ZETRON®

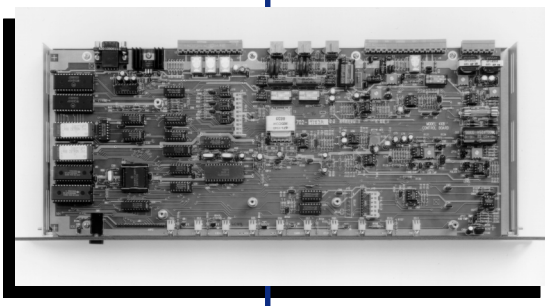
MODEL 45B

Z-Patch

A Remote-Programmable, Multi-User Telephone Interconnect

- All types of radio systems
- Per-user features
- Per-user call accounting
- Programmable by Touch-Tone, CRT, or computer
- Modem (standard) eliminates site trips
- Full Zetron warranty and support

FEATURES



- **Simplex, half- and full-duplex operation**
- **99 or 325 separate users**
- **Standard RS-232 serial port and internal modem**
- **Remote access from CRT, computer, phone, or radio**
- **Two telephone line inputs with auto-line select**
- **One local telephone input for local phone or DID**
- **Calling restrictions/privileges per user**
- **Compatible with rotary telephone (dial-click)**
- **User and system database in nonvolatile memory**
- **DTMF ANI decode and validation**
- **Seven ringing sounds for mobile alerts**
- **Nine system speed-dial numbers**
- **Regenerated DTMF (Touch-Tone) or pulse dialing**
- **Sense inputs for monitoring external equipment**
- **Relays for remote-control of external equipment**
- **Remote diagnostics via modem**
- **Options include paging formats, DID converter, call-accounting, voice prompts, dial click decoder, and radio specific cables**

OPERATION

The Zetron Model 45B is a microprocessor-based radio-to-telephone interconnect. It's designed to provide flexible operation as a full-featured telephone patch with selective calling, ANI decode, and advanced airtime billing features.

The Model 45B interfaces a radio system to the public telephone system for interconnected conversations. It also provides selective calling of mobile radios and pagers from the telephone system or from other mobile radios. An RS-232 serial port allows on-screen manipulation of all system and user information. The system and user database can be "downloaded" and "uploaded" using a PC with Zetron ZCU software installed. Remote DTMF (Touch-Tone) programming is also supported.

The Model 45B is designed for radio common carriers, co-ops, utilities and private systems where a number of different users need to share the system yet receive different service and separate accounting.

User Identification

Every user on the system is given a unique user code. These codes refer to user records in the Model 45B's internal database. A user's record contains information about access privileges, selective call type, and other unique parameters assigned to that particular user. The record also accumulates the user's call statistics. People wishing to access the system identify themselves by entering their user codes on their DTMF radio keypads. Or, if the radios have DTMF ANI (automatic number identification), the codes are sent automatically. The Model 45B can also require a code to terminate a call.

Calls From the Telephone System

A person at a telephone calls a mobile radio by dialing a regular seven-digit number. If the Model 45B answers with a dial tone, the person "overdials" the user number of the desired mobile radio. If the Model 45B is equipped with the voice prompts option, a recorded voice tells the person when and how to overdial. If the DID converter option is installed, overdial is not necessary.

The desired mobile radio is alerted with a distinctive ring-out tone and paging, CTCSS, or digital squelch code. To ensure the call is answered by the correct party a user code can be required to answer the line. A second telephone line can be dedicated for normal use or priority access (priority overrides calls in progress). If desired, both lines can automatically call a certain mobile in the absence of overdial.

Calls From a Mobile

A person with a mobile radio can place calls only if his or her user record in the Model 45B internal database allows. A person places a call by keying a valid user code followed by a phone number. The user may be restricted to using only the nine speed-dial telephone numbers. The user can also be restricted from using certain PBX access codes, long distance or operator prefixes, or certain first and second digits.

The Model 45B can still allow calls to 1-800, 1-888, and 9-1-1 even if other toll restrictions are in place.

The Model 45B automatically dials into the telephone system using Touch-Tone or rotary pulses. If two outgoing lines are available, then the line into which the Model 45B dials depends upon how the owner configured the user's record. Or, the line can be user-selected, allowing toll-free calling over a wider area if the Model 45B straddles two adjacent service areas.

PROGRAMMING

Flexible Operation

Almost all functions of the Model 45B can be customized by the owner. For instance, choices are made for the type of radio system and the type of dialing. Fine-tuning technical parameters like COR and VOX timers ensures that conversations are not interrupted by awkward clicks and pauses. A whole list of features can be customized differently for each user on the system. (See lists below).

