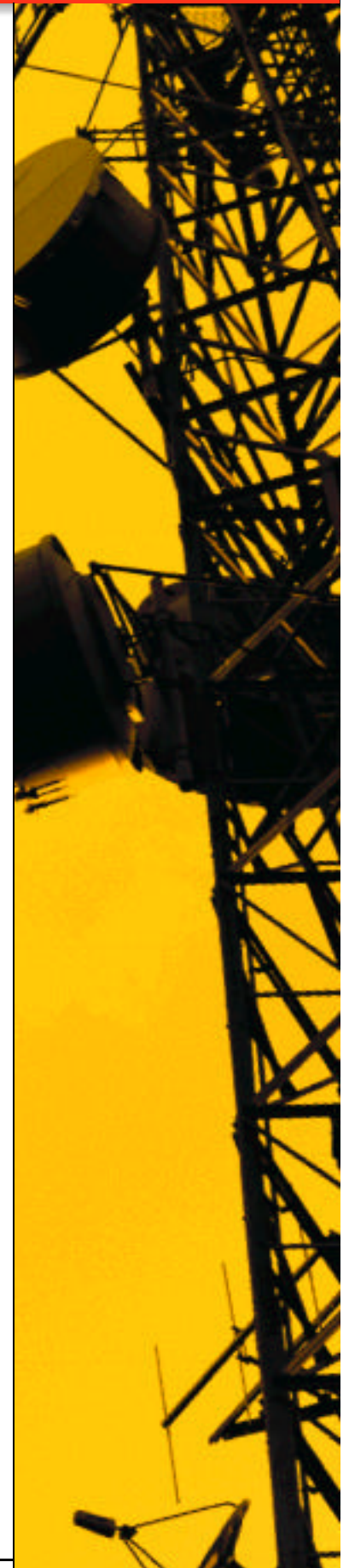
TP-3200RM-B Triple Rack Mount Version with one TP-3200 (Holds up to 3 TP-3200's)

TP-3200D Table Top Version

\$279.95 each

\$279.95 each

\$269.95 each



TP-3200 Programming Features

- Repeater CW ID
- Programmable CW ID per subscriber
- CW ID Interval per subscriber
- CW ID Interval (System)
- Anti-Kerchunck Timer
- Stuck Mic Activity Timer
- DCS Input Polarity
- DCS Output Polarity
- COR with Polarity Select
- Programming Mode Access Code is programmable
- Hog Timer, Hog Idle & Hog Monitor Timers
- Programmable Courtesy Tone per subscriber
- Programmable Reserve Tone
- Time & Hit Counters Record the time of ALL CTCSS & DCS Codes on the repeater channel
- Regenerated Tone can be the same or different for ALL CTCSS & DCS Codes
- Real Time Display shows all Received Tones & Codes as they occur, even if not active in the panel
- Panel can be used as Stand Alone Tone & Code Display of ALL 51 CTCSS, 106 DCS & 16 DTMF Codes
- Will not False on Adjacent Tones, even those with Reverse Burst
- Remotely Programmable by DTMF or local Programming through menu driven RS-232 Port, or with Modem on Landline
- Pre-Paid Customer Time Blocks
- Remote Enable/Disable of All Tones & Codes
- DTMF-DTMF Regeneration
- Global User Programming
- Programmable Hang Time (Carrier Delay) per subscriber
- Barge-In Enable/Disable per subscriber
- Hog Timer Enable/Disable per subscriber
- Regenerated CTCSS Tone or DCS Code Programmable to turn off at the start or end of the Carrier Delay per subscriber
- Cross Tone, Cross Code Encoding per subscriber
- Direct CTCSS Frequency and DCS Code Entry
- Test Procedure to set all Repeater Levels is built-in

ID-8 Automatic Morse Station Identifier **\$69.95**

- Provides automatic Morse Code identification for commercial, public safety and amateur radio applications, including repeaters, base stations, mobiles, beacons, CW memory keyers, etc. Meets all FCC identification requirements. Low voltage/current operation and small size make it universally applicable. All functions are programmable with a plug-on keypad included with each unit. All programming is stored in a non-volatile EEPROM, parameters can be reprogrammed at any time. Supplied with miniature plug/wire assembly for installation, programming keypad, and mounting tape.



