iChip Plus ™

iChip Plus CO561AD-D

Datasheet

Ver. 2.15

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Revision History 11-3300-01		
Version	**Date**	**Description**
1.00	July 2001	First REV of iChip Plus CO561AD-D.
1.10	December 2001	Corrected Error in pin numbers for ~CDM, ~DTRM
1.20	January 2002	Added Crystal 8900 parameters. Changed C9 on iModem reference design to 22pF. Added DC characteristic parameters. Added recommendation to short CTS to RTS and DSR to GND when not used. Added reference design for iChip LAN with Realtek LAN controller RTL8019AS.
2.00	October 2002	Changed data sheet format. Change name of –CDH and –RIH to –CDH/–RCV and -RIH/–SER respectively.
2.10	January 2003	Internal Editing
2.15	February 2003	Added Modem interface description in chap. 4.

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1 Introduction

Description

The CO561AD-D iChip Plus™ Internet Controller™ is a low-cost intelligent peripheral device that provides Internet connectivity solutions to a myriad of embedded devices. iChip Plus supports dial-up, wireless and 10BaseT Ethernet LAN Internet connectivity.

As an embedded, self-contained Internet engine, iChip Plus acts as mediator device between a host processor and an Internet communications platform. By completely offloading Internet connectivity and standard protocols, it relieves the host from the burden of handling Internet communications. From the perspective of a host device, the complexity of establishing and maintaining Internet-related sessions is reduced to simple, straightforward commands that are entirely dealt with within iChip Plus's domain.

A serial bus interfaces iChip Plus to a device's host processor via an on-chip UART. iChip Plus also directly interfaces a serial data modem, through which it supports independent communications on the Internet via a dial-up ISP connection. In addition to supporting dial-up modems, iChip Plus also supports CDMA, TDMA, GSM, GPRS, CDPD, iDEN and AMPS wireless modems. Furthermore, the iChip Plus directly interfaces an Ethernet controller to gain access to the Internet through a standard LAN.

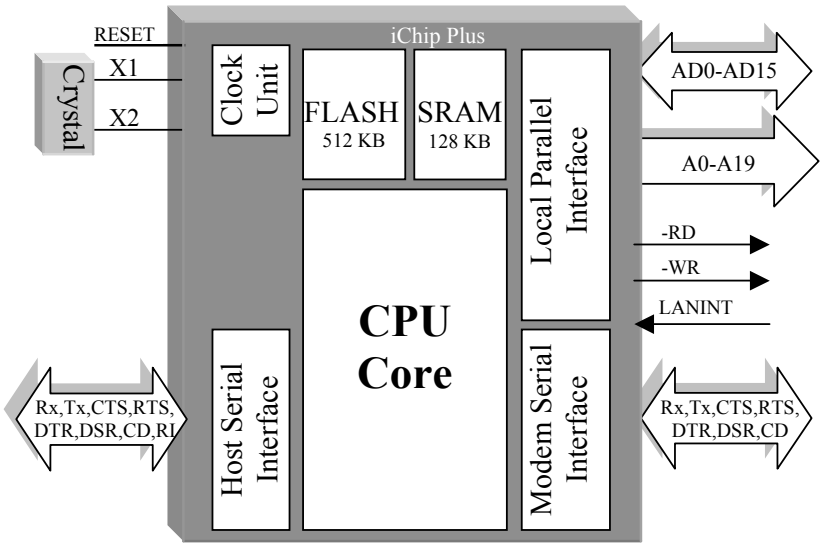
Through its host Application Programming Interface (API), iChip Plus accepts commands formatted in Connect One's AT+i™ extension to the industry-standard Hayes AT command set.

Commands are available to store and manipulate functional and Internet-related non-volatile parameter data; transmit and receive textual Email messages; transmit and receive binary (MIME encoded) Email messages; serve and fetch HTML web pages; manage FTP and Telnet transactions; act as a dynamic Web server; manipulate TCP and UDP sockets; and download parameter and firmware updates for the host device or iChip Plus itself. iChip Plus supports several levels of status reporting to the host. When the host CPU issues standard AT commands, iChip Plus gains direct access to the modem and automatically operates in transparent mode, emulating a direct host-to-modem environment (when the modem platform is selected).

iChip Plus supports 10BaseT Ethernet LANs and all serial data modems that support the AT command set. A dedicated AT+i command enables switching iChip Plus between LAN or modem mode.

Upon receiving an AT+i command, iChip Plus operates in Internet mode, controls the modem or Ethernet controller, and independently manages standard Internet protocols. iChip Plus provides all the necessary procedures to log onto an ISP, authenticate the user and establish an Internet session.

Functional Block Diagram



Pin Diagram

PLCC68

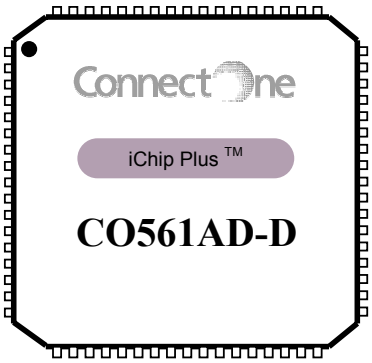


Figure 1-1 iChip Plus Functional Block Diagram

General Features

- Microprocessor-controllable through a standard serial connection or optional parallel bus.
- Supports remote firmware update by host, email, or direct modem-to-modem communications.
- Includes onboard 128KB SRAM and 512KB flash memory.
- Supports adding external memory.
- Driven by Connect One's "AT+i" extension to the AT command set.
- Stand-alone Internet communication capabilities.
- Binary Base64 encoding and MIME.
- Manages up to 10 simultaneous TCP or UDP sockets and 2 Listening sockets.
- 3.3 and 5-volt versions available, CMOS technology.
- Onboard non-volatile memory stores all functional and Internet-related parameters.
- Supports several layers of status reports.
- Internal self-test procedures.
- Auto baud rate detection up to 115,200 bps.
- Includes hardware and software flow control.
- PLCC68 package.

General Protocols

- Supports following Internet Protocols: IP, TCP, UDP, DNS, SMTP, POP3, MIME, HTTP, FTP, Telnet and Web server
- SerialNET mode for Serial to Internet routing.

Dial-up Features

- Supports dialup Internet Protocols: PPP, LCP, IPCP, and PAP or CHAP authentication.
- Supports data modems up to 56 Kbps.
- Supports AMPS, CDMA, CDPD, iDEN, TDMA, GSM and GPRS wireless modems.
- Stay-on-line feature for multiple send/receive sessions.
- Transparent mode supports direct modem commands.

