Tom McShane

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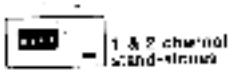
Mountain View, CA 94043
(415) 965-1620


Bell & IBM type modem modules

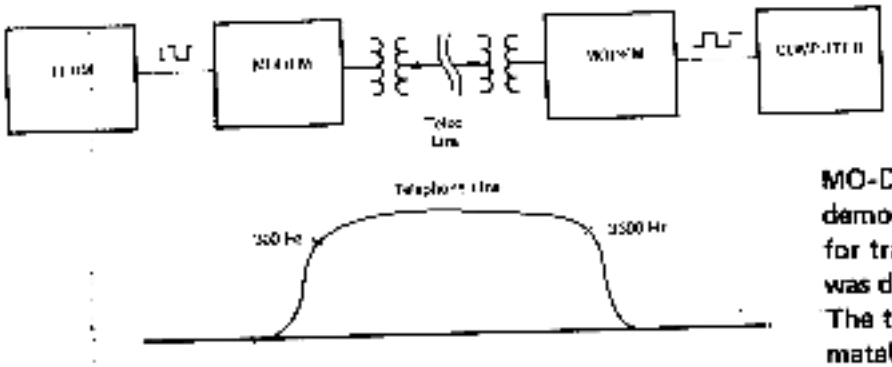

Modem modules on I/O boards


16 channel multiple data set system

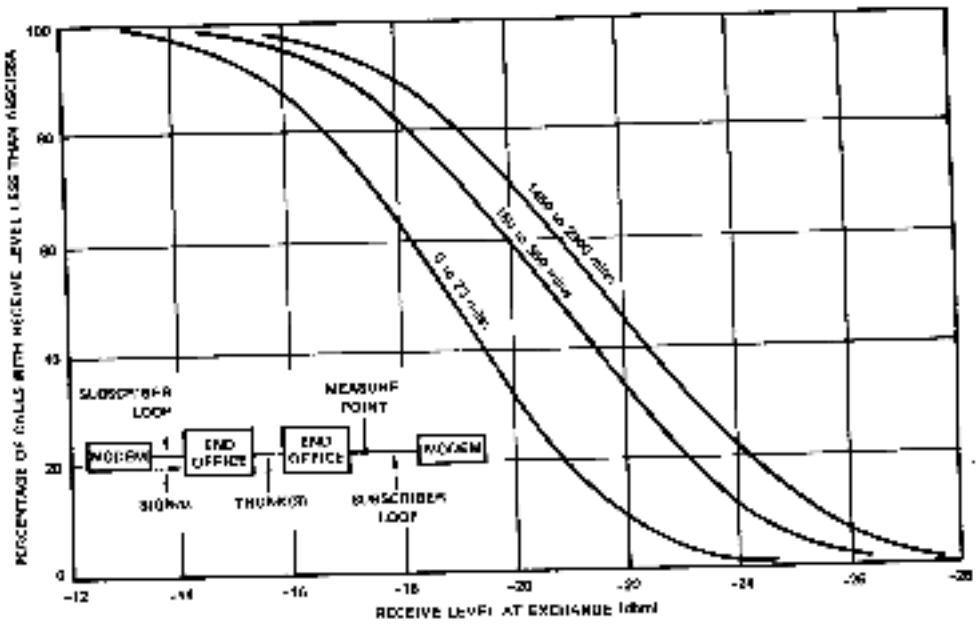

1 & 2 channel stand-alones

Telecommunications From The User's Viewpoint

WHY MODEMS?



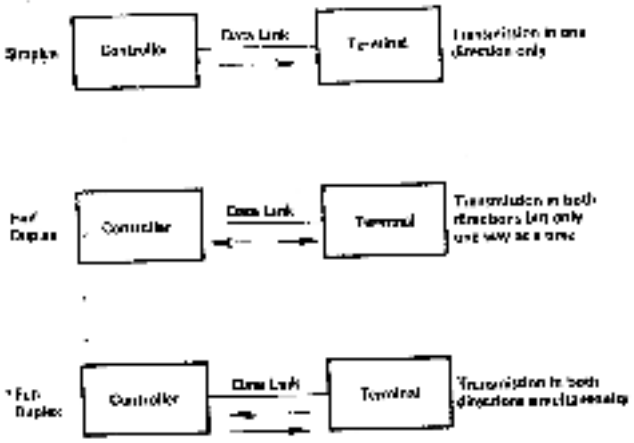
MO-DEM is a contraction of the words modulator - demodulator and is used to condition digital signals for transmission over the telephone network which was designed for analog voice signal transmission. The telephone network has a bandwidth of approximately 300 Hz to 3300 Hz, so the modems used on the telephone network must condition the signals to fit within the band.



End Office Receive Levels on Direct Distance Dial Network

Expected receive level between telephone exchanges on the DDD network is shown on a probabilistic basis. Subscriber loop loss at each end must be added to the interexchange loss.

Communication Modes



Communications terminology can be confusion. When the term "communication mode" is applied to modems the following nomenclature is used:

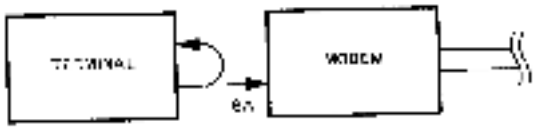
Simplex — transmission in one direction only with no way of responding. Your home TV reception of a signal transmitted from the TV station is an example of simplex communication.

Half Duplex — transmission in two directions, but only one way at a time. CB radio operators either transmit or receive, but cannot do both simultaneously on a single channel. At the end of transmission it is necessary to advise the other party when through transmitting and ready to receive by saying "over". Then the other operator can begin transmitting.

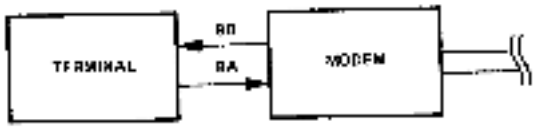
Full Duplex — transmission in both directions simultaneously. In the CB example, if two channels were used – one for transmitting and another for receiving – two simultaneous transmissions could be made.

HALF/FULL DUPLEX OPERATION
Terminal or Computer

Half Duplex

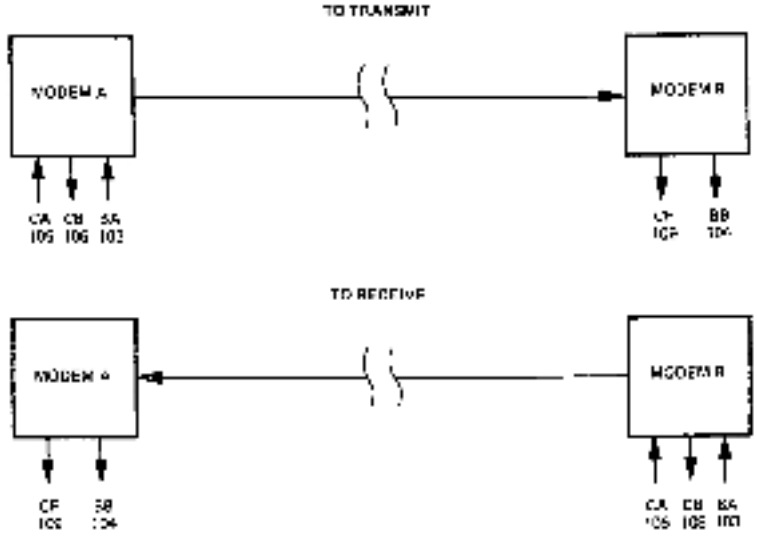


Full Duplex



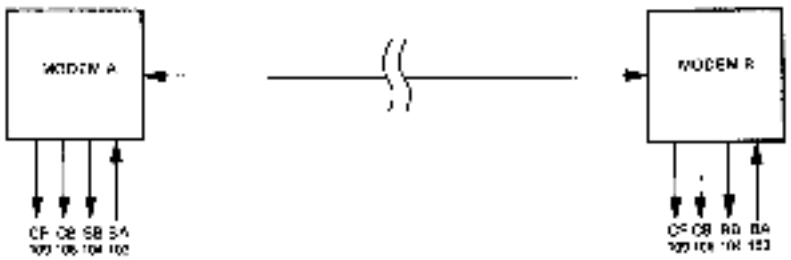
Terminal manufacturers often use the terms half duplex and full duplex to mean whether local copy is provided or whether the far end loops back (echoplexes) that which was transmitted. The presence or absence of local copy has nothing to do with the communications mode of the data link.

