**24-66 VoIP**

**Remote Base Controller**

**Version 1.80**

**Printings:**

Version 1.00 : 07/23/04
Version 1.01 : 09/17/04
Version 1.10 : 02/03/05
Version 1.11 : 03/25/05
Version 1.60 : 04/22/05
Version 1.70 : 08/01/06
Version 1.80 : 12/16/09

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## SPECIFICATIONS

| | |
|---|---|
| Input voltage | 15 Vdc @ 1000mA<br>24 Watt Wall Transformer<br><br>2.1 x 5.5mm barrel conn. Center (+) |
| Current consumption @ 15Vdc | 450 mA (TX)<br>800 mA (RX) Vol. Max (3 watts to speaker)<br>400 mA (Standby) |
| Standby voltage | 12 - 15 Vdc ** |
| Temperature range | 0 to +60 deg C |
| Relative humidity | 90% at 50 deg C |
| Tx hum & noise | -60 dB (ref. +0 dBm) (When using a high bit rate CODEC) |
| Speaker audio output | 3 W into 4 ohms |
| Distortion (at rated speaker output) | < 3% (When using a high bit rate CODEC) |
| RX hum & noise | -47 dB (ref 0dBm) |
| Frequency response | +1, -3 dB (300 to 3000 Hz) |
| Weight | 3 lb. |
| Dimensions | 4.75" (H) x 10" (W) x 8" (D) |

## 1.0 GENERAL DESCRIPTION

### 1.1 Description

The 24-66 VoIP series of remote controllers is used to remotely control repeaters and base station radios. The 24-66 VoIP requires a 20-28 VoIP panel in the repeater or at the base station for correct operation. The communication between the 20-28 VoIP Termination Panel and the 24-66 VoIP Remote Controllers is done via a TCP/IP Ethernet connection. The network configuration parameters, audio configuration parameters, and one of eight different profiles for the 24-66 VoIP can be selected and changed from a computer through a web browser. The multicast set-up, CODEC algorithms, and the remote buttons profile set-up of the 24-66VoIP are stored in the 20-28 VoIP panel. All of these parameters are accessible through a WEB browser on a PC that is on the network accessing the IP Address that is assigned to the 20-28 VoIP. ***Refer to the 20-28 VoIP manual and the 20-28 VoIP online help screens for more information on this.***

TCP is one of the main protocols in TCP/IP networks, whereas the IP protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent. All of the audio is sent and received as UDP packets via a multicast IP or unicast IP address and port. The 24-66 VoIP is available with either a handset or a desk microphone. A 12 Vdc power cable is also available, which allows the 24-66 VoIP to be operated from a 12 Vdc source.

### 1.2 Capabilities and Features

- TCP/IP protocol
- G.711, G.723.1, G.726 CODEC algorithms.
- Handset or desk microphone
- Desk or wall mount
- Over 99 channel capability
- Operation from 12 Vdc source
- Parallel remote update
- Intercom
- Ethernet activity indicator
- External push to talk capability
- Headset capability

## 2.0 INSTALLATION

### 2.1 Inspection

Please refer to the checklist packed with the 24-66 VoIP in order to become familiar with the unit and to insure that everything ordered has been received. In the event a part is missing from the checklist, please call the Customer Services Department at 1-701-280-1122.

This unit was thoroughly inspected before leaving the factory. If the outer package appears damaged, please inspect the unit for possible damage immediately. Any dents, scratches, or marks suggest rough handling in shipping. Please notify the shipper if you find any indications of mishandling. If there are any concerns about the condition of the 24-66 VoIP when it is received, please don't hesitate to call the Customer Services Department.

### 2.2 Wall Transformer Power Supply Connection

Connect the wall transformer power supply to power connector on the back of the 24-66 VoIP.

### 2.3 Ethernet Connection

The 24-66 VoIP allows Remote Control of a base station via an Ethernet LAN. A computer can also be connected to remote that is on the same LAN to allow the computer access to the network without the need for a hub.

The Ethernet connectors are found on the back of the 24-66 VoIP. The Ethernet cable should be a standard cable that is available anywhere that telephone and computer accessories are sold. The green link LED on the Ethernet connector should turn on showing a connection to the network. ***Refer also to the 24-66 VoIP installation diagrams in the back of this manual.***

### 2.4 External Push to Talk Connection

Connect the external push to talk switch to J2. J2 is a 3.5mm connector and is located on the side of the 24-66 VoIP next to the volume control potentiometer.

### 2.5 External Headset Connection

Connect the external headset to J3. J3 is a 2.5mm connector and is located on the side of the 24-66 VoIP between the volume control potentiometer and the handset/desk microphone connector.

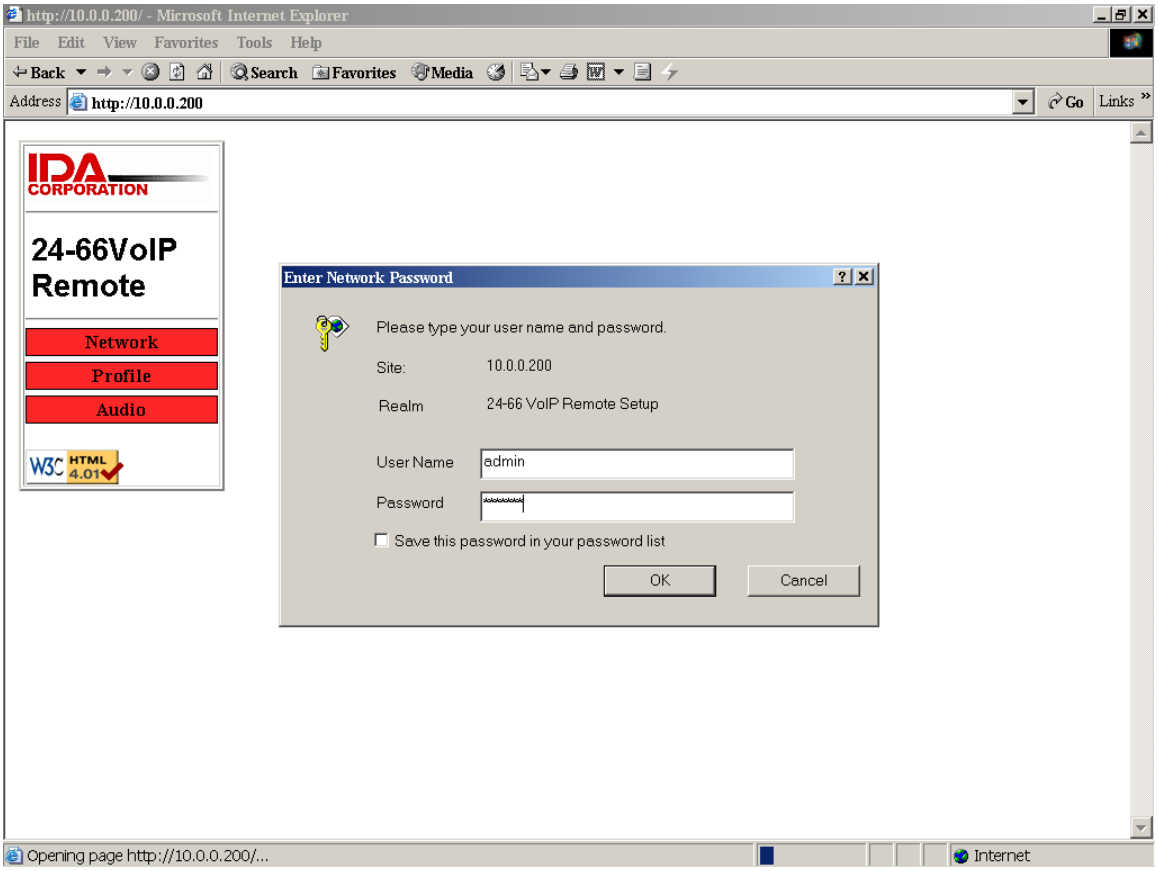
### 2.6 External Handset/Desk Microphone Connection

Connect the external handset or desk microphone to J4. J4 is a RJ11 connector and is located on the side of the 24-66 VoIP next to the external headset connector.

## 3.0 ADJUSTMENT PROCEDURES

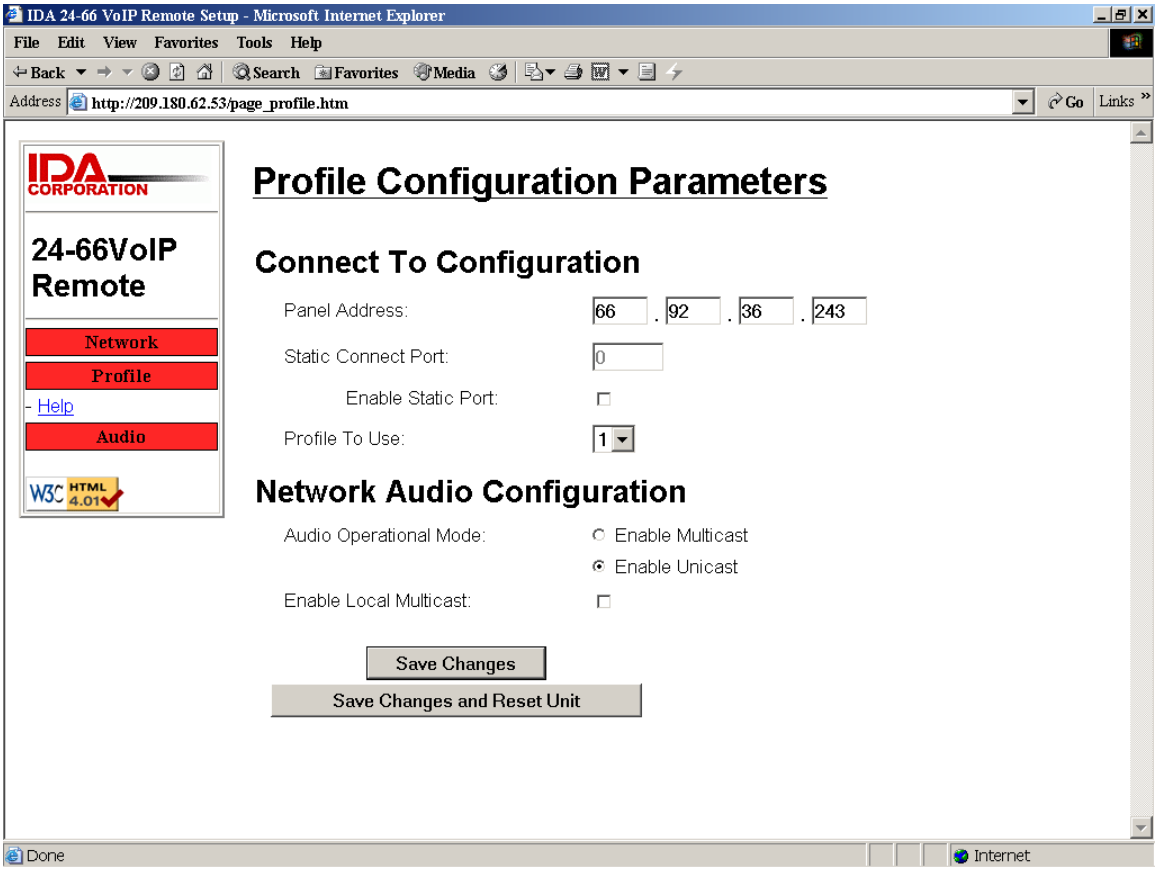
The following will explain the adjustment procedure for the 24-66 VoIP. Most audio levels are factory preset and will, in most cases, not need adjustment. All of the network settings, profile settings, and audio adjustment are accessible from a computer using a web browser. The default address is 10.0.0.200 with the subnet of 255.255.255.0. The user name is “admin” and the default password is ”idacorp”. Before you connect your computer to the 24-66 VoIP make sure the computers NIC is set to the same IP address range and local subnet as the 24-66 VoIP. Connect your computer directly to the 24-66 VoIP and use your web browser to access the logon screen. Once you logon you should configure the network settings to the IP address, the subnet address, and gateway address that will be used to connect to your network, also change the password to something else to protect your system. Select the “Save Changes” button before you continue.