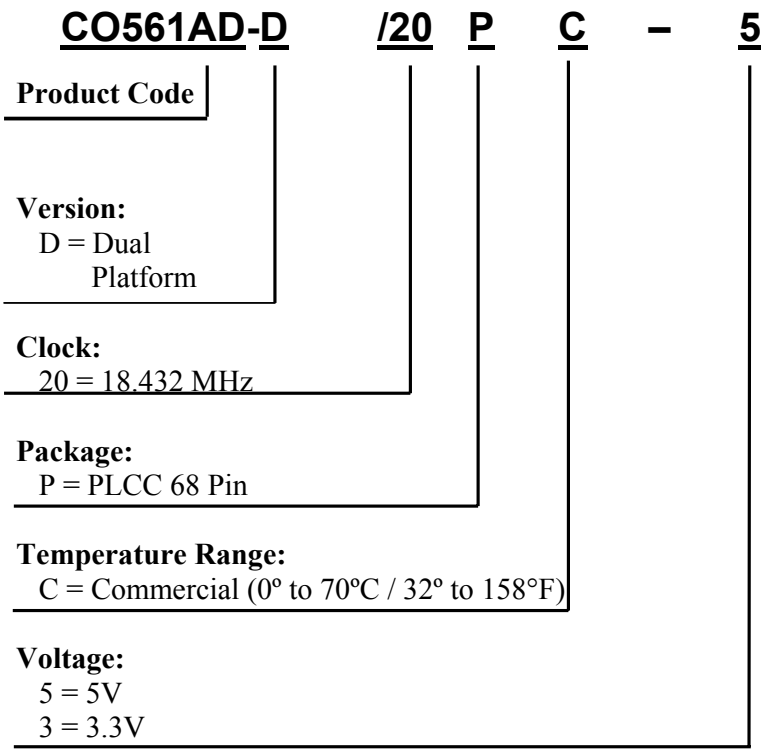
LAN Features

- Supports LAN Internet Protocols: ARP, ICMP and DHCP.
- Provides 10BaseT Ethernet LAN connectivity via Crystal LAN CS8900A and Realtek RTL8019AS Ethernet controller.
- Supports up to 115.2 Kbps throughput.

2 Ordering Information

2.1 iChip Plus Order Number

Connect One's iChip Plus devices are available in two operating voltages. The order number is formed by a combination of the elements below:



3 Functional Description

3.1 Overview

Connect One's iChip Plus Internet Controller is an integrated, firmware-driven, self-contained Internet engine that is available in a 68-pin PLCC package. iChip Plus accepts simple ASCII commands from a host CPU via a serial communication bus and manages an Internet communication session to send and receive Email, Web and WAP pages/files, utilize FTP and Telnet, serve as a serial-to-Internet router, or to manipulate sockets through a linked modem or Ethernet communications platform.

For 10BaseT Ethernet and modem applications, iChip Plus includes the firmware and pin-out necessary to drive an external Crystal LAN CS8900A or Realtek RTL8019AS (RTL8019AS for 5-volt version only) 10BaseT Ethernet controller, a serial dial up modem or a wireless cellular modem.

iChip Plus contains a non-volatile FLASH memory to store its firmware and Internet-related operational parameters. Remote firmware and parameter updates are supported through the local host link, by Email, using a Web browser or directly through the communications platform.

3.2 Technical Specifications

3.2.1 General

iChip Plus constitutes a complete Internet messaging solution for non-PC embedded devices. It acts as a mediator device to completely offload the host processor of Internet-related software and activities. An industry-standard asynchronous serial link connects iChip Plus to the host processor. Programming, monitoring and control are fully supported using Connect One's AT+i extension to the standard AT command set.

iChip Plus connects to serial modems and to an Ethernet controller for Internet access. An AT+i command is provided to switch between the serial modem and Ethernet.

3.2.2 Data Rates

iChip Plus supports standard baud rate configurations from 2,400 bps up to 115,200 bps on the host asynchronous serial communications bus. iChip Plus is shipped in a default auto baud rate mode. This default may be changed by using the AT+iBDRF command.

3.2.3 Operation

All iChip Plus Internet and parameter operations are controlled by AT+i commands.

3.2.3.1 Transparent Mode

In modem communications mode, iChip Plus defaults to Transparent mode, allowing the host to control the modem device directly. Control is implemented by issuing standard

AT commands to iChip Plus. In this mode, iChip Plus transparently echoes the AT commands to the modem, as well as echoing the modem responses back to the host. iChip Plus supports interlacing AT+i and AT commands while the modem is in Command mode.

When the modem is put into data mode, by issuing a dial command, Transparent mode is sustained throughout the data-mode session.

3.2.3.2 Command Mode

iChip Plus commands are implemented using the AT+i command set. Command flow exists only on the host serial bus between the host and iChip Plus.

3.2.3.3 Internet Mode

iChip Plus enters Internet mode after being issued an Internet command such as to send or receive an Email message, open a socket, etc. iChip Plus attempts to establish an Internet connection and carry out the required activity through the communication platform link. While in this mode, AT+i commands are supported to monitor and control the process when needed.

3.2.3.4 Direct Modem Firmware Update Mode

In a modem configuration, issuing an AT+iFU command enters this mode. iChip Plus monitors the modem for an incoming call by detecting the 'RING' response. When called, iChip Plus instructs the modem to answer the call and assumes a YMODEM session to receive a file containing a firmware update. The incoming file contents are downloaded and authenticated. If the new firmware image checks out the existing firmware is replaced in the on-chip flash memory and iChip Plus is reinitialized.

3.2.3.5 SerialNET Mode

iChip Plus SerialNET mode extends a local asynchronous serial link to a TCP or UDP socket across a LAN or Internet. Its main purpose is to allow simple devices, which normally interact over a serial line, to interact in a similar fashion across a network, without requiring any changes in the device itself. iChip Plus contains a set of associated operational parameters, which define the nature of the desired network connection. iChip Plus supports both Server and Client modes in SerialNET mode. AT+i commands are not required to operate SerialNET mode. Thus, SerialNET mode may be used in existing systems with little or no need to modify the application program.

3.2.4 Remote Internet Firmware Update

New firmware may be uploaded from a remote location using standard Internet protocols. iChip Plus accepts Emails with new firmware attachments, as well as firmware uploads from a remote browser through iChip Plus's Web server.

3.2.5 Host Serial Connection

iChip Plus supports a full-duplex, TTL-level serial communications link with the host processor. Full EIA-232-D hardware flow control, including Tx, Rx, CTS, RTS, DTR, and DSR lines, is supported.

3.2.6 Serial Connection to Analog Modem

iChip Plus CO561AD-D supports a full-duplex, TTL-level serial communications link with the modem device. Full EIA-232-D hardware flow control, including Tx, Rx, CTS, RTS, DTR, DSR and CD lines, is supported. It does not support the RI line.

3.2.7 Hardware and Software Flow Control

Hardware flow control is supported between the host CPU and iChip Plus and between iChip Plus and the modem. Flow control is programmed via the AT+iFLW command. The default flow control methods are set to "Wait/Continue" software flow control between iChip Plus and the host. This method is similar to XON/XOFF software flow control.

The hardware flow control method frees the host CPU from monitoring and handling the software flow control. The host can program iChip Plus to either use hardware flow control or to use "Wait/Continue" software flow control between iChip Plus and the host CPU. The flow control mechanism is based on the RTS/CTS signals.

