Niagara BUG Bulletin VOL 3 NUMBER 1

January 28, 1985

New-Volume Blues

That's what we're singing, here at headquarters. I am sorry to say that resubscriptions this year were even worse than I had first thought. (which says a lot!) I would encourage all of our subscribers to 'pitch in' by whatever means possible. It seems certain that the Bulletin will become extinct at the end of this volume, without radical changes.

Cartridges on the horizon?

One of our lookouts has informed me that a long-time supplier has been trying to arrange deals with Astrocade, to release some of the newer titles through independent producers. (Music Maker, Conan the Barbarian, etc.) We'll keep you informed on this as we recieve word.

Program transmission

A few of the locals and I have attempted this before, with some success, by hooking our tape recorders up to the telephone reciever via a patch cord, and some aligator clips. On the transmission end, the patch cord had capacitors attached to each wire, as was suggested in the Arcadian, vol2 pg 30.

We managed to duplicate one program, during 3 or 4 tries. I would like to engage the aid of some of our more knowlegeable hackers out there, and hopefully produce a box that would be equipped for send/recieve, with a tape recorder.

I would also like to suggest that with a small program in memory, we might be able to send data through the cassette interface, (2000 baud) and the phone, and have a makeshift modem. Would major modifications have to be performed on the signal to make this procedure effective? Chew on that for a while!

Letters

I always encourage subscriber input, whether it be programs, articles, or letters. Now that we have the extra capacity, I would like to hear from those of you who have been mysteriously silent for a while. Question answering is part of the service that you pay for, so don't be afraid to ask!

Diversify?

It is not always a good idea for we buggers to hide in our holes and ignore the rest of the computing world. In the issues to follow I'll have a little to say about what goes on outside the realm of Ballydom. If you would like to see more of the outside world, give the word!

><(>< TRICKS OF THE TRADE ><(><
><(><(>< A TUTORIAL BY ><(><(><
><(><(>< MIKE WHITE ><(><(><
><(><(>< COUNTY LINE #2 ><(><(><
><(><(>< R.D.#1 BOX 373 ><(><(><
><(><(>< WAKEMAN , OHIO ><(><(><
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GREETINGS! TO ALL THE NEW SUBSCRIBERS, AND TO ALL YOU "DIE HARDS", WELCOME BACK!!

AS YOU CAN SEE, I HAVE UPGRADED MY COLUMN WRITER TO INCLUDE THE SYMBOLS ←→↑↓x AND ÷ AS WELL AS ENHANCED PRINTING! LAST YEAR THIS COLUMN HAD SOME FUNNY SYMBOLS IN SOME OF THE LISTINGS. BUT NO MORE! IF YOU DON'T HAVE NIAGARA BUG BULLETIN VOL.2 GET IT!! BACK ISSUES ARE AVAILABLE THROUGH KEVIN O'NEILL.

ON PG.33 VOL.2 NIAGARA BUG BULLETIN I SAID THAT "FOR NEXT" LOOPS RUN FASTER THAN GOTO OR GOSUB. THAT IS BECAUSE THE ADDRESS FOLLOWING THE "FOR" STATEMENT IS "PUSHED" ONTO THE STACK WITH THE "TO" AND "STEP" VALUES. LOOP 1 OF MY LAST COLUMN (LAST YEAR) DEMONSTRATES THIS. LOOP 2 SHOWS THE EXACT ADDRESS. AS THE "FOR" STATEMENT IS READ BY THE COMPUTER THE "STEP" VALUE CHANGES, BUT ONLY IF TR(1) IS PULLED! HENSEFORTH, THE "FOR" STATEMENT IS ONLY READ ONCE, NORMALLY! THE STACK HOLDS EVERYTHING TILL THE "NEXT" IS ENCOUNTERED. THEN WE RETURN TO THE STORED ADDRESS, AND KEEP LOOPING. THE ADDRESS OF THE LOOPING VARIABLE IS ALSO PUSHED ONTO THE STACK. SEE QUADRA OR THESE 2 LOOPS:

LOOP A

```
10 FOR A=0TO 99
20 FOR B=0TO 99
30 NEXT A
40 NEXT B
```

LOOP B

```
10 FOR A=0TO 99;IF A=50GOTO 30
20 NEXT A
30 FOR B=0TO 99;IF B=50RUN
40 NEXT B
```

LINE 40 "BLOWS OUT" IN LOOP A, BECAUSE THE "FOR B" DATA GETS ERASED WHEN "FOR A" DATA GETS READ FROM THE BOTTOM OF THE STACK. LOOP B RUNS FOREVER! THESE "FOR" STATEMENTS ARE "RESTACKED" WHEN REINITIATED, SO THE STACK (200 BYTES IN AB) DOESN'T EXPLODE.

NOW AS PROMISED LAST YEAR, LET'S LOOK AT:

DIRECT SOUND PORT ACCESS

```
&(16)=MO          MO=&(16)
&(17)=TA          TA=&(17)
&(18)=TB          TB=&(18)
&(19)=TC          TC=&(19)
&(20)=VFx64+VR    VF=&(20)÷64;VR=RM
&(21)=NMx16+VC    NM=&(21)÷16;VC=RM
&(22)=VBx16+VA    VB=&(22)÷16;VA=RM
&(23)=NV          NV=&(23)
```

THE CHART WAS TAKEN FROM THE PORT TO VARIABLE TRANSLATOR BY [GEORGE MOSES]. THE PROGRAM LETS YOU HEAR THE SOUNDS AS WELL AS SEE THEIR VALUES. THE TUTORIAL ON PG.62 TO 66 VOL.1 ARCADIAN EXPLAINS THE SOUND GENERATOR IN DETAIL. ONE THING ABOUT &(21), &(21)=255 GIVES THE SAME SOUND AS &(21)=63. GEORGE MOSES'S PORT TO VARIABLE TRANSLATOR WON'T EVEN ACCEPT A &(21) INPUT OVER 63.