**Logon screen example**



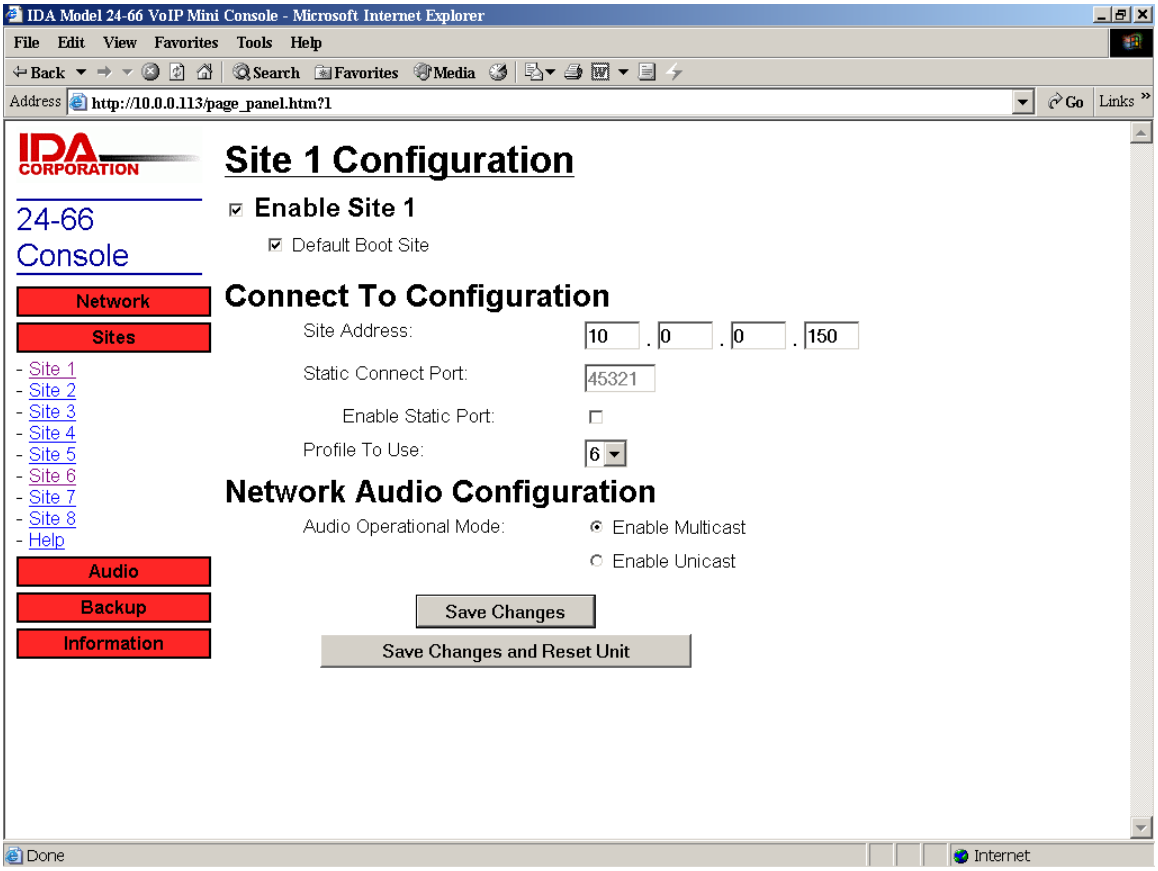
Next configure the profile settings, enter the IP address of the 20-28 VoIP panel that the 24-66 VoIP remote will connect to and select one of the eight profiles. Select the “Save Changes and Reset Unit” button. After resetting, the 24-66 VoIP network and profile changes will take affect. If you are configuring multiple 24-66 VoIP Remotes, you may need to reset the computer NIC card or restart the computer if the next 24-66 VoIP your computer is connected to does not respond. If you have the 24-66 VoIP Mini Console there will not be a profile menu but a site menu will be in its place so skip to the next page.

**24-66 VoIP Remote Profile screen example**



Next configure the site settings, enter the IP address of each 20-28 VoIP panel that the 24-66 VoIP Mini Console will connect to and select one of the eight profiles. Select the “Save Changes and Reset Unit” button. After resetting, the 24-66 VoIP network and profile changes will take affect.  If you are configuring multiple 24-66 VoIP Remotes, you may need to reset the computer NIC card or restart the computer if the next 24-66 VoIP your computer is connected to does not respond.

**24-66 VoIP Mini Console Site screen example**



### 3.1 Handset/Desk Microphone To Ethernet Level

The handset or desk microphone audio level is adjusted via a web browser. The level can be adjusted from -4db to 36db in 2db steps.

### 3.2 Desk Microphone Output Sensitivity

The audio output level of the desk microphone can be adjusted through a hole in the bottom of the desk microphone. A small jeweler's flat blade screwdriver will be needed. The adjustment may need to be made depending upon background noise in the environment where the 24-66 VoIP is located and also upon the user of the desk microphone and how close and/or loud the user speaks.

### 3.3 Internal Microphone to Ethernet Level

The internal microphone audio level is adjusted via a web browser. The level can be adjusted from -4db to 36db in 2db steps.

### 3.4 Headset Microphone to Ethernet Level

The Headset microphone audio level is adjusted via a web browser. The level can be adjusted from -4db to 36db in 2db steps.

### 3.5 Speaker Level

The internal speaker audio level is adjusted via a web browser. The level can be adjusted from -24db to 0db in 6db steps.
While connected to the system and receiving audio from the highest-level source, adjust the level so that audio in the speaker is a comfortable listening level. Do not turn it up too high since this will cause distortion and clipping. The audio should not exceed 3.45 Vrms at the speaker terminals.

### 3.6 Handset Earpiece Level

The handset earpiece audio level is adjusted via a web browser. The level can be adjusted from -24db to 0db in 6db steps.
The handset earpiece, headset earpiece, and the base speaker are all controlled by the volume control. It may be necessary in certain noisy environments to increase the level to the earpiece. While in the noisy environment and receiving audio from the source with the least level coming in, adjust for a comfortable listening level with the volume control potentiometer at maximum.

### 3.7 Headset Earpiece Level

The headset earpiece audio level is adjusted via a web browser. The level can be adjusted from -24db to 0db in 6db steps.
The headset earpiece, handset earpiece, and the base speaker are all controlled by the volume control. It may be necessary in certain noisy environments to increase the level to the earpiece. While in the noisy environment and receiving audio from the source with the least level coming in, adjust for a comfortable listening level with the volume control potentiometer at maximum.

## 4.0 CIRCUIT DESCRIPTION

### 4.1 Power Supply

Power is supplied to the 24-66 VoIP via the supplied 15VDC wall transformer. It is connected at J10 on the back of the 24-66 VoIP. The polarity of the connector must be correct. From J10 the power is routed through a diode D7 and a 1 amp fuse F1. Diode D7 prevents a reverse polarity from harming the 24-66 VoIP. Power is fed into voltage regulator U18. The output voltage of U18 is set to 12.5. This 12.5 Vdc through a diode D4 drives the audio section of the 24-66 VoIP. It is also fed into voltage regulator U19 and U20. The output voltage of U19 is set to 3.3 Vdc and this 3.3 Vdc is also fed into voltage regulator U16. The output voltage of U16 is set to 1.5 Vdc. The output voltage of U20 is set to 2.5 Vdc. The 3.3 Vdc, 2.5 vdc, and the 1.5 Vdc powers the digital section of the 24-66 VoIP.

The 24-66 VoIP can be operated from a 13.8 Vdc supply through connector J12. Diode D8 prevents a reverse polarity from harming the 24-66 VoIP.

### 4.2 Receive Audio

Receive audio UDP packets from the Ethernet interface section is passed to the microprocessor U8 for decoding. The decoded digital audio is then sent to the DSP U10. The DSP then converts the digital audio to analog and adjusts the level out.

The audio is passed to the handset earpiece at pin 2 of J5.

The audio is also fed into the speaker driver U3. U3 and its associated circuitry is a wide band audio amplifier set to have a gain of 36 dB. The output of the speaker driver goes to J11, the speaker connector. Resistor R14 is removed only if an external speaker is installed.

### 4.3 Transmit Audio

Microphone audio from the handset or the desk microphone comes from pin 4 of J5. The microphone is biased by resistors R126 and R136. The microphone audio then passes through to the DSP U10. The DSP then converts the audio to digital. The digital audio is then sent to the microprocessor to be assembled in to UDP packets. The UDP Packets are then passed to the Ethernet section.

### 4.4 Microprocessor

The Net+ARM 7520B MCU U8 provides the network interface functions and provides the platform for the application code. Integrated peripherals include a 10/100 Ethernet MAC, two serial ports, and numerous general-purpose I/O pins. An RTOS and a TCP/IP stack are included along with drivers for the internal peripherals.

### 4.5 Digital Signal Processor

The DSP U10 provides the audio processing functions. This DSP has six audio inputs, four audio outputs, a single Sigma-Delta CODEC, and an audio multiplexor to connect the CODEC to one audio input and one audio output. It also has numerous general-purpose I/O pins and a host interface. The DSP firmware comes pre-programmed in ROM and the functions provided can be controlled by the host CPU U8 through the host interface. The DSP firmware provides the following standard CODEC algorithms: G.711, G.723.1, G.726.

### 4.6 Ethernet Interface

The Ethernet interface consists of a three port 10/100 Base-TX Switch U4. One port is connecting externally to the LAN and the second port will connect externally to a computer to allow the computer access to the LAN. The third port will connect internally to the Ethernet port of the NET+ARM MCU U8. LEDs integrated into the Ethernet connectors will provide Connect and Activity status. The Ethernet port for connecting to the PC will be cross-wired to allow straight-through cables to be used on both ports.

### 4.7 Keypad Board

The keypad board is mounted on the faceplate of the 24-66 VoIP. It is connected to J13 on the base board by a ribbon cable that is soldered to J5 on the keypad board. The keypad board has the contacts for the front panel buttons etched on it, and provides a backplane for the front panel buttons. The rows and columns of the keypad are fed to the baseboard through connector J5. The microprocessor determines if a certain key is pressed by pulling the row input for that key low and then checking to see if the column output for that key also goes low.