3.2.8 Local BUS Connection to Ethernet Controller

iChip Plus directly supports a Crystal LAN CS8900A or Realtek RTL8019AS IEEE 802.3 Ethernet controller in 16-bit memory mode. The Interrupt signal is directly connected to a dedicated input pin.

4 Hardware Interface

iChip Plus CO561AD-D interfaces between a host CPU and a modem.

4.1 Host Interface

The host interface is a serial DTE interface. Speeds of 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps are supported in the following data format:

Parity	Data Length (No. of Bits)	No. of Stop Bits	Transmission Length (No. of Bits)
None	8	1[1]	10

Table 4-1 Host Data Format

Note: 1) When hardware flow control is enabled, the iChip Plus transmitter will add an additional stop bit.

4.2 LAN Interface

iChip Plus directly interfaces an Ethernet LAN MAC/PHY device on its 16-bit local BUS. Currently iChip Plus supports the Crystal LAN CS8900A 10BaseT Ethernet controller.

4.3 Serial Modem Interface

iChip Plus includes a dedicated port to interface a serial modem.

The modem interface is a serial DCE interface. Speeds of 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps are supported in the following data format:

Parity	Data Length (No. of Bits)	No. of Stop Bits	Transmission Length (No. of Bits)
None	8	1	10

Table 4-2 Modem Data Format

Actual baud rate may be preprogrammed or dynamically defined as equal to the auto baud rate detected on the serial host interface (when the iChip Plus operates in Serial mode). When iChip Plus operates in Parallel mode, the modem interface baud rate must be preprogrammed.

iChip Plus does not provide a Ring Indicator input signal.

4.4 Dual Interface

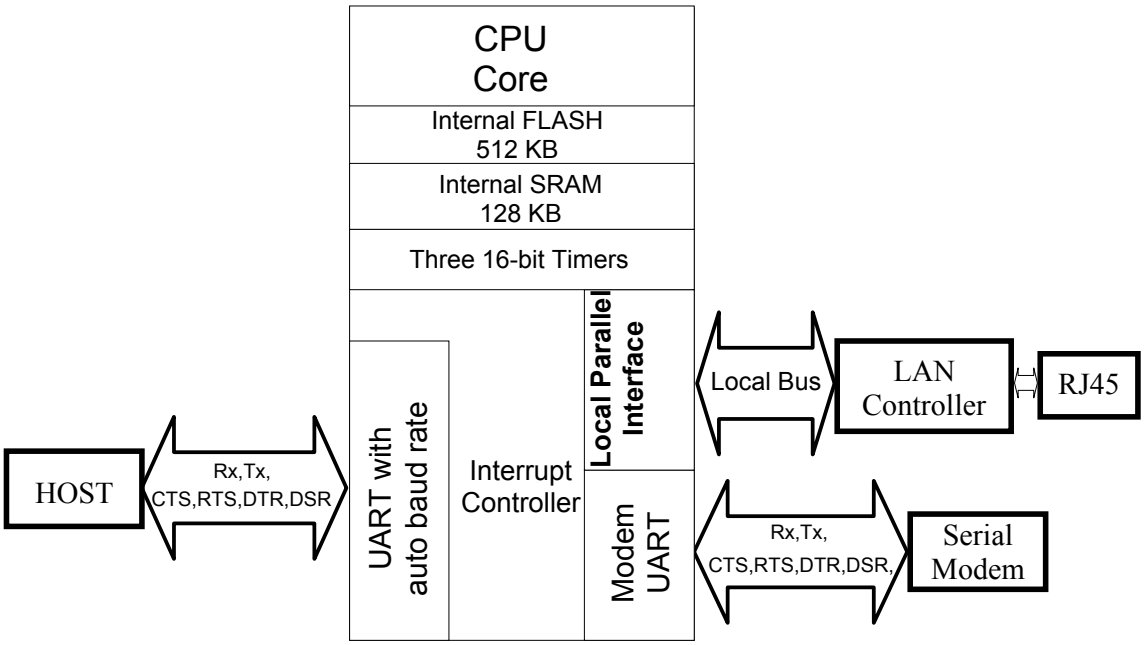


Figure 4-1 iChip Plus CO561AD-D with LAN and serial modem interface

5 Pin Descriptions

5.1 iChip Plus CO561AD-D Pin Assignments

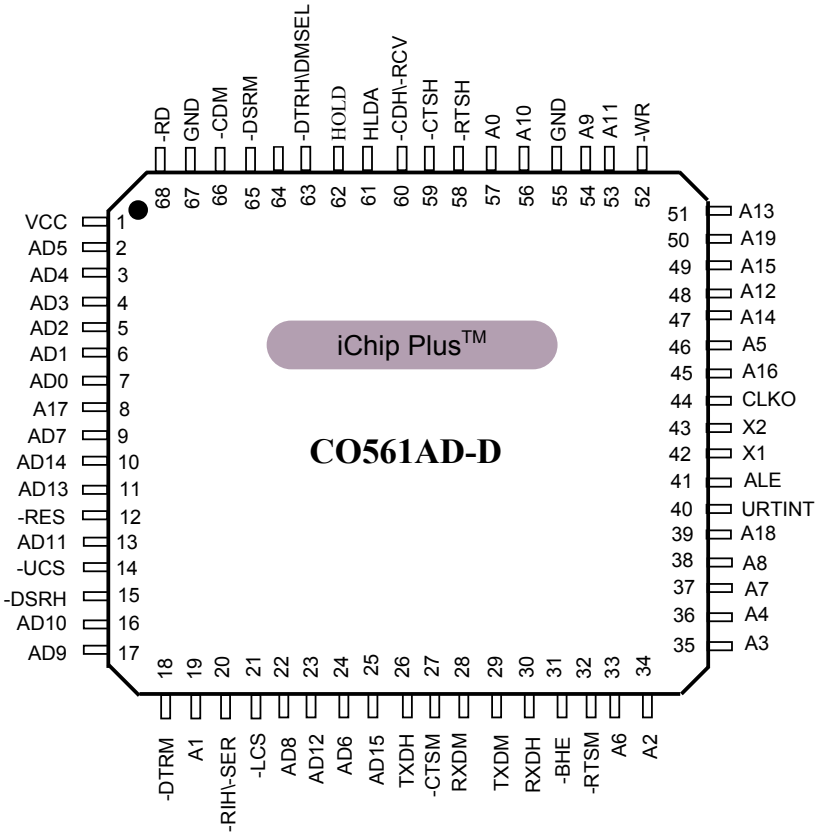


Figure 5-1 PLCC68 Package for iChip Plus CO561AD-D Version

5.2 iChip Plus Pin Functional Descriptions

5.2.1 Local BUS Signals

Signal	Type	Pin No.	Description
A [19:0]	O	50, 39, 8, 45, 49, 47, 51, 48, 53, 56, 54, 38, 37, 33, 46, 36, 35, 34, 19, 57	Address BUS: These pins supply addresses to the system one-half of a CLKO period earlier than the multiplexed address and data BUS AD15–AD0. During a BUS hold or reset condition, the address BUS is in a HIGH-impedance state. These pins should be Connected to the address BUS of the LAN controller.
AD[15:0]	O/I	25, 10, 11, 23, 13, 16, 17, 22, 9, 24, 2, 3, 4, 5, 6, 7	Address and Data BUS: These time-multiplexed pins supply addresses and data to the system. This BUS supplies an address to the system during the first period of a BUS cycle. They supply data to the system during the remaining periods of that cycle. During a BUS hold or reset condition, the address BUS is in a HIGH-impedance state. These pins should be Connected to data BUS of the LAN controller.
ALE	O	41	Address Latch Enable: This pin indicates to the system that an address appears on the address and data BUS (AD15–AD0). The address is guaranteed to be valid on the trailing edge of ALE. This pin should be left Not Connected.

