CUGS — the Monitor

January 1996

Executive Numbers

In This Issue

Happy New Year!

Though the rescheduling of this month's meeting may make this greeting seem somewhat outdated, happy new year! I hope you'll all have a prosperous and rewarding 1996.

That aside, I'd like to begin by congratulating our new executive for this year. New senior members include Drew Ruether as president and 128 librarian, Stan Mustatia as assistant editor, Rudi Breuer as secretary/treasurer, Robert Gilchrist as 64 librarian, and Arthur Hamer as assistant 64 librarian. With so many new executives, CUGS can be assured a multitude of new ideas and fresh energy for the new year. Apparently, the only 1995 executive to retain his post for this year has been me, but it appears that may soon change. Due to a class I will be taking, I will no longer be able to attend any general meetings and thus my position as editor will soon go to Stan Mustatia. However, judging from the work he has done already on this issue, I'm sure the job will be left in apt hands. The last six pages of this month's monitor have been created and printed by Stan with geoPublish, the program used by previous editor Jarrett Currie from 1990 to 1992. Within a few months, we hope to gradually phase out the current means of producing the newsletter (it's currently printed using an MS-DOS system for lack of any suitable hardware or software for my 64) in favour of a more traditional all-Commodore method. As much as I enjoy assembling the *Monitor* myself, I must say I am eager see the newsletter printed with

Editorial

geoPublish once again. Judging from past newsletters Jarrett has printed, I'm sure we will all agree that a 64 or 128 using geoPublish and a good printer is capable of producing impressive layouts comparable to anything WordPerfect could churn out.

This month's *Monitor* sees a huge resurgence of creativity from local members — in this issue can be found articles from several club members as well as helpful information gleaned by Drew and Judi from a variety of other clubs' newsletters. The result is one of our largest *Monitors* in recent times (or ever, for that matter). Congratulations to everyone who contributed to this month's successful issue! ❖

DATAPUMP

by Perry Grodzinski

With the price of high speed modems quickly falling, home computer users can now have 9600 bits per second modems for the price that 300 BPS once cost. Unfortunately, anything about 2400 BPS for the C64 is a problem; it just can't keep up. Most of the serial-to-parallel and other bit handling is done from the CIA 6526 chip and intensive code. Other Commodores of the past, like the SuperPET, B[128] series, and Plus/4 all used another means to achieve the serial conversion. By using an IC known as a UART (Universal Asynchronous Communications Interface Adapter), these machines were able to handle a much higher bit rate than what can be achieved with a C64. The UART used is known as the R6551 ACIA (Asynchronous Communications Interface Adapter). It can also be noted that this is also the UART used in the CMD SwiftLink™. The design presented here allows the C64 to communicate at speeds of up to 38,400 BPS. Although I have not tested at the higher-end speeds, I do use this design to communicate with my modem at 19,200 BPS without any problems. Purchasing a SwiftLink from a Canadian supplier was a tad costly for me and was not going to challenge me as an electronic project, so I decided to try to build a card around the 6551. Thus, the DATAPUMP! After receiving the 6551 and specification sheets, I was very pleasantly surprised to see that this was going to be a breeze. It was as though the 6551 was built for interfacing to the C64. No fancy interfacing was required at all. All that

had to be done was *hook it up!* Looking further into the spec sheets, I found that the maximum speed with the recommended crystal was 19,200 bits per second. Knowing that terminal programs like Fritzterm and Novaterm had maximum speed settings of 38,400 BPS for use with SwiftLink, it quickly hit me that CMD was doubling the speed. I quickly looked through the parts catalog and found there to be a crystal of a standard speed exactly double the frequency of the spec sheet, so I ordered it. After getting my card built, I found that indeed a double speed crystal was what was used in the design of the SwiftLink. By the way, for the record, let me mention here and now that my design, even though it may appear to be it in some ways, is *not* a SwiftLink clone. That is to say, I had never even seen what the case of one looked like, let alone the insides. Actually, at the date of this writing, I still haven't seen a SwiftLink! Now with the legality questions out of the way, let's go build a DATAPUMP!