User Friendly Field Programmable Features

- Eight selectable programmable messages
- CW speed from 1 to 99 WPM
- ID interval timer from 0 to 99 minutes
- ID hold off timer from 0 to 99 seconds
- CW tone frequency from 100Hz to 3000Hz.
- Front porch delay interval from 0 to 9.9 seconds
- Message length 216 characters
- CW or MCW operation
- Trigger ID and Inhibit ID, active high or low

Specifications

- Size: 1.85" x 1.12" x 0.35"
- 6-20 vdc, unregulated @ 6 ma.
- Low impedance, low distortion, adjustable sine wave output: 0-4 v peak to peak
- Transmitter PTT output: open collector transistor handles 80 vdc @ 300 ma.
- Temp. range: -30°C to +65°C

DI-16 Remote Data Interrogator for TP-3200 **\$249.95**

- Allows remote access to the TP-3200 for the purpose of retrieving time and hit information, as well as enabling or disabling repeater subscribers. All DTMF programming functions may be performed remotely with the DI-16. The data is displayed on a four digit LED display, plus a serial output port is provided for output of the data to a computer or 1200 bps serial printer.



ANI AUTOMATIC NUMBER IDENTIFICATION SYSTEMS

ST-888 DTMF ANI Decoder/Display Unit

\$499.00

• The ST-888, when used with model ST-804A, (shown on page 7) or other DTMF ANI units, provides instant identification of the transmitter for remote status monitoring and control systems. Provides positive identification of individual units in a fleet of taxis, police, public safety, or other service vehicles. The Mobilecall™ System is used to reduce channel time, identify system abusers, or to provide a permanent record of fleet activity. The system is also useful for ENI purposes, such as "man down", or other emergency notification functions. The ST-888 is packaged in an attractive desktop configuration, and may be interfaced with your PC, or model ST-824 serial printer for a hard copy record.



Features

- Code Validation
- Variable Data Rate
- Internal Clock and Calendar
- Two Output Ports, serial and parallel (for computer and/or printer interface)
- Internal Memory Stack (stores last eight ANI codes received)
- ENI Compatible
- RS-232C Serial Port and PC Interface Cable
- Receiver Interface Cable included

Specifications

- Size: 8.0" x 4.3" x 1.7"
- 13.6Vdc (±20%) @150mAac
- Signaling format: DTMF (all 16 characters)
- Sequence Length, prefix plus 1 to 8 ID digits
- Signaling Input Level, 30mVRMS to 2.5VRMS
- Twist Acceptance, -8 to +4dB if lesser tone is >30mVRMS
- Noise Tolerance, -12dB referenced to lower amplitude tone
- Decode Bandwidth, ±2.3% of nominal DTMF frequency
- Signaling Input Impedance, >50k balanced, or unbalanced

ST-824 Serial Printer

\$89.95

• Thermal serial printer interfaces with the ST-888 ANI display unit. Provides permanent record of all incoming ANI and ENI codes, along with date and time. Supplied with interface cable, and one roll of thermal paper (additional paper is commonly available from office supply retailers).



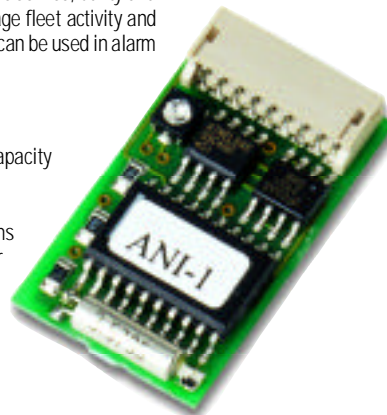
ANI-1 Programmable ANI EIA 5-Tone Protocol Encoder \$49.95

• Microprocessor based system features the ANI-1 Miniature ANI Encoder and ANI-2 Station Decoder. Automatic Number Identification used in mobile and portable radios provides a simple and economical method of identifying users on a radio channel. Public service, utility and delivery companies can use the ANI-1 to identify system abusers, manage fleet activity and save airtime by eliminating unnecessary voice transmissions. The ANI-1 can be used in alarm monitoring and remote status configurations for numerous applications.