ON PG.69 VOL.1 ARCADIAN YOU'LL FIND A CHART OF CONCERT NOTES TO AUDIO FREQUENCIES. AND ON PG.73 IS A CHART FROM &(17) OR TA VALUES TO AUDIO FREQUENCIES. REMEMBER THAT TB+TC OR &(18)+&(19) ARE THE SAME (SOUND WISE) AS &(17) OR TA. THEREFORE YOU CAN MAKE THREE VOICE MUSIC FROM THESE TWO CHARTS. GEORGE MOSES SENT ME A COUPLE OF LETTERS A WHILE BACK AND HE GAVE ME THIS:

THE FORMULA FOR A NOTE ONE OCTAVE LOWER IS TO TAKE THE MO (OR TA) VALUE, ADD 1, DOUBLE IT, AND SUBTRACT 1.

THE FORMULA FOR A NOTE ONE OCTAVE HIGHER IS TO TAKE THE MO (OR TA) VALUE, SUBTRACT 1, AND DIVIDE BY 2.

TO CREATE STRANGE SOUNDS REQUIRES A "FOR NEXT" LOOP. HERE IS "THE RAZZ"!! SLOBBER AND ALL:

```
10 NT=-1;&(18)=-1;&(19)=100;&(21)=36;&(22)=-1
20 FOR A=50TO 0STEP -1;&(20)=A
30 NEXT A;NT=0
```

IF YOU USE THE VARIABLES INSTEAD OF THE PORTS, YOU MAY USE THEM TO STEP THE LOOP. (SUCH AS "FOR VR=50TO 1STEP -1"). BUT NOT ALL IS SWEET!! TRY THIS:

```
11 NT=10
12 PRINT "135x1 5x100
13 CLEAR
60 FOR N=1TO 1000;NEXT N
333 NT=0
343 TB=-1;TC=100;NM=2;VC=4;VA=-1;VB=-1
344 FOR VR=50TO 1STEP -1
345 FOR XY=1TO 2;NEXT XY;NEXT VR;↓
511 NT=15
512 PRINT "100101100+20220110-11000
```

THE VARIABLES RUN SLIGHTLY FASTER THAN THE PORT LOOPS. THE REASON IS, THERE ARE LESS BYTES. SO A SHORT DELAY IS ADDED TO LINE 345. BUT "WHERE IS THE RAZZ"? IF YOU ADD THE ABOVE PROGRAM TO **ANTI-AIRCRAFT GUN** BY [BOB OGDEN], PG.73 ASTRO BASIC HANDBOOK, (EXCEPT LINE 60) YOU WILL GET "THE RAZZ" IF THE AIRPLANE REACHES THE RIGHT EDGE OF THE SCREEN. BUT ONLY IF YOU MISS AT LEAST ONCE FROM THE GROUND. OTHERWISE, YOU HEAR A NASTY SCREECH. NEXT MONTH I'LL TELL YOU WHY! ALSO, DID YOU TAKE THE "&(16)=71" OUT OF LINE 20 OF **SPACE MISSION (PART 2)**? IF ANYONE CAN TELL ME WHERE THE MO SHIFT OCCURS BEFORE THE MARCH "TRICKS" COLUMN COMES OUT, I'LL GIVE THAT PERSON A FREE **QUADRA**! (HINT) ANTI-AIRCRAFT GUN MODS ALSO SUFFER FROM MO SHIFT! CLUES NEXT MONTH! KEEP BUGGIN'

TEXT DESCRIPTION OF JE610 ASCII KEYBOARD INTERFACE OPERATIO

FIG.1 is the pictorial diagram of the cassette interface (300ba board showing the various point connections to and from the UAI Interface board.

FIG. 2 is the color coded wiring for the 9 pin connector cable-Ch ntroller cable)- 6 wires are actually used, the 2 remaining wi - Green and white - could be used to double up on the 5V sourc and the ground to lower the wire resistance.

FIG. 3 is the complete schematic diagram of the UART interface ci This a brief description of what information is needed for a UART to oper A 4800 Hz clock frequency (16x baud rate) derived from the cassett interface board is applied to pin 40.
The negative going strobe pulse from the JE610 Keyboard goes to p The serial data on pin 25 is sent back to the cassette interface The logic states on pins 34 thru 38 programs the UART serial outp for 1 start bit - 8 data bits, DØ to D7 - the MSB(D7) always at zer in bally basic and 1 stop bit.
The 5V source goes to pin 1 and ground to pin 3.
A JE212 adapter board KIT - incoming 5V to -12V is used for the 2376 encoder chip on the Keyboard only.
Pin 21 is the reset line for the UART. Pin 21 could be connected direc to ground but on first applying 5V to the UART's pin 1, the very first Keypress will cause a error message - ? - to appear on your TV screen. Pin 21 should be a brief logic hi and then a logic lo in order to cl the internal registors of the UART,

FIG. 4 shows a simple circuit that will initiate this operation ma... Also this same circuit will pulse a SCR turnon circuit for the 5V o the Keyboard. But NO 5V must enter the 5V Bus on the Keyboard ex thru the SCR itself in order for this circuit to function properly. This feature minimizes current drain when the Keyboard is not in us

FIG. 5 is also a simple circuit to add on for the erase function.