Programming the Model 45B

The Model 45B can be programmed from a variety of sources (see diagram next page). A remote Model 45B can be completely controlled via PC through the public switched telephone system. The system manager never has to leave the office.

The built-in modem also allows Zetron technicians to dial up and diagnose a Model 45B from the Zetron factory in a matter of minutes.

On-screen with a CRT or Computer

One of the most powerful features of the Model 45B is that it can be completely programmed and supervised from a CRT or personal computer. It's no longer necessary to use long strings of DTMF (Touch-Tone) commands. On your computer screen, you'll see questions like, "Fast ANI required?" You simply select yes, no, or an appropriate number from a given range. The on-screen method puts commands before your eyes for visual verification before they're sent to the patch.

Another handy feature of CRT or computer control is an on-screen "user programming chart" that shows, in a single glance, all chosen parameters for each individual user. The chart can be printed out on a printer for a convenient reference guide.

Since the Model 45B is equipped with an internal memory buffer, you can use a CRT or computer to retrieve per-user airtime information for billing purposes. The optional ZEBRA Billing System software package will process this information and provide detailed or accumulated billing reports. ZEBRA also lets you save all programming on diskette, make various traffic analyses, and make back-up programming diskettes in case of lightning strikes.

PROGRAMMABLE FEATURES

System Programming

Mode of operation:
- Simplex VOX with digital voice delay or sampling
- Half- and full-duplex. Both types of radios can be supported on the same system

User Codes:
Owners are able to program a variety of mobile and telephone access sequences to meet different system requirements. DTMF ANI connect and disconnect codes may be up to 8 digits in length

Telco Dialing:
Pulse or regenerated DTMF dialing

COR Programming:
Variables include COR polarity, hold time, mobile activity time, channel busy, and others

Morse Code ID:
10-character Morse ID and interval

Speed-Dial Numbers:
Nine 16-digit telephone numbers and delay intervals

Channel Ring-outs:
Number of ring-outs sent to mobile radio

Second Dial Tone Disconnect:
Enable or disable

Rings Before Answer:
Number of rings from telephone system before call is processed

Dial Tone Wait:
Duration Model 45B waits for dial tone before dialing

Repeat Audio:
Enable/disable repeat audio for mobile-to-mobile conversations

Per-User Programming

Equipment Type:
Full-duplex, half-duplex, tone-only pager, tone-and-voice pager, talk-back pager, direct air access

ANI Code:
Up to 8 DTMF digits if required. Different length ANIs are supported for different mobile radios. ANI can be required for disconnect. High speed ANI can be required for added security

Selective Call Format:
2-tone, DTMF, CTCSS, digital squelch, 2805, 5/6 tone. Subaudible and digital squelch signaling can be sent for duration of call, duration of first page, or until mobile radio answers

Ring-out Tone:
Up to seven different sounds

Toll Restriction
Restrict up to 4 digits for the first and second digit.
Restrict number of dialed digits. 1-800, 1-888, and 9-1-1 not restricted

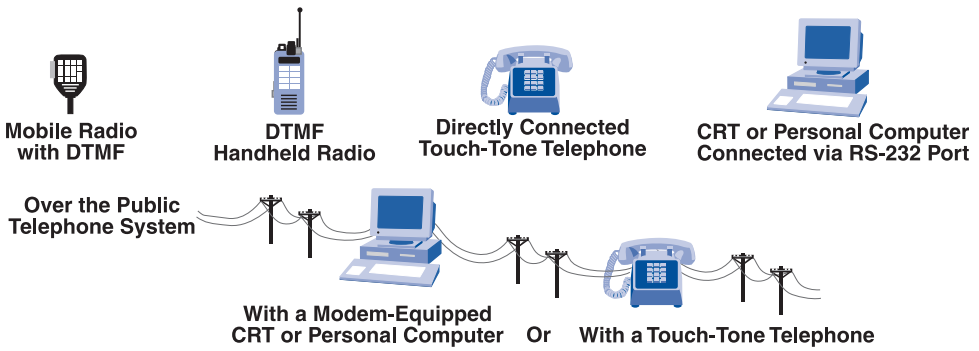
Mobile Access To:
Instant dial numbers (yes/no)
Dial phone calls (yes/no)
Receive telephone calls (yes/no)
Mobile-to-mobile paging (yes/no)
Dial out on line 1, line 2 or either

Conversation Time:
Each user can be assigned one of two programmable time limits or no time limit

Supervisory User Code:
Supervisory code answers or disconnects any call

DTMF Through:
Allow DTMF dialing to phone line during call (yes/no)

Ways of Programming the Model 45B Z-Patch



OPTIONS AND RELATED PRODUCTS

Paging Formats

Selective signaling of radios and pagers is available with optional signaling formats (2-tone, 5-tone, DTMF, 2805, CTCSS, DCS). This allows radios to be called selectively and equipment to be remote-controlled.

