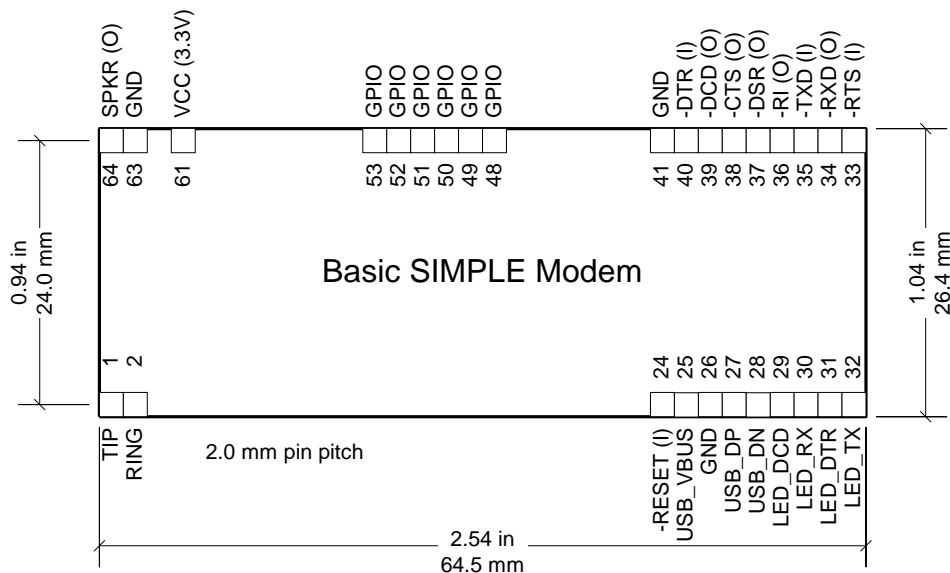


# VOCAL

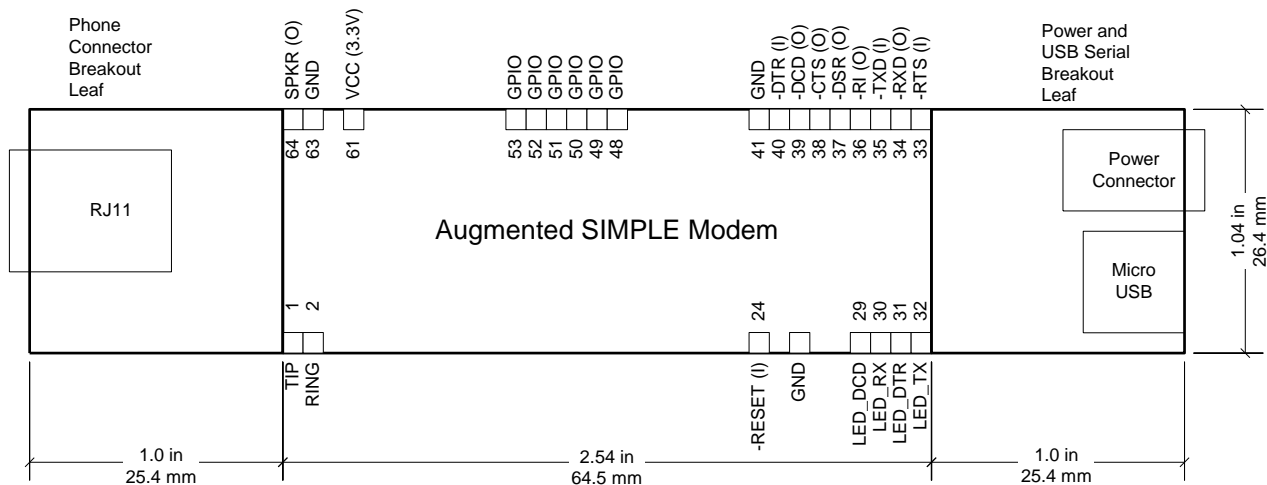
## SIMPLE Modem Reference Design Kits

The VOCAL SIMPLE (Socket Installable Module Performance Low-cost Embedded) Modem Reference Design Kits enable licensees to deploy a variety of standards-based data and fax modem capabilities with extensive features and world-wide configurability. VoCAL's highly optimized On-One™ DSP technology is used to reduce system cost by implementing all command set processing, protocol handling and performing advanced signal processing on a single state-of-the-art DSP. These designs far surpass the competition in terms of cost advantage and time-to-market potential, and VoCAL's extensive customization support allows quick and easy implementation of value-added features. Modem performance has been well characterized and virtually identical to industry leaders. Designs are based on manufacturers and components expected to support very long production life.