HALF DUPLEX MODE

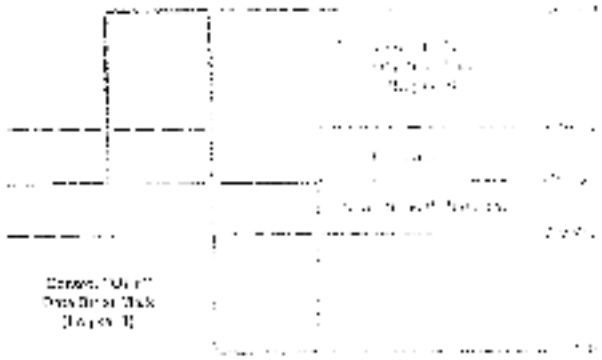


Control signals required to turn on modem A's transmitter and cause modem B's receiver to respond are shown in the top of the slide. The process is reversed in the lower portion.

FULL DUPLEX MODE



Interface signals for transmitting and receiving data simultaneously are shown at both ends of the full duplex data link.



Standard RS-232-C defines the interface between [illegible] equipment and data communications [illegible] employing serial binary data. Mechanical [illegible] electrical specifications are provided. The slide [illegible] voltage transition levels at the interface [illegible] a connection exists between the terminal [illegible] communications equipment.

The figure shows
BA [illegible]
BB [illegible]
CA [illegible]
CB [illegible]
CC [illegible]
CD [illegible]
CE [illegible]
CF [illegible]

The slide shows the more common EIA interface [illegible] as they appear on the diagnostic panel of [illegible]'s sixteen channal multi chassis. Internal designations per CCITT standards appear in parenthesis.

HOW ARE MODEMS SPECIFIED?

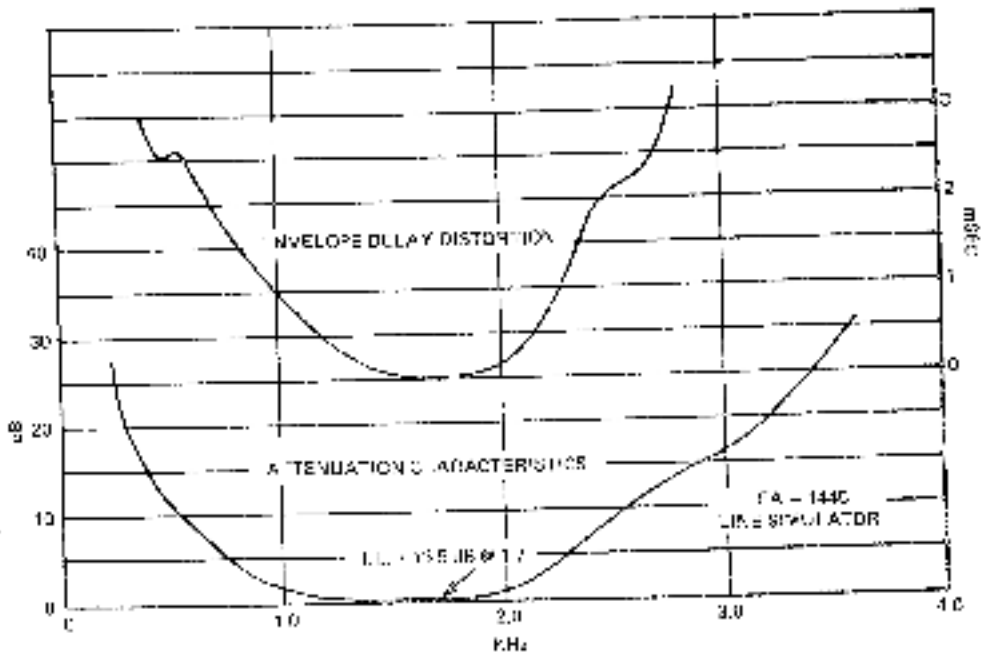
I. INTERFACE
A. [illegible]
B. [illegible]
C. [illegible]
D. [illegible]
E. [illegible]
F. [illegible]

INTERFACE - Engineering Info
A. [illegible]
B. [illegible]
1. [illegible]
2. [illegible]
C. [illegible]
D. [illegible]
E. [illegible]

II. SPEED
A. Low speed 0 to 300 BPS
B. Medium speed 0 to 1200 BPS
C. High speed 2400 to 9600 BPS
D. [illegible] 19.6k BPS to 250.0 BPS

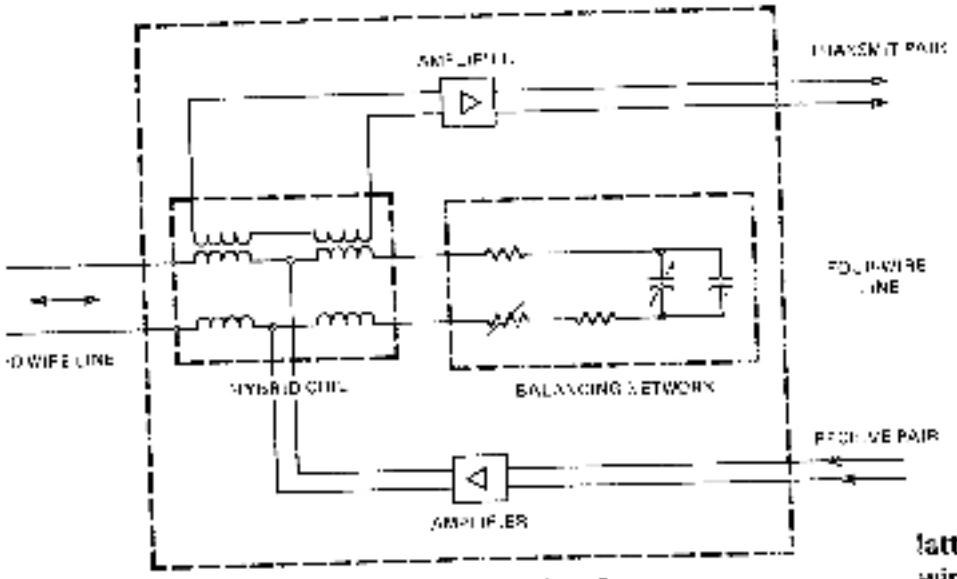
IV. COMMUNICATION MODE
A. Simplex
B. Half duplex
C. Full duplex

Modem specifications include business machine and phone line interface as well as speed, communications mode, and performance criteria.



Envelope Delay Distortion & Attenuation 3002 unconditioned voice grade line

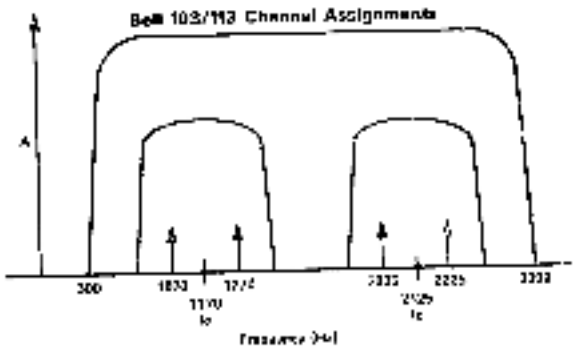
Because different frequencies encounter different amplitude attenuation and propagation delay times through the telephone network, not all of the bandwidth can be utilized for the transmission of digital data. These differences are largely immaterial in voice communications, but can be very detrimental to data transmission, particularly at speeds above 2400 bps.