Digital Voice Delay

This option improves simplex VOX operation by delaying the phone-to-mobile audio from 0.15 to 0.80 seconds.

Dial Click Decoder

Rotary telephones can be used to call mobiles or pagers when DTMF phone service is not available.

Voice Prompts

The voice prompts option for the Model 45B allows the owner to record a series of greetings and instructions that are played to telephone callers. Callers already accustomed to the system can overdial the extra digits as soon as the prompt begins and the voice will shut off automatically. The voice prompts option is added to the Model 45B as a small circuitry card.

Internal Memory Buffer

This option stores detailed data about each call in a battery-backed memory for later retrieval by CRT or computer. Up to 999 transactions can be logged. Data includes user, date, time of day, duration, type of call, and number dialed. Data may be sent out of the serial port to a line printer or data recorder at the end of each call.

ZCU

ZCU (Zetron Communications Utility) is an IBM-PC compatible communications program for use with the Model 45B, as well as a variety of other Zetron products. This software allows users to program the unit, upload or download programming information for safekeeping, and download accumulated airtime or call detail records from a properly equipped Model 45B to a computer for further processing.

ZEBRA

ZEBRA is an invoicing and accounts receivable software package that generates accurate accounting and management reports. Usage data is retrieved from the Model 45B and used as the basis for billing. ZEBRA can also be used with a variety of other Zetron products.

Model 50 DID Converter

This external unit interfaces a DID telephone line to the Model 45B's local phone port to allow each mobile radio on a system to have a unique 7-digit telephone number. This means people can call specific mobile radios without dialing more than seven digits. This option lets the system be used by uninitiated callers and allows office and home phone numbers to be call-forwarded to specific mobile radios.

Model 71 RemotaPhone

The Model 71 interfaces a Touch-Tone telephone instrument (phone, FAX, or modem) to a two-way radio. The purpose is to provide a remote location with user-friendly access to the public telephone system. The Model 71 and radio must be located within the coverage area of a Model 45B (or other DTMF-capable interconnect). With the Model 71, new customers may be easily incorporated into an existing Model 45B system on an add-on basis.

Model 72 Extend-a-Line

The Model 72 Extend-a-Line is a pair of radio/telephone interfaces that allows a phone line to be extended, via two full-duplex radios, out to a remote location such as a Model 45B site.

ZMX Microphone

For best results, each mobile radio in a Model 45B system should be equipped with a Zetron Model ZMX DTMF microphone. The ZMX is a durable, backlit microphone with programmable ANI codes and autodials. Cellular-style and other convenient, store-and-forward dialing modes are provided.

DeadBolt Lightning Protector

The DeadBolt is an advanced, reusable, five-stage surge arrestor. It protects a Model 45B (or similar device) from voltage coming in over the telephone line. It also suppresses UHF and VHF interference.

APPLICATIONS

Optional radio 4-wire port for special applications

Transmitter and receiver connections

Full-duplex radios, half-duplex radios, and pagers can all be mixed on the same system

2-way Radios for Answering Telephone Calls or Talk-Back Pagers

2-way Radios with Touch-Tone Pads for Placing and Receiving Calls

Mobile Telephones

Mobile Radios

Tone-Only and Tone-and-Voice Pagers

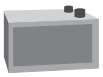
Three inputs for monitoring channel activity:

1. TX frequency COR (ensures channel is clear before Model 45 transmits)
2. RX frequency COR (allows fast squelch when radios unkey)
3. Channel guard decode (prevents unauthorized use)

Two sense inputs for alarm-activated paging

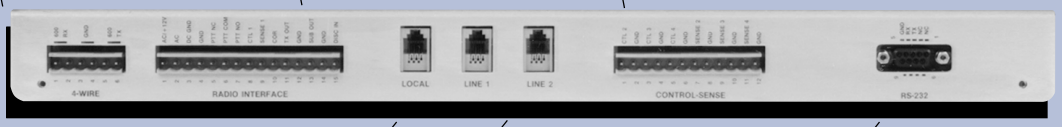
Four auxiliary relays

1. 2 remote-controlled relays for switching equipment such as auxiliary generators
2. 2 relays for per-call or per-user control of such things as TX or frequency selection



Low Battery Indicator

Smoke Detector, etc.



