



April, 1994

Volume Two, Number Three

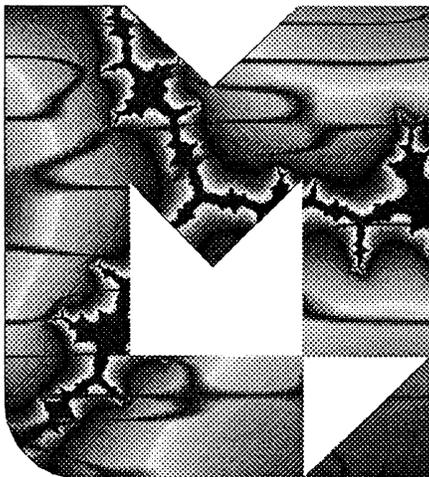
## THE MEDIALINK REAL-TIME MULTIMEDIA NETWORK

By Mark Lacas

and Bob Moses

### Introduction

MediaLink is a complete real-time multimedia networking system providing connectivity for virtually all types of equipment. In 1993, the system became a standard in the professional audio industry when over 40 audio manufacturers licensed the technology and began the process of designing a large



assortment of MediaLink compatible gear. Some of this gear is due to hit the marketplace in just a few months.

A unique characteristic of MediaLink is that it assures delivery of data to its specified destination at a guaranteed time of arrival. This

## CyberArtist

capability suits it ideally for the real-time sensitivities of media-based systems. Today, MediaLink hardware carries MIDI, RS-232, and an object-based control and monitoring protocol over fiber optic cables. In the future, a custom VLSI integrated circuit will allow the system to carry high speed data, such as digital audio and video, over the same cable. This will provide unprecedented integration and management of multimedia data. MediaLink is the top contender to carry data over the final 100 meters of the proposed information superhighway.

This article is a condensed version of a paper we presented last fall at the Audio Engineering Society Convention in San Francisco describing the inner-workings of a MediaLink system and some example applications.

### The Atomistic System

Traditional systems are based on the atomistic view that the whole system can be broken into small pieces. Each piece of gear in the system is an autonomous, indivisible component (for example, in an audio system you have an amp, an EQ, a compressor/limiter, and so on...). Groups of these components are assembled into a system. Each component conforms to a rigid set of interface standards, and can therefore be mated with components

built by other manufacturers. However, each device in a system is completely unaware that the other devices in the system are present. Also, the human operator is a separate observer of the system. This paradigm, an outgrowth of our classic sciences (see last month's article: "The Empty Space Between the Notes" for more discussion on the Western atomistic paradigm) has

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**APRIL MEETING:  
MONDAY, APRIL 11  
(THE SECOND  
MONDAY - DUE TO  
LAURIE ANDERSON ON  
THE FIRST MONDAY)**

**THE ART INSTITUTE  
OF SEATTLE  
ROOM 717/718  
2323 ELLIOT AVENUE  
7:30PM**

**APRIL'S GUEST:  
MARK LACAS  
FROM LONE WOLF  
DESCRIBES AND  
DEMONSTRATES  
MEDIALINK**

**IN MAY:  
BOB MOSES SHOWS  
THE MIDITOLS KIT  
FROM DIGITAL  
PROJECTS FOR  
MUSICIANS**

**JUNE: ELECTRONIC  
CAFE NIGHT**

**JULY: TRIMPIN**

# PUBLISHER'S CORNER

by Steve Turnidge

There are exciting things happening all around us. Jose Flores just found a job with a Japanese video game manufacturer and will be moving to Japan! If anyone else wants to help with the graphics on the newsletter, let me know. Speaking of the newsletter, Bret Batty has offered to help out in the DTP area!

John Beezer put our unstated policy of rational anarchism to work and is arranging an FTP (File Transfer Protocol) site for us with Eskimo North. This is an online place that will be a distribution site for our online Acrobat version of the newsletter. He is also setting up a resource list of our members who want to be listed, and an internet "mailing list", where email to one address will bounce to everyone on the list. He will have more information at the meeting and a detailed report in the next issue.

## COLLABORATION PAGE

**TOR MIDTSKOG** is a musician/composer who has been involved with electronic and acoustic music for 14 years. Trained in music theory and arranging, he has provided music for films, videos, theater pieces, and fashion shows.

Pursuing an intense interest in various ethnic music (particularly Hindustani music, of which he has amassed a collection of over 1000 hours of recordings), Tor brings his knowledge of diverse tonal and rhythmic systems and forms of musical expression to many of his recent efforts, reflecting a broad range of musical tastes.