2/4-Wire Terminating Set

The subscriber loop is basically a continuous loop of wire without amplifiers. At the central office the transmitted signal (voice or data) is sent to the far end office on a unidirectional channel called the transmit pair. This channel is simplex; one way only due to the audio amplifiers which exist. The far end transmitted signal appears at the near end on the receive pair. The transmit pair and receive pair are referred to by telco personnel as 4-wire lines. Leased circuits can be provided on a 4-wire or 2-wire basis. The latter case involves combining the signals in a 2/4 wire terminating set (hybrid). The subscriber loop is a 2-wire bi-directional channel for dial up use.

Bell 103/113



Specifications

Mode:

Data Transfer Rate:

Modulation:

Frequency Assignments:

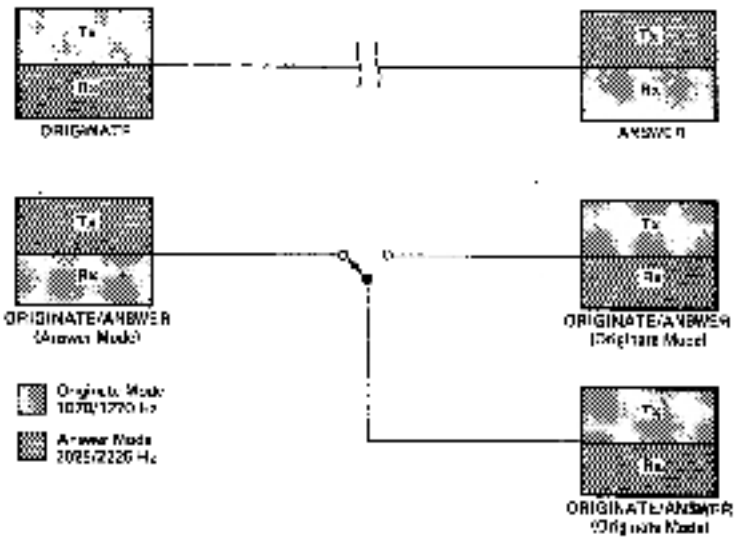
	Originating End	Answering End
Transmit	1070 Hz space 1270 Hz mark	2025 Hz space 2225 Hz mark
Receive	2025 Hz space 2225 Hz mark	1070 Hz space 1270 Hz mark

Transmit Level:

Receive Level:

Specifications and channel assignments for the full duplex 300 bps asynchronous Bell 103/113 modem are shown in this slide.

103/113
ORIGINATE/ANSWER



The Bell 103 modem can transmit and receive in either the low or high band. The ability to switch modes has been termed "originate and answer". The Bell 113A operates only in the originate mode; the Bell 113B operates only in the answer mode.

BELL 103/113 FAMILY
0 to 300 BPS

DIAL-UP

103J 2 or 4W
- Originate/answer
- Single-channel—self contained
- $25 to $35/month

103E Data Station—Computer Style
- Originate/answer
- 40 channels max
- $25 to $35/month

113A Terminal Data Set
- Originate only
- Single-channel—self contained
- $10 to $15/month

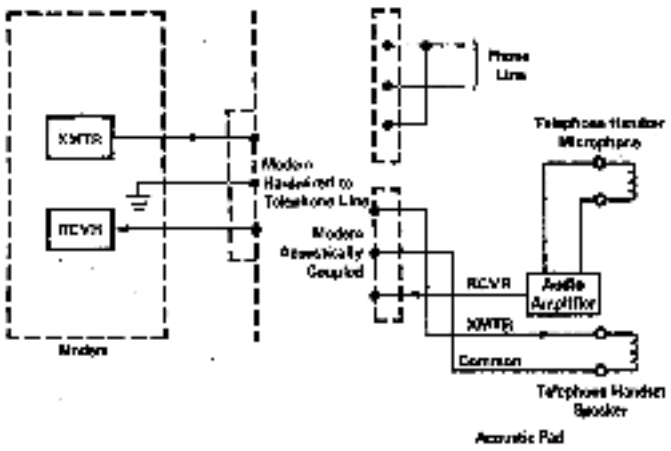
113B Data Station—Computer Style
- Answer only
- 20-channel increments—240 max
- $12 to $20/month Average $7 to $10

LEASED LINE

103F
- Originate/answer
- Single-channel—self contained
- $25 to $35/month

Bell 103/113 models and prices are shown in this slide.

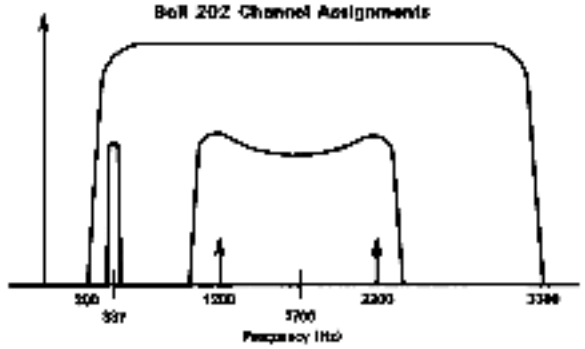
Acoustic vs. Hardwired Modem



Modems can be directly connected to telephone lines via a "hardwired" electrical connection. Where portability is required low speed modems can be acoustically connected via the transducers in an acoustic pad and the telephone handset. There is usually some performance degradation due to the distortion introduced by transducers reducing the maximum speed capability and receiver sensitivity of acoustic couplers compared with hardwired modems.

Bell 202

Bell 202 Channel Assignments



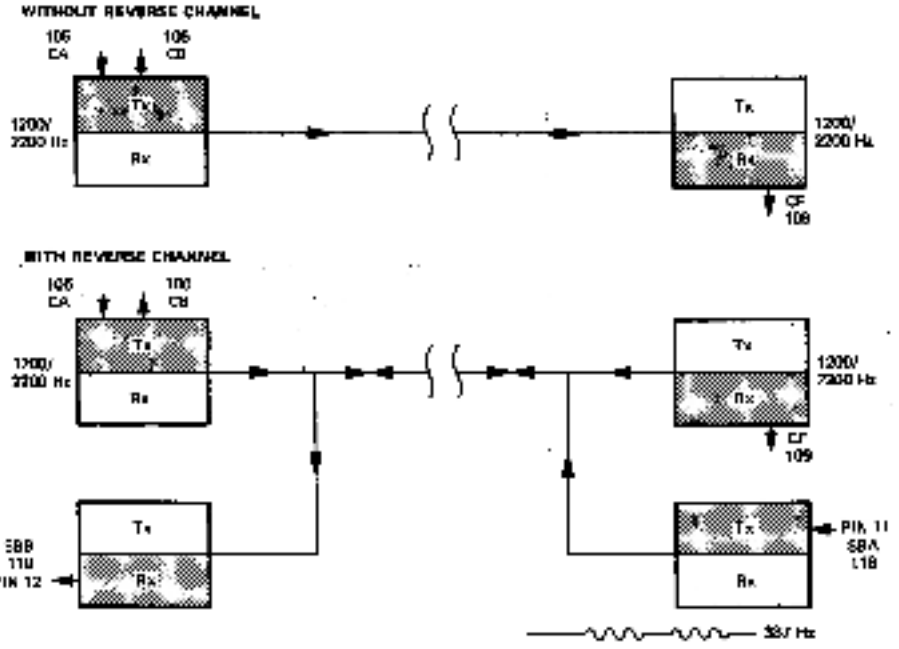
Specifications

Data	Serial, asynchronous, full duplex or 2 wire half
Data Transfer Rate	0 to 1200 bps – switched network 0 to 1800 bps – leased lines with C2 conditioning Optional 5 bps AM reverse channel transmitter and receiver available for switched network
Modulation	Frequency Shift Keyed (FSK) FM
Frequency Assignments	Mark - 1200 Hz Space - 2200 Hz
Transmit Level	0 to -12 dBm
Receive Level	0 to -50 dBm switched network 0 to -50 dBm leased network

Bell's 202 modem provides for 0 to 1200 bps communication over the diel network and 0 to 1800 bps over leased lines with C_2 conditioning per Bell's specifications, but in practice the 202's do not require conditioned lines even at 1800 bps. The 202 is half duplex with a two wire circuit (leased or dial up) and full duplex with a 4-wire circuit. Optionally available is a 5 bps reverse channel which operates in the low end of the 300 Hz to 3300 Hz channel and is primarily used for supervisory control. For instance, this channel could be used to transmit an "out of paper" signal from a remote printer back to the CPU to terminate data transmission until the paper could be reloaded in the printer.