The heart and soul of the DATAPUMP is, of course, the 6551. I used one manufactured by Rockwell. Again, interfacing the 6551 to the C64 is very simple. The 6551 pinout is as follows:

Pin#	Label	Function
1	GND	Ground
2	CS0	Chip Select High
3	/CS1	Chip Select Low
4	/RES	Reset
5	RxC	Receive Clock
6	XTL1	Crystal Leg
7	XTL2	Crystal Leg
8	/RTS	Request to Send
9	/CTS	Clear to Send

10	TxD	Transmit Data
11	/DTR	Data Terminal Ready
12	RxD	Receive Data
13	RS0	Register Select Bit 0
14	RS1	Register Select Bit 1
28	R/W	Read/Write
27	Ph2	Phase 2 Clock
26	/IRQ	Interrupt Request
25	DB7	Data Bus 7
24	DB6	Data Bus 6
23	DB5	Data Bus 5
22	DB4	Data Bus 4
21	DB3	Data Bus 3
20	DB2	Data Bus 2
19	DB1	Data Bus 1
18	DB0	Data Bus 0
17	/DSR	Data Set Ready
16	/DCD	Data Carrier Detect
15	Vcc	+5 Volt

I'll further explain some of these pins and their functions. To select the chip (to read/write to it), CS0 must be high and CS1 must be low. So we'll use I/O1 to select the chip as it is active low. We tie CS0 permanently high and toggle the chip by changing I/O1. I/O1 goes low whenever a read or write to $DExx takes place. Note that you can use I/O2 here and map the 6551 to $DFxx if you wish, but be aware that this will put the 6551 in conflict with an REU.

/RES could be tied to the /reset signal coming from the C64, but I chose not to do this for my purpose as I can do a hard reset from my C64, or do whatever such as load a different communications package and be back without resetting my 6551 which would cause my modem to disconnect. I leave this up to you but make sure this line is pulled up via R1 even if you connect your 64 /RES here. A0 and A1 connected to RS0 and RS1 allow the registers of the 6551 to be selected from $DE00 through $DE03. R2 through R4 must be in place to cause the conditions to be true on CTS, DCD, and DSR, when no modem is connected to the 6551. If these states are not true, the 6551 can generate interrupts that, if not properly handled with software, can cause the C64 to hang rudely. Pins 10, 11, 12, 15, 16, 17, and GND all make up the RS232C serial output. To follow the RS232C voltage standards, I used the common 1488 RS232 driver and the 1489 receiver. The only hassle is with the fact that the 1488 requires two 9-15 volt power supplies. One supply ties its negative to ground and positive to pin 14 of the 1488. The other supply has its positive side connected to pin 1 of the 1488. To acquire the two 12 volt supplies, I used a +5 volt to +/- 12 volt DC to DC converter made by a firm called Astec. I removed this converter from an old junk board that was a serial card for a Radio Shack TRS-80 Model 1 micro. If you have problems finding such a part, there are many alternatives to achieving these voltages. You could steal the 9V AC supply off the user port and, through a network of diodes and capacitors, create two 9V DC supplies. Another would be to use an external center tap 24 volt transformer and create two 12 volt DC supplies. To get by, you could simply use two 9 volt batteries. The reason I chose the converter was that I could then build the entire DATAPUMP, power and all, on one card, and use the 5V coming from the C64. C1 through C7 and L1 and L2 are simply used for filtering on the converter.