- Size, 1.13" x .66" x .22"
- Data Rate is 37ms per tone, EIA 5-tone protocol
- Message duration is shorter than 150ms for 1000 number system capacity
- Crystal controlled for high accuracy, non-volatile EEPROM memory
- 6-18 vdc @ 3.5ma, temperature range is -40° C to +70° C
- ANI-1 analog transmissions will pass over links and repeater systems
- ID and status messages can be decoded and displayed on a computer using the ANI-2 Station Decoder
- The ANI-1 eliminates the need for voice communications and conserves valuable airtime
- Easy interface with 9 conductor color coded plug-in cable

Programmable Features

- ANI digits programmable from 2 to 8 plus 1 status (00-99999999)
- PTT ANI programmable on PTT closure, release, closure & release, or application of power
- Front porch delay adjustable from 0-9.99 seconds in 18ms intervals
- Repeat timer delay adjustable from 0-99 seconds in 1 second intervals
- Active low PTT input, PTT output, plus programmable AUX input and Busy-Trunking input
- Programmable by computer using Windows 3.1™ or Windows 95™



ANI-2 Station Decoder \$299.95

- Size is 5.4" x 5.8" x 1.4" with DB-9 connectors for easy interface to receiver and computer
- Decodes off receiver audio
- Displays 100 received messages on computer screen from ANI-1 Encoder
- Uses a real time clock for time and date message stamping
- Digital filter captures ANI-1 in poor signal-to-noise environments
- Comes complete with programming kit for both ANI-1 and ANI-2 that includes all cables, software programming disks and power supply
- 10-18 vdc @ 75ma



DTMF DECODER, MULTI-FORMAT ENCODER

ST-809B Miniature DTMF Decoder **\$59.95**

• PC Programmable DTMF (Touch-Tone®) decoder interfaces with all FM transceivers. Typical uses are mobile radio paging, selective calling, and other various remote control applications. Small size makes the ST-809B perfect for handhelds and mobiles, and a low profile connector makes programming and installation a snap. Uses ST-809PM Product Manager software, available for free from our web site, or at a nominal cost from our factory.

Features

- 1 – 7 Digit Address Codes provide over 250 million unique addresses
- Three latched and/or interlocking outputs
- Telemetry function to confirm output status
- Confirmation tone to confirm receipt of call
- Alert tone
- Individual/Group/All Call capability
- Radio kill function

Specifications

- Size: .85" x 1.34" x .21"
- 5.5 – 25 Vdc, @ 7ma.
- Open Collector Output, 80mAdc
- Call Lamp Output, 80mAdc
- Temperature Range, -30°C to +60°C
- DTMF input (HI range) 30-850mVRMS
- DTMF input (low range) 10-280mVRMS
- Signal to noise ratio, 12 dB SINAD
- DTMF twist, ±10 dB



- Digit recognition time, 20ms min., 300ms max. programmable
- Interdigit time, 50-5000ms programmable
- Decode time, 0-1 sec.+ interdigit time programmable (from the end of the last DTMF character)
- Decode momentary time, 0.050-9999 sec. programmable
- Transpond/Alert tone level, 5V p-p, no load
- Transpond duration, 2.34 sec.
- Transpond Tone Frequency, 874Hz
- Alert Tone Frequency, 528Hz
- Call Lamp Flash, 100-999ms programmable

Accessories

- ST-809PM Programming Software, **\$4.95**
- ST-954B Programming Adapter, **\$15.95**

ST-804A Multi-Format Encoder **\$59.95** (DTMF ANI, Burst, Continuous, Two-Tone Sequential)



• All three popular signaling formats are available in one unit. PC Programmable encoder interfaces with all FM transceivers. Small size makes it perfect for handhelds and mobiles, and low profile connector makes programming and installation a snap. Uses ST-804PM Product Manager software, available for free from our web site, or at a nominal cost from our factory.