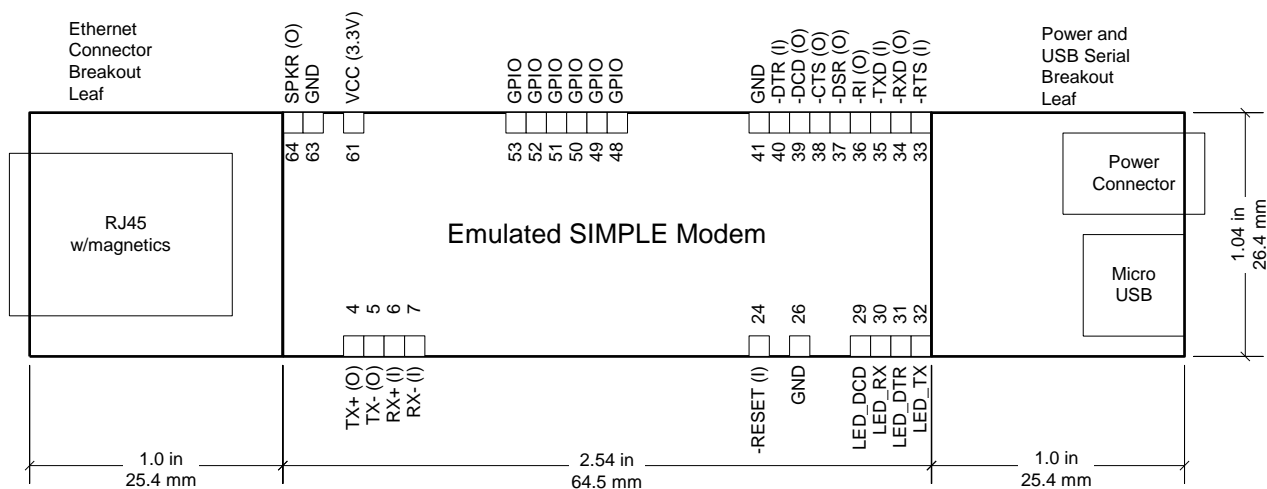
The VOCAL Basic SIMPLE Modem (BSM) is available in an industry standard embedded modem form factor with similar AT command set support. This is a plug-in replacement for other vendor's discontinued industry standard modem sockets. VOCAL's AT command set includes FAX Class 2/2.0/2.1 support for easy transition away from discontinued SocketedModem™ module products formerly offered by Multitech (trademark owned by Multitech).

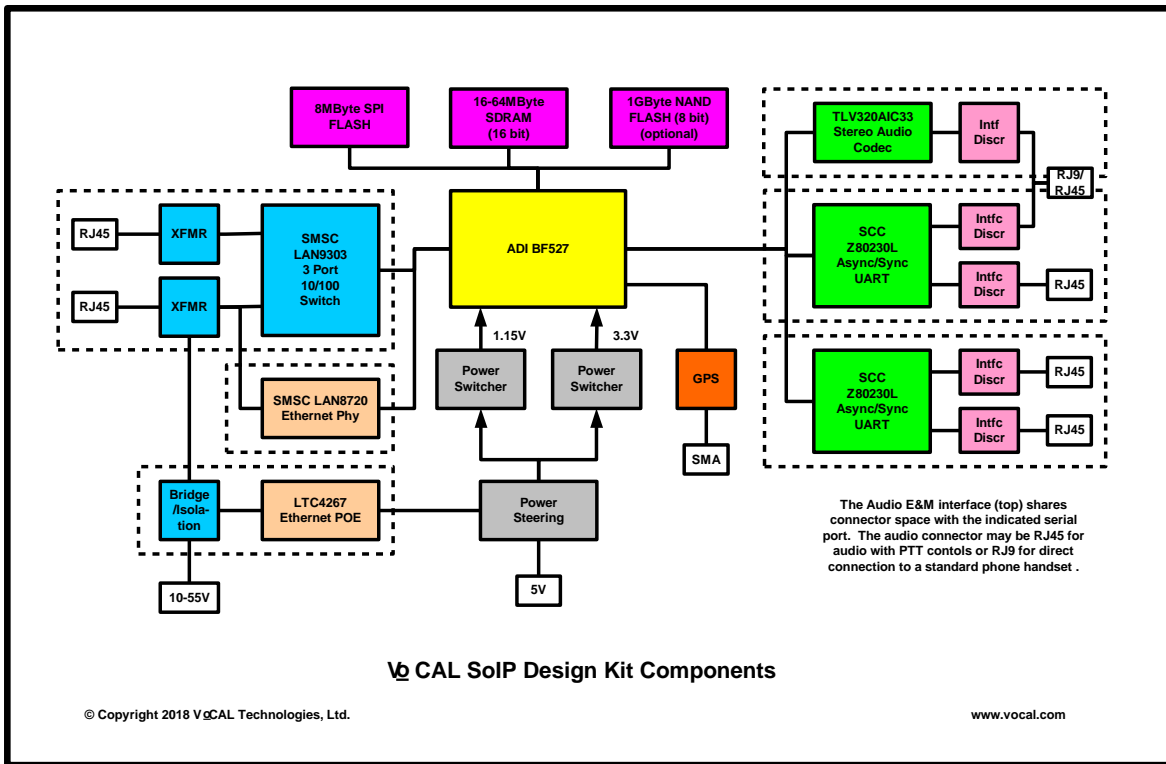


A VOCAL Augmented SIMPLE Modem (ASM) can be used as a stand-alone USB connected modem for various industrial applications. A built-in USB serial port recognized by Windows and Linux is used for full async modem operational control. One break-off leaf contains the isolated and protected telephone line interface. The other break-off leaf contains the USB serial port interface and 5V modem power supply.