Construction is very easy and no previous training in rocket science is necessary. However, basic knowledge in electronics and soldering would be an asset. The entire project is built on a single card plugged into the expansion port of the C64. I used a Radio Shack part 276-192. It is a 72-position plug-in board with .100" contact centers. U.S. friends should check the RS numbers as I am unsure if Radio Shack uses the same part numbers in the U.S. as they do in Canada. The card edge must be carefully cut down, of course, to match the 44-pin expansion port female on the back of the C64. Once this is done, you now have a large 4.5" x 5.7" card to add more than the DATAPUMP if you wish. On my card, I have the DATAPUMP project, a couple of EPROMs, another female 44-pin for my REU, and a few other goodies. I used sockets on all the ICs except for the DC-DC converter. On my external cards, I always use single core copper telephone wire for circuit trace connections, and never have problems with noise.

I hope you enjoy this project as much as I did. I know you'll love the ability to really cruise at 19,200 BPS. To date I have found few terminal programs that could really make the card hum. Terminal 1 is one terminal package that works very well. Fritzterm also flies along and keeps the C64 right up to snuff with the 6551. Novaterm 9.3 also supports the 6551 but becomes undependable at speeds higher than 2400. I mentioned this to the author so maybe we'll see this in his next release. Although this interface was designed for the C64, it could easily be adapted to the 128 as well. Of course, from what I understand, on the 128, a 6551 is not required unless the user wishes to transceive at speeds higher than 9600 BPS. ❖

Here's Looking at You!

by Judi & Drew

Name: Stan Mustatia
Age: 41
Birthplace: Regina
Employer: Advanced Engineered Products
Phone: 789-8167
Equipment owned: Commodore 128, two 1571 drives, 1902 monitor, REU, Star NX1000C printer, Okidata 182 printer, 1200 baud modem
Favourite/latest project/software: GEOS, Perfect Print, Mah Jonng, Super Krack-Out, Solitaire
Commodore wish list: Hard drive, 1581 drive, 24-pin (or better) printer, CMD 4000 drive
What direction do you want to see the club go? Use more of library programs; attract more members.
General interests other than Commodore: Scouts leader, tennis, my kids, computers in general, reading
Expertise: GEOS

Name: Judi Zentner
Age: Not allowed to ask (a woman, you know!)
Birthplace: Simpson, Saskatchewan
Occupation: Semi-retired
Phone: 522-7083
Equipment Owned: Two 128Ds, 1571 drive, 1541 drive, 1581 drive, 2002 monitor, 1902 monitor, two REUs, two 1531 mice, Star 1000 printer, Canon 4100 colour printer, 2400 baud modem, RS232 interface
Latest/favourite project/software: GEOS, Fun Graphics Machine, X
Commodore wish list: Hard drive, 1581 drive
What direction do you want to see the club go? Better organization, SIG classes
General interests other than Commodore: Crafts, sewing
Expertise: Still learning! ❖

Programming on the C64

by Robert Gilchrist

If you were present at last month's meeting, you may have received along with your copy of the *Monitor* a blue sheet of paper introducing me as your new 64 librarian. You would also have been subjected to my little tirade about programming. So instead of just sounding off, I have decided to write a column about programming. Some of what I am about to relate today may seem old hat to many of us, but we have new members that know very little. So, those of you who think I am just rehashing some old axioms, just bear with me for the first few columns if you will.

This is not going to be a column on BASIC programming (although we will for the most part be working in BASIC). I have decided to take a different approach and start with something different — Commodore graphics. For my main source of inspiration I will be using a book called *Graphics Guide to the Commodore 64*, written by Charles Platt and published by Sybex Computer Books. Much of the column will be paraphrased from or simply quoted from this tome.

Some of the conventions I will be using in this column are as follows:

☞ anything in {curly brackets} is a key on the Commodore 64

☞ anything in (parentheses) contains additional information

☞ anything in a monospaced font must be typed exactly as shown.

So to begin, we will have a quick word about memory in the Commodore 64 (If you are an experienced user, you can skip this part). You can think of the memory in the 64 as a long line of mailboxes on Commodore Street (*Sunny days... can you tell me how to get, how to get to Commodore Street?*). Each mailbox has a number or address. Into each mailbox you can (for the most part) POKE in a single letter with a number from 0 to 255 on it.