Features

- Time-out Timer
- Stuck Microphone Alarm
- Prefix or Suffix ANI Code
- Variable Transmit Delay
- Microphone Muting
- Programmable Tone On/Off Time
- ANI Hold-off Period
- ENI Talk Window
- ENI Re-transmit Time

Specifications

- Size: .84" x 1.15" x .15"
- 5.2 – 16.3 VDC, @ 6ma.
- Active Open Collector output, 40mAdc
- Tone output level, 0 to >3 V p-p composite DTMF signal w/<1 dB twist
- Frequency Range, 300 – 3000Hz (burst tone, continuous and two tone sequential)
- Temperature Range, -30°C to +60°C
- Tone Output Impedance
Non-Signaling: >500k
Signaling: <30 Ohms

Accessories:

- ST-804PM Programming Software, **\$4.95**
- ST-954B Programming Adapter Cable, **\$15.95**



ST-32 DC Line Termination Panel **\$129.95**

• Interfaces most DC remote control consoles to the base station radio. When used as part of a DC remote control system, the ST-32 provides an economical way to optimize the location of radio transmitters, or to provide low cost radio extensions within an office building or plant site. Interfaced via a pair of metallic wires, the ST-32 provides Form "C" relay contacts for PTT, F1/F2 select, and Monitor. These control wires are also utilized to pass transmit and receive audio between the radio equipment and the remote control equipment. Optical isolators provide current detection, while outputs are Form "C" relay contacts. The ST-32 comes complete with a modular RJ11 phone jack, a 7' line cord, and a 42A wall mount terminal block. Installation is by double-sided tape and 18" color-coded wire connection leads.

Features

- Small enough to fit in most base radios
- Compatible with most common DC control systems (+ transmit current; - monitor current)
- Easy installation (with included jack, line cord and terminal block)



Specifications

- Size: 1.9" x 2.6" x 1.0"
- Power: 13.6 VDC ±20% @ <60mA
- Temperature Range: -30°C to +60°C

THE PRIVATE COLLECTION

AFFORDABLE VOICE ENCRYPTION

• Effective security for two way radio systems from taxi and tow services, to corporate giants. Two levels of security protect against unwanted listeners, from the casual scanner hobbyist to high security. Each of the **PRIVATE COLLECTION** encryption units features miniature size and a low profile connector. Due to the complexity of this product, installation should be done by a qualified technician. Programming of all Private Collection units is via your PC with Product Manager software available for free at www.com-spec.com, or at a nominal cost from our factory.

Use model **ST-954B (\$15.95)** programming interface cable.

ST-20B Inversion Scrambler \$79.95

The lowest level of security, wherein the cipher process inverts speech frequencies in reference to one of eight possible inversion carriers. This process makes the encrypted signal unintelligible to the casual listener, or co-channel users, but is easily deciphered by a determined eavesdropper with minimal equipment and knowledge.

ST-20BGP Inversion Scrambler for Motorola GP300/350 \$79.95

The same as the ST-20B, but modified for the Motorola GP300 and GP350.

ST-20BK Inversion Scrambler for Kenwood TK-790/890 \$89.95

The same as the ST-20B, but modified for the Kenwood TK-790 and TK-890.

ST-20C Inversion Scrambler with Low Pass Filter \$99.95

Offers the same features as the ST-20B, but also provides a low pass filter in parallel to the normal receive audio path. This path is used for some applications where CTCSS detection must occur after the application point in the host radio. Some examples of this application would be Motorola M1225, P1225, MT2000, and MT2100.

Specifications

- Operating Voltage: 5.2Vdc – 16.3Vdc @ <8mA
- Temperature Range: -30°C to +60°C
- Usable Rx/Tx Audio Level: 25mV p-p to 2.0V p-p
- Input Output Gain: <±1dB
- Frequency Response: ST-20B, 300Hz to 2600Hz
ST-20C, 67Hz to 250Hz No cipher 300Hz to 2600Hz
- Size: .90" x 1.5" x .18"

ST-25B Rolling Code Voice Encryption Module \$149.00

Voice encryption for high security tactical communications. Considerable time and equipment is required to break this type of code, so that by the time someone is able to decipher the transmission, the content of the communication would no longer have value. Up to four user programmable code keys, each selected from over four billion possible keys, may be used to communicate in secure mode with up to four different groups on the same radio channel. To maintain security, code keys are stored in a non-volatile EEPROM and are never transmitted over the air. User selectable options are limited to either clear or cipher. Receive mode is automatic, so that either option is understandable at the receiver side of the communication, and only receivers set for high security within a fleet will receive encrypted messages.

ST-25BGP Rolling Code Module for Motorola GP300/350 \$149.00

The same as the ST-25B, but modified for the Motorola GP300 and GP350.

ST-25BK Rolling Code Module for Kenwood TK-790/890 \$159.00

The same as the ST-25B, but modified for the Kenwood TK-790 and TK-890.