LEDs are provided for each button and also for the TX indicator. These LEDs are driven by the LED display driver U1. This driver has a serial interface to the microprocessor on the base board. Serial data coming from the baseboard on pin 1 is clocked into U1 by the clock signal on pin 13. When all the data is clocked in, pin 12 is pulsed to load the data into the drivers.

Also located on the keypad board are the mounting sockets for the VU meter and LCD. The LCD plugs into J3. The VU meter plugs into either *J1 or J2.*

## PARTS LISTS

## 24-66 VoIP Main Board

## 101-0291

| Item | Reference | Description | Part No. | Qty |
|---|---|---|---|---|
| 1 | C1,2,12,25,28,44,46 | CAP, A ELEC 47UF 6.3 | 381-0470R | 7 |
| 2 | C3,8 | CAP, A ELEC 1UF 50V | 381-5105R | 2 |
| 3 | C4,45 | CAP, A ELEC 47UF 16V | 381-2470R | 2 |
| 4 | C5,6,13,15,50,51,52,53,54,55, 56,57.58,59,60,61,63,64,65,66, 68,69,70,71,72,73,74,75,76,77, 78.79,80,81,82,83,84,85,86,87, 88,89,90,91,92,93,94,95,96,97, 98,99,100,101,102,104,105,106, 107,108,109,110,111,112,113, 114,115,116,117,118,119,121 | CAP, .1UF X7R 16V | 375-2104R | 72 |
| 5 | C7,11,17,18,20,21 | CAP, A ELEC 10UF 16V | 381-2106R | 6 |
| 6 | C9 | CAP, A ELEC 2.2UF 35 | 381-4225R | 1 |
| 7 | C10,120 | CAP, .47UF Y5V 16V | 375-2474R | 2 |
| 8 | C14,26 | CAP, A ELEC 4.7UF 25 | 381-3475R | 2 |
| 9 | C16,37,38,42,48 | CAP, A ELEC 470UF 25 | 381-3471R | 5 |
| 10 | C19,47 | CAP, A ELEC 150UF 10 | 381-1151R | 2 |
| 11 | C22,31,32,33,34 | CAP, .1UF X7R 16V | 375-2104R | 5 |
| 12 | C23,24 | CAP, 22PF NPO 50V | 375-5220R | 2 |
| 13 | C29,30,67,103 | CAP, 10PF NPO 50V | 375-5100R | 4 |
| 14 | C35,39,40 | CAP, .01UF X7R 10%50 | 375-5103R | 3 |
| 15 | C36 | CAP, 2700PF X7R 50V | 375-5272R | 1 |
| 16 | C41,43 | CAP TANT, 1UF 35V | 392-4105R | 2 |
| 17 | C49 | CAP .22UF Y5V 16V | 375-2224R | 1 |
| 18 | C62 | CAP, .1UF X7R 16V | 375-2104R | 1 |
| 19 | D1,2,9,10 | DIODE, SWITCH BAS16 | 110-2201R | 4 |
| 20 | D3,5 | DIODE, SCHKY B140 | 110-2302R | 2 |
| 21 | D4,7,8 | DIODE, SCHKY B330A | 110-2301R | 3 |
| 22 | D6 | LED, SUPER RED 0603 | 112-0201R | 1 |
| 23 | F1 | FUSE PC MOUNT 1 AMP | 290-0008 | 1 |
| 24 | J1 | JACK MOD, RJ45 LED | 234-0121 | 1 |
| 25 | J2 | JACK SPKR PNL MNT | 234-0091 | 1 |

| | | | | |
|---|---|---|---|---|
| 26 | J3 | JACK AUDIO, 2.5mm | 234-0116 | 1 |
| 27 | J4 | CONN, 7POS .1LOCK HDR | 234-0006 | 1 |
| 28 | J5 | JACK, MOD 4POS SIDE | 231-0021 | 1 |
| 29 | J6 | JACK MOD, RJ45 LED | 234-0120 | 1 |
| 30 | J7 | CONN 36 POS R/A HDR | 231-1236 | 0.14 |
| 31 | J8 | CONN 5 POS POST | 231-1005 | 1 |
| 32 | J9 | CONN. 6 POS POST | 231-1006 | 1 |
| 33 | J10 | CONN, R/A POWER | 234-0114 | 1 |
| 34 | J11 | CONN 4POS .1 LCK HDR | 234-0014 | 1 |
| 35 | J12 | CONN 2 POS .156 POST | 231-1067 | 1 |
| 36 | J13 | SCKT, DIP, 16 PIN IC | 220-0001 | 1 |
| 37 | L1,5,6,7,8,9 | FERRITE, 150 OHM 800 | 306-2001R | 6 |
| 38 | L3 | POWER IND, 47.00uH | 306-3001R | 1 |
| 39 | L4 | POWER IND, 33.00uH | 306-3002R | 1 |
| 40 | M1 | ELEMENT, MIC, EM-50 | 901-0010 | 1 |
| 41 | P1 | HDR 14 POS .1 X .1 | 231-1076 | 1 |
| 42 | R1 | POT 50K SLIDE/AUDTAP | 340-0003 | 1 |
| 43 | R2,3,18,19,21,22,23,25,26,35, 49,113,116,118,119,130,131, 133 | RES, 49.9 1% 1/16W | 322-49R9R | 18 |
| 44 | R4,5 | RES, 2K 5% 1/10W | 323-1202R | 2 |
| 45 | R7,10,13,30,48,51,52,53,54,56, 58, 71,76,80,83,86,107,108,111, 112 120,125,132,134 | RES, 10K 5% 1/10W | 323-1103R | 23 |
| 46 | R9,12,14,15,55,78,79,81,82,98, 105,106,115,123,124,128 | RES, 0 5% 1/10W | 323-0000R | 13 |
| 47 | R11,47,122 | RES, 10 5% 1/10W | 323-1100R | 3 |
| 48 | R17,20 | RES, 100 1% 1/16W | 322-1000R | 2 |
| 49 | R32,33,37,39,40,41,42,44,45,46 | RES, 33 5% 1/10W | 323-1330R | 10 |
| 50 | R34,38,43 | RES, 820 5% 1/10W | 323-1821R | 3 |
| 51 | R36,61,62,63,64,65,66,89,95,96 97,99,101,102,103,104,109,127 129,136 | RES, 1K 5% 1/10W | 323-1102R | 20 |
| 52 | R50 | RES, 499K 1% 1/16W | 322-4993R | 1 |
| 53 | R60 | RES, 56 5% 1/10W | 323-1560R | 1 |
| 54 | R67 | RES, 10M 5% 1/10W | 323-1106R | 1 |
| 55 | R68,69 | RES, 9.31k 1% 1/4W | 326-9311R | 2 |
| 56 | R70 | RES, 7.15K 1% 1/4W | 326-7151R | 1 |
| 57 | R72 | RES, 300 5% 1/10W | 323-1301R | 1 |
| 58 | R73 | RES, 1k 1% 1/4W | 326-1001R | 1 |
| 59 | R74,75 | RES, 75K 5% 1/10W | 323-1753R | 2 |
| 60 | R77 | RES, 0 5% 1/10W | 323-0000R | 1 |
| 61 | R90 | RES, 2.7K 5% 1/10W | 323-1272R | 1 |
| 62 | R94 | RES, 1M 1% 1/16W | 322-1004R | 1 |
| 63 | R110 | RES, 3.01K 1% 1/16W | 322-3011R | 1 |
| 64 | R121 | RES, 1 5% 1/10W | 323-11R0R | 1 |
| 65 | R126 | RES, 620 5% 1/10W | 323-1621R | 1 |
| 66 | U1 | IC, 24LC256 | 131-1060 | 1 |

| | | | | |
|---|---|---|---|---|
| 67 | U2 | IC, MCP3221A5T-I/OT | 131-5001 | 1 |
| 68 | U3 | IC, TPA1517DWPR | 131-1061 | 1 |
| 69 | U4 | IC, KS8993 | 131-2009 | 1 |
| 70 | U5,15 | IC, SN74AHC1GO8DBVR | 131-5002 | 2 |
| 71 | U6 | IC, TC1270TERCT-ND | 131-5003 | 1 |
| 72 | U7 | IC, SN74AHC1GO8DBVR | 131-5002 | 1 |
| 73 | U8 | IC, NS7520B-1-C55 | 131-6000 | 1 |
| 74 | U9,14 | IC, HY57V161610DTC-7 | 131-1064 | 2 |
| 75 | U10 | IC, VP101X12BQC-1 | 131-2010 | 1 |
| 76 | U11 | IC, MAX3232ESE | 131-1062 | 1 |
| 77 | U12 | IC, SN74LVC1GU04DBVR | 131-5005 | 1 |
| 78 | U13 | IC, AM29LV800BT120 | 131-1063 | 1 |
| 79 | U16 | IC, LP3984IMF-1.5 | 131-5004 | 1 |
| 80 | U17 | IC, XC9572XL-10PC44C | 131-3010 | 1 |
| 81 | U18 | IC, LM2673S-ADJ | 131-4001 | 1 |
| 82 | U19 | IC, LM2673S-3.3 | 131-4002 | 1 |
| 83 | U20 | IC, LM1086CS-5.0 | 131-4003 | 1 |
| 84 | U21 | IC, LM1086CS-2.5 | 131-4004 | 1 |
| 85 | Y2 | CRY, 18.432 MHZ 20PF | 305-0101R | 1 |
| 86 | Y3 | CRY, 25.000MHZ 18PF | 305-0103R | 1 |
| 87 | Y4 | CRY, 4.096MHA 20PF | 305-0102R | 1 |
| 88 | 00 | PC BD, VoIP RMT MAIN | 900-0291 | 1 |
| 89 | 00 | MOUNT, RBR .SHACK 80A | 901-0011 | 1 |

**24-66 VoIP Keypad Board**
**101-0209**

| Item | Reference | Description | Part No. | Qty. |
|---|---|---|---|---|
| 1 | C1,2 | 10uF 16V ELEC CAP | 360-0004 | 2 |
| 2 | C3 | 10uF 16V TANT CAP | 390-0010 | 1 |
| 3 | C4,6 | NOT INSTALLED | 000-0002 | 2 |
| 4 | C5 | .1uF 50V 10% MONO CAP | 365-5104 | 1 |
| 5 | D1 | NOT INSTALLED | 000-0002 | 1 |
| 6 | D2,3,4,5,6,7,8,9,10, 11,12,13 | LED, T-1 RED | 112-0012 | 12 |
| 7 | D14 | LED, RED HIGH INTENSITY | 112-0024 | 1 |
| 8 | J1,2,3,4 | NOT INSTALLED | 000-0002 | 4 |
| 9 | J5 | 16 POS CABLE 8” | 222-0025 | 1 |
| 10 | JP1,2 | STAPLE JUMPER | 265-0016 | 2 |
| 11 | R1,6 | 220 1 W RES | 314-1224 | 2 |
| 12 | R2 | 1.2K 5% 1/4 W RES | 312-0034 | 1 |
| 13 | R3,5,7 | 10K 5% 1/4 W RES | 312-0011 | 3 |
| 14 | R4 | 33K 5% 1/4 W RES | 312-0014 | 1 |
| 15 | R8 | NOT INSTALLED | 000-0002 | 1 |
| 16 | U1 | MAX7219, IC | 130-0287 | 1 |
| 17 | U2 | NOT INSTALLED | 000-0002 | 1 |
| 18 | | KEYPAD PC BOARD | 900-0209 | 1 |