0	Black	8	Orange
1	White	9	Brown
2	Red	10	Bright red
3	Cyan	11	Dark grey
4	Magenta	12	Medium grey
5	Green	13	Bright green
6	Blue	14	Bright blue
7	Yellow	15	Light grey

Some of these mail boxes you can't open, some already have letters, and others have nothing at all in them. It is the latter two that we will be dealing with here.

When you turn on your computer in the morning and instruct it to fetch your slippers and the morning newspaper... oops; that's the dog...

When you turn on your computer you will see a blue screen with pale blue lettering. Pretty, isn't it? But not much fun or easy to read after awhile. "Wouldn't it be nice" to change the colours to something more fun, or better yet, easier to read? Well, you can (for only $19.95! Hurry, hurry, hurry!)!

First, let's divide your screen into its three areas:

☞ the text, or lettering

☞ the background, or what your letters are written on

☞ the border, or the frame around your background

Changing your current text colour is fairly easy. Simply hold down your {CTRL} or {COMMODORE} key and type a number from 1 to 8. Changing your background colour is a little more difficult, but still not very hard. What we are going to do is change the number on the letter at the address that controls what you see on the screen. We will do this by POKEing a new number into the mailbox.

First, let's change the colour of the text or the cursor — hold down your control key ({CTRL}) and press the numeral 3. Next, type exactly as shown here:
POKE 53281,0

Don't forget the comma, and press return. Now you should have a black background with cyan lettering. Type a few words and see if this is true. If it is, you are learning to program.

"But the border is still blue! You say I'd like my screen all one colour and 'I want to paint it black'." Well, that's not hard to do. First we will clear the screen of any unwanted characters that you may have typed in. This can be easily done by holding down your {CTRL} key and pressing your {CLR/HOME} key. After doing this, your screen should clear.

Now we will have to go next door to change the border colour. Type POKE 53280,0{RETURN} and if you have done everything correctly so far, "your whole world should now be painted black." By changing the value following the comma in the above examples, you can have your choice of sixteen colours from the list accompanying this article. However, I wouldn't recommend having your text the same colour as the background as it could be very hard to read.

Sixteen colours from 0 to 15 — have fun for now and play around. Next month, we will do something a little more difficult — I promise! ❖

Uncle Cugsy's Tips & Tricks

by Judi & Drew

Well, I hope you all enjoyed my first column in what I hope to be a monthly feature. If anyone has tips or tricks for the 64/128 or just a general helpful hint, pass them along to Tristan or Stan or myself and we'll make sure they find a good home in this column! This month's tips and tricks cover a wide range of topics, so please enjoy.

① Modem problems? If your modem works on other computers but not on yours, it may be your edge connectors on the user port. They can accumulate dirt or gunk. Swab both sides of the edge connectors with a cotton swab dipped in isopropyl alcohol. If this does not solve the problem, lightly rub each connector (both sides) with a fine emery board. The idea is to remove the film, not the metal, then reswab with the alcohol.

②The Magic "N" — There is a well-kept secret about the DOS (disk operating system) on the Commodore disk drive that is called an "undocumented feature". The disk drive operator's manual tells us that when we want to open a file, whether a program, sequential, user, or relative, for reading, we must place a comma and a P, S, U, or R after the filename. N can be used instead of any of these and will open any file on the disk, regardless of type.

③ If you get your fingers smudged either by reinking your old ribbons or just handling ribbon changes, a little Windex cuts right through the ink and cleanup is a breeze!