ST-25C Rolling Code Module with Low Pass Filter \$169.00

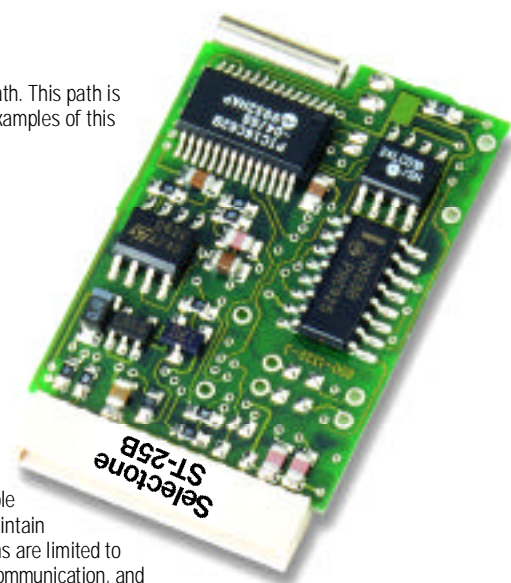
Offers the same features as the ST-25B, but also provides a low pass filter in parallel to the normal receive audio path. This path is used for some applications where CTCSS detection must occur after the application point in the host radio. Some examples of this application would be Motorola M1225, P1225, MT2000, and MT2100.

Specifications

- Operating Voltage: 5.2Vdc – 16.3Vdc @ <8mA
- Temperature Range: -30°C to +60°C
- Usable Rx/Tx Audio Level: 25mV p-p to 2.0V p-p
- Input Output Gain: <±1dB
- Frequency Response: ST-25B, 300Hz to 2600Hz
ST-25C, 67Hz to 250Hz No cipher
300Hz to 2600Hz
- Size: .90" x 1.5" x .18"

Accessories

- ST-25PM Programming Software, **\$4.95**
- ST-954B Programming Adapter, **\$15.95**



Export Restrictions

The export of most encryption devices is controlled by the United States Department of Commerce, Bureau of Export Administration. Shipments of the ST-25B/C outside of the United States or Canada must identify the end user of the equipment, which will be reported to the Department of Commerce.

Customers in the United States who purchase encryption equipment for re-export to another country (except Canada) must apply to the Department of Commerce for an export license.

Note: The ST-20B/C Inversion Scrambler does not require an export license.

PE-1000A Desk-Top Paging Encoder, Two-Tone **\$224.95**

• Two-tone sequential desktop paging encoder. The PE-1000A includes all paging tones in Motorola groups 1 through 6, Motorola A, B and Z, plus General Electric groups A, B and C. The desired tone groups, as well as a substantial list of features are accessible by the field service technician from the front panel keyboard. This allows the PE-1000 to be customized to fit the specific application.

PE-1000B Desk-Top Paging Encoder, Five-Tone **\$249.95**

• Five-tone sequential format. Compatible with all 5-6 tone paging groups including EIA, ZVEII, CCIR/EEA, CCIT, EURO.

PE-1000C Desk-Top Paging Encoder, REACH™ **\$249.95**

• REACH™ Two-tone sequential format. Compatible with all REACH™ paging systems.

PE-1000D Desk-Top Paging Encoder, Custom Tones **\$249.95**

• With customer specified tones. Custom tones should be entered on our blank programming chart, available at www.com-spec.com/insheet/custpgm.pdf or by calling our sales department and requesting a copy. We will assign a serial number to your custom program for re-ordering convenience. Tone lists that are not submitted on our programming chart may be subject to a \$25.00 set-up fee.

51-2732-D EEPROM **\$37.50**

To order a replacement EEPROM for your PE-1000 please reference your custom serial number, or provide a new programming chart.

PE-1000P Desk-Top POCSAG(RPC1) Paging Encoder **\$324.95**

• POCSAG (RPC1) format. This is now the United Nations accepted standard and is widely used in Europe and throughout the world. The PE-1000P is capable of all numeric RPC1 codes. Available in 512 or 1200 baud.