## VU Meter Option (New)

| Item | Reference | Description | Part No. | Qty. |
|---|---|---|---|---|
| 1 | D1,2 | 10 SEGMENT BAR LED | 112-0027 | 2 |
| 2 | P1 | 12 POS HEADER POST | 231-3315 | 1 |
| 3 | U2 | LM3915 IC | 130-0372 | 1 |
| 4 | | PLASTIC STANDOFF .125" | 200-0388 | 2 |
| 5 | | VU METER PC BOARD | 900-0281 | 1 |

## LCD Option

| Item | Reference | Description | Part No. | Qty. |
|---|---|---|---|---|
| 1 | C4,6 | .1uF 50V 10% MONO CAP | 365-5104 | 2 |
| 2 | J1 | 6 POS RECEPTACLE | 231-1116 | 2 |
| 3 | J3 | 8 POS RECEPTACLE | 231-3008 | 2 |
| 4 | R8 | 10K 1 TURN POT | 351-1103 | 1 |
| 5 | U2 | 74HC595, IC | 130-0350 | 1 |
| 6 | | LCD 32 CHARACTER | 113-0104 | 1 |
| 7 | | PLASTIC STAND OFF 3/16” | 200-0385 | 4 |
| 8 | | 16 POS HEADER POST | 231-3116 | 1 |

## Desk Mic Option

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | DESK MIC | 900-0399 | 1 |
| 2 | CRYSTAL PROGRAMMABLE | 900-0725 | 1 |
| 3 | CABINET TOP for LCD | 900-0750 | 1 |

## Hand Set Option

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | HOLE COVER | 199-6137 | 1 |
| 2 | CABLE TIE (SHORT) | 200-0081 | 2 |
| 3 | SENSOR SWITCH | 611-0027 | 1 |
| 4 | HAND SET | 900-0020 | 1 |
| 5 | CABINET TOP for LCD | 900-0751 | 1 |

### Ethernet Cable Option

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | 10 FT Ethernet Cable | 800-2080 | 1 |

### DC Power Cable Option

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | 2 POS .156 RECEPTACLE | 233-0024 | 1 |
| 2 | CABLE TIE (SHORT) | 200-0081 | 1 |
| 3 | 2 COND. 20ga. CABLE | 800-1106 | 5’ |

### External Encode/Decode Cable Option

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | CABLE TIE (SHORT) | 200-0081 | 1 |
| 2 | 9 COND. 22ga. CABLE | 222-0034 | 3’ |
| 3 | 5 POS .1” RECEPTACLE | 233-0024 | 1 |
| 4 | 2 POS .1” RECEPTACLE | 234-0033 | 1 |

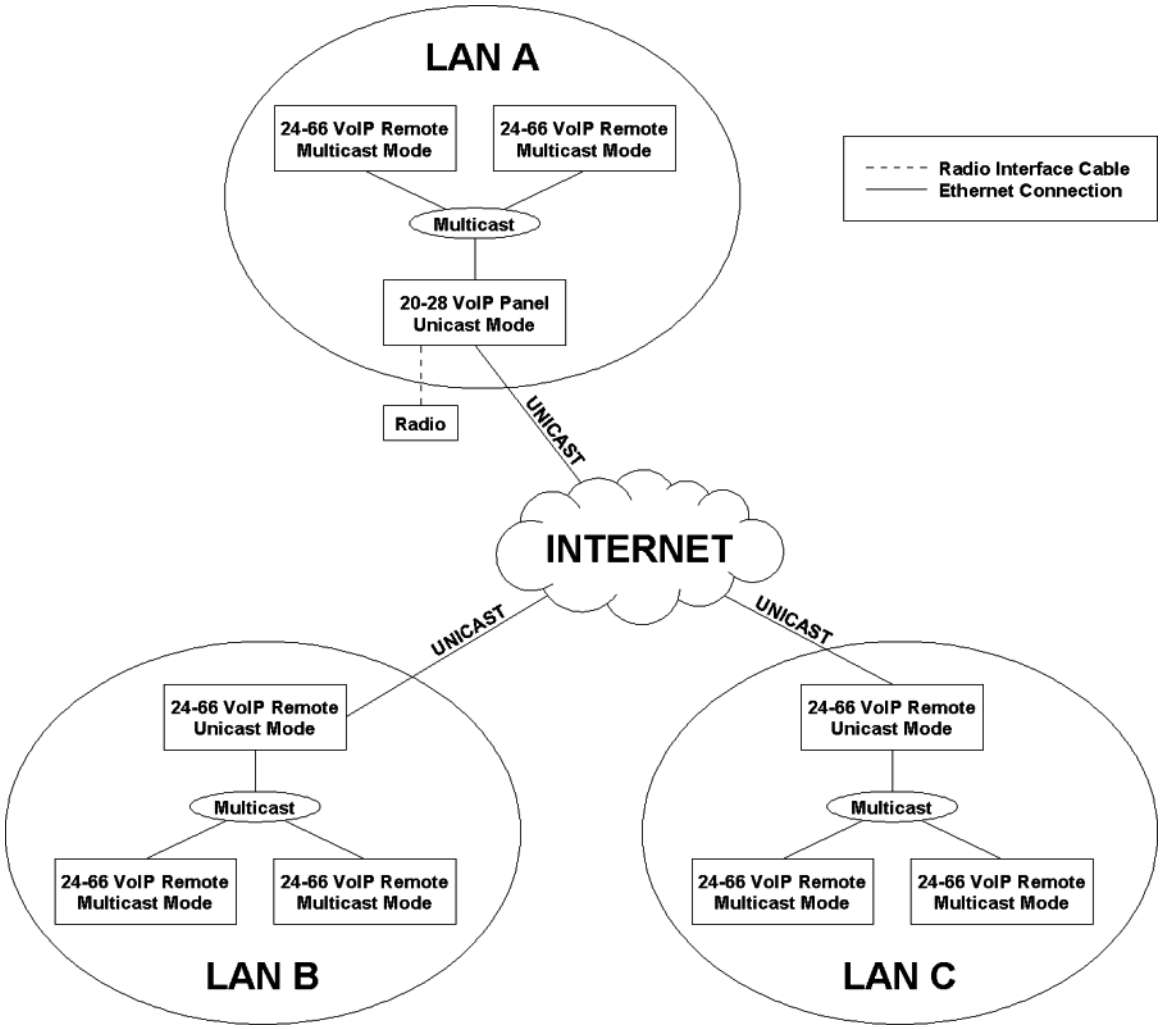
### Wall Mount Option

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | WALL BRACKET | 900-5104A | 1 |
| 2 | 6 x ½” SHEET MTL SCREW | 199-4010 | 4 |
| 3 | 6 x 1” SHEET MTL SCREW | 199-4011 | 4 |
| 4 | WALL ANCHOR | 199-4012 | 4 |

**24-66 Base Cabinet**
**900-0751**

| Item | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | NUT PAL | 199-0040 | 4 |
| 2 | #6 FLAT WASHER | 199-2106 | 2 |
| 3 | 6-32 X 1/4” SCREW | 199-3070 | 1 |
| 4 | #4 X 1/4” TAP SCREW | 199-4029 | 9 |
| 5 | #6 X 3/8” TAP SCREW | 199-4038 | 7 |
| 6 | #6 X 1/4” TAP SCREW | 199-4039 | 6 |
| 7 | 6 KEY, KEYPAD | 203-0026 | 1 |
| 8 | 3 KEY, KEYPAD | 203-0027 | 2 |
| 9 | 3/8” FOOT | 203-1053 | 4 |
| 10 | 22 AWG WIRE GREEN | 222-0016 | 6” |
| 11 | 22 AWG WIRE YELLOW | 222-0018 | 6” |
| 12 | 4 POS RECEPTACLE | 233-0045 | 1 |
| 13 | REMOTE BUTTON | 900-0718 | 12 |
| 14 | 12 KEY PANEL SCREENED | 900-0722S | 1 |
| 15 | BOTTOM CABINET VoIP | 900-0724V | 1 |
| 16 | CRYSTAL for LCD | 900-0732 | 1 |
| 17 | WEIGHT VoIP | 900-5008A | 1 |
| 18 | 3W 4ohm SPEAKER | 901-0004 | 1 |
| 19 | WALL TRANSFORMER | 902-0015 | 1 |

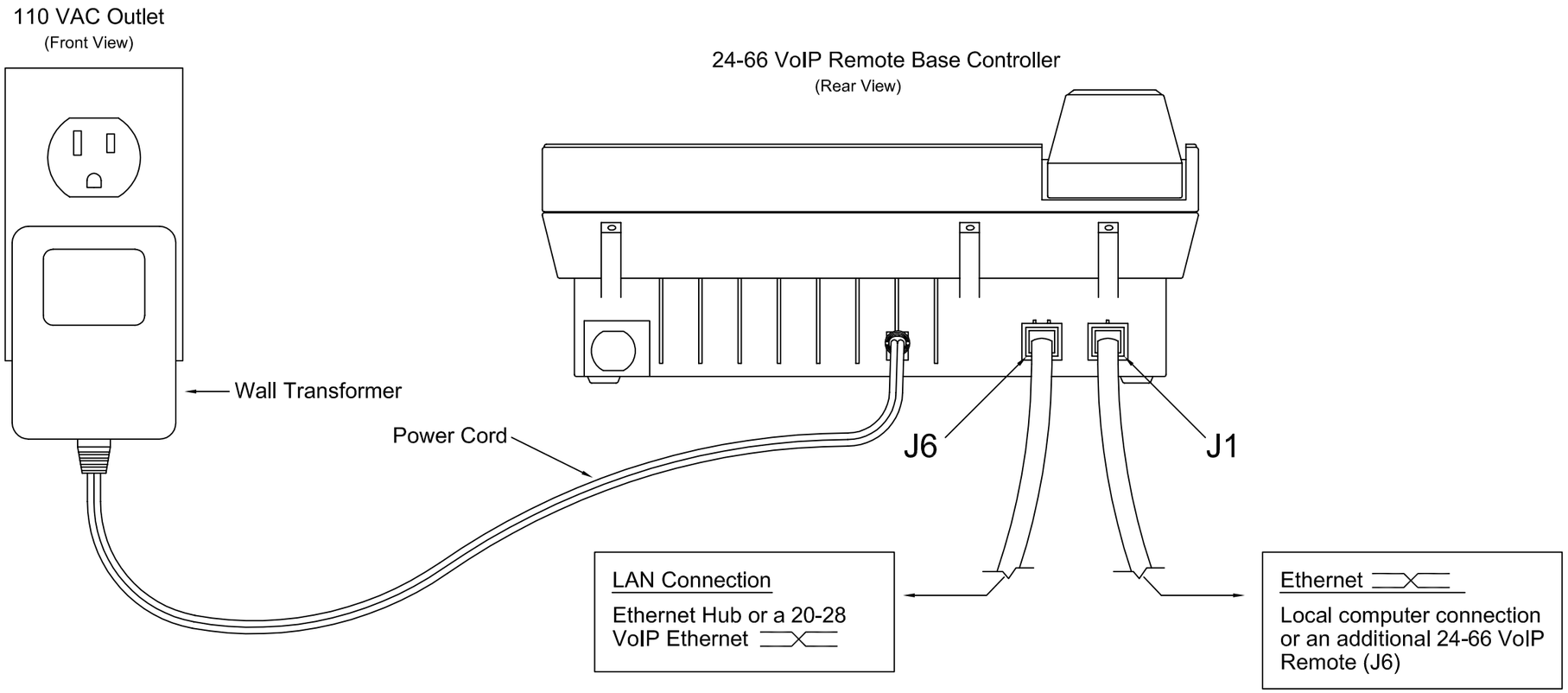
# Multicast / Unicast Typical Installation Example