All alphanumeric, punctuation and command words (lower case) are acessible except these four - halt, pause, go+10 and erase. (See Fig Four wierd looking graphic symbols are on Keys D, E, F and G. (lower With Bally Basic cartridge inserted, KeyIN : INPUT - go on your Keypa Switch1 on Keyboard to on position - Keyboard mode, the off positi restores cassette interface to normal operation as before, pres reset PB 1 on Keyboard (reset could be pressed first and then switch, it doesn't matter). The error message - ? - is automatically gone.
You are ready to start programming easier - fewer KeyStrokes, fa - up to 300wpm.
One nice feature is you can type way ahead with the TV scre display trying to catch up to your typing. There is no waiting.
You can also interact with programs, run them, callup partial o single line instructions to check for errors, etc.
I use IBach's cartridge swap explained in Arcadian Vol.4-#5-page 4
IF all of this is too technical for you, please let me know and I try to answer your Questions to the best of my knowledge.
P.S.* Bob Fabris has decided to shut down the Presses.

pg 4

Roy Del Doggetto 11/11,

JE610 (JAMECO) ASCII KEYBOARD INTERFACE DIAGRAMS

CASSETTE INTERFACE P.C. BOARD ACI-0100

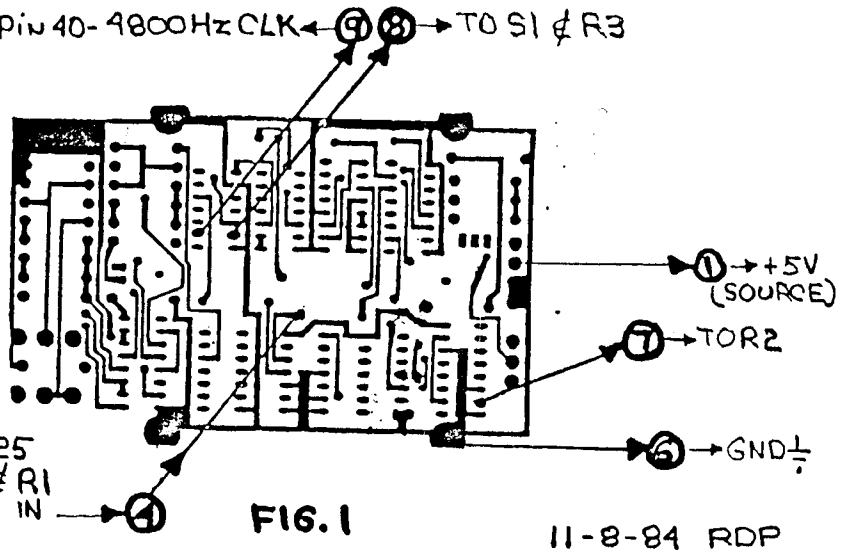


FIG. 1

11-8-84 RDP

9-PIN CONNECTOR CABLE COLOR CODE

1 -	RED	+5V SOURCE
2 -	GREEN	N.C. } SEE TEXT
3 -	WHITE	N.C. }
4 -	BLUE	SERIAL OUT
5 -	N.C.	N.C. (BLANK)
6 -	BLACK	GROUND
7 -	YELLOW	TO R2 - 1KΩ
8 -	PURPLE	TO R3 - 25KΩ
9 -	ORANGE	4.8KHz CLOC