CRT or Personal Computer

or

Logging Printer

2 phone line connections allow incoming/outgoing calls on 2 separate lines. Lines can be from adjacent service areas to avoid long-distance charges

Rotary Telephones (Consult Zetron)

Touch-Tone Telephones

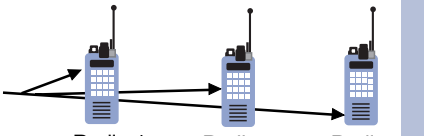
Modem-Equipped CRT or Personal computer

Remote Diagnostics from Zetron

Directly Connected or Telephone

DID Converter for One Incoming DID Line

A DID telephone line allows each mobile radio to be reached at a unique seven-digit telephone number



Radio 1 644-1301

Radio 2 644-1302

Radio 74 644-1374

SPECIFICATIONS

GENERAL SPECIFICATIONS

Power	100-130V AC, 60 Hz, 7 watts or 12-15V DC, 600 mA
Temperature	0 to 65 degrees Celsius
Size	19" W x 7.25" D x 1.75" H, 19" rack-mount
Weight	7 pounds

INTERCONNECT CAPACITY

Database	99 or 325 subscribers, up to 999 call detail records
ANI Length	1 to 8 DTMF digits
ANI Speed	Up to 14 digits per second

SIGNALING SPECIFICATIONS

Freq range	67 to 3500 Hz
Freq accuracy	0.1%
Freq stability	0.0005%
Distortion	2% nominal
Two-Tone Sequential	Motorola/GE all tone groups, code plans, and capcodes
DTMF	1 to 7 digits per subscriber
2805	1 to 7 digits per subscriber
Five/Six-Tone	EIA, ZVEI, CCIR single or dual address
CTCSS	38 standard EIA tones
Digital Squelch	104 Codes

TELEPHONE INTERFACE SPECIFICATIONS

Phone Jacks	Two end-to-end (B1) phone lines, one local phone
Connector	RJ11-C modular jack
Mode	Full duplex operation, hybrid with fixed-null
Call progress tones	Dial tone, ringing, interrupted ringing, busy, and reorder
Dial tone detection	Single tone, adjustable, preset to 440 Hz
END-TO-END:	
FCC Registration	EYB5Q5-15387-OT-T
Incoming call	Ring detection on tip-ring pair or dry contact closure to ground. Programmable number of rings to answer
Call answer	Off-hook, tip-ring current draw or darlington output (wet)
Call disconnect	Second dial tone for 2 seconds (440 Hz), busy tone (0.5 Hz, 50% duty cycle)
LOCAL PHONE:	
Incoming call	Loop start or dry contact closure, immediate dial
Call answer	Darlington output (wet)
Call disconnect	Local phone on-hook (For connection to 2500 deskset or DID converter)

RADIO INTERFACE SPECIFICATIONS

PTT	One Form-C relay closure, 100 mA max
COR	Noise detector, VOX detector or voltage change
Subaudible output	-40 to +6dBm. Hi/Lo Selector. 600 ohm output
Tx audio	-40 to +6 dBm. Hi/Lo Selector. 1K ohm output
Rx audio	-40 to +10 dBm. Hi/Lo Selector. 50K ohm input. 25 mV to 6 V P-P
Direct modulation	CTCSS/Digital squelch, bipolar adjustable
System relays	2 each, remotely toggled by DTMF code from phone or mobile, form A relay closures to ground
User relays	2 each, programmable per user to automatically latch for duration of call, form A relay closures to ground
Sense inputs	2 each, Form-A relay closures input
Channel busy input	Closure input from secondary receiver COR.
COR validation input	Closure input to disable COR operation

ADDITIONAL SPECIFICATIONS

Modem	300 baud Bell 103J or 1200 baud Bell 212
Indicators	Line 1, Line 2, Local, VOX, DTMF, Carrier, CTCSS, Transmit, Page, Power
Switch	Connect/disconnect
Station ID	Morse code, fixed 1200 Hz frequency and selectable call sign
Operating modes	Half-duplex and full-duplex, simplex VOX, simplex sampling, digital voice delay, per user
Equipment types	Tone-only pager, Tone+Voice pager, Talkback pager, Mobile, Direct air
Prompt tones	Progress tones, error tones, and warning tones sent to phone or mobile
Programming	Programmable via DTMF phone, DTMF mobile, RS-232 or phone modem
Data retention	Internal battery - backed
Secondary protection	Telco high-voltage clamps with protective fusing elements

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See Zetron price list for option pricing. Specifications subject to change without notice. Literature number: 005-0046I January 1998