<table>
<tr><th>Signal</th><th>Type</th><th>Pin No.</th><th>Description</th></tr>
<tr><td>-BHE</td><td>O</td><td>31</td><td>BUS HIGH Enable: This pin and the least-significant address bit (AD0 or A0) indicate to the system which bytes of the data BUS (upper, lower, or both) participate in a BUS cycle. The -BHE and A0 pins are encoded as shown in the table below.
<table>
<tr><th>-BHE</th><th>AD0</th><th>Type of BUS cycle</th></tr>
<tr><td>0</td><td>0</td><td>Word Transfer</td></tr>
<tr><td>1</td><td>0</td><td>Even Byte Transfer</td></tr>
<tr><td>0</td><td>1</td><td>Odd Byte Transfer</td></tr>
<tr><td>1</td><td>1</td><td>N/A</td></tr>
</table>
During a BUS hold or reset condition, -BHE is in a HIGH impedance state.
This pin should be Connected to -BHE of LAN controller if it exists.</td></tr>
<tr><td>-UCS</td><td>O</td><td>14</td><td>Upper Chip Select: When –UCS is LOW, iChip Plus accesses internal flash memory.
This pin should be left Not Connected.</td></tr>
<tr><td>-LCS</td><td>O</td><td>21</td><td>Lower Chip Select: When –LCS is LOW, iChip Plus accesses internal SRAM memory.
This pin should be left Not Connected.</td></tr>
<tr><td>HOLD</td><td>I</td><td>62</td><td>BUS Hold Request: when HOLD is HIGH, it indicates that an external BUS master needs control of the local BUS.
This pin should be connect to GND.</td></tr>
<tr><td>HLDA</td><td>O</td><td>61</td><td>BUS Hold Acknowledge: This pin goes HIGH to indicate to an external BUS master that iChip Plus has released control of the local BUS.
This pin should be left Not Connected.</td></tr>
<tr><td>-RD</td><td>O</td><td>68</td><td>READ: This pin indicates that iChip Plus is performing a memory read cycle. -RD floats during a BUS hold condition.
This pin should be Connected to -RD of the LAN controller.</td></tr>
<tr><td>-WR</td><td>O</td><td>52</td><td>WRITE: This pin indicates that iChip Plus is performing a memory write cycle. -WR floats during a BUS hold condition.
This pin should be Connected to the LAN controller’s -WR signal.</td></tr>
</table>

5.2.2 Miscellaneous Signals

Signal	Type	Pin No.	Description
URTINT	I	40	UART Interrupt: This pin is for debugging purpose only. It is internally connected to a pull up resistor. This pin should be left Not Connected.
-RES	I	12	RESET: When -RES is LOW, iChip Plus immediately terminates its present activity and clears its internal logic. -RES must be held LOW for at least 1 ms after power stabilizes. iChip Plus begins fetching instructions approximately 6.5 CLKO periods after -RES going HIGH. This input is provided with a Schmidt trigger to facilitate power-on reset generation via an RC network.
LANINT	I	64	LAN Interrupt. When high, indicates that the LAN controller has information.
X1	I	42	Crystal Input: This pin and the X2 pin provide connections for a fundamental mode or third-overtone, parallel-resonant crystal used by the internal oscillator circuit. To provide iChip Plus with an external clock source, connect the source to the X1 pin and leave the X2 pin unconnected.
X2	O	43	Crystal Output: This pin and the X1 pin provide connections for a fundamental mode or third-overtone, parallel-resonant crystal used by the internal oscillator circuit.
CLKO	O	44	Clock Output: This pin supplies the internal clock to the system and has the some frequency as X2.
GND	P	67, 55	Ground: Ground signal for iChip Plus.
VCC	P	1	Power Supply: This pin supplies power (+5V or +3.3V) to iChip Plus.

5.2.3 Host Interface Signals

Signal	Type	Pin No.	Description
TXDH	O	26	Transmit Data Host: This pin supplies asynchronous serial transmit data to the host.
RXDH	I	30	Receive Data Host: This pin supplies asynchronous serial receive data from the host. When this pin is not used, connect it to VCC.
-CTSH	I	59	Clear-to-Send Host: -CTSH is active only when host hardware flow control is enabled. When -CTSH is LOW, flow control is enabled to the host serial port, i.e., iChip Plus may transmit to the host. When -CTSH is HIGH, the iChip Plus transmitter holds its data in the serial port transmit register. -CTSH is sampled only at the beginning of a frame transmission. If -CTSH is raised while a character frame is being transmitted, that frame will be completed. Connect -CTSH to -RTSH when not in use.
-RTSH	O	58	Ready-to-Send Host: -RTSH is active only when host hardware flow control is enabled. When -RTSH is LOW, flow control is enabled from the host serial port, i.e., the host may transmit to iChip Plus. When -RTSH is HIGH, iChip Plus indicates that its receiver is busy and cannot receive data from host. Connect -RTSH to -CTSH when not in use.
-DSRH	I	15	Data Set Ready Host: When -DSRH is LOW, it indicates that the host is attached and ready to communicate with iChip Plus. Connect -DSRH to GND when not in use.
-CDH/-RCV	O	60	In dial-up mode, this pin functions as –CDH. In LAN mode, it functions as –RCV. Carrier Detect Host: This pin indicates to the host that the modem communication device detects a carrier signal. Receive LAN Package: When LOW, indicates that iChip Plus may receive a data packet from the LAN controller. During firmware update, -CDH and -RIH are used to display the firmware update status.

Signal	Type	Pin No.	Description
-RIH/-SER	O	20	In dial-up mode, this pin functions as –RIH. In LAN mode, it functions as –SER. Ring Indicator Host: This pin indicates to the host that the modem communication device detects a Ring signal. Serial Indicator Host: When LOW, indicates that iChip Plus may receive a legal character from the host. During firmware update, -CDH and -RIH are used to display the firmware update status.
-DTRH/DMSEL	O	63	After reset, this pin's functionality is DMSEL. During normal operation, this pin acts as –DTRH. Data Terminal Ready Host: When -DTRH is LOW, it indicates to the host that iChip Plus is attached and ready to communicate. When this pin is held LOW during power up for at least 1 second, and no longer than 5 seconds, iChip Plus will enter auto baud rate mode. When this pin is held LOW during power up for more than 5 seconds, iChip Plus will automatically enter firmware update mode.