FIG. 2

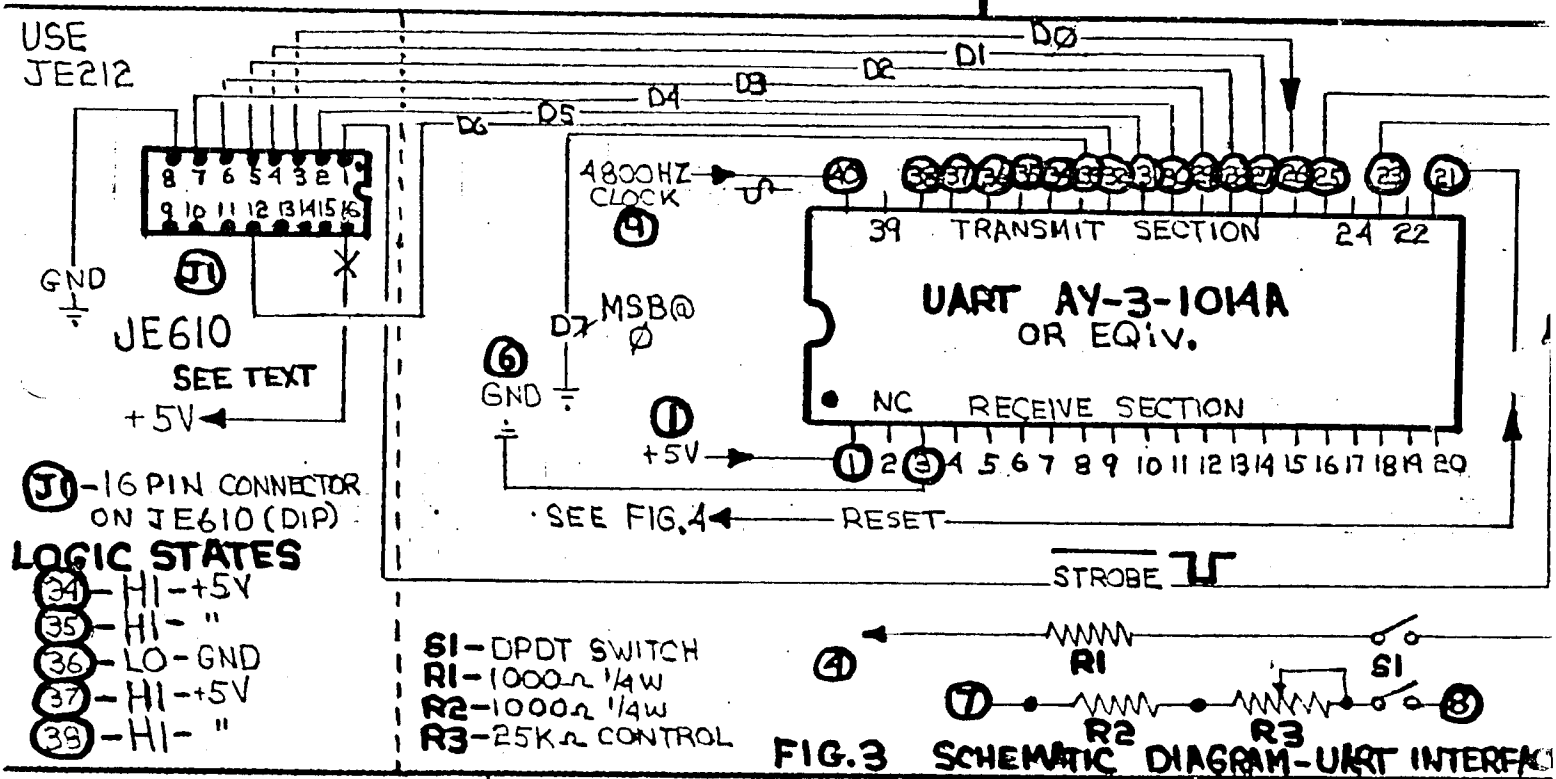


FIG. 3 SCHEMATIC DIAGRAM - UART INTERFACE

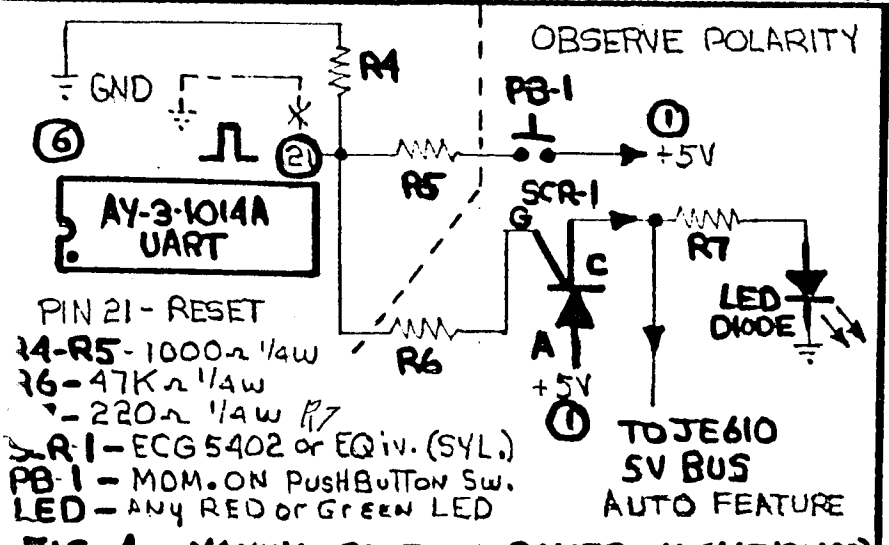