Features

- 100 or 1000 call paging capacity
- All operating functions are field programmable via keypad
- Non-volatile memory retains programming if power loss occurs
- Three digit LED display
- LED indicators for power, transmit, page cycle and ready to talk
- Automatic PTT and microphone muting
- All connections made via rear terminal block
- Provided with AC wall transformer

Specifications

- Size: 7.5" X 7.8" X 2.7"
- Powered from 11-16 VDC, unregulated @ 500 ma (5 watts)
- Frequency range from 250.0 Hz to 4000.0 Hz
- Accuracy better than .1% below 1000 Hz and .2% above 1000 Hz
- Frequency drift less than .1 Hz
- Flat or de-emphasized frequency response @ -6db/oct within .5db
- Output is 0 to 4V peak to peak sine wave @ less than 1% THD
- Output impedance, 5.0 K
- Operating temperature from -20°C to +55°C
- Printer Port is TTL output, 300 baud (1 start, 2 stop bits)
- Relay contact pulls to ground or supply for control outputs

Multi-Call POCSAG (RPC1) Paging Encoders

• Ideal for in-house and/or local paging systems for factories, restaurants, local trucking companies, security operations, or wherever direct control of local paging is desired. The PE-4 and PE-15 use the world standard POCSAG (RPC1) signaling format for readily available low-cost pagers. All programming is stored in a non-volatile EEPROM, which may be factory altered at no charge, or at your shop via an optional keypad (part # 38-1006) that plugs into an onboard programming connector. Comes with microminiature wire and plug set for easy installation or removal, tape mounting materials and easy to follow instructions.

PE-4 **\$79.95**

• Send up to 4 separate tone and numeric messages. The PE-4 will send tone only, or tone and up to a 10-digit message. The PE-4 is available in 512 or 1200 baud and can be factory programmed to your specific address codes.



PE-15 **\$79.95**

• Send up to 15 tone-only codes. The PE-15 will send 15 separate codes, which may be used to activate up to four distinct alert tones on each pager, 15 individual pagers, or any combination thereof. A POCSAG transmission is initiated by momentarily selecting a binary code on the PageCall Inputs.

Specifications:

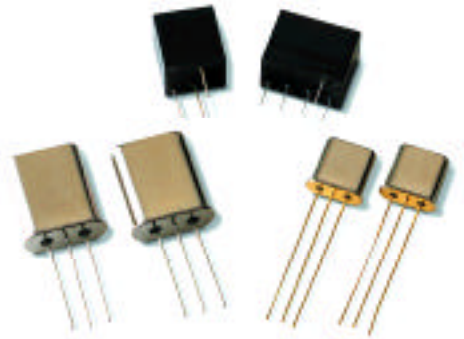
- Size: 1.78" x 1.03" x .35"
- Voltage: 6 - 20vdc @ 9 ma
- Temp. range: -30°C to +65°C
- Output Z, 2.2Kohms AC coupled
- Output level, adjustable from 0v to 5v
- TX PTT Output, open collector transistor



NARROW-BAND FILTERS

For NEW $\pm 2.5\text{kHz}$ deviation, 15kHz (150MHz) or 12.5kHz (450MHz) channel spacing

• Here's how to squeeze twice as many customers into your existing spectrum by reducing channel spacing to 12.5 kHz on 450 MHz or 15kHz on 150MHz. With our IF crystal filter kits and tone signaling protection, you can open up a lot of new channels without fear of adjacent channel interference. Don't discard those old radios like Master II's, Micors and countless others. Convert them to 12.5 kHz/15kHz narrow band and save thousands of dollars in new radio replacements. Our high quality, low cost crystal and ceramic filters provide relief from interference under Part 90 rules. Available as individual filters or as complete conversion kits for specific radios. Installation instructions are available for many popular radios. Call our sales or technical staff if you have any questions.



CRYSTAL FILTERS • High IF • 4 pole (matched pair)

For NEW $\pm 2.5\text{kHz}$ deviation, 15kHz (150MHz) or 12.5kHz (450MHz) channel spacing

3db BW = $\pm 3.75\text{kHz}$ • 40db BW = $\pm 14\text{kHz}$ • 65db BW = $\pm 300\text{kHz}$