5.2.4 iChip Plus Serial Modem Signals

Signal	Type	Pin No.	Description
TXDM	O	29	Transmit Data Modem: This pin provides asynchronous serial transmit data to the modem from the serial port.
RXDM	I	28	Receive Data Modem: This pin provides asynchronous serial receive data from the modem to the asynchronous modem serial port. When this pin is not used, connect it to VCC.
-CTSM	I	27	Clear-to-Send Modem: -CTSM is active only when modem hardware flow control is enabled. When -CTSM is LOW, flow control is enabled to the modem serial port, i.e., iChip Plus may transmit to the modem. When -CTSM is HIGH, the iChip Plus transmitter holds its data in the serial port transmit register. Connect -CTSM to -RTSM when not in use
-RTSM	O	32	Ready-to-Send Modem: -RTSM is active only when modem hardware flow control is enabled. When -RTSM is LOW, flow control is enabled from the modem serial port, i.e., the modem may transmit to iChip Plus. When -RTSM is HIGH, iChip Plus indicates that its receiver is busy and cannot receive data from the modem. Connect -RTSM to -CTSM when not in use.
-DSRM	I	65	Data Set Ready Modem: When -DSRM is LOW, it indicates that the modem is attached and ready to communicate with iChip Plus. Connect -DSRM to GND when not in use.
-DTRM	O	18	Data Terminal Ready Modem: When -DTRM is LOW it indicates to the modem that iChip Plus is attached and ready to communicate.
-CDM	I	66	Carrier Detect Modem: This pin indicates to iChip Plus that the modem detects a carrier signal.

6 Electrical/Mechanical Specifications

6.1 Environmental Specifications

6.1.1 Absolute Maximum Ratings

Parameter	Rating
Voltage at any pin with respect to ground	-0.5 to VCC + 0.5 Volts
Operating temperature	0°C to 70°C (32 to 158°F)
Storage temperature	-60°C to 120°C (–76 to 248°F)
Soldering temperature (max. 10 sec.)	220°C (428°F)
Package dissipation	1.5 Watts

Table 6-1 Environmental Specifications for 5V and 3.3V Version

6.1.2 DC Operating Characteristics

6.1.2.1 3.3 Volt Version

Parameter	Min	Typical	Max	Units
DC Supply	3.0	3.3	3.6	Volts
HIGH-level Input	2.0		VCC+0.5	Volts
HIGH-level Input for X1	VCC-0.8		VCC+0.5	Volts
LOW-level Input	-0.5		0.8	Volts
HIGH-level Output[1]	VCC-0.5		VCC	Volts
LOW-level Output[2]			0.45	Volts
Input leakage current			+/- 10	µA
Power supply current (Operating Mode[3])		70	80	mA
Input capacitance			20	pF

Notes: 1: $I_{OH} = 0.2mA$
2: $I_{OL} = 1mA$
3: 18.432 MHz clock

Table 6-2 DC Operating Characteristics 3.3V Version

6.1.2.2 5 Volt Version

Parameter	Min	Typical	Max	Units
DC Supply	4.75	5.0	5.25	Volts
HIGH-level Input	2.0		VCC+0.5	Volts
LOW-level Input	-0.5		0.8	Volts
HIGH-level Output[1]	2.4		VCC	Volts
HIGH-level Input for X1	VCC-0.8		VCC+0.5	Volts
LOW-level Output[2]			0.45	Volts
Input leakage current			+/- 10	µA
Power supply current (Operating Mode[3])		160	220	mA
Input capacitance			20	pF

Notes: 1: $I_{OH} = 2.4mA$
2: $I_{OL} = 2mA$
3: 18.432 MHz clock

Table 6-3 DC Operating Characteristics 5V Version

6.2 Interface Timing and Waveforms

6.2.1 Switching Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Clock Out frequency	Fclk	18.430	18.432	18.434	MHz
Clock Out period	Tclk		1/Fck		us
Address valid to –RD LOW	Tavrl	72			ns
-RD active delay	Tclrl	25			ns
-RD pulse with	Trlrh	94			ns
Data in setup	Tdvcl	10			ns
Data in hold	Tcldx	3			ns
Address valid to –WR LOW	Tavwl	72			ns
Data valid delay	Tcldv	0		25	ns
Control active delay	Tcvctv	0		25	ns
-WR pulse with	Trlrh	94			ns
X1 fall time (1)	Tckhl			5	ns
X1 rise time (2)	Tcklh			5	ns
X1 LOW time	Tclck	24	27	30	ns
X1 HIGH time	Tchck	24	27	30	ns
X1 to CLKO skew	Tcico			25	Ns

Table 6-4 Switching Characteristics

(1) Fall time in 5V version is from 3.5V to 1V and in 3V version is from 2V to 1V.
(2) Rise time in 5V version is from 1V to 3.5V and in 3V version is from 1V to 2V.