FIG. 4 MANUAL RESET & POWER ON (KEYBOARD) DIAGRAM

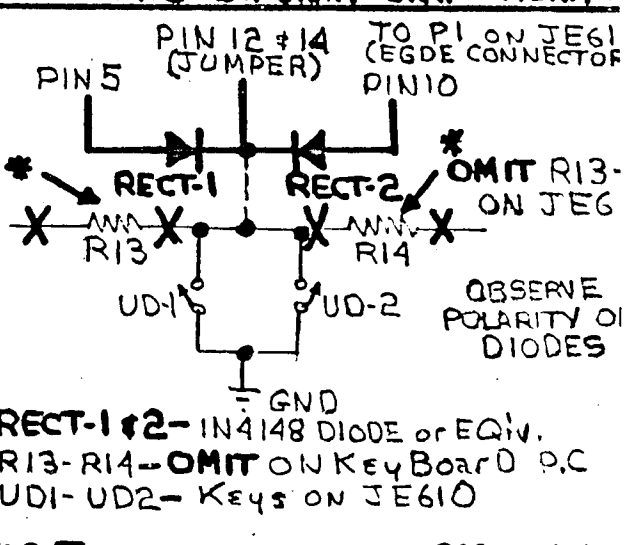
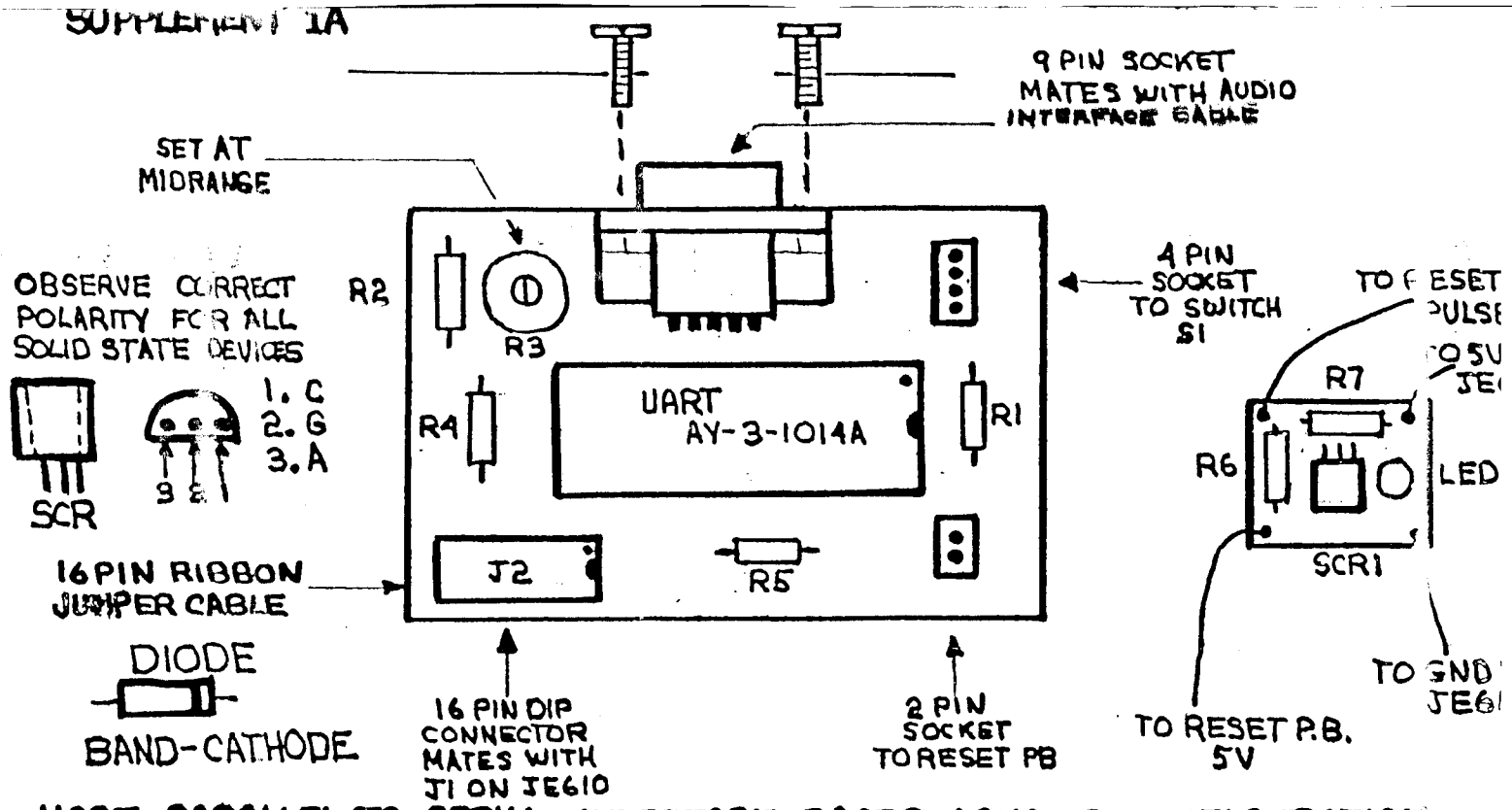