Ripple = 1db • Loss = 2.5db • Operating Temp. = -20°C to $+70^\circ\text{C}$

Price per Pair			1-9	10-24	25-49	50-99	100+
CF-1	10.7MHz	HC-49/U x 2 Terminating Impedance 1.8K/4pf	10.00	9.00	8.00	7.00	6.00
CF-2	21.4MHz	UM-1 x 2 (miniature case) Terminating Impedance 850ohm/5pf	16.00	15.00	14.00	13.00	12.00
CF-3	21.8MHz	UM-1 x 2 (miniature case) Terminating Impedance 850ohm/5pf	16.00	15.00	14.00	13.00	12.00
CF-51	11.2MHz	HC-49/U x 2 Terminating Impedance 1.8K/4pf	10.00	9.00	8.00	7.00	6.00
CF-52	11.7MHz	HC-49/U x 2 Terminating Impedance 1.8K/4pf	10.00	9.00	8.00	7.00	6.00
CF-65	45.050MHz	UM-1 x 2 (miniature case) Terminating Impedance 380ohm/9pf	16.00	15.00	14.00	13.00	12.00

(Model CF-3 for Icom H-16/U-16/U-200/U-400 etc.)

CERAMIC FILTERS • Low IF • 455kHz • (Murata Exact Replacements)

For NEW $\pm 2.5\text{kHz}$ deviation, 15kHz (150MHz) or 12.5kHz (450MHz) channel spacing

CF-5	Ceramic Filter CFU455HT	4 pole (3 leads)	6db BW= $\pm 3\text{kHz}$ 40db BW= $\pm 9\text{kHz}$
CF-6	Ceramic Filter CFW455H	6 pole (5 leads)	6db BW= $\pm 3\text{kHz}$ 50db BW= $\pm 9\text{kHz}$
CF-7	Ceramic Filter CFU455G2	4 pole (3 leads)	6db BW= $\pm 4.5\text{kHz}$ 40db BW= $\pm 10\text{kHz}$
CF-10	Ceramic Filter CFW455G	6 pole (5 leads)	6db BW= $\pm 4.5\text{kHz}$ 50db BW= $\pm 10\text{kHz}$
CF-15	Ceramic Filter CFUM455G	4 pole (4 leads)	6db BW= $\pm 4.5\text{kHz}$ 40db BW= $\pm 10\text{kHz}$
CF-20	Ceramic Filter CFWM455G	6 pole (5 leads)	6db BW= $\pm 4.5\text{kHz}$ 40db BW= $\pm 10\text{kHz}$

For OLD $\pm 5.0\text{kHz}$ deviation, 30kHz (150MHz) or 25kHz (450MHz) channel spacing

CF-8	Ceramic Filter, CFU455E2	4 pole (3 leads)	6db BW= $\pm 7.5\text{kHz}$ 40db BW= $\pm 15\text{kHz}$
CF-9	Ceramic Filter CFW455E	6 pole (5 leads)	6db BW= $\pm 7.5\text{kHz}$ 50db BW= $\pm 15\text{kHz}$
Price per Ceramic Filter			
			1-9
			10-24
			25-49
			50-99
			100 +
			3.00
			2.75
			2.50
			2.25
			2.00

Most other bandwidth CFU455, CFUM455, CFW455, CFWM455 filters are available at the price shown above. Call for availability.

NARROW-BAND KITS For NEW $\pm 2.5\text{kHz}$ deviation, 15kHz (150MHz) or 12.5kHz (450MHz) channel spacing

Price per Narrow-Band Kit		1-9	10-24	25-49	50-99	100 +
CF-Challenger	Narrow-Band Kit for Johnson Challenger	20.00	19.00	18.00	17.00	16.00
CF-EXECII	Narrow-Band Kit for G.E. Master Exec. II	25.00	22.50	20.00	17.50	15.00
CF-MICOR	Narrow-Band Kit for Motorola MICOR	25.00	22.50	20.00	17.50	15.00
CF-MITREK	Narrow-Band Kit for Motorola MITREK	25.00	22.50	20.00	17.50	15.00
CF-MSF-5000	Narrow-Band Kit for Motorola MSF-5000	30.00	27.50	25.00	22.50	20.00
CF-MSTII	Narrow-Band Kit for G.E. Master II	25.00	22.50	20.00	17.50	15.00
CF-MVP	Narrow-Band Kit for G.E. MVP	25.00	22.50	20.00	17.50	15.00
CF-TK840	Narrow-Band Kit for Kenwood TK-840	34.95	34.95	34.95	34.95	34.95

PRICE LIST (Service Station Net)