A significant factor to consider when using the 202 type modem is the line turnaround time required for switching from the transmit mode to the receive mode. Echo suppressors in the telephone equipment that are required for voice transmission must be turned off by the modem to transmit digital data. These echo suppressors turn on if there is no energy in the band for 100 miliseconds (.1 second). The modem must provide a 200 ms signal to the line to turn off the echo suppressors every time it goes from transmit to receive mode – hence, if short records are being transmitted, such as in a graphic terminal application, the turnaround time can slow your anticipated 1200 baud (120 character/second) throughput to possibly 60 characters/second or less on an actual basis. Also since the CPU must be able to control the Request to Send lead of the Bell 202 for half duplex transmission, you should check your computer specifications to determine if this control is available. Most mini's do not have the capability of supporting half duplex 202, but can support 103 line discipline.

202 DIAL UP



This slide shows the interface signals required to operate the half duplex 202 - with or without the reverse channel.

BELL 202 FAMILY

DIAL UP

202C, S or T1
0 to 1200 BPS
Single channel, self-contained
Without reverse channel
$35 to $50/month

202D, T0 or T2
0 to 1200 BPS
Single channel, self-contained
With reverse channel
$35 to $60/month

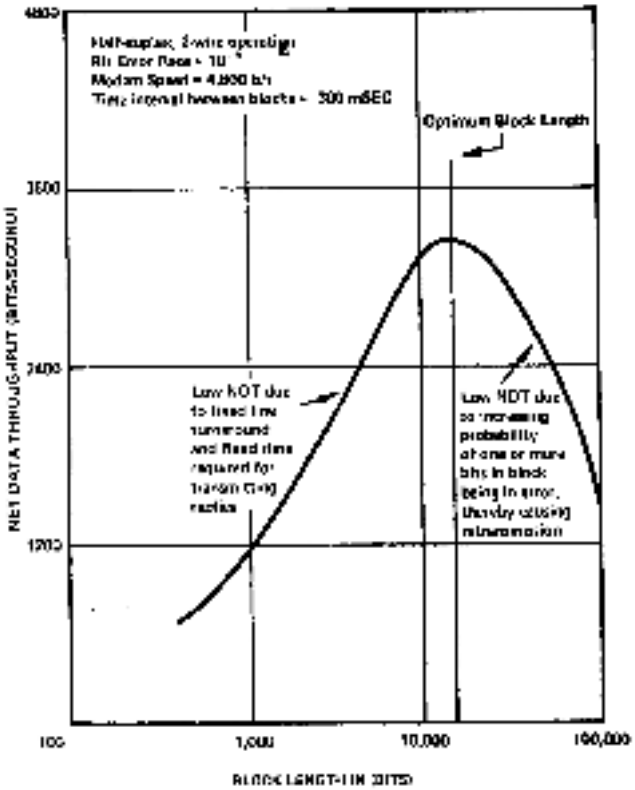
202E
0 to 1200 BPS
Single channel up to 8 channels in one housing
Reverse channel optional
$30 to $400/month

LEASED LINE

202C/202D
0 to 1800 BPS
Single channel, self-contained
$35 to $90/month

202T
0 to 1800 BPS
Single channel in up to 8 in one housing
$30 to $400/month

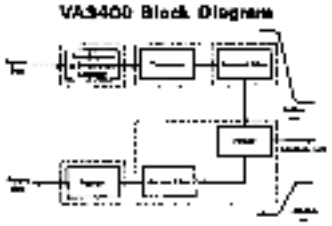
Bell 202 models and prices are shown in this slide.



Effect of Block Length on Net Data Throughput (NDT)

This slide shows the effect of block length on net data throughput. The curve is taken from an excellent article on throughput which appeared in the July/ August 1974 issue of Data Communications magazine.

Vadic VA3400



Specifications

Data: Serial, binary, asynchronous or synchronous, full duplex

Data Transfer Rate: 1200 bps

Modulation: D-bit Phase-Shift Keying (DPSK)

Transmit Level: 0 to -12 dBm

Receive Level: -15 to -50 dBm (or 0 to -35 dBm with adjustable channel compensation up to 0 dBm)

Channel Assignment:

	Originating End	Answering End
Transmit	High Band	Low Band
Receive	Low Band	High Band

Phase Shift

D-bit	VA3400
00	90°
01	0°
11	180°
10	270°

A block diagram and specification summary of VADIC's full duplex VA3400 modem is shown. This modem operates at 1200 bps full duplex on 2-wire dial up or leased lines. The full duplex line discipline makes it possible to simply change modems and quadruple data speed over the Bell 103.

VA3400 FEATURES

1200 bps full duplex on dial up or 2 wire leased lines

Full duplex Protocol similar to Bell 103 (V21)

Abort timer disconnect

Loss of carrier disconnect

Remote controlled loopback

Echoplex operation

10:1 Improvement in error rate compared to FSK 1200 bps Modems

Terminal break capability provided

Eliminates half duplex turn around delay

Positive indication of connect status

Simplifies terminal operation

The slide shows the VA3400 features.

Bell 201B/C

Specifications

Data:	Serial, binary, synchronous, half duplex on 2 wire lines
Data Transfer Rate:	2400 bps
Modulation:	Differential Phase Shift Keying (DPSK)
Transmit Level:	0 to -10 dBm
Receive Level:	-15 dBm to -50 dBm or 0 dBm to -35 dBm
RTS/CTS Delay:	0, 75 msec, or 150 msec

Phase Shift

Dibit	201B/C	201A
00	45°	0°
01	135°	90°
11	225°	180°
10	315°	270°

Note: 201A 2000 bps dial up not marketed by VADIC

Bell 201 modems are 2400 bps synchronous half duplex 2-wire or full duplex 4-wire units that use a modulation scheme similar to the VADIC VA3400. The 201A is an obsolete 2000 bps unit, 201B is primarily for private or leased line applications, and the 201C is for dial up applications.

BELL HIGH SPEED
All Synchronous

201A
2000 BPS
Single channel, self contained
Dial-up
$55 leased; $70 dial-up

201B
2400 BPS
Single channel, self contained
Leased line
$65 leased; $70 dial-up

201C
2400 BPS
Single channel or up to 6, 12 or 30
In common cabinet
Dial-up or leased line
$55 leased; $70 dial-up

Bell 201 models and prices are shown in this slide.

BELL HIGH SPEED

[illegible]

OTHER BELL MODEMS

[illegible]

Bell high speed as well as other Bell modems are discussed.