6.2.2 Local BUS Read Cycle

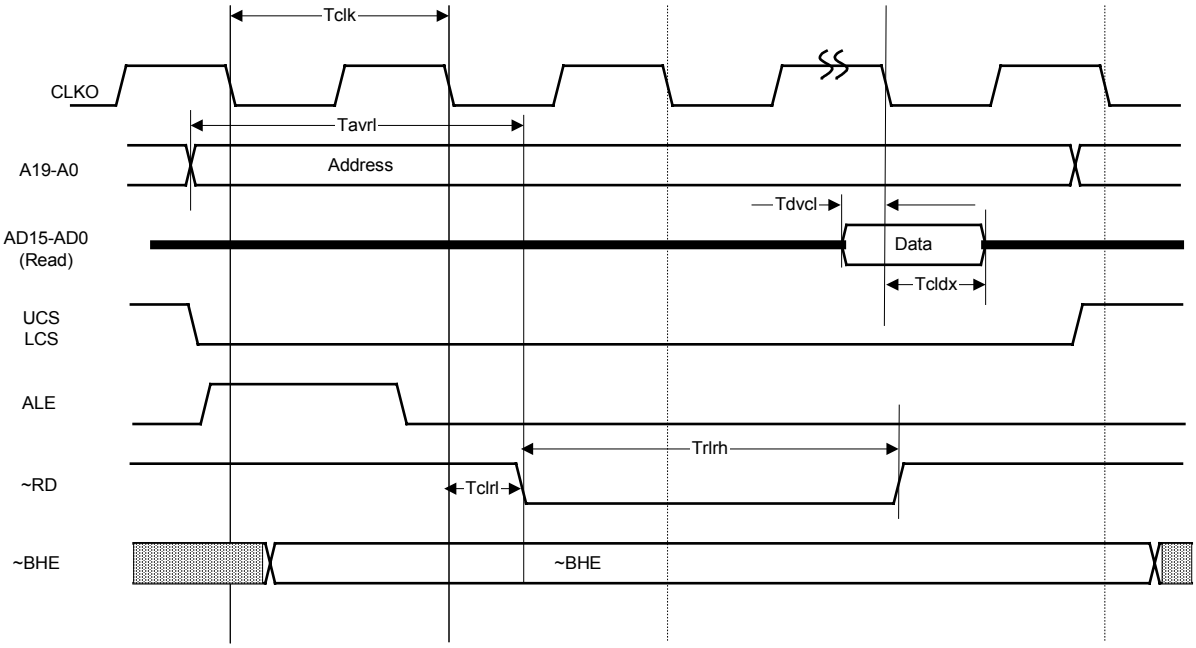


Figure 6-1 Local BUS Read Cycle

6.2.3 Local BUS Read Cycle

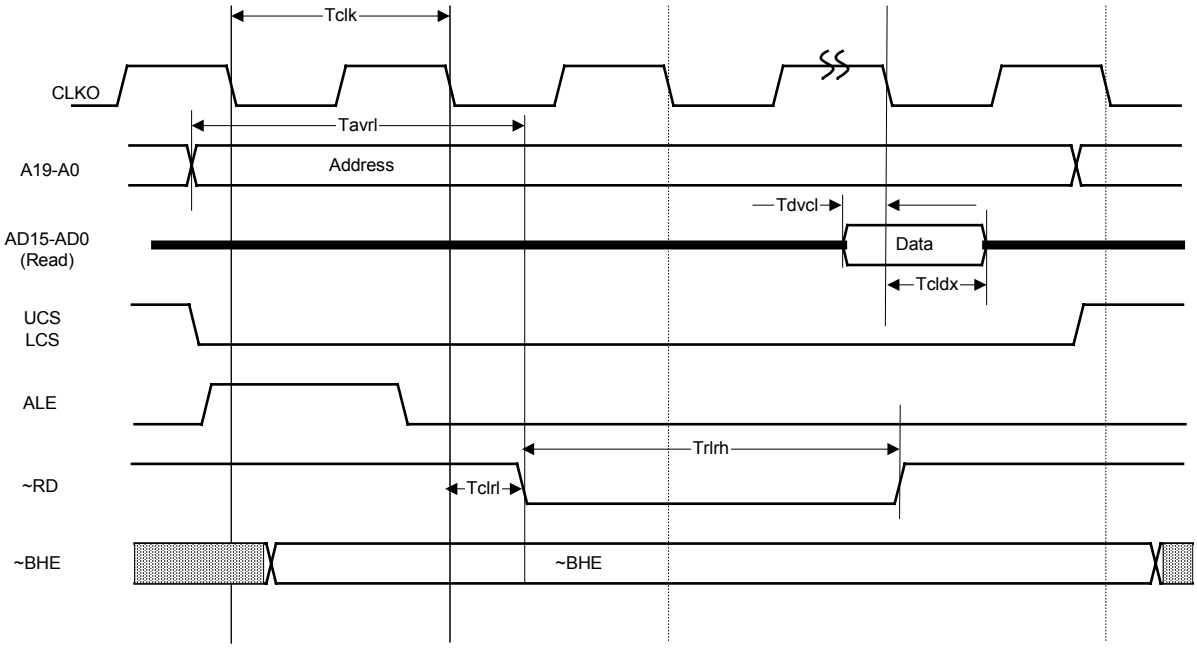


Figure 6-2 Local BUS Write Cycle

6.2.4 Clock Waveform

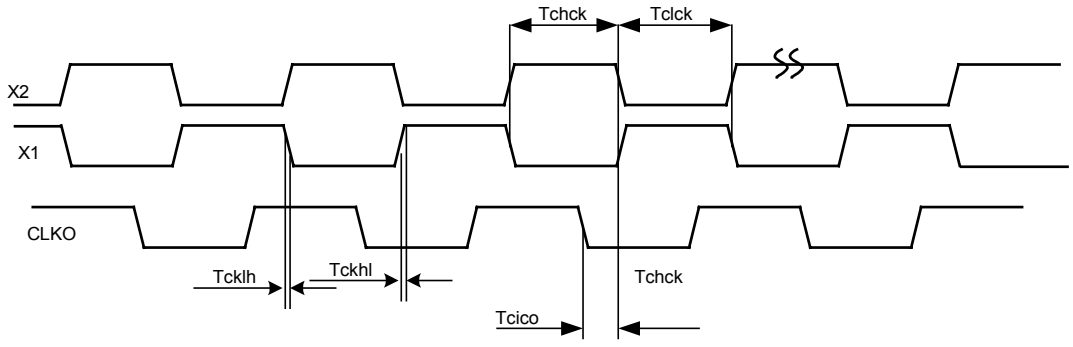


Figure 6-3 Clock Waveform

6.3 Mechanical Dimensions

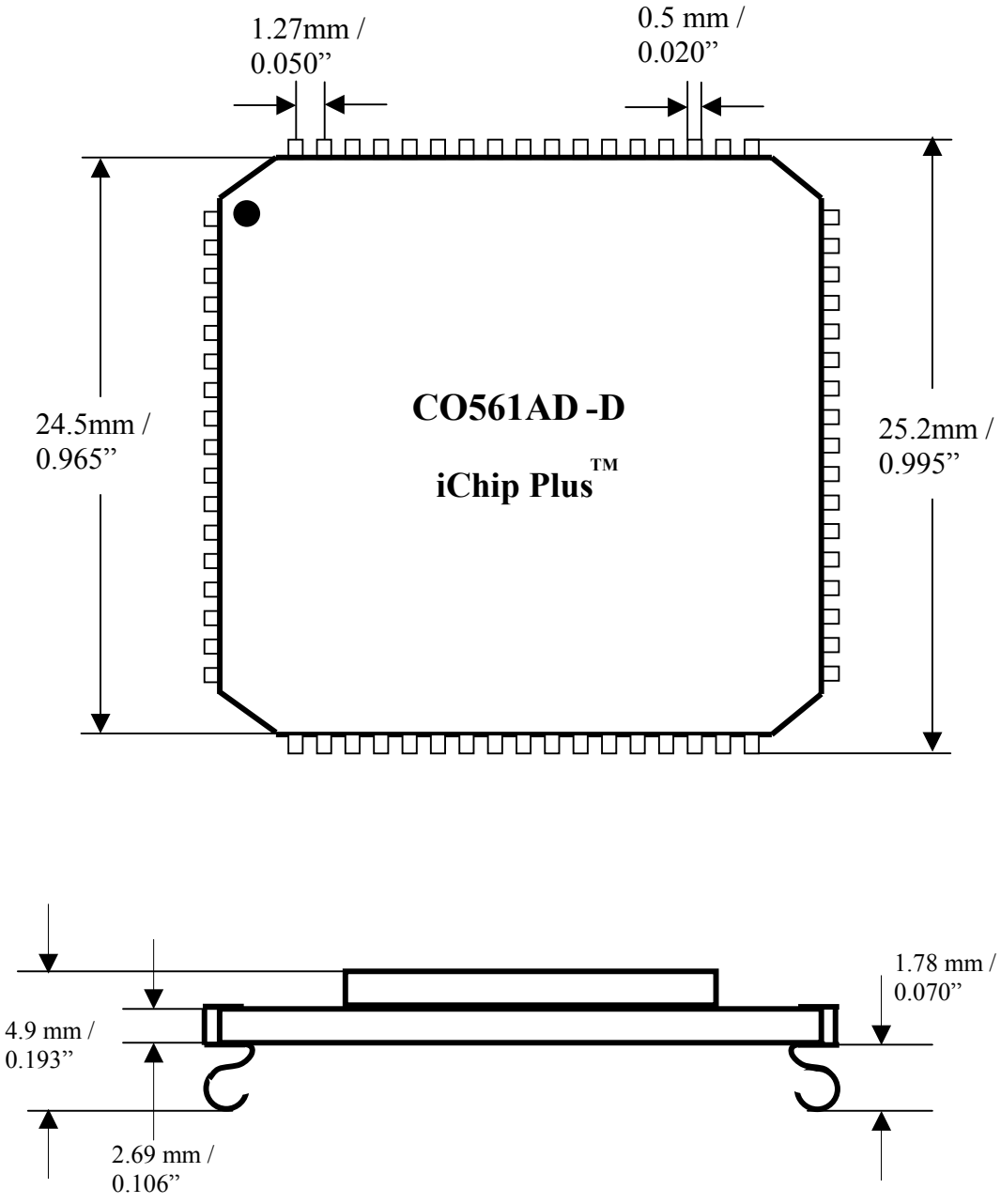


Figure 6-4 Mechanical Dimensions

7 iChip Plus Designs

7.1 Ethernet Controller Environment with CS8900A (5V or 3.3V)

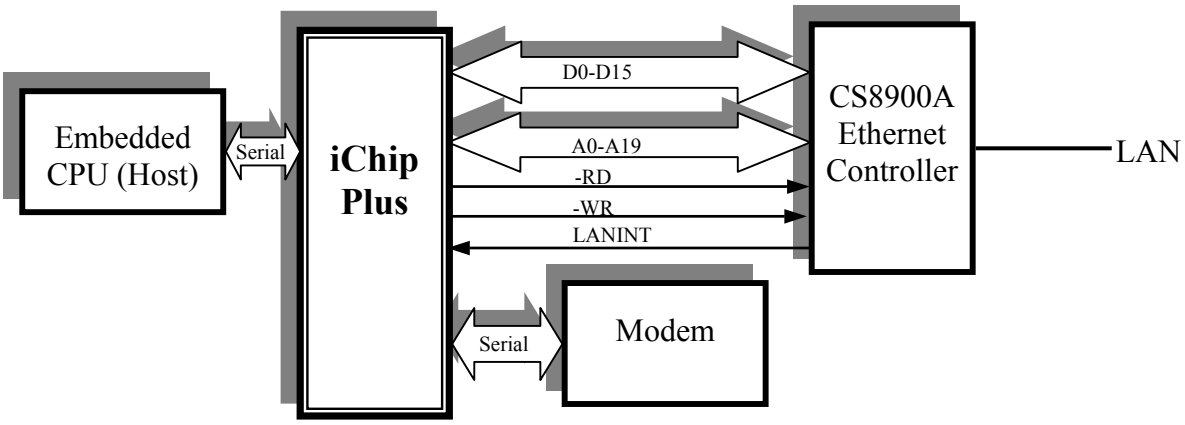


Figure 7-1 CS8900A Ethernet Controller Environment

7.2 Ethernet Controller Environment with RTL8019AS (5V only)

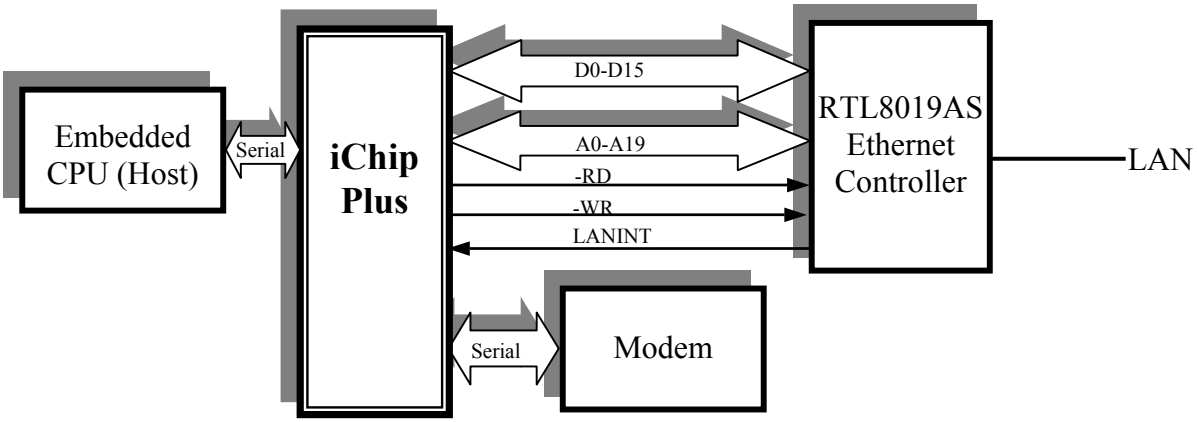


Figure 7-2RTL8019AS Ethernet Controller Environment

7.3 Selecting a Crystal

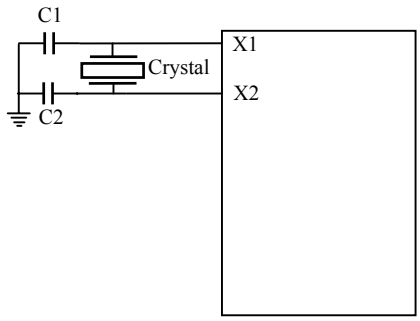


Figure 7-3 Selecting a Crystal.

The characteristics of the built-in inverting amplifier set limits on the following parameters for crystals:
Crystal first overtone frequency ..... 18.432 MHz
ESR (Equivalent Series Resistance) ..... 40 Ω max
Drive Level .....….. 1 mW max
Frequency tolerance …… +/- 100ppm
Load capacitance…….. 18pF
Shunt capacitance……. 7pF Maximum

The recommended range of values for C 1 and C 2 are as follows:
C 1 ..... 15 pF ± 20%
C 2 ..... 22 pF ± 20%
The specific values for C1 and C2 must be determined by the designer and are dependent on the characteristics of the chosen crystal and board design.

7.4 Selecting the Reset Circuit

7.4.1 RC Network

The Reset signal may be designed with an RC network. τ should be greater than 10 mSec. This is a low-cost solution.