④ If your program stops [and leaves you in BASIC], leaving your disk drive light flashing, don't take out the disk or reset the computer. Instead, type OPEN 15,8,15:CLOSE 15 followed by a return. The drive light will go out, preventing a splat file. [Note: splat files are not necessarily created every time a program quits with a drive error. It should be up to the user/programmer's discretion as to when to use this technique (i.e. only when one suspects that a file has been left open). Keep in mind that this command will clear the error channel, making it difficult to troubleshoot the problem if its cause is not already known. —Ed.] ❖

President's Report

by Drew Ruether

Well, another year ends for the old executive and starts anew for us who have taken on these posts. Welcome to Rudi Breuer as our new secretary/treasurer, to Rob Gilchrist and his assistant/helper Art Hamer as the 64 librarians, and also to Stan Mustatia who will be assisting Tristan Miller as *Monitor* editor. We would also like to welcome our five newest members: Gordon Vincer, Bob and La Vaughn Strohan, Bill Zaremba, and Aaron Paetsch. We hope you enjoy being members of C.U.G.S. and please don't hesitate to ask any member for assistance; that's what a club is all about.

On December 17, 1995, the new executive met for the first time and many issues were discussed as to the general direction the club should take in 1996. Memberships are now due for the current year; please take care of this as our club runs on a tight budget and late dues hurt us all as a club. This month's general meeting has demos from E. Carl Reilly on Tundra BBS, Stan Mustatia on D.C.M.R. (our club disk library is assembled with the help of this fine program) and Rob Gilchrist will demo our disks of the month received from our exchange clubs. As your new club president, let me take this moment to wish you all the best in 1996 and happy computing! ❖

PEEKs Into Other Clubs

by Judi & Drew

Well, here it is — another month. Will winter never end? I hope everyone had a pleasant Christmas as well as a safe and happy New Year's Eve. Our club newsletter/sample disk exchange program continues with new arrivals daily. We received another disk of the month from C.O.U.G.A.R. (Commodore Users' Group of Ames Region) and Rob Gilchrist will be giving a demo of this disk at this month's general meeting. Last month's disk of the month from the C.H.U.G. and C.O.U.G.A.R. users' groups are now in the club library for purchase and the new price structure for club library disks will be discussed at this month's general meeting.

Newsletters have been arriving throughout the month from several clubs. We would like to welcome A.B.C.U.G. from Glen Burnie, Maryland, C.H.L.B. (Commodore Helpers of Long Beach) from Long Beach, California, FCC³ from Fort Collins, Colorado, S.A.C.U.G. (Saginaw Area Computer Users Group) from Saginaw, Michigan, and S.C.U.G. (Sandwich Computer Users' Group) from Sandwich, Illinois. These newsletters, along with updates from our honourary membership clubs, are available for reading in the club newsletter binders. They may be viewed at club meetings or may be taken home for a ten-day period, after which I will pick them up from you. Articles from our *Monitor* were quoted in two of our exchange clubs' monthly newsletters — C.H.U.G.'s (Commodore Hayward Users' Group) and W.C.C.U.G.'s (Western Colorado Commodore Users' Group).

It was brought to my attention by one of our club members that there were some inaccuracies in a couple of the reprinted articles in our column. As stated before, these articles are reprinted verbatim, so if any errors are detected, please accept our apologies and if you can help us correct these errors, write an update to the *Monitor* to help us all out.

This month's excerpts are of a timely nature to all of us in these 'Internet access' days. For all who don't have this article (which appeared in a previous *Monitor*), please keep it for future reference. It's reprinted from W.C.C.U.G. and originally from our well-known friend Perry Grodzinski in his article outlining how to build a DataPump. Also, we have a C64 internal layout diagram from C.H.U.G.

Well, until next month, we'll keep on spreading the Commodore word. Bye! ◆

About CUGS...

CUGS is a nonprofit organization comprised of Commodore users interested in sharing ideas, programs, knowledge, problems, and solutions with each other. Membership dues ($15) are pro-rated, based on a January to December year.

Anyone interested in computing is welcome to attend any meeting. They are held on the first Wednesday of every month at Miller High School, Room 173, from 7:30 to 9:30 P.M. The next meeting will be held on February 7, 1996.

Members are encouraged to submit **public domain** and shareware software for inclusion in the CUGS Disk **Library**. The programs are compiled onto disk volumes, which are made available to members at $3.00 each (discounted prices when buying bulk). Since some programs on the disks are from magazines; individual members are responsible for deleting any program that they are not entitled to by law. To the best of our knowledge, all such programs are identified in their listings.