DATA ACCESS ARRANGEMENTS

Manual: CDT — 1000A
Manual only operation
$2.00 to $3.00/month

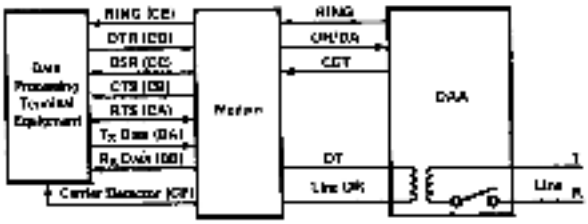
Automatic: CBS — 1001A or 1001F
Automatic operation
voice interface
$3.00 to $7.00/month

CBT — 1001B or 1001D
Automatic operation
Operator control interface
$4.00 to $5.00/month

Functions

- Protect telephone network from excessive signal energy
- Provide DC isolation/impedance matching between network and modem
- Protect network from excessive power levels
- Perform the handset-handset to modem and network
- Automatically initiate CBT or CBS call

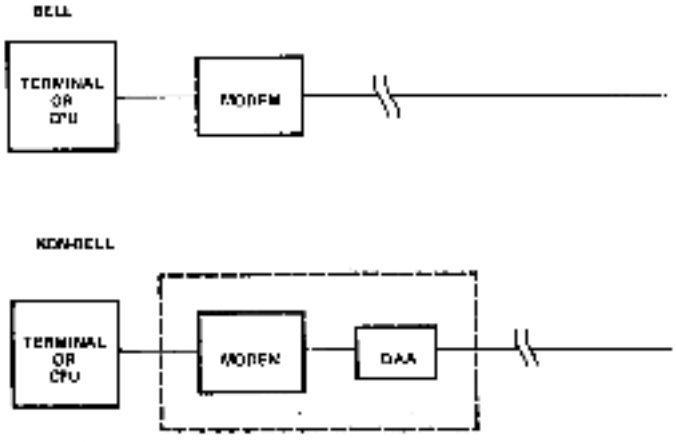
Typical Automatic DAA Configuration



Connecting a non-telco modem to the switched network has required the use of a protective device called a data access arrangement (DAA). During 1975 the California Public Utilities Commission began certifying non-telco DAA's so that independent manufacturers such as VADIC could connect their equipment to the network via a customer provided (VADIC provided) DAA. The FCC is now proposing that all the state PUC's and telephone companies allow the DAA to be part of the equipment provided by independent manufacturers.

REPLACING BELL MODEMS

1. Leased line
   No DAA required
2. Dial-up
   DAA required



Until the California PUC decision in mid 1975 the non-Bell modem had to have a separate telco provided DAA connected to it. The Bell modem connected directly to the line, as shown in the top of the slide.

IBM Line Adapters

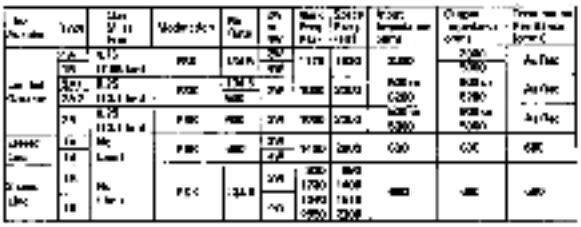
Specifications

Data: Serial, binary, synchronous half duplex

Data Transfer Rate: Leased Ordinary Adapter – 0 to 134.5 bps (0 to 600 bps)
Leased Line Adapter – 0 to 600 bps
Shared Line Adapter – 0 to 1345 bps

Modulation: Frequency Shift Keyed (FSK) FM

Specifications Summary

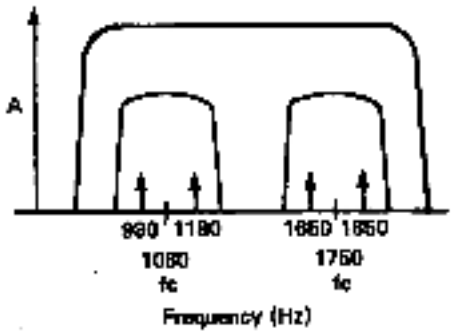


IBM manufactures a line of asynchronous modems which they call line adaptors for use on leased lines. The specifications are summarized on the slide.

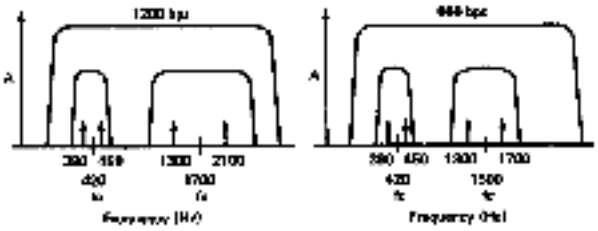
CCITT Modems

V21	(0 to 300 bps)	(similar to Bell 103/113)
V23	(0 to 1200 bps)	(similar to Bell 202)
V26	(2400 bps)	(similar to Bell 201)

V21 Channel Assignments



V23 Channel Assignments

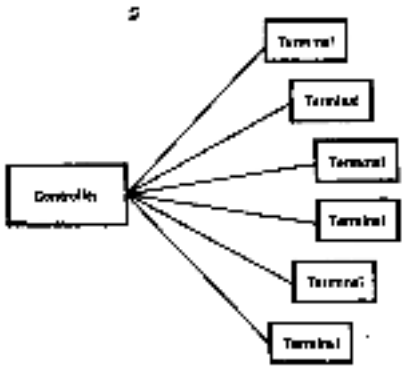


V26 Data Encoding

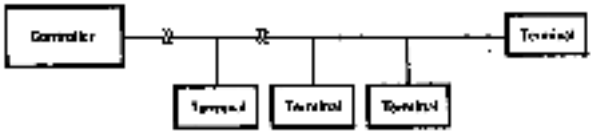
	Type A	Type B
00	0°	45°
01	90°	135°
11	180°	225°
10	270°	315°

Outside the U. S. data transmission standards are set by the International Telegraph & Telephone Consultative Committee (CCITT) which is a part of the International Telecommunications Union in Geneva. Standards V.21, V.23, and V.26 describe modems similar to the Bell 103, 202, and 201 respectively.

Point-to-Point Network



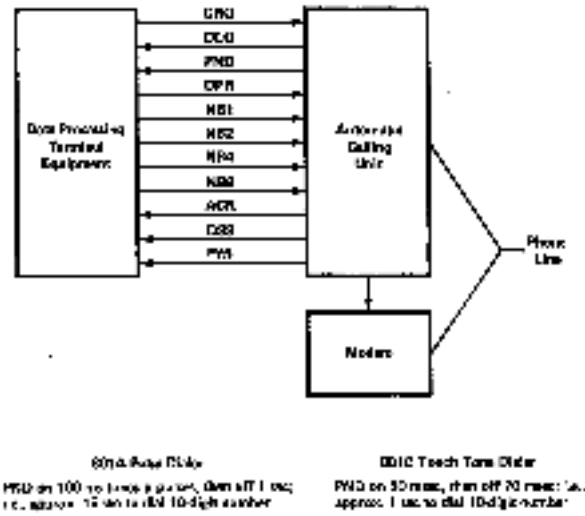
Multipoint Network



Point-to-point leased line networks are similar to what is shown at the top of the slide. All dial up connections are point-to-point. Multipoint networks have more then one remote station for each central station.