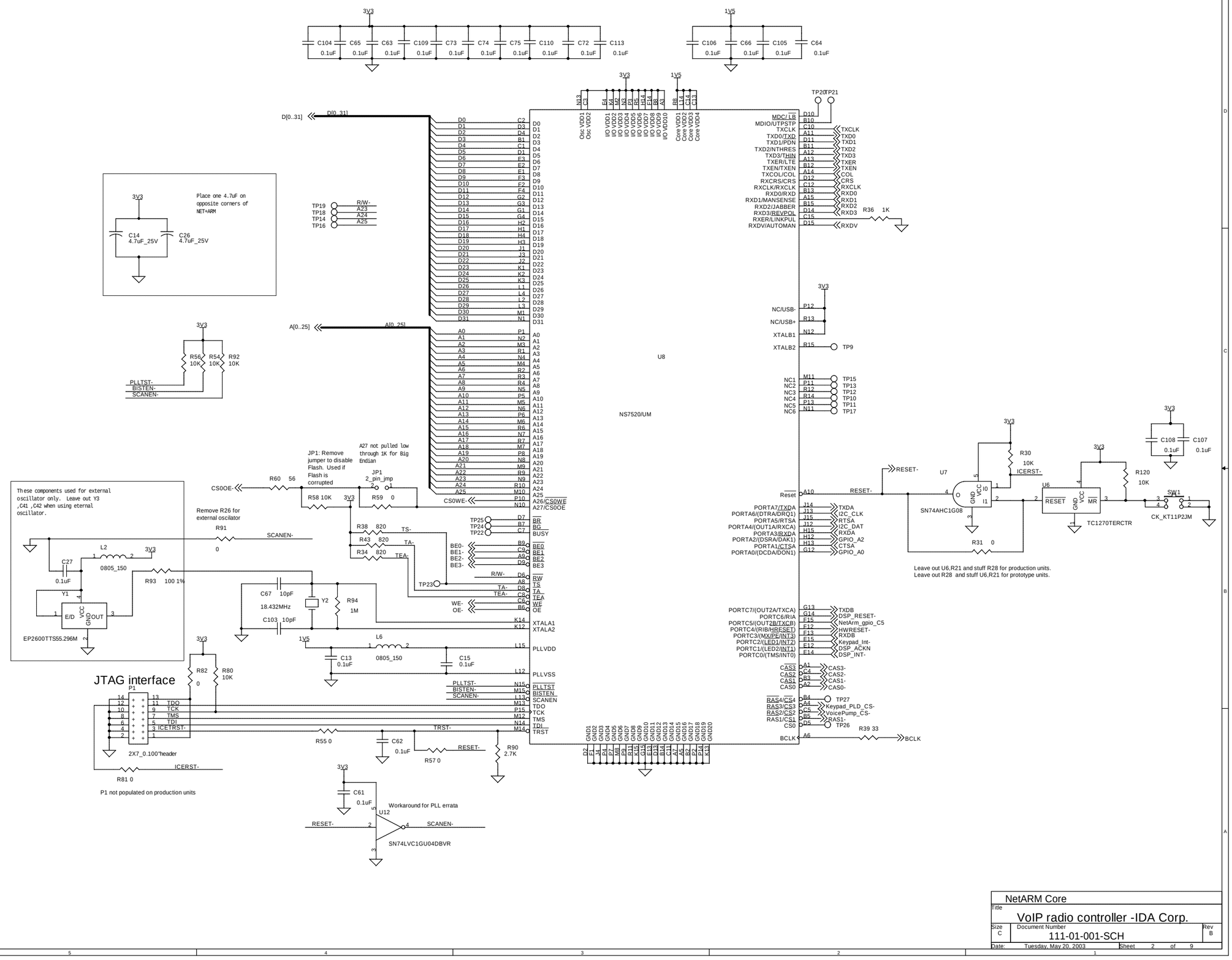



Since Multicast across the Internet is not supported in all most cases, the 20-28 VoIP and the 24-66 VoIP units connected to the Internet can be configured for Unicast. The 20-28 VoIP (at one LAN) and any 24-66 VoIP's (at other LAN's) connected to the Internet are configured for Unicast. The remaining 24-66 VoIP's at each LAN are configured for Multicast. The units configured for Unicast also provide a Multicast repeat of the audio to the remaining units at their particular LAN.

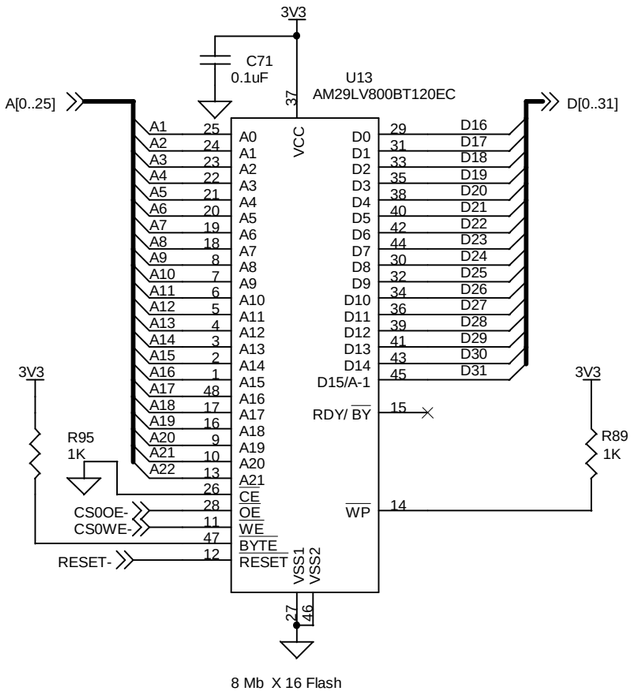
**Note: The 24-66 MC does not support Multicast repeat of the audio to the remaining units at their LAN.**

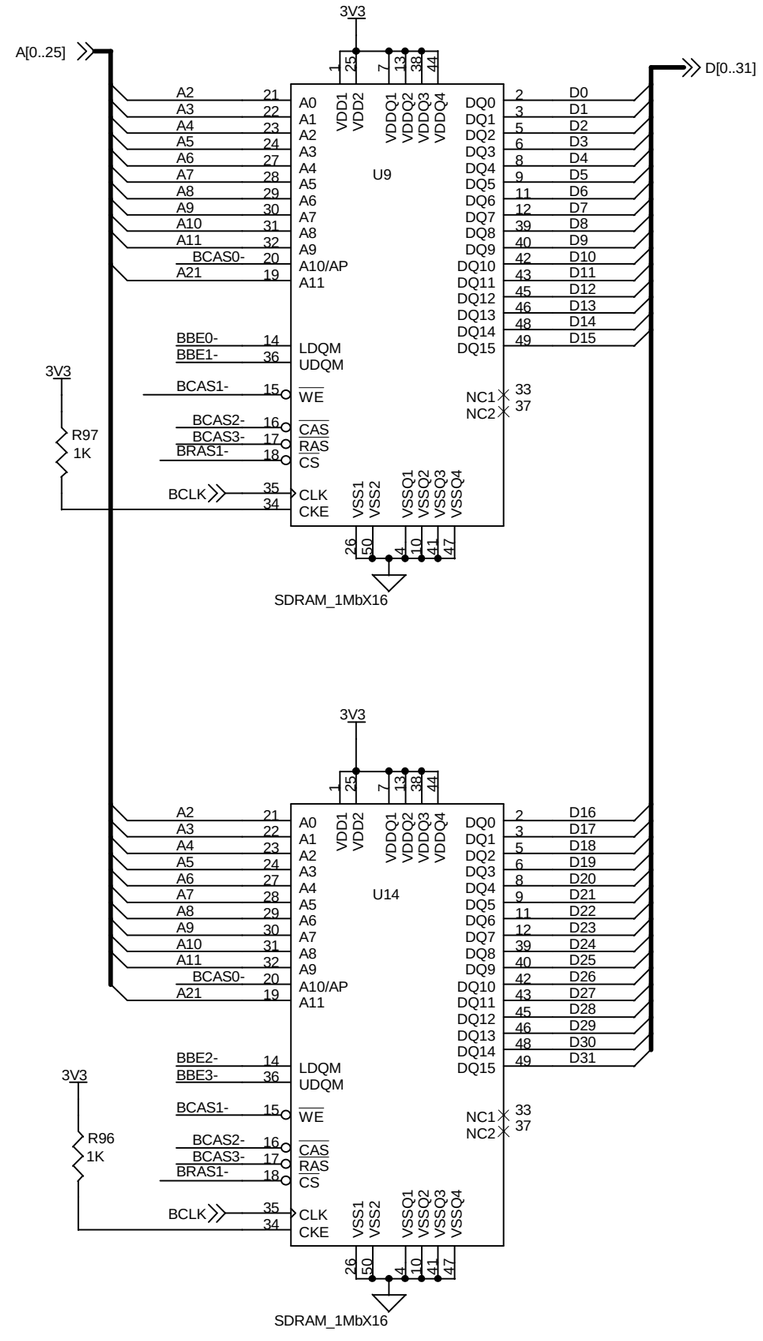
# 24-66 VoIP INSTALLATION DIAGRAM

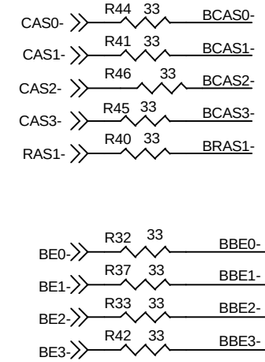


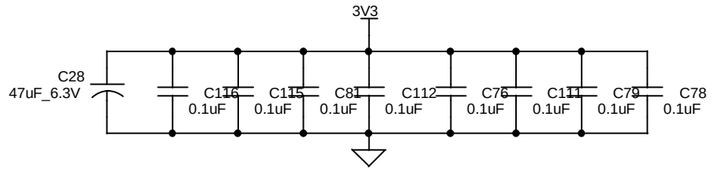


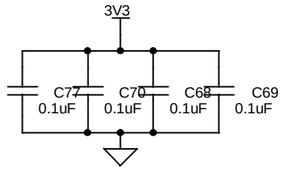

| | | |
|---|---|---|
| NetARM Core | | |
| Title: VoIP radio controller -IDA Corp. | | |
| Size: C | Document Number: 111-01-001-SCH | Rev: B |
| Date: Tuesday, May 20, 2003 | Sheet 2 of 9 | |