He sings, plays guitar and keyboards, is "heavily into" Hammond organ. All-around versatility and good language skills with a bit of audio engineering experience thrown in make him a valuable asset to any number of art-technology applications.

Tor seeks employment/work in companies/projects which have imagination and vision; so if it sounds as if you could use him, give him a call at (206)324-9097.

**Announcing: Random Access**  
An Exhibition of High Tech Art  
at The Center on Contemporary Art (COCA)  
June 25 - August 6, 1994

Curated by Janet and Edward Galore

We are only beginning to understand the power of emerging technologies, and this revolution is creating new realms for artists to explore. Random Access will showcase art works which utilize high technologies as artistic mediums. Some have mastered the mediums to transparency. Others hold up the technology itself for scrutiny. Whatever the approach, challenging the nature of art and the mediums themselves is the intent.

The activities and installations will address issues pervading these mediums, including access to high technology, the nature of cyberspace, high tech and humanity, privacy, the fantasy of virtual sex, and the dream of virtual reality. To do this, COCA will house six to eight installations and host a performance series on a specially designed stage. COCA, long known as the venue for risk-oriented and challenging art, will continue its tradition with this exhibition.

Look for "C.A.I.R.E. (Cyberhead: Am I Really Existing?)" by Patrice Caire of New York; the coin-op "SimSex Arcade" by Seattle artist Clair Colquitt; a living, dynamic architectural phase space called "Interface/Enter Phase" by Mark and John Bain of Los Angeles; and other installations by James Acord of Richland, WA (the only artist awarded permission by the US government to work with radioactive materials); David Galbraith and Theresa Seeman of Lone Wolf Productions, now in Seattle; Seattle artists Kurt and Debla Geissel, Joel Kollin, and others.

Events may include panel discussions, telepresent actions, performances by Bay Area artist Mark Trayle; experimental multimedia by Screan of Montreal; interactive theatre with Tod Foley of Los Angeles; Seattle artists Trimpin, Norman Durkee, Julius Brown, Roland Barker, and other collaborations with local and national artists.

Watch for upcoming announcements and a calendar of events. If you are

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10802 47th Avenue West  
Mukilteo, WA 98275-5098  
Voice: (206)355-6000  
Fax: (206)347-7757

Steve Turnidge  
Publisher and Host  
CompuServe: 72250,3205  
Internet: steve@rane.win.net

Bob Moses  
Production Manager  
Internet: bobmoses@pan.com

Bret Battey, Researcher  
Internet: bret@eskimo.com

Jose Flores (Campesino Atomico)  
Art Director

The Northwest CyberArtist is free for those who ask to be added to the mailing list. The Northwest CyberArtist is published monthly by Northwest CyberArtists. First class postage paid at Seattle, WA

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LONE WOLF

**RANE**

interested and would like to offer technical help or would like to find out more, please contact Janet or Edward Galore —  
Janet: zyzzy@u.washington.edu;  
phone (206) 324-0905  
Edward: lemaire@u.washington.edu.

## MEDIA-LINK

### Continued from page 1

been incumbent in most technology-based systems since their inception.

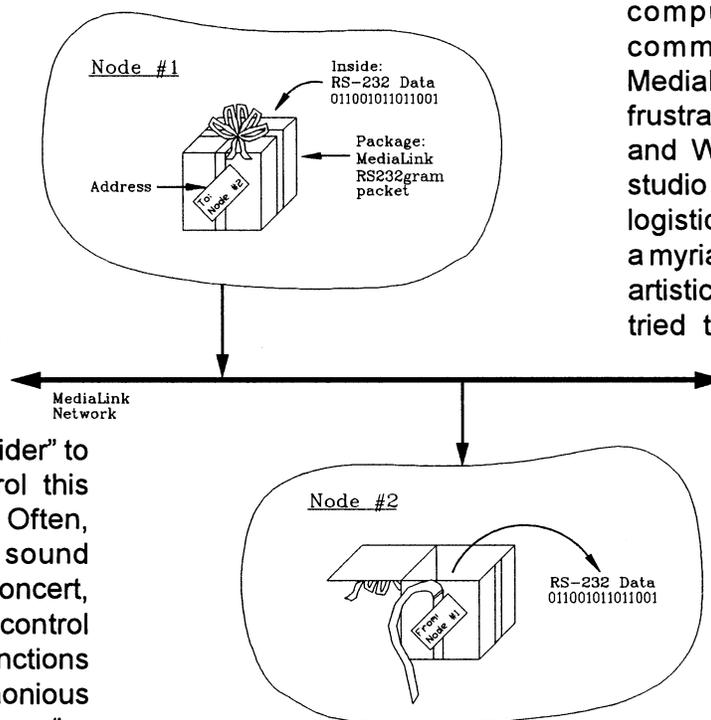
The benefits of the atomistic system have been numerous. Consumers can purchase a piece of equipment from one particular manufacturer, and rest assured that their new box will work with equipment manufactured by other companies. This ability to mix and match equipment facilitates competition, and our old friend the market economy. Single manufacturers can focus on their particular niche, and perfect the state of their art. Costs go down, performance goes up. Everybody wins.