Other benefits of club membership include access to our **disk copying service** to make backups of copy-protected software, eligibility for our frequent and year-end **prize draws**, and accessibility to current and past issues of our monthly newsletter, *the Monitor*. ❖


C-64 CHIP LAYOUT
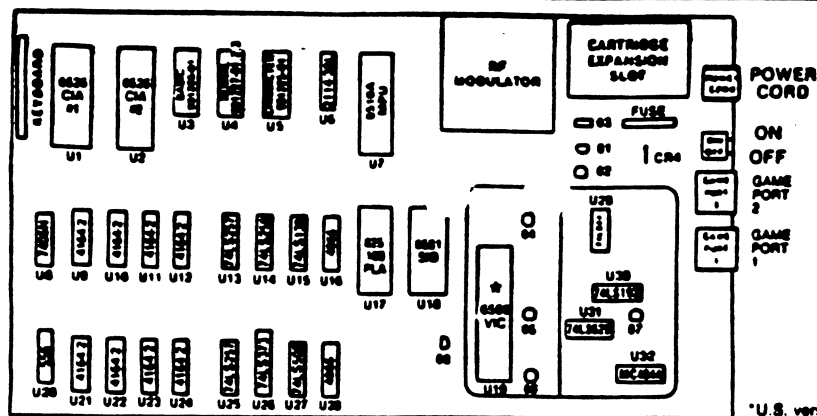
*U.S. version of the 6569 is 6567.

HINTS:
1) Over 50% of faulty computers are caused by the external power supply delivering excessive voltages.
2) Check power supply to see if your unit has a fuse which could be changed.
3) Check all interconnecting cables.

1541 Diagnosis Chart

SYMPTOMS	POSSIBLE PROBLEM							
	6502	6522	325302	901229	LM311	582	9602	325572
Error LED blinks on powerup	●		●					
Searching with no red LED			●	●				
Drive fails to read					●	●	●	●
Fails to format		●						●
Stepper motor does not step		●						●
Will not save when drive heats up	●	●						
Lights stay on; motor runs continuously	●			●				
No LEDs on power up	Power supply voltage, CR3, VR2, VR1, CR1							
Drive motor runs continuously with no green LED	5VLT on power supply							
Drive motor runs continuously with green LED on	UC1, UD2							
Flashing light on and off during loading; load is intermittent	Alignment, defective disk							
Message 'FILE NOT FOUND' is displayed	Alignment, dirty drive head							
Drive speed will not stabilize	PC8 speed (LAG570 for Newt. Drive)							
Displays READ ERROR 21-29	Diskette, drive motor							
Displays WRITE PROTECT ON ERROR 25	WPS, UA1, write protect switch, alignment							
TRACK 18 DISPLAY 21 READ ERROR	Alignment, UC2, UE6, read/write head							
Will not load certain programs	Alignment, track 0 stop							