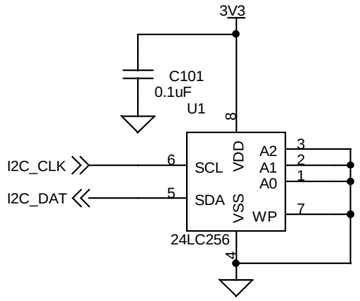




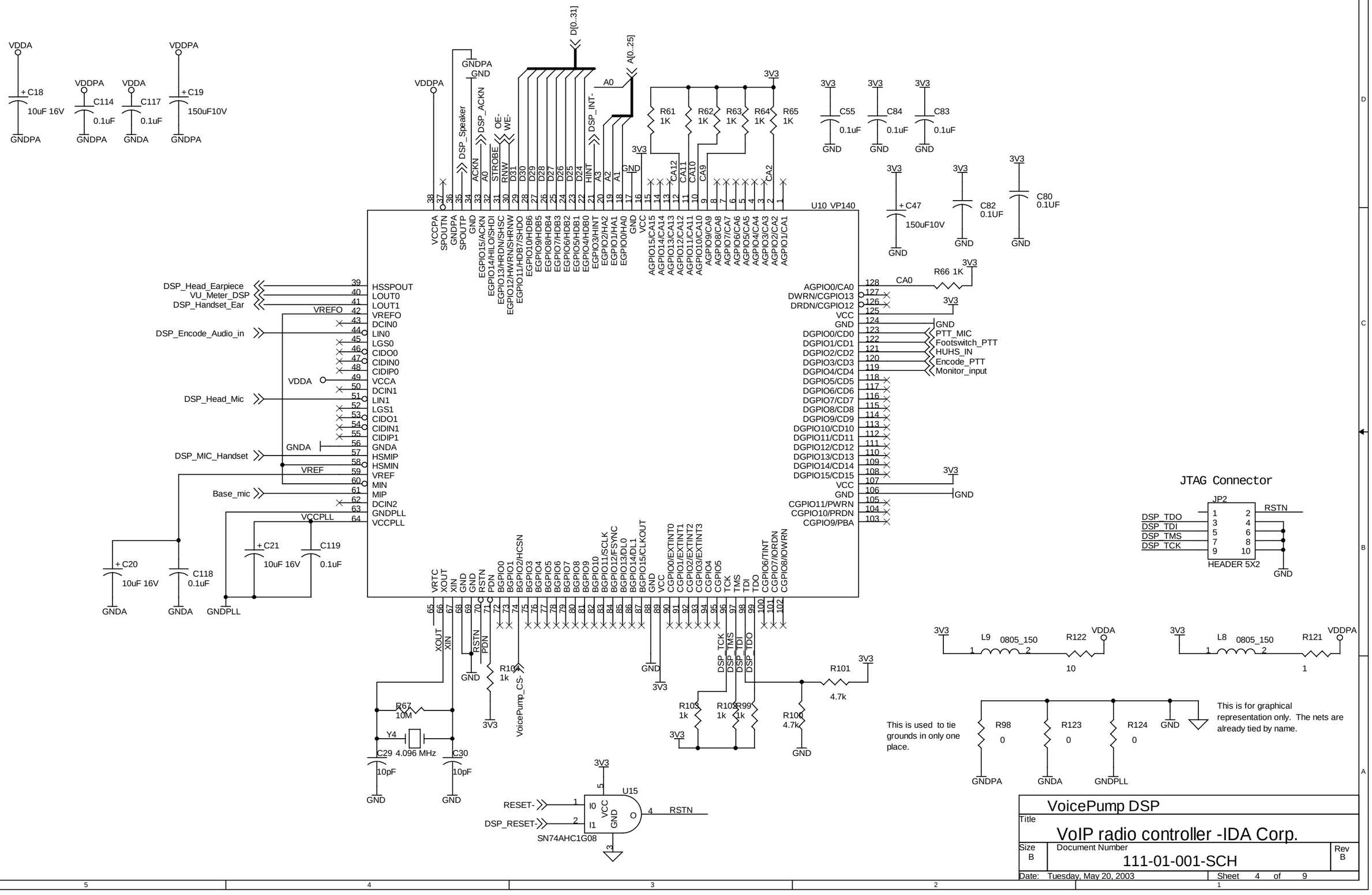


Flash,SDRAM and Serial EEprom

Title: VoIP radio controller -IDA Corp.

Size: B | Document Number: 111-01-001-SCH | Rev: B

Date: Tuesday, May 20, 2003 | Sheet 3 of 9


VDDA
C18
10uF 16V
GNDPA
VDDPA
C114
0.1uF
GNDPA
VDDA
C117
0.1uF
GNDA
VDDPA
C19
150uF10V
GNDPA
D[0..31]
A[0..25]
A0
DSP_INT-
DSP_Speaker
DSP_ACKN
OE-
WE-
GNDPA
GND
VDDPA
3V3
R61 1K
R62 1K
R63 1K
R64 1K
R65 1K
C55 0.1uF
C84 0.1uF
C83 0.1uF
C47 150uF10V
C82 0.1UF
C80 0.1UF
U10 VP140
VCCPA
SPOUTN
GNDPA
SPOUTP
GND
EGPIO15/ACKN
EGPIO14/HILO/SHDI
EGPIO13/HRDN/SHSC
EGPIO12/HWRN/SHRNW
EGPIO11/HDB7/SHDO
EGPIO10/HDB6
EGPIO9/HDB5
EGPIO8/HDB4
EGPIO7/HDB3
EGPIO6/HDB2
EGPIO5/HDB1
EGPIO4/HDB0
EGPIO3/HINT
EGPIO2/HA2
EGPIO1/HA1
EGPIO0/HA0
GND
VCC
AGPIO15/CA15
AGPIO14/CA14
AGPIO13/CA13
AGPIO12/CA12
AGPIO11/CA11
AGPIO10/CA10
AGPIO9/CA9
AGPIO8/CA8
AGPIO7/CA7
AGPIO6/CA6
AGPIO5/CA5
AGPIO4/CA4
AGPIO3/CA3
AGPIO2/CA2
AGPIO1/CA1
DSP_Head_Earpiece
VU_Meter_DSP
DSP_Handset_Ear
VREFO
DSP_Encode_Audio_in
DSP_Head_Mic
VDDA
GNDA
DSP_MIC_Handset
VREF
Base_mic
VCCPLL
HSSPOUT
LOUT0
LOUT1
VREFO
DCIN0
LIN0
LGS0
CIDO0
CIDIN0
CIDIP0
VCCA
DCIN1
LIN1
LGS1
CIDO1
CIDIN1
CIDIP1
GNDA
HSMIP
HSMIN
VREF
MIN
MIP
DCIN2
GNDPLL
VCCPLL
C20 10uF 16V
C118 0.1uF
C21 10uF 16V
C119 0.1uF
GNDPLL
AGPIO0/CA0
DWRN/CGPIO13
DRDN/CGPIO12
VCC
GND
DGPIO0/CD0
DGPIO1/CD1
DGPIO2/CD2
DGPIO3/CD3
DGPIO4/CD4
DGPIO5/CD5
DGPIO6/CD6
DGPIO7/CD7
DGPIO8/CD8
DGPIO9/CD9
DGPIO10/CD10
DGPIO11/CD11
DGPIO12/CD12
DGPIO13/CD13
DGPIO14/CD14
DGPIO15/CD15
VCC
GND
CGPIO11/PWRN
CGPIO10/PRDN
CGPIO9/PBA
R66 1K
CA0
PTT_MIC
Footswitch_PTT
HUHS_IN
Encode_PTT
Monitor_input
VRTC
XOUT
XIN
GND
GND
RSTN
PDN
BGPIO0
BGPIO1
BGPIO2/HCSN
BGPIO3
BGPIO4
BGPIO5
BGPIO6
BGPIO7
BGPIO8
BGPIO9
BGPIO10
BGPIO11/SCLK
BGPIO12/FSYNC
BGPIO13/DL0
BGPIO14/DL1
BGPIO15/CLKOUT
GND
VCC
CGPIO0/EXTINT0
CGPIO1/EXTINT1
CGPIO2/EXTINT2
CGPIO3/EXTINT3
CGPIO4
CGPIO5
TCK
TMS
TDI
TDO
CGPIO6/TINT
CGPIO7/IORDN
CGPIO8/IOWRN
XOUT
XIN
RSTN
PDN
R104 1k
VoicePump_CS-
R67 10M
Y4
C29 4.096 MHz
10pF
C30
10pF
GND
3V3
DSP_TCK
DSP_TMS
DSP_TDI
DSP_TDO
R101 4.7k
R102 1k
R103 1k
R99 1k
R106 4.7k
U15
RESET-
DSP_RESET-
I0
I1
VCC
GND
O
RSTN
SN74AHC1G08
JTAG Connector
JP2
DSP_TDO
DSP_TDI
DSP_TMS
DSP_TCK
RSTN
HEADER 5X2
L9 0805_150
R122
10
L8 0805_150
R121
1
This is used to tie grounds in only one place.
R98 0
R123 0
R124 0
GNDPA
GNDA
GNDPLL
This is for graphical representation only. The nets are already tied by name.
VoicePump DSP
Title
VoIP radio controller -IDA Corp.
Size B
Document Number
111-01-001-SCH
Rev B
Date: Tuesday, May 20, 2003
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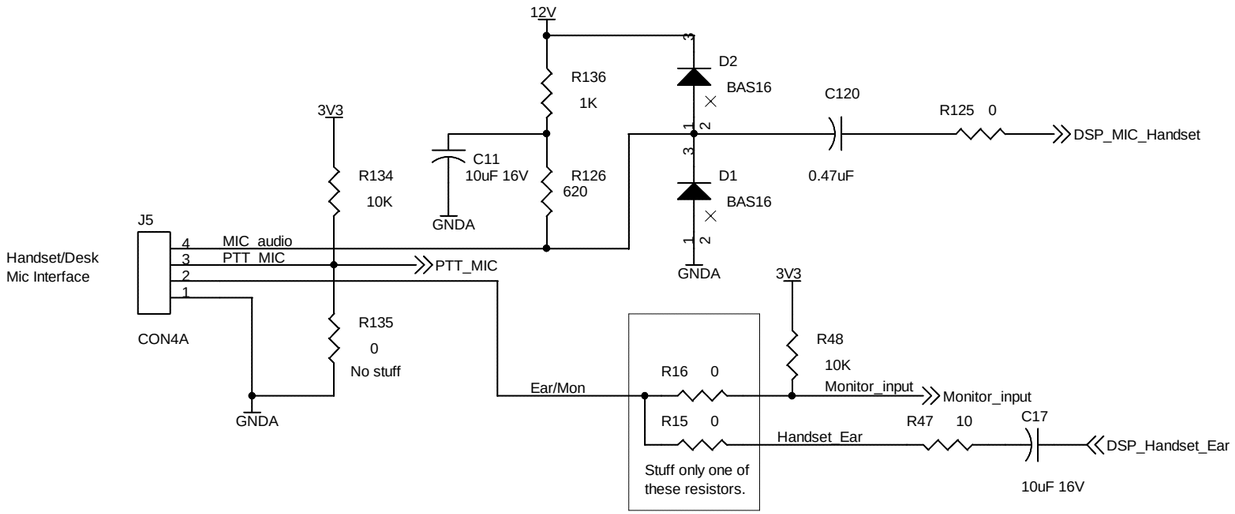