But this system approach also has several inherent limitations. Devices in the system do not interoperate as a team. The human, an "outsider" to this system, is left to control this entire mass of "dumb" gear. Often, as in the case of a live sound reinforcement system for a concert, the human operator must control hundreds of simultaneous functions and experiences a disharmonious relationship with the system as s/he fights to make equipment behave. Unfortunately, equipment is becoming more and more sophisticated, and harder to interface and operate. As long as devices ignore their neighbors, the system is unable to enjoy the benefits of distributed intelligence and automation.

### The Evolution of Systems Based on a Shared Network

The key to dissolving the barriers between devices and humans in a media-oriented system is to facilitate better communication between them. This has led to the evolution of new system architecture's in which devices communicate over local area networks and share resources. For

example, MIDI provides a powerful means of communication between people and devices in the performing arts (mainly music). Lighting equipment communicates over a similar control network called "DMX 512". Indeed, there are a number of unique little networks for controlling music, lighting, video, tape recorders, pyrotechnics, and so on. But the goal of "multimedia" is to integrate all these disparate pieces



together and create a hybrid form. What is needed is a common network which integrates all these devices, people, and media into one system. These people and machines would then have the opportunity to interact, share resources, and work together as a cohesive team rather than a collection of disconnected autonomous entities. Today, the system which is bringing this goal to reality is called MediaLink.

### What is MediaLink?

MediaLink is a format-independent network communications protocol which allows seamless integration of electronic devices into a fault tolerant network. MediaLink allows real-time, simultaneous transmission of virtually

all forms of digital media. In essence, MediaLink dissolves the boundaries between different equipment and media, facilitating interoperability (a fancy name for automation and teamwork) and harmony in the system.

### The Idea

MediaLink is the creation of Mark Lacas and David Warman, both avid musicians and electrical engineers with fifteen years experience in the computer network and data communications industries. MediaLink technology was born from frustrations experienced by Lacas and Warman while working in the studio on a joint music project. The logistics of connecting and operating a myriad of equipment hindered their artistic creativity. Lacas and Warman tried to network their studio gear using standard technologies such as Arcnet and Ethernet, but these systems had flaws which limited their usefulness in low cost real-time media data distribution. So, based on their experience designing fault-tolerant deterministic systems for the military and datacomm industries, they invented MediaLink.

### The Medialink Protocol

A MediaLink network is very similar to the postal system (except it's much faster!). As an analogy, say you want to send your mom a birthday present. First, you carefully wrap the present in bubble wrap (or other suitable packing material) so it doesn't get damaged in transit. Then you pack it into a box, write your mom's address on it, and hand it over to the post office. A couple days later, your mom receives the box, unpacks the present, and showers you with gratitude and love. Sending data through MediaLink is very similar. First, your data is protected (encoded by digital error correction algorithms),

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## **MediaLink**

### **Continued from page 3**

bundled into a "package" (a bucket of data bytes conforming to the MediaLink protocol), addressed (with the code name of the node on the network that will receive it), and handed over to the post office (network). MediaLink delivers the data packet to its destination node, which unpacks and processes the data.

A unique feature of MediaLink is it can bundle and mail virtually any type of data through the network, just like you can mail letters, presents, magazines, bills — you name it, through the postal system. MediaLink parcels are called "datagrams", and there are currently 11 different types defined: RS232gram (carries raw RS232 data from your personal computer's "COM" port, a modem, serial printer, etc.), MIDIgram (carries MIDI messages), AUDIOgram (carries digital audio), SMPTEgram (carries SMPTE time code), VIDEOgram (carries digitized video), SCSIgram (carries SCSI data), PA422gram (carries PA-422 messages), TRANSPORTgram (carries data to machine transports such as tape recorders), DMXgram (carries DMX lighting messages), LANSCAPEgram (carries the name of a network-wide snap shot of all devices settings—called a lanscape), and finally, the BLACKBOARDgram (which carries a global image of data shared by all devices in the network). As new types of digital data arise, MediaLink can incorporate them into the network by defining new datagrams.