In Alphabetical Order

Product	Description	1-9	10-24	25-49	50-99	100-up
ANI-1	Miniature ANI Encoder	\$49.95	\$49.95	\$47.50	\$45.00	CALL
ANI-2	ANI Station Decoder	299.95	299.95	299.95	299.95	299.95
DCS-23	Microminiature DCS Encoder-Decoder	59.95	58.45	56.95	53.96	50.96
DI-16	Data Interrogator for TP-3200	249.95	237.45	224.95	212.46	199.96
ID-8	Morse Code Identifier	69.95	66.46	62.96	59.46	55.96
PE-1000A	Paging Encoder, Motorola/GE Tones	224.95	213.70	202.45	191.21	179.96
PE-1000B,C,D	Paging Encoder, Misc. Formats	249.95	237.45	224.95	212.46	199.96
PE-1000P	Paging Encoder, POCSAG	324.95	308.70	292.45	276.21	259.96
PE-4 or PE-15	Miniature POCSAG Paging Encoders	79.95	75.95	71.96	67.96	63.96
RC-1	DTMF Remote Controller for PE-1000	49.95	47.45	44.95	42.46	39.96
SS-64	Microminiature CTCSS Encoder	28.95	27.50	26.05	24.61	23.16
ST-20B	Speech Inversion Scrambler	79.95	75.95	71.95	67.95	63.96
ST-20BGP	Speech Inversion Scrambler, Motorola GP300/350	79.95	75.95	71.95	67.95	63.96
ST-20BK	Speech Inversion Scrambler, Kenwood TK-790/890	89.95	85.45	80.95	76.45	71.96
ST-20C	Speech Inversion Scrambler, with CTCSS Bypass	99.95	94.95	89.95	84.95	79.96
ST-25B	Rolling Code Encryption Module	149.00	141.55	134.10	126.65	119.20
ST-25BGP	Rolling Code Encryption Module, Mot. GP300/350	149.00	141.55	134.10	126.65	119.20
ST-25BK	Rolling Code Encryption Module, Ken. TK-790/890	159.00	151.05	143.10	135.15	127.20
ST-25C	Rolling Code Encryption Module, w/ CTCSS Bypass	169.00	160.55	152.10	143.65	135.20
ST-25PM	Program Manager Software for ST-25	4.95	4.95	4.95	4.95	4.95
ST-32	D.C. Line Termination Panel	129.00	122.55	116.10	109.65	103.20
ST-804A	Multi-Format Encoder	59.95	56.95	53.95	50.95	47.96
ST-804PM	Program Manager Software for ST-804A	4.95	4.95	4.95	4.95	4.95
ST-809B	Miniature DTMF Decoder	59.95	56.95	53.95	50.95	47.96
ST-809PM	Program Manager Software for ST-809B	4.95	4.95	4.95	4.95	4.95
ST-824	Serial Printer with Thermal Paper, for ST-888	89.95	89.95	89.95	89.95	89.95
ST-888	ANI Decoder Display Unit	499.00	474.05	449.10	424.15	399.20
ST-954B	PC Programming Adapter Cable	15.95	15.95	15.95	15.95	15.95
TE-32	Multi-Tone CTCSS Encoder	49.95	47.45	44.95	42.46	39.96
TE-32D	TE-32 with LED Display	99.95	94.95	89.95	84.95	79.96
TP-3200D	Shared Repeater Tone Panel (Table Top)	269.95	269.95	269.95	269.95	269.95
TP-3200RM-A	Shared Repeater Tone Panel (Single Rack Mount)	279.95	279.95	279.95	279.95	279.95
TP-3200RM-B	Shared Repeater Tone Panel (Triple Rack Mount)	279.95	279.95	279.95	279.95	279.95
TS-64	Microminiature CTCSS Encoder-Decoder	54.95	52.21	49.46	46.71	43.96
TS-64DS	Microminiature CTCSS Enc.-Dec. w/DIP Switch	57.95	56.50	55.05	52.16	49.26
TSU-64DS	Universal Plug-on Type CTCSS Enc.-Dec.	57.95	56.50	55.05	52.16	49.26
38-1006	Programming Keypad for PE-4/PE-15	24.72	24.72	24.72	24.72	24.72

Consult with factory for larger quantity pricing. SAME DAY SHIPPING ON MOST ORDERS!



CALL 1-815-790-4494