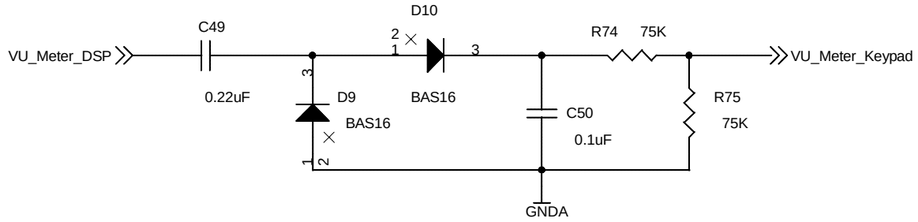


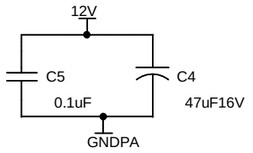


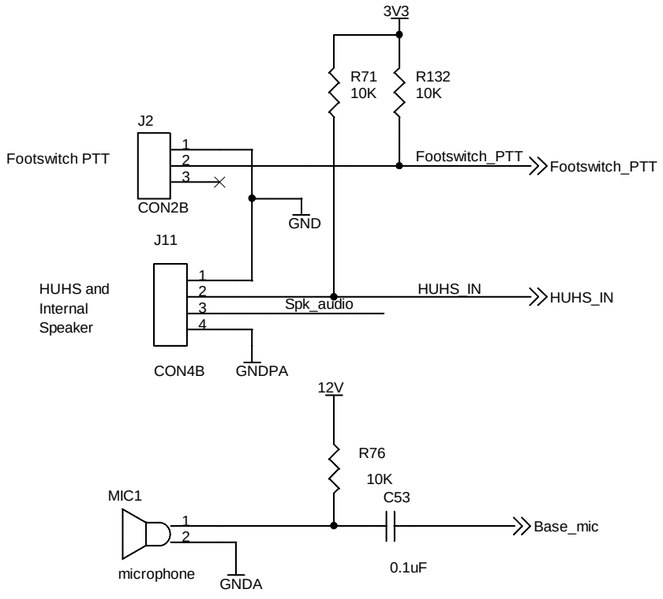


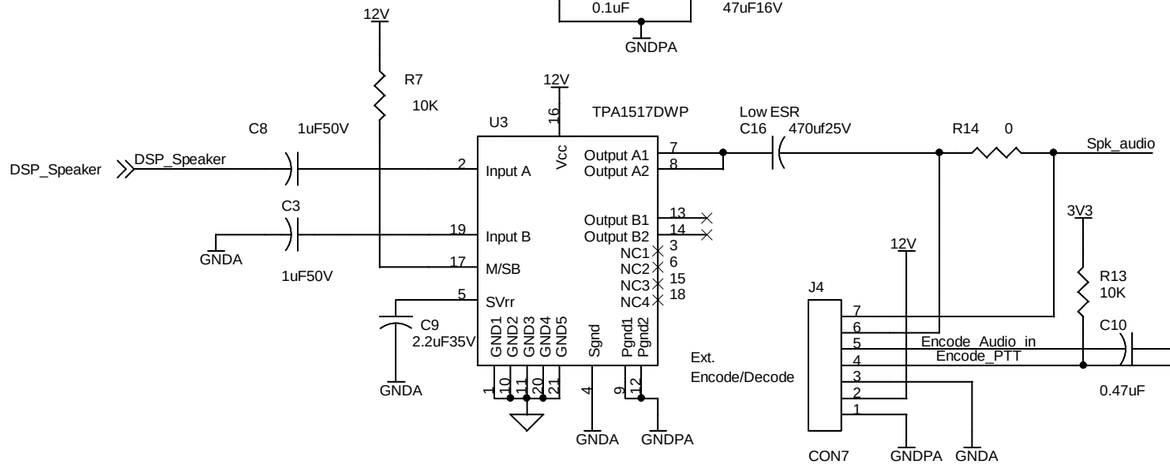


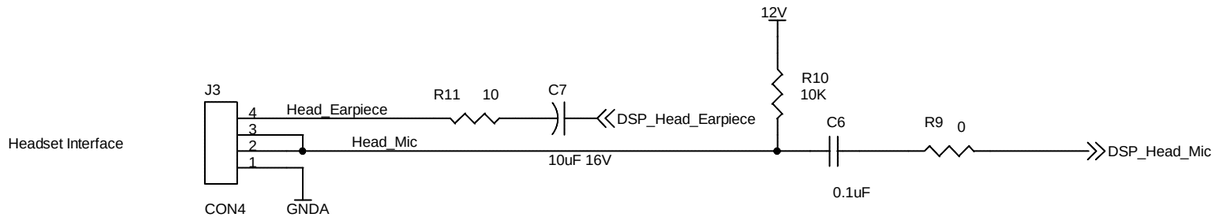


DSP Front end circuitry

Title: VoIP radio controller -IDA Corp.

| Size | Document Number | Rev |
|---|---|---|
| B | 111-01-001-SCH | B |

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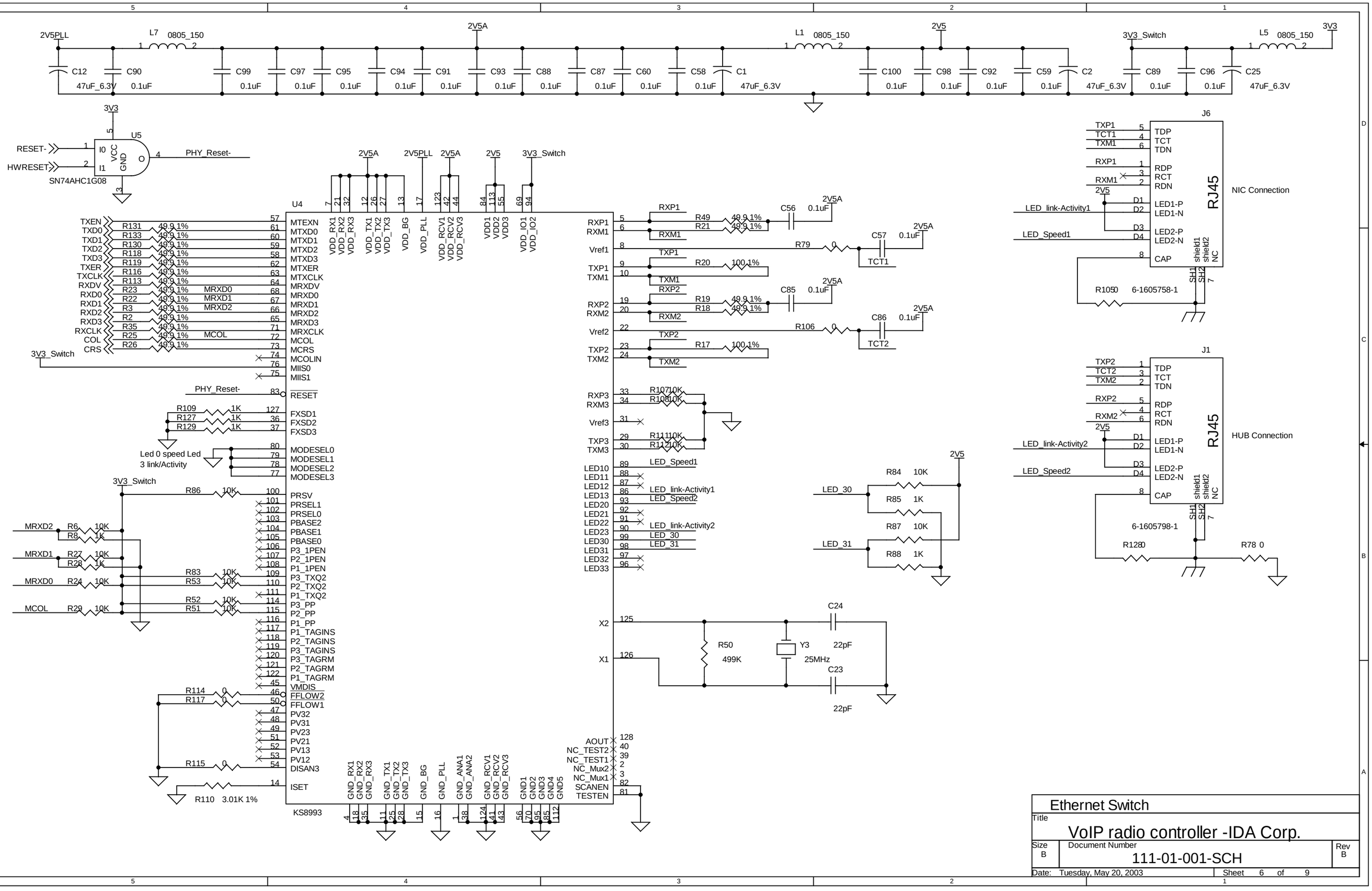