FIG. 5 ERASE FUNCTION DIAGRAM

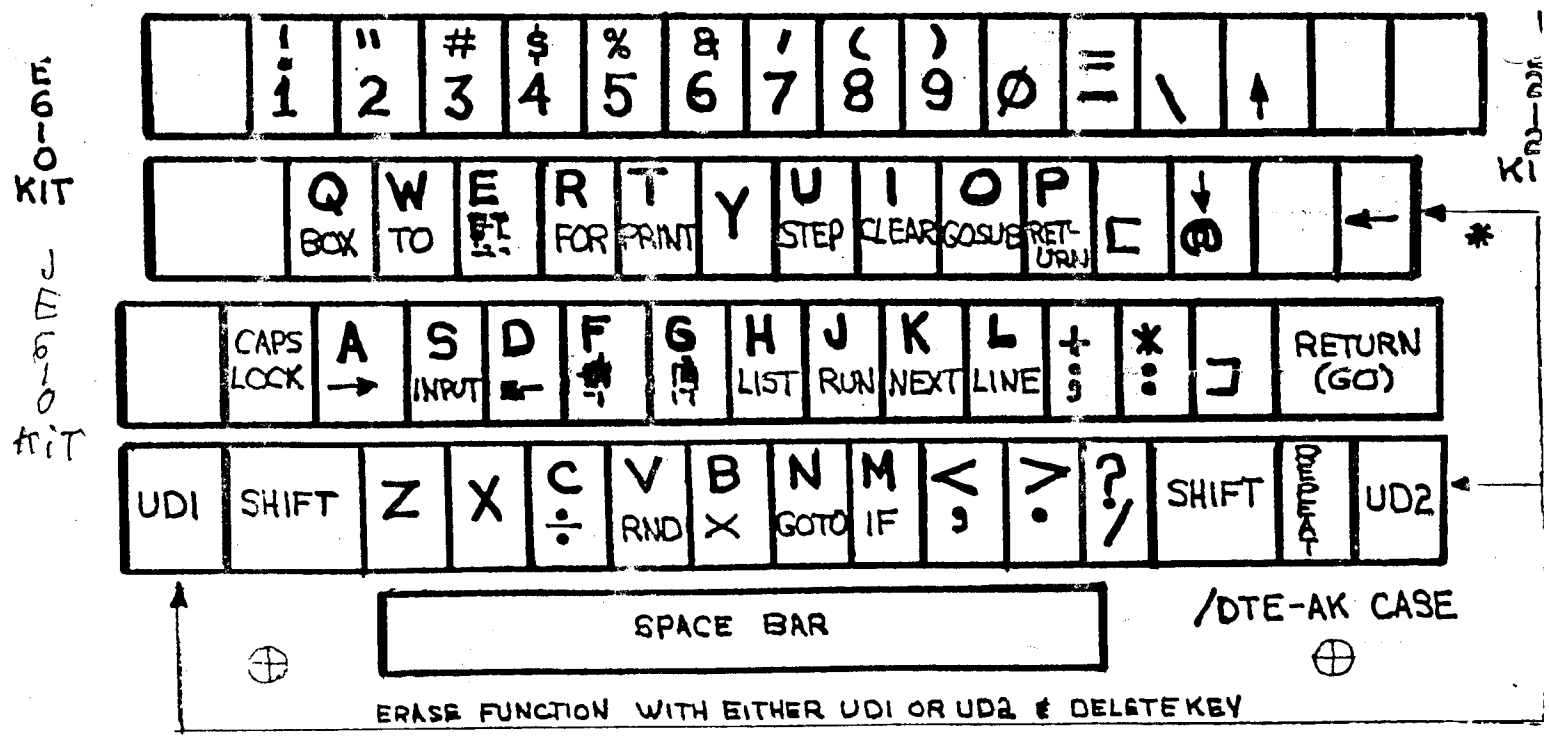
SUPPLEMENT 1A



UART-PARALLEL TO SERIAL- INTERFACE BOARD LAYOUT CONFIGURATION

ASCII TO BALLY BASIC TRUTH TABLE CHART LAYOUT

JAMECO ELECTRONICS-1355 SHOREWAY RD.-BELMONT,CA.-94002-(415)-592-80



ROY DAL POGGETTO
57 JERSEY ST.
SAN FRANCISCO, CA.
94114

* TO OBTAIN LEFT HANDED ARROW ← CAPS LOCK KEY DOWN THEN DELETE YOU CAN SWITCH KEY CAPS AROUND TO SUIT YOU - ALSO BLANK KEY CAPS ARE AVAILABLE.

11-10-84 RDP

NIAGARA BUG BULLETIN

6 WOOD-DALE DRIVE,
ST. CATHARINES, ONTARIO
CANADA L2T 1Y8

March 29. 1985

What's The Hold Up?

I admit that it's been a while since you recieved your last issue. It has also been a while since there has been any news to print. As it is now. I must admit we're scraping the bottom of the barrel.

There has been no shortage of tutorials, and there are a few programs here that we are holding in reserve, but news is at a standstill. Astrocade, I am sorry to say, is officially closed down. Reports from readers trying to get letters through have been anything but cheerful, with tales of offices continually floating around, finally to disappear without a forwarding address.

The Arcadian newsletter has started up again, printing four large issues per year, at a higher price. Extended systems, equipped with a Blue Ram, Zgrass keyboard or Viper, will be given greater coverage. Arcadian, 3626 Morrie Dr, San Jose CA, 95127.

'Speak, Strike, Redress!'

None the less, life goes on, at least until the end of the volume. The Niagara Bugs Club Tape has been put together by Mike & Tim White. It contains several programs that have been printed here, and a few that haven't. There have been a couple of bugs (pardon the expression) in duplication, due to the fact that Astrocade owners don't have like tape recorders, but the tape will be available soon. The price is, as yet, undeclared.

Personal Insights

I'll throw in my two cents worth this month, and try to explain a bit about the 'big processor revolution', and why 64 isn't the magic number anymore!

TRICKS OF THE TRADE

A TUTORIAL BY
MIKE WHITE
COUNTY LINE #2
R.D.#1 BOX 373
WAKEMAN , OHIO
44889

LAST YEAR I SAID THAT "YOU MAY CONSIDER PURCHASING THE PORT TO VARIABLE TRANSLATOR BY [GEORGE MOSES]". IN TRUTH THIS PROGRAM IS A "FREEBEE", AND APPEARS ON PG.58 VOL.5 ARCADIAN. I GOT MINE FROM GEORGE, ON A TAPE WITH ASTRO ZAP AND BACH MUSIC. I FORGOT ABOUT PG.58 VOL.5. SORRY ABOUT THAT! I STRONGLY SUGGEST THAT YOU KEY THIS IN. BE SURE TO READ THE TUTORIAL WITH IT!