Bell 801

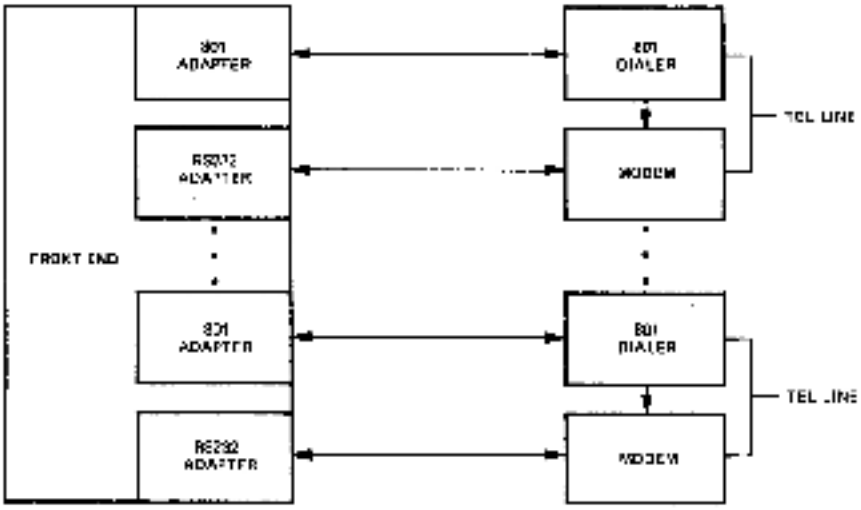
Automatic Dialing



Automatic dialing via the Bell 801 auto calling unit requires a unique interface between the business machine and ACU. This interface is defined in EIA specification RS366. The interface signals are as follows:

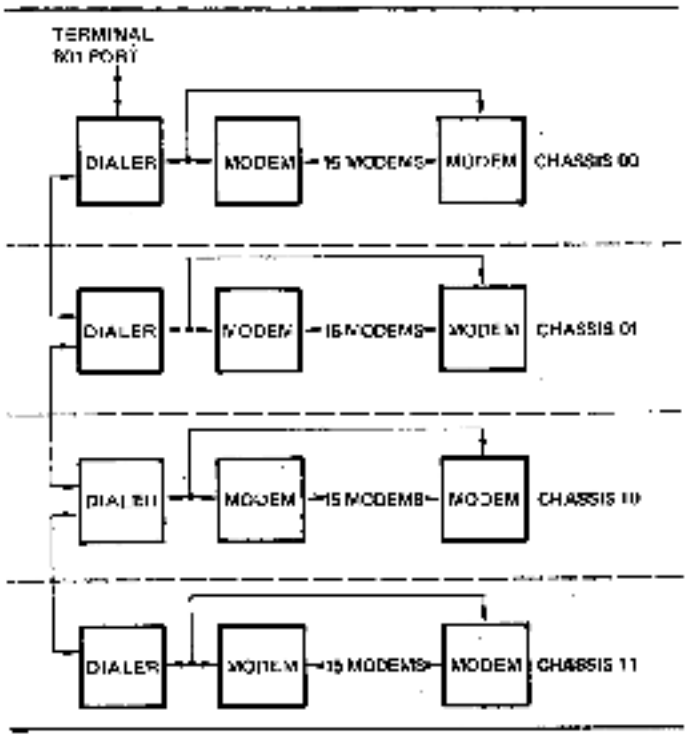
CRQ	Call Request
DLO	Data Line Occupied
PND	Present Next Digit
DPR	Digit Present
NB1	Digit Value 1
NB2	Digit Value 2
NB4	Digit Value 4
NB8	Digit Value 8
ACR	Abandon Call & Retry
DSS	Data Set Status
PWI	Power Indication

NORMAL ACU CONFIGURATION



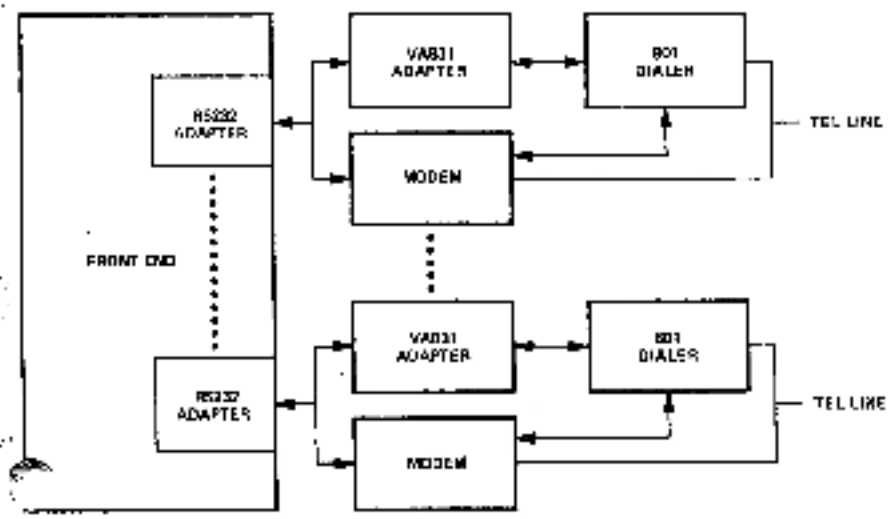
Each 801 auto calling unit requires its own front end 801 RS366 adaptor. A single modem is associated with each dialer. The modem/ACU combination is attached to a single phone line.

MACS Block Diagram



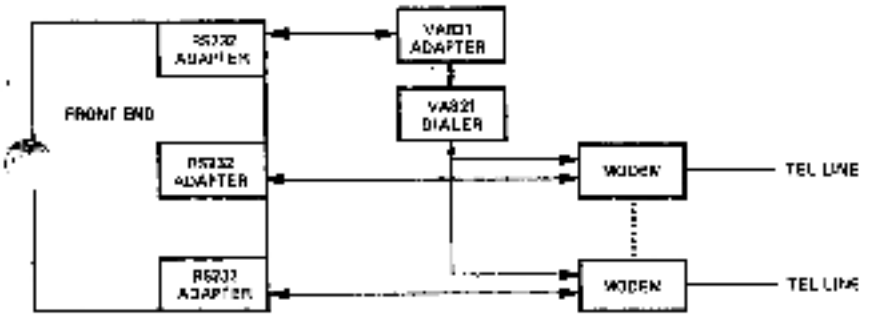
VADIC's multiline automatic calling system is diagramed in this slide. A single RS366 ACU port connects to as many as 60 phone lines. Each MACS dialer, VA821, can handle up to 15 modems.

SYSTEM WITH RS232 TO RS366 ADAPTER

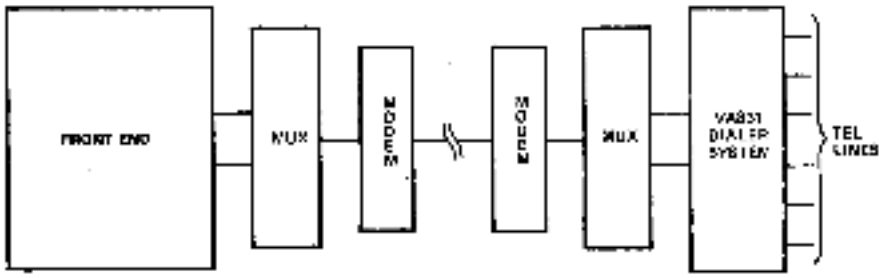


VADIC's VA831 adaptor enables a computer to initiate the dialer and transmit dialing information – digits and supervision – to an 801 pulse or touch tone dialer via an RS232 modem interface. All signaling takes place through characters sent from the computer on Transmit Data, and received by the computer on Received Data.