DATAPUMP THE 6551 ACIA CARD
DESIGNED BY
PERRY M. GRODZINSKI (C) 1991

(From Pin View)
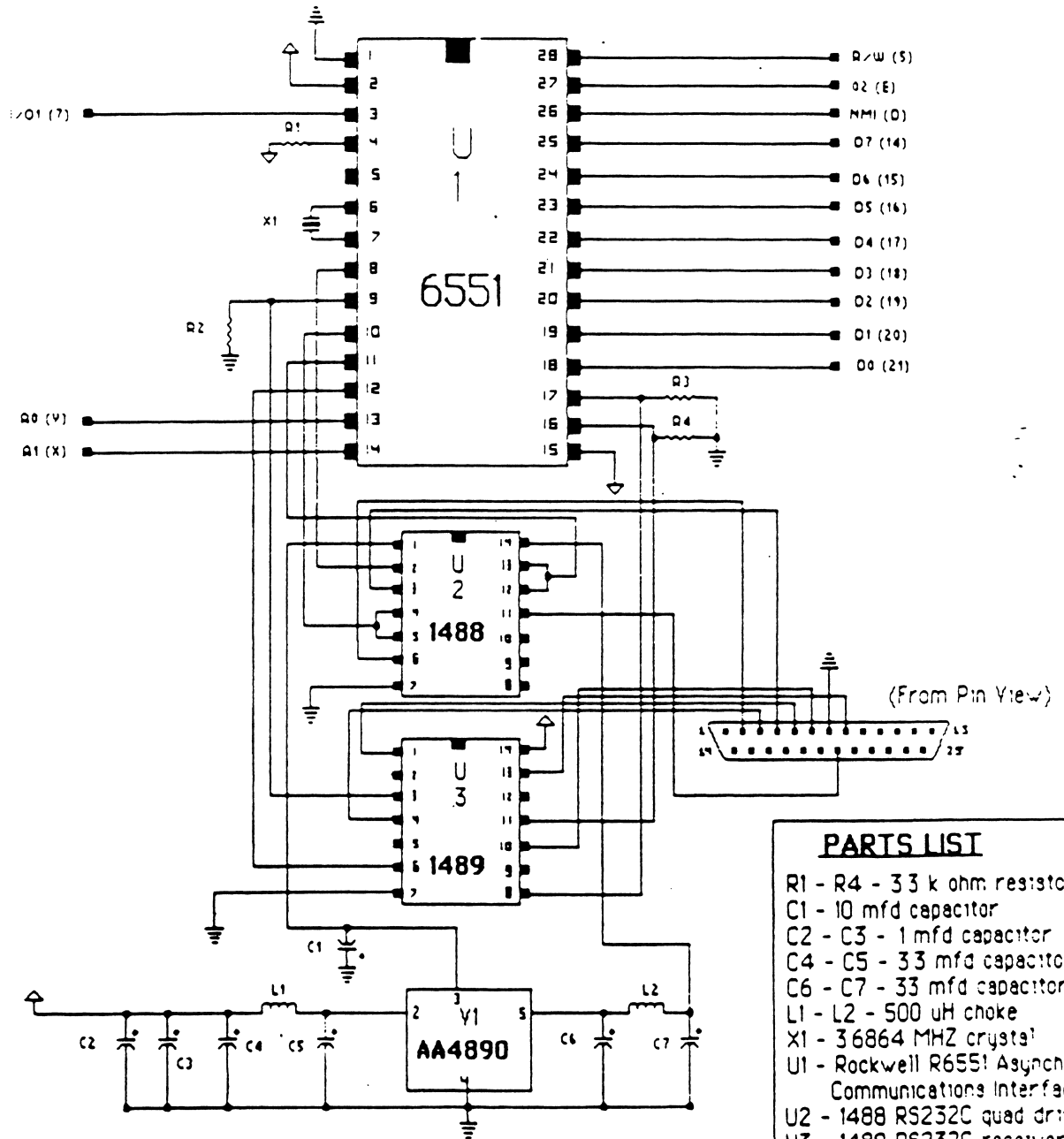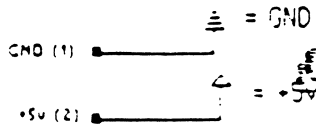
PARTS LIST

R1 - R4 - 33 k ohm resistors
C1 - 10 mfd capacitor
C2 - C3 - 1 mfd capacitor
C4 - C5 - 33 mfd capacitor
C6 - C7 - 33 mfd capacitor
L1 - L2 - 500 uH choke
X1 - 3.6864 MHZ crystal
U1 - Rockwell R6551 Asynchronous
    Communications Interface Adac
U2 - 1488 RS232C quad driver
U3 - 1489 RS232C receiver
V1 - Astec +5 - +/- 12 dc-dc
    convertor
MISC - Radio Shack 276-192 0.1"
    contact centers, wire socket