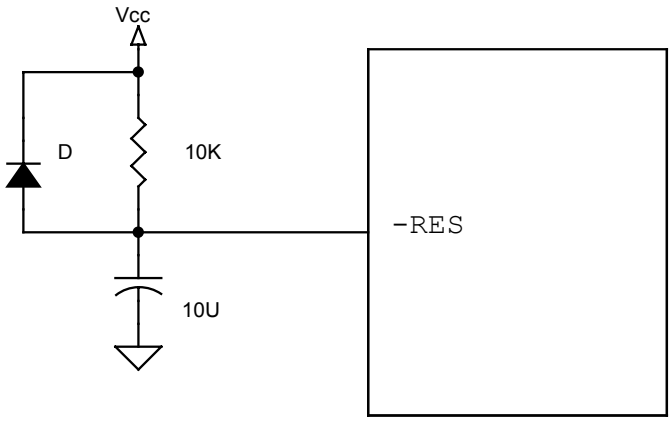


Figure 7-4 RC Reset Circuit

7.4.2 Supervisory Circuit

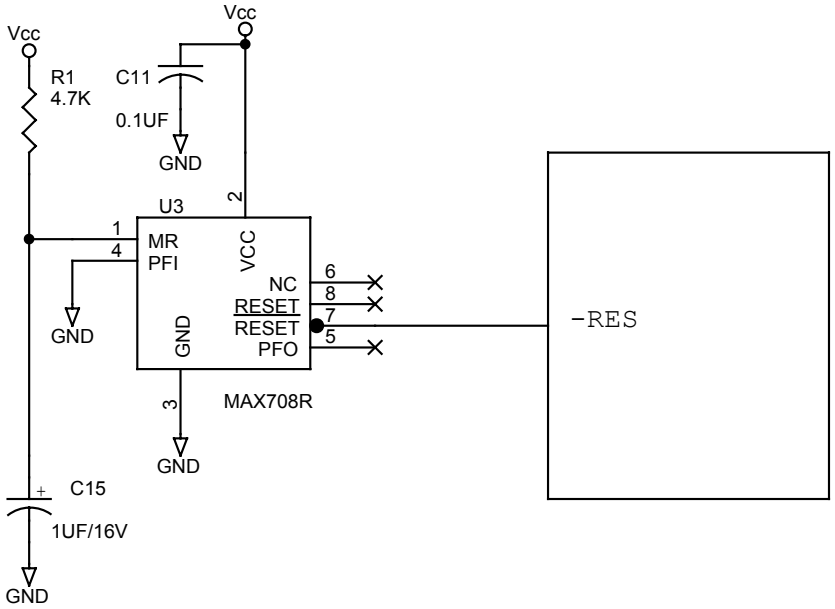


Figure 7-5 Supervisory Reset Circuit

8 Protocol Compliance

iChip Plus CO561AD-D complies with the following Internet standards:

RFC 768	User Datagram Protocol (UDP)
RFC 791	Internet Protocol (IP)
RFC 792	ICMP – Internet Control Message Protocol
RFC 793	Transmission Control Protocol (TCP)
RFC 821	Simple Mail Transfer Protocol (SMTP)
RFC 822	Standard for the Format of ARPA Internet Text Messages
RFC 826	Ethernet Address Resolution Protocol (ARP)
RFC 854	TELNET protocol specification
RFC 857	Telnet ECHO option
RFC 858	Telnet suppress go-ahead option
RFC 959	FTP – File Transfer Protocol
RFC 1034	DOMAIN NAMES (DNS) - Concepts and Facilities
RFC 1035	DOMAIN NAMES (DNS) - Implementation and Specification
RFC 1073	Telnet window size option
RFC 1091	Telnet terminal type option
RFC 1321	MD5 Message Digest Algorithm
RFC 1331	Point-to-Point Protocol (PPP)
RFC 1332	PPP Internet Protocol Control Protocol (IPCP)
RFC 1334	PPP Authentication Protocols (PAP)
RFC 1570	PPP LCP Extensions
RFC 1661	Point-to-Point Protocol (PPP)
RFC 1877	PPP IPCP Extensions for Name Server Addresses
RFC 1939	Post Office Protocol - Version 3 (POP3)
RFC 1957	Some Observations on the Implementations of the Post Office Protocol (POP3)
RFC 1994	PPP Challenge Handshake Authentication Protocol (CHAP)
RFC 2045	Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies
RFC 2046	Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types
RFC 2047	MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text
RFC 2048	Multipurpose Internet Mail Extensions (MIME) Part Four: Registration Procedures
RFC 2049	Multipurpose Internet Mail Extensions (MIME) Part Five: Conformance Criteria and Examples
RFC 2068	HyperText Transfer Protocol HTTP/1.1
RFC 2131	DHCP
RFC 2132	DHCP Options

Table 8-1 Internet Protocol Compliance

9 List of Terms and Acronyms

10BaseT	10-Mbps baseband Ethernet specification using two pairs of twisted-pair cabling (Category 3, 4, or 5): one pair for transmitting data and the other for receiving data.
AT+i™	**Connect One's** Internet extension to the industry-standard Hayes AT command set. Supports simplified Internet connectivity commands in the spirit of the AT syntax.
Base64	**Encoding scheme**, which converts arbitrary binary data into a 64-character subset of US ASCII. The encoded data is 33% larger than the original data.
CHAP	**Challenge Authentication Protocol.** Extends the PAP procedure by introducing advanced elements of security.
DNS	**Domain Name System**. Defines the structure of Internet names and their association with IP addresses.
iChip™	**Connect One's Internet Controller for embedded Internet connectivity.**
ICMP	**Internet Control Message Protocol**. Network layer Internet protocol that reports errors and provides other information relevant to IP packet processing.
IP	**Internet Protocol**. Provides for transmitting blocks of data, called datagrams, from sources to destinations, which are hosts identified by fixed length addresses. Also provides for fragmentation and reassemble of long datagrams, if necessary.
IPCP	**Internet Protocol Control Protocol**. Establishes and configures the Internet Protocol over PPP. Also negotiates Van Jacobson TCP/IP header compression with PPP.
ISP	**Internet Service Provider**. Commercial company that provides Internet access to end (mostly PC) users through a dial-up connection.
LAN	**Local Area Network**. HIGH-speed, LOW-error data network covering a relatively small geographic area (up to a few thousand meters).
LCP	**Link Control Protocol**. Negotiates data link characteristics and tests the integrity of the link.

MIME	**Multipurpose Internet Mail Extensions**. Extends the format of mail message bodies to allow multi-part textual and non-textual data to be represented and exchanged between Internet mail servers.
PAP	**Password Authentication Protocol**. Used optionally by the PPP protocol to identify the user to the ISP.
ping	**packet internet groper**. ICMP echo message and its reply. Often used in IP networks to test the reachability of a network device.
POP3	**Post Office Protocol Version 3**. Allows a workstation/PC to dynamically retrieve mail from a mailbox kept on a remote server.
PPP	**Point-to-Point Protocol**. Communications protocol used to send data across serial communication links, such as modems.
RFC	**Request For Comments**. Collections of standards that define the way remote computers communicate over the Internet.
SMTP	**Simple Mail Transfer Protocol**. Provides for transferring mail reliably and efficiently over the Internet.
TCP	**Transmission Control Protocol**. Provides reliable stream-oriented connections over the Internet. Works in conjunction with its underlying IP protocol.
"Leave on Server"	**An option** designating whether retrieved Email messages are to be left intact on the server for subsequent downloads or are to be deleted from the server after a successful download.

Table 9-1 Terms and Acronyms