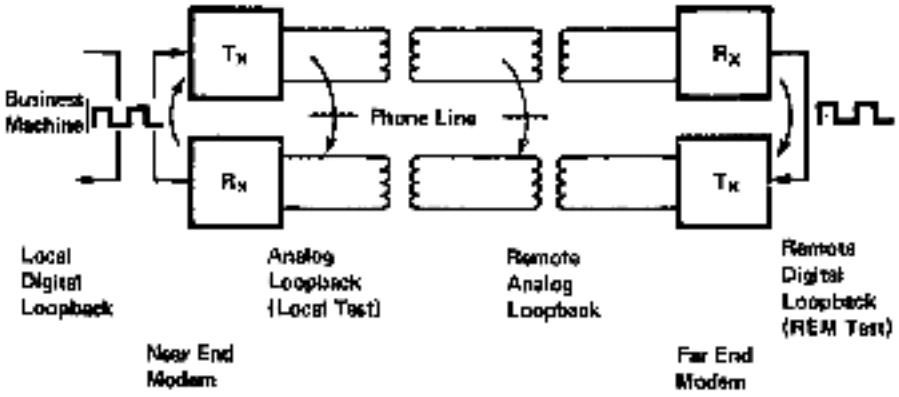
SYSTEM USING VA821 MULTILINE DIALER



MULTIPLEXER CONFIGURATION

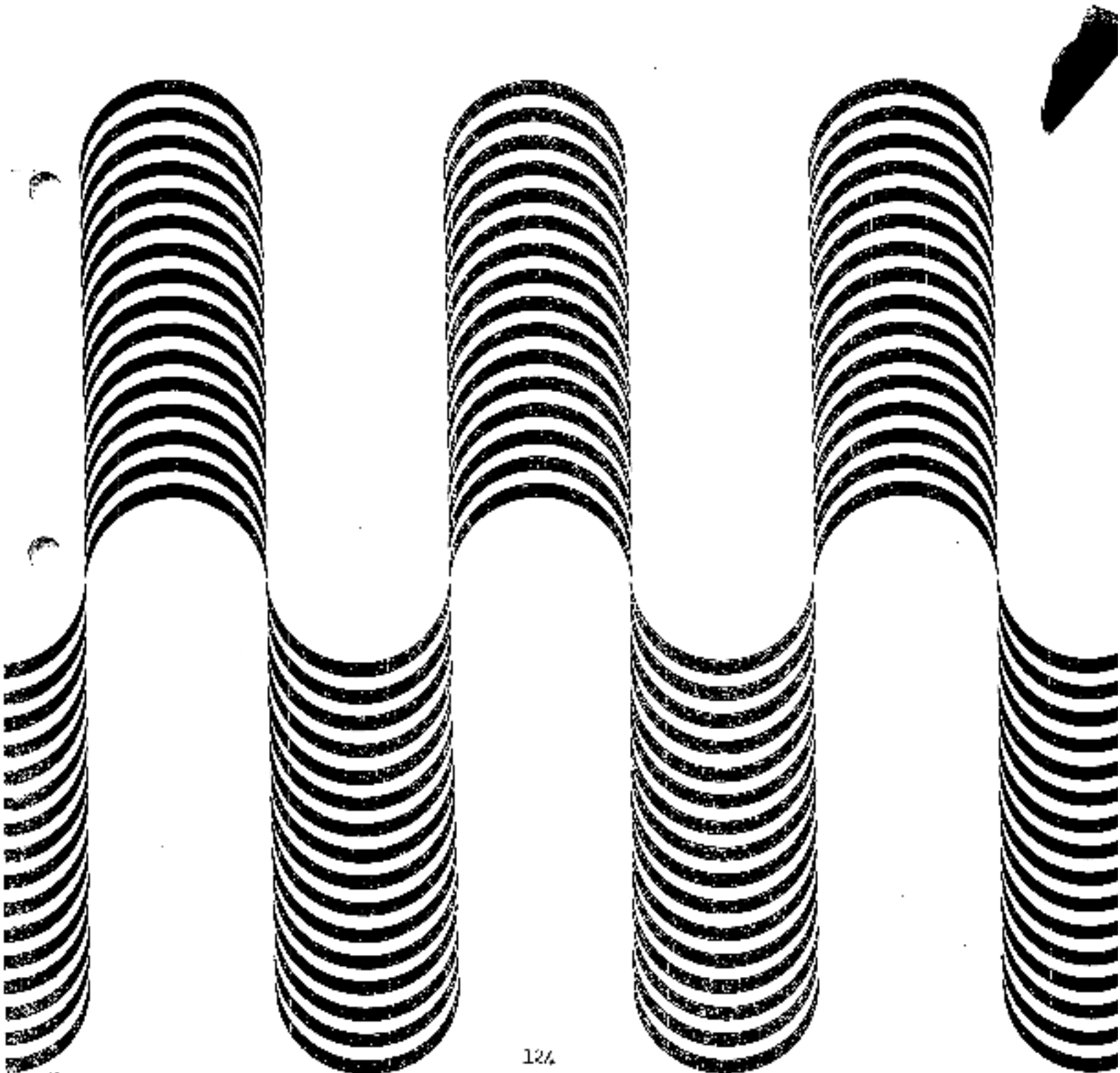


When VADIC's VA821 multiline dialer is used the RS232-RS366 adaptor requires a dedicated RS232 port. The VA831 makes it possible to have automatic calling through a multiplexer port that does not pass 801 interface signals. As shown in the lower portion of the slide, an automatic dialer can be located at the distant end of a multiplexer link, and accessed through a conventional RS232 interface without hardware modifications.



Analog loopback refers to connecting the transmitter's (analog) output to the receiver's input of the same modem. (For full duplex modems the transmitter and receiver must be switched into the same channel since normally they are in opposite channels.) The receiver demodulates the transmitted signal; agreement between transmit and receive data thus confirms that all parts of the modem are working correctly.

Digital loopback refers to connecting the receiver's (digital) output to the transmitter's input. A message sent from the near end modem which is looped back digitally at the far end and successfully received is a complete check that both modems and the communication link are working satisfactorily.



Vadic Modems—A Whole Family of Modules, Cards & Chassis for OEM's & End-users.

MODULAR CONCEPT FOR THE OEM

Vadic's data set modules (Bell 103, 202, IBM, CCITT) are specifically designed for incorporation inside remote terminals and data communication systems. The modules combine superior performance and low cost with packaging flexibility that enables rapid and inexpensive custom printed circuit board configuration. Vadic's modules also provide broad application flexibility—full transmit/receive (with or without reverse channel for the 202 and CCITT data sets), transmit only/receive only operation, switched or leased lines, point-to-point or multipoint. Vadic manufactures custom circuit boards to EOM specifications for interconnect characteristics and physical configuration. All VA300, VA1200, VA2400, VA2700, and VA3400 Series modems as well as automatic dialers are available in custom configurations.

MDS CONCEPT FOR THE END USER

Picture a whole new generation of computer-connected modem hardware and you've got Vadic's Multiple Data Set System (MDS). There's nothing like it for size, flexibility, and performance. Bell 103, 202, 201 compatible modems, Vadic's unique VA3400, IBM modems, and automatic dialers fit in seven inches of rack space—interchangeable in any way. And to put the system even further ahead, we built in display and diagnostic functions that make troubleshooting an entire communications system easy.
We didn't stop there. We added a one- and two-channel chassis for terminal clusters and multiplexer sites—with identical diagnostics plus cabinets to hold the modems and associated telephone line connecting equipment.
In data communications, Vadic matches both ends of the line.

VA3400: 1200 BAUD FULL DUPLEX, 2-WIRE MODEM

Here's a modem to make you sit back and take note—full duplex, 1200 baud on a two-wire circuit! This precedent setting modem has the speed of a Bell 202, with the simple line protocol of the 103 and can replace either one without any software modifications; it can be used on switched networks or leased lines.

IT'S FAST

If your front end and remote terminals are capable of 1200 baud operation, you can make your data system run four times as fast simply by replacing 103's or Vadic VA300's with the VA3400's. Take two minutes to change board straps and a VA3400 can resemble a Bell 202 or VA1200. But since the VA3400 is full duplex, with continuous carrier in both directions, turnaround delay is zero. On some systems this means substantial performance improvement. You can also make it easier to deal with the disconnect and line outage problems so common in half-duplex operations, because the VA3400 incorporates an optional abort timer that disconnects a call if carrier is not detected within 12 seconds of answering a call and a carrier-off disconnect that automatically puts the data coupler on-hook if incoming carrier is lost.

ASYNCHRONOUS/SYNCHRONOUS

VA3405 modems have an integral asynchronous/synchronous buffer, which allows use of the identical simple line discipline used by Bell 103 or VA300 modems. The VA3410's are synchronous and offer something new if you want to design your 1200 baud system to have higher throughput and lower line costs.