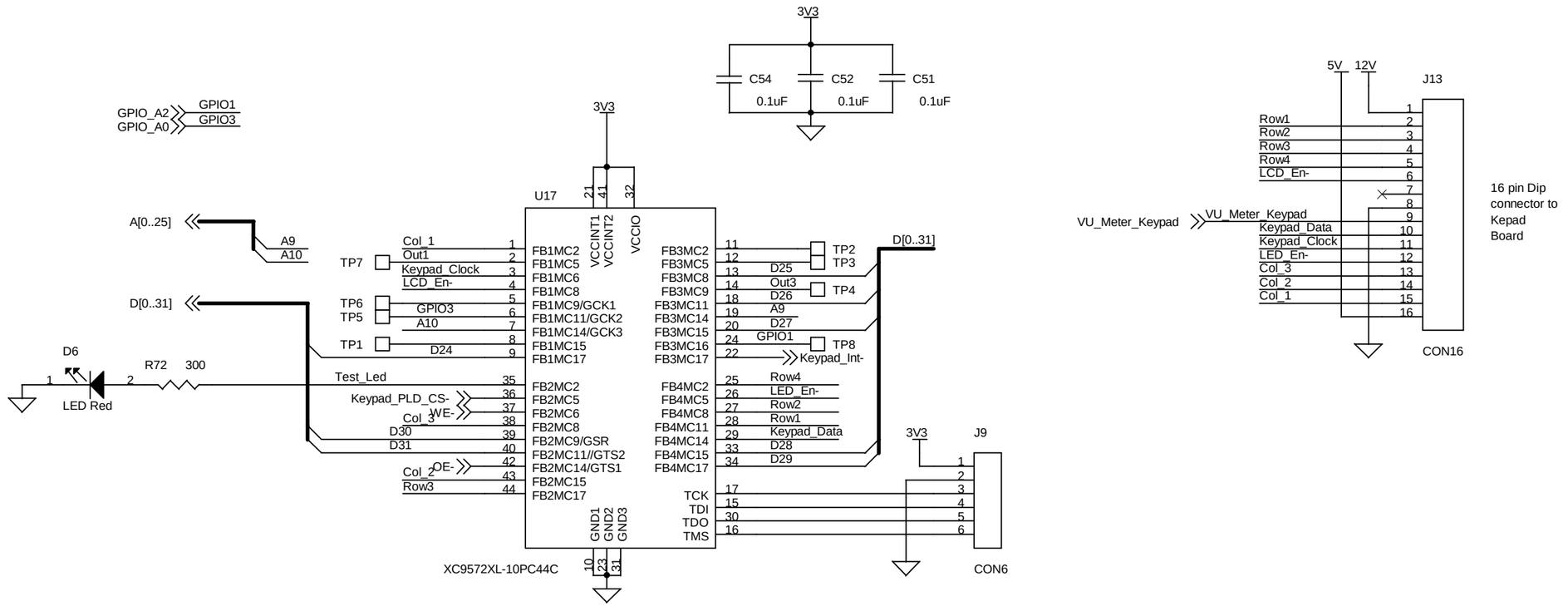

Ethernet Switch

Title

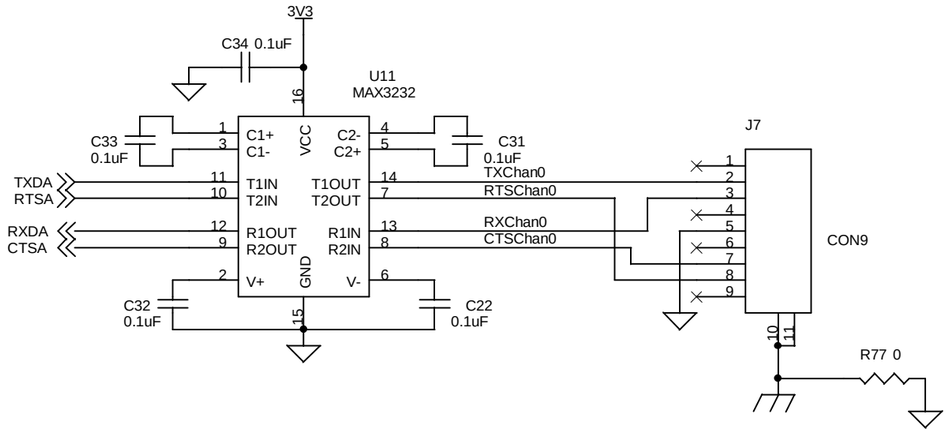
VoIP radio controller -IDA Corp.

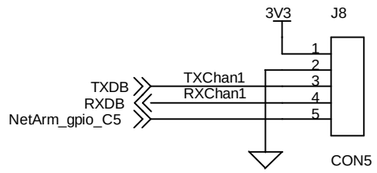
| Size | Document Number | Rev |
|---|---|---|
| B | 111-01-001-SCH | B |

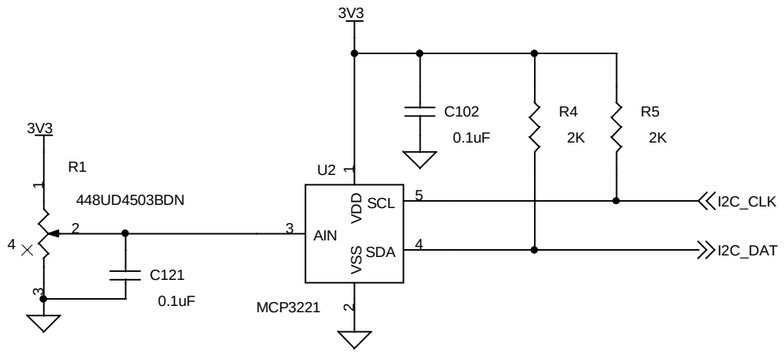
Date: Tuesday, May 20, 2003 Sheet 6 of 9



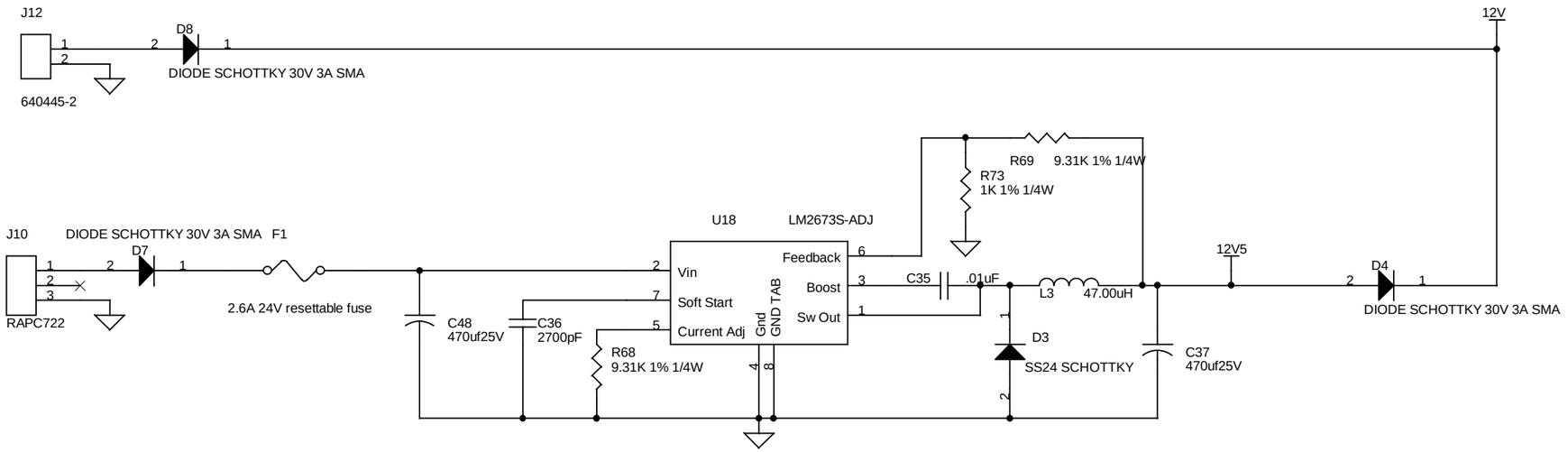

| | | |
|---|---|---|
| Keypad Interface Board | | |
| Title: VoIP radio controller -IDA Corp. | | |
| Size: B | Document Number: 111-01-001-SCH | Rev: B |
| Date: Tuesday, May 20, 2003 | Sheet 7 of 9 | |



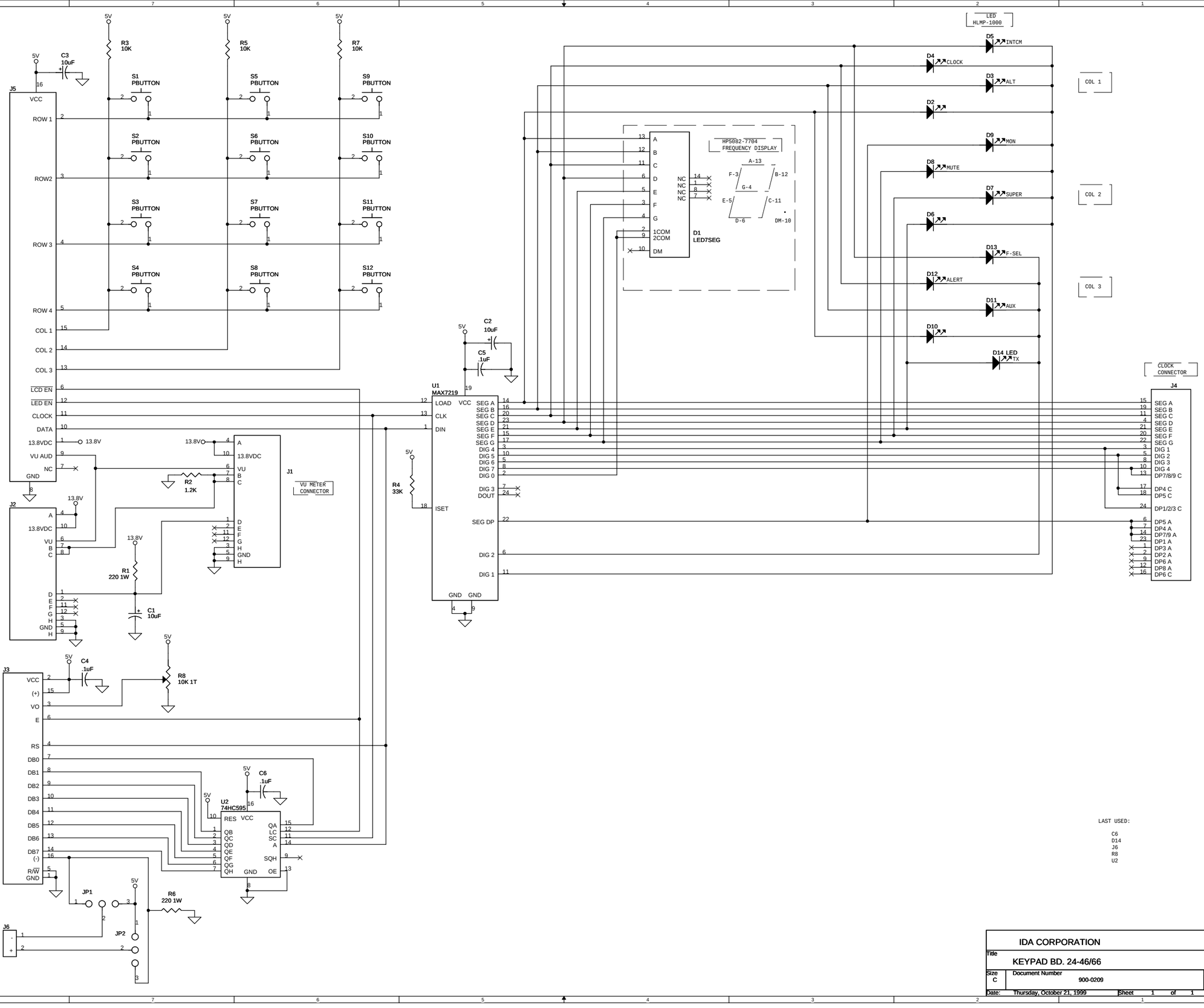




| | | |
|---|---|---|
| Serial Ports and Volume control Pot and A to D | | |
| Title: VoIP radio controller -IDA Corp. | | |
| Size: B | Document Number: 111-01-001-SCH | Rev: B |
| Date: Tuesday, May 20, 2003 | Sheet 8 of 9 | |




| | | | |
|---|---|---|---|
| Power Supply | | | |
| Title | | | |
| VoIP radio controller -IDA Corp. | | | |
| Size B | Document Number 111-01-001-SCH | | Rev B |
| Date: Tuesday, May 20, 2003 | Sheet 9 of 9 | | |




| | | |
|---|---|---|
| IDA CORPORATION | | |
| Title: KEYPAD BD. 24-46/66 | | |
| Size: C | Document Number: 900-0209 | Rev: D |
| Date: Thursday, October 21, 1999 | Sheet 1 of 1 | |