A VOCAL Emulated SIMPLE Modem (ESM) combines legacy technology with modern-IP based telephony. A standard modem command set is used by the controlling processor. Telephone calls are placed using SIP. Media traffic is handled via RTP with redundancy, T.38 for facsimile or Modem over IP (MoIP). Remote server-based applications may access an ESM serial port as a remote COM port with a redirector with RFC 2217 support. V.150.1 support is optional. An on-board Ethernet port (10/100) is used for external communications.





# Reference Design Kit

The SIMPLE Modem Reference Design Kits from VoCAL offer the following capabilities:

## Technical Specifications

### Voice-over-IP (VoIP) protocols

SIPv2 - Session Initiation Protocol (RFC 3261, 3262, 3263, 3264)  
SDP - Session Description Protocol (RFC 4566)  
RTP - Real-Time Protocol (RFC 3550, 3551)  
RTCP - Real-Time Control Protocol (RFC 3550)  
RFC 4733 X-NSE Tone Events for SIP/RTP  
RFC 4733 AVT Tone Events for SIP/RTP  
STUN - Simple Traversal of UDP over NATs (RFC 3789)

### Fax Modem Support

G.711 Fax Pass-Through  
T.38 - Real-Time Fax Over IP  
T.38 using UDP  
T.38 using RTP

### Data Modem Support

G.711 Pass-Through w/Redundancy  
MoIP - Modem Over IP  
RFC 2217 Remote Port Protocol  
V.150.1 (optional)

### Fax Modulations

V.34 - Group3+ (33.6 kbps)  
V.17 - 14.4 kbps  
V.29 - 4800, 7200 and 9600 bps  
V.27 - 2400 and 4800 bps  
V.21 Channel 2 - 300 bps

### Fax Protocols

Fax Class 1, 2, 2.0 and 2.1  
T.30 - Fax Transfer Protocol  
T.4/T.6 - Format Conversions  
T.32 Command Set

### Data Modulations

V.90 - 54.6 kbps (56K)  
V.92 - Quick Connect, Modem on Hold  
V.34 - 33.6 kbps  
V.32bis - 14.4 kbps  
V.22bis - 1200 and 2400 bps  
V.23/Bell203 - 1200/75 bps  
V.21/Bell103 - 300 bps

### Data Protocols

V.42 - LAPM Error Correction  
V.42 - MNP2-4 Error Correction  
V.42bis - Data Compression  
V.44 - Data Compression  
MNP5 Data Compression  
MNP10 Enhanced Controls

### Network Protocols

IPv4 - Internet Protocol Version 4 (RFC 791)  
TCP - Transmission Control Protocol (RFC 793)  
UDP - User Datagram Protocol (RFC 768)  
ICMP - Internet Control Message Protocol (RFC 792)  
RARP - Reverse Address Resolution Protocol (RFC 903)  
ARP - Address Resolution Protocol (RFC 826)  
DNS - Domain Name Server

DHCP Client - Dynamic Host Control Protocol (RFC 2131)  
PPPoE - Point to Point Protocol over Ethernet (RFC 2516)

### Voice Codecs

G.711 - Pulse Code Modulation  
G.726 - 16, 24, 32 and 40 kbps ADPCM  
Linear 16 - 16-bit PCM  
Clearmode - RFC 4040

### Telephony

Q.24 DTMF Generation with Zero Crossing Cutoff  
Q.24 DTMF Detection exceeding Bellcore Specifications  
Caller ID Type I Detection  
Caller ID Type II Detection

### Line-echo cancellation

G.168 Line Echo Cancellation  
32 ms Echo Length  
Nonlinear Echo Suppression (ERL greater than 28 dB for f = 300 to 3400 Hz)  
Double-Talk Detection

### Quality of Service

Layer 2 Class-of-Service (CoS) Tagging (802.1P)  
Layer 2 (802.1Q VLAN)  
Layer 3 Type-of-Service (ToS) Tagging (RFC 791/1349)  
Layer 3 DIFFServ (RFC 2475)

## Hardware Features

### Data Network

Ethernet - 10baseT/100base RJ-45  
Ethernet WAN Port RJ-45

### Serial Ports

Asynchronous 75 to 115,200 bps, 5-8 data bits, optional parity

### Voice-over-IP (VoIP) protocols

Power-on Auto Registration  
Re-registration with SIP Proxy Server  
SIP over UDP  
SIP Authentication (HHP Digest with MD5)

### Security

Provisioning/Configuration/Authentications  
Password Protected Web based Administration  
RC4 Encryption for TFTP Configuration Profiles  
Authentication (DIGEST using MD5)

### Remote Configuration/Maintenance

Web Configuration via Built-in Web Server  
Configuration Update via TFTP or HTTP  
Firmware Upgrade via TFTP or HTTP  
SYSLOG Update/Upgrade Processing Notifications

### Documentation

Administration Guide  
Installation Guide  
Configuration Guide

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