OTHER THAN THE SOUND VARIABLES, AND PORT COMMANDS, THERE ARE THREE OTHER WAYS OF ACCESSING SOUND IN THE BALLY, "MU=", "TV=", AND "PRINT ". THESE ARE UNDER THE HEADING OF:

INDIRECT SOUND PORT ACCESS

ON PG.71 TO 73 OF VOL.1 ARCADIAN IS THE TUTORIAL ON INDIRECT SOUND PORT ACCESS. THE CHART ON PG.73 HOLDS TRUE FOR BOTH BB AND EB. AB USES A DIFFERENT KEYBOARD CODE. THAT IS, THE "A" (TV=65) FOR EXAMPLE, GIVES A &(17) VALUE OF 27 IN BB OR EB. IN AB IT'S 43. LISTEN TO SOME KEYBOARD SOUNDS BETWEEN AB, BB, AND EB, IF YOU HAVE ACCESS TO THESE BASICS, AND YOU'LL UNDERSTAND WHAT I'M SAYING. GEORGE MOSES SENT ME A COUPLE OF LETTERS (MENTIONED LAST MONTH) CONTAINING THESE TWO SHORT PROGRAMS:

```
1 .MO AND TA SHIFT ROUTINE
5 CLEAR
6 PRINT " NOTE    MO       TA
10 FOR A=48TO 55;NT=10
20 PRINT " -",;TV=A;NT=0;GOSUB 100;NEXT A
90 NT=0;STOP
100 NT=0;PRINT MO,TA;RETURN
```

```
1 .MO AND TA PRINTOUT ROUTINE
10 CLEAR ;GOTO 20
15 BOX 0,8,160,8,2
20 NT=3;PRINT " INPUT NOTE ",;FOR B=1TO 2;@(B)=KP;TV=@(B);IF @(B
)#13NEXT B
30 NT=0;PRINT ;CY=-8;PRINT " NOTE    MO       TA
40 NT=20;CX=-71;FOR A=1TO B-1;TV=@(A);NEXT A;NT=0;PRINT MO,TA;GO
TO 15
```

SUBSTITUTE A "+", "x", "÷", OR A SPACE, FOR THE PRINTED "-" IN LINE 20 OF THE FIRST PROGRAM TO SEE ALL THE SHIFT VALUES. THE SECOND PROGRAM GENERATED THE DATA FOR THE CHART THAT FOLLOWS. (ALSO IN GEORGE'S LETTER BY THE WAY):

A13 KEYPAD "KARACTER" FREQUENCIES

CHAR	MO	TA	CHAR	MO	TA	CHAR	MO	TA	CHAR	MO	TA	CHAR	MO	TA
-1	71	100	&	71	70	-8	71	52	C	71	41	S	71	25
1	71	94	'	71	69	8	71	52	D	71	40	T	71	24
+1	71	89	(	71	68	+8	71	52	E	71	39	U	71	23
-2	71	89	)	71	67	-9	71	51	F	71	38	V	71	22
2	71	84	*	71	66	9	71	51	G	71	37	W	71	21
+2	71	79	+4	71	66	+9	71	51	H	71	36	X	71	20
-3	71	79	-5	71	66	:	71	50	I	71	35	Y	71	19
!	71	75	,	71	64	;	71	49	J	71	34	Z	71	18
3	71	74	.	71	62	7	71	49	K	71	33	[	71	17
-4	71	74	5	71	62	<	71	48	L	71	32	\	71	16
"	71	74	/	71	61	>	71	46	M	71	31	]	71	15
#	71	73	+5	71	59	+7	71	46	N	71	30	↑	71	14
$	71	72	-6	71	59	?	71	45	O	71	29	←	71	13
%	71	71	6	71	55	@	71	44	P	71	28	↓	71	12
+3	71	70	+6	71	52	A	71	43	Q	71	27	→	71	11
4	71	70	-7	71	52	B	71	43	R	71	26	0	71	0

IF YOU RUN THE SHIFT ROUTINE FURTHER YOU'LL FIND THAT TA CA
ONLY SHIFT IF A NUMBER FROM 1 TO 7 GETS PRINTED. THE "+" AND "-"
SIGNS HAVE NO EFFECT IF FOLLOWED BY AN ALPHABETIC CHARACTER OR A
SYMBOL. EXAMPLE: PRINTING "+T" OR "-T" GIVES "T" SOUND.

TA IS ALWAYS RESET TO ZERO AFTER A NOTE PLAYS. VA IS ALSO
RESET TO ZERO. THIS CAN BE USED TO ADVANTAGE. HERE ARE TWO LINES
FROM U.F.O. ATTACK (AVAILABLE AS PART OF QUADRA):

```
14 C=X;I=0;VA=15;FOR D=Y-HTO -40STEP -B;GOSUB 6;C=C+J;LINE C,D,I
;IF V>0TA=40-D;BOX C+E÷8,D+3,1,1,I

15 MU=RND (9)+32;IF N>0GOSUB 3;P=P+1
```

THERE ARE NO OTHER SOUND COMMANDS IN LINES 15, 16, OR 17, OR
IN SUBROUTINE 6. V>0 WHEN A FLYING SAUCER GETS HIT. SO THE LOOP
GIVES A FALLING SOUND USING TA + VA. WHEN THE CRASH SOUND PLAYS
(LINE 18), TA + VA RESET TO ZERO TURNING OFF ALL SOUND.