VA300: 300 BAUD BELL 103 COMPATIBLE MODEM

Vadic's VA300 series features every 103 or 113 configuration offered by Bell, plus system capabilities and options not available from Bell. Standard Vadic transmitter and receiver modules form the analog functions of each unit. We add controls, interfacing, and diagnostics hardware to create a family of modems that give unexcelled performance and flexibility, yet hold their own in price.

SWITCHED NETWORK MODEMS

The VA300 family includes modem cards completely compatible with Bell's 103A2, 103E, and 113A/B switched network models. In particular, the VA305C/D card features all the disconnect and control capabilities of the 103E with a bonus—automatic dialing, using Vadic's VA801 type dialer. Applying advanced circuit techniques, Vadic packs full originate/answer operation into the same space taken by answer-only or originate-only models.

LEASED LINE MODEMS

This series also incorporates 103-compatible versions, right down to programmable local test capability. They can be used in originate-only or answer-only modes.

SPECIFICATIONS AND MODELS

There are 12 different models, plus strapping options, in the VA300 Series—for all kinds of switched network and leased line applications.

VA1200: 1200 BAUD BELL 202 COMPATIBLE MODEM

Vadic's VA1200 Series mirrors the VA3400 in concept and scope. Built around Vadic's proven line of 1200 baud transmitter and receiver modules, it offers more than Bell in performance, flexibility, and test capabilities.

SWITCHED NETWORK UNITS

The VA1200 family covers all Bell 202 configurations, with or without 5-baud reverse channel. All models in the MDS series can also be used with Vadic's VA801 type automatic dialer. With its unique modular construction, Vadic units can be configured for transmit-only or receive-only applications.

LEASED LINE UNITS

Vadic's VA1200 series also satisfies all 202D- or 202R-compatible requirements, but adds enough flexibility to meet virtually all leased line 1200 or 2800 baud applications. Basic units provide field straps for adjusting Clear To Send, carrier detect, soft carrier, and turn-around delays. These control features provide versions for two or four wire connection, point-to-point or multipoint system arrangements.

NO EQUALIZER

One option Vadic does not require is a strappable equalizer. A new detection method obviates a compromise equalizer for typical phase and amplitude distortion. Operation over both short and long haul circuits is excellent—without field adjustment.

VA2400 SERIES— BELL 201 COMPATIBLE MODEM

Vadic's VA2400 Series modems provide synchronous data transmission at 2400 bits per second. Vadic's modems utilize unique detection techniques that improve performance and enable rapid carrier acquisition over worst case lines.

SWITCHED NETWORK MODEMS

The VA2400 family is fully compatible with all Bell 201C configurations plus provides automatic dialing using Vadic's VA801 type dialer.

LEASED LINE MODEMS

The VA2400 Series also is compatible with all Bell 201B modems. Both 2-wire and 4-wire models are available for use in point-to-point or multidrop applications. RTS/CTS delay is strappable for 7.5 msec to optimize throughput.

MDS DIAGNOSTICS

All VA2400 Series modems are completely interchangeable with Vadic's standard packaging and diagnostic hardware. Digital and analog loopback test in-service operation without additional equipment and comprehensive interface display pictures modem and network operation.

LOW POWER

CMOS circuits are used to minimize power consumption, making the modem ideal for incorporation inside remote terminals or data communications systems.

SPECIFICATIONS AND MODELS

There are five different models, plus strapping options via pencil switch control, to cover all types of switched network or leased line applications.

VA2700: IBM COMPATIBLE MODEM

IBM supplies a series of modems, called line adapters, for IBM data communications systems. Vadic offers a complete set of modems compatible with IBM line adapters, but featuring package interchangeability with Bell types and diagnostics unique to Vadic's MDS concept. By adding a free standing cabinet, Vadic can replace and augment IBM 2711 installations.

LDA's—Limited Distance Adapters—for use with privately owned lines of limited length.

SLA's—Shared Line Adapters—up to four pairs of modems can operate independently over one privately owned line, each pair using a different frequency.

LLA's—Leased Line Adapters—IBM's version of modems for lines leased from a common carrier.

These IBM compatible modems can be mixed with all other Vadic modems in any chassis and their diagnostics capabilities are right up with all other MDS modems.

CCITT COMPATIBLE MODEMS

Vadic also manufactures a complete line of CCITT compatible low and medium speed modems. Contact the factory for information.

VA801: AUTOMATIC DIALERS

Dialers are numbered VA801A and VA801C, following Bell designations 801A and 801C for pulse and touch-tone automatic calling units, respectively. These units are functional equivalents to Bell dialers, with all strap options available. Computer systems replacing Bell dialers require *NO* software or hardware changes.

OPERATING FEATURES

Vadic dialers feature all operations necessary for reliable automatic dialing, plus several functions that optimize system performance:

- Positive dial tone detection
- Positive answer tone detection (2025 Hz or 2225 Hz)
- 7 to 90 second abandon call and retry timer
- End of number code detection
- Forced 1½ second hang-up
- Full compatibility with all Bell 103 and 202 type modems
- Field conversion between pulse and touchtone dialers
- Busy detection for early retry
- CBS or CBT Data Couplers
- Tandem Dialing (optional)
- Invalid digit detection

Vadic Multiple Data Set Systems

VA1616: 16 CHANNEL CHASSIS

The VA1616 chassis leads the group. With its capacity to hold up to 16 intermixed Vadic modems, switched or leased line, or automatic dialers in one seven inch high chassis, it is truly a space saver. And of course, redundant power supplies, programmable diagnostics, and selectable front panel display are part of the package. This means 128 modems—or 48 modems and 48 DAA cards—in a standard Vadic 19- inch wide cabinet!

DIAGNOSTICS

Sharp diagnostics figure keenly in Vadic's achievement. We know we could not just cut Bell's prices—we had to offer maintenance techniques that would make you want Vadic hardware for superior system performance. Our integral test and display system actually replaces telephone company services and hardware. Our customers tell us it's nice to know exactly what's wrong *before* phoning Bell. Look at the VA1616 chassis. With this elegant and powerful control panel at the central site you can:

- Display all EIA interface lines from a selected modem
- Test any modem locally
- Test any modem from remote station
- Send built-in test signals to remote, or use for local test
- Busy-out any modem
- Watch dynamic channel status of any modem
- Test remote terminals
- Test telephone lines

Vadic adds support hardware to the VA1616 that makes life easier for everyone. Standard prewired cabinets with housings for Bell Data Couplers simplify installation, maintenance, and the floor plan.

VA1601 & 2: 1 & 2 CHANNEL CHASSIS

For the remote terminal end, Vadic matches its MDS with a complete family of standalone modems. These units express the same sense of style and performance that sets the MDS apart. Two basic chassis, the VA1601 and VA1602, accommodate any of over 47 different plug-in modem cards—the entire Bell 103, 202, and 201 compatible line, IBM modems, and Vadic's advanced VA3400 Series.

The VA1601 holds one modem and the VA1602 holds two. Now, add the VA1601ACU automatic calling unit chassis and you have more data communications and packaging flexibility than you can find anywhere.

DIAGNOSTICS AND DISPLAY

Even though they look nice and small, each standalone chassis has the same powerful diagnostics as the VA1616.

VA1601ACU: AUTOMATIC CALLING UNIT

Packaging is in the clean and simple style of other Vadic standalone chassis, but inside there are three cards—any one of the MDS modems, a VA801 Series touchtone or pulse type dialer and an audible line monitor card. Enough room is left for a power supply that can even supply a type CBT data coupler, if necessary.

SPECIAL DIAGNOSTICS

To let you always see what the modem and dialer are doing, the VA1601ACU has separate diagnostic indicators for each. The upper row of eight lights monitors the dialer and the lower monitors the modem interface leads. Of course, these diagnostics are in every way up with the rest of Vadic MDS and standalone units. The audible line monitor card and speaker is an add feature that allows you to hear the dial and connect sequence as it actually occurs. A rear panel switch silences it for normal operation.

vadic
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