UNLIKE MO! ON PG.71 VOL.1 ARCADIAN ONE FALSE STATEMENT IS
MADE. "AS SOON AS THE NOTE IS FINISHED, &(16) WILL AGAIN RETURN
TO 71 UNLESS THE NEXT NOTE IS ALSO PRECEEDED BY A ÷ (OR x)". NOT
SO!! MO SHIFTS TO ONE OF FOUR NUMBERS (71, 35, 143, OR 0), AND
STAYS RIGHT THERE! UNTIL ANOTHER SHIFT OCCURS, OR A &(16) OR "P"
COMMAND IS ENCOUNTERED. A "MO=" COMMAND MAY NOT ALWAYS WORK. IN
SPACE MISSION FOR EXAMPLE, HALTING PART 2, AND KEYING IN "NT=0
MO=71" DOES NOTHING! AND, IF YOU KEY IN "PRINT MO", YOU'LL FIND
MO ALREADY IS 71!! CONFUSED? HERE ARE YOUR CLUES: MO INPUTS FROM
THE TAPE AND &(16) DOESN'T, BUT IF YOU STARTED LOOKING IN PART 1
YOU'RE ONLY HALF RIGHT. ALSO, BY CAREFUL LISTENING YOU WILL FIND
THAT &(16)=0! IN ANTI-AIRCRAFT GUN MODS (LAST MONTH), THE SHIFT
IS IN LINE 12. ALL FURTHER ANSWERS NEXT MONTH! KEEP BUGGIN'!

A FEW WORDS FROM YOUR EDITOR

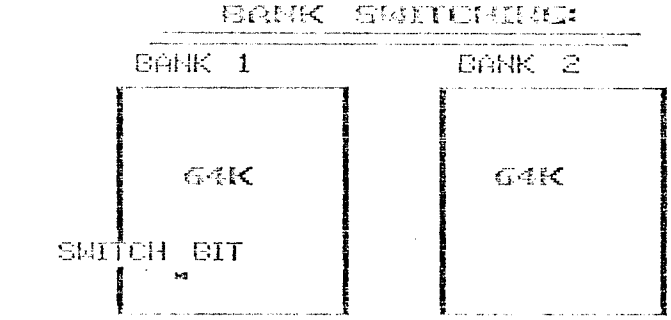
What's the big deal about the Apple Macintosh, anyway? Many of us ask that question, and with good reason. After all, it doesn't look so threatening. As we all know, looks can be decieving.

The Mac is a product of the present trend in micros, and it won't be alone for long. Atari (yeah, they're still around) and other industry hot-shoes will be comming out with similar machines soon.

Although the Mac looks small, and (let's admit it) cute, under the hood is alot of superior technology. (not new, just superior) The Mac operates on a 32-bit microprocessor. What this means, in rough terms, is that it can bite off and handle more data in a single chunk than a Z80, or 6502, or 8086 microprocessor can.

Relating this to systems, the Apple II, TRS 80, IBM PC, and other popular makes can't handle as much data at once, or as fast as a Mac. What's more, they can't use as much memory, either. Now, I'm not about to jump on the bandwagon that, regretably, just about everybody else has. 'RAM doesn't make the world go round'. I simply hate the thought of compensating for lousy programming with massive ammounts of memory space. Structured programming as we know it will go out the window if we invent computers with too great an address range!

The fact remains, however, that 8-bit processors have a very limited address range, and can only 'see' 64K at a time. But what's this? Apple II/c's are supposed to have 128K! Well, there's a neat little trick that is used to give 8-bits a little more 'umph!'. It's called bank switching, and basically, it does this: two identical banks of 64K are located inside the computer, and a single bit somewhere in the computer is assigned as a switch. Each time memory is addressed, it can be in the 'high' or 'low' bank, depending upon the setting of the switch bit.



BOTH BANKS CONTAIN IDENTICAL ADDRESSES.
THE 'SWITCH BIT' (AS I CALL IT) DETERMINES
WHETHER THE ADDRESS IS 'LOW' OR 'HIGH'.
THIS PRINCIPLE CAN'T BE TO RAM AS WELL

The illusion granted by this little kludge doesn't stand up unless you have software that will support it. It takes intelligent software to be able to tell what kind of a system it is running on, and what additions it contains. (a few well placed peeks here and there...)

The Mac, and systems like it, aren't about to take the industry by storm. In my judgement, changes in the computer industry happen fairly slowly. Of course, my perception of time may be a bit rapid for you. With computers, you have to think in terms of months.

Systems evolve, just as animals and ideas do. This is a process that takes time, and although the growth of new systems tends to be a little flighty sometimes, I strongly doubt that some computer will suddenly appear to capture the market. Remember the Adam? I predicted it's downfall months ago, although we're just hearing the final cries of despair now.

Getting back to cases, the latest 32-bit systems just pool and organize the technology that's been around for a while now. The Mac also contains a great deal of ROM, which has been packed full of all sorts of goodies, like menu routines, mouse controlling routines, and a lot of other stuff that makes a programmer's life quite a bit easier.

Predictions:

32-bit systems will come down in price, eventually. Bear in mind that whenever a company tries to make a major price break, they either fail miserably, or destroy the quality of the product while doing it. (witness the Commodore Vic, and the Adam) As always, you get what you pay for, but it'll be worth a lot less before long.

I love letters, so please send any comments to:

The Bulletin
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