### **Present and Future MediaLink Applications**

With the world evolving toward a global paradigm of interoperability, MediaLink's applications promise to be far-reaching. One day, MediaLink may be found in everything from home entertainment equipment, to

automobiles, to the Space Station. Indeed, leaders in each of these fields (including NASA) are currently evaluating MediaLink with excellent results so far.

MediaLink systems allow an operator to control devices from a remote location. As a result, equipment can be distributed or centralized — whichever is most convenient. System operation is simplified since a single operator has access to all devices in the system. Non-human operators (i.e. computers) can take over many of the routine tasks. For example, computers in an audio system can take over monitoring clip indicators and VU meters, and adjusting levels appropriately. This frees the human operator to concentrate on creative tasks. Few would argue that remote control is not highly desired — just look at the average American coffee table!

### **Recording Studios**

MediaLink has been installed in several recording studios around the world. The benefits of MediaLink in these applications are numerous. All the equipment in a studio can be networked and controlled from a central location. More importantly, equipment can be controlled from a remote location, allowing large studios to share equipment regardless of physical location.

### **Touring Live Sound Performance & Reinforcement**

MediaLink has toured with a number of world class performers. Live sound systems benefit in a number of ways from MediaLink. First, MIDI equipment can be networked—providing a flexible, repeatable, dependable, way to tear down and reconstruct the system as it travels from town to town. The distributed nature of a MediaLink network allows equipment to be placed where it belongs (amps next to loudspeakers, mixing and signal

processing in the mix island, monitoring equipment near the stage, and so on). Even though the equipment is distributed physically, it can be remotely controlled and monitored through the network.

### **Consumer Audio**

Consumer audio systems employ a number of components; a CD player, cassette player, tuner, preamplifier (signal router), power amplifier, and so on. Today, these various audio components are connected with a plethora of interface cables, and are only controllable via complicated dedicated controls. In the future, consumers will not be asked to connect a number of confusing cables—just one fiber daisy-chained between them. Moreover, by replacing the plethora connectors on a device with a single multimedia connector, the size, weight, and cost of the device is reduced. The benefits of remote control, interoperability, and an improved human interface (discussed earlier) also apply here. One day, with this level of integration, when you pick up your telephone the volume of your stereo or television will automatically turn down.

### **Summary**

The world is flourishing in the "information age". Everywhere around us, boundaries are dropping and information is spreading in favor of interoperability. Soon, we'll be able to work, bank, shop, and entertain ourselves via sophisticated digital communication networks. It won't be long before global networking services pump a continuous river of data into our homes and work places.

MediaLink is an extremely efficient, dependable, and affordable multimedia network technology with unprecedented benefits to the media arts. Please join us Monday, April 11, to meet some of our friends from Lone Wolf, and to watch a demonstration of MediaLink in action.

# The Information Backroads

By Bob Moses

You wouldn't believe the telephone calls I've been getting lately! Ever since our *Synesthetics* performance last fall, and the resulting (very positive) press we received, Northwest CyberArtists has become known and respected nationally. We are being offered numerous opportunities to get involved in really cool projects all over the country! In just the past few weeks, I've been contacted by the Governor's office, the Boy Scouts of America, a movie producer, the Earth Day Festival, and nearly a dozen other people wanting our help in amazing projects. My struggle today is to match all these projects with people. **HELP ME!**

*A little history:* Our group evolved out of a previous group called Northwest Electronic Musicians ("NEMUS"). NEMUS focused on electronic music, back when electronic music was on the fringe. Now, acoustic music is the fringe, and D-50's are heard in every elevator, Safeway, television commercial, video game, bla bla. So, two years ago we expanded our scope to include new forms of technology and aesthetics, and changed our name to Northwest CyberArtists. Once again, we are at the cutting edge of whatever it is we are doing (I hesitate to define it, because then I limit it). Our group is happening, it's exciting, and it's catching a lot of attention. It's time to take a look at this beast we have created and figure out what to do with it next.

For starters, we need to create a better means of communicating what each mem-

ber does and needs within and outside the group. The "tech-checks" at our monthly meetings are an excellent way to hear what everyone else is up to, and to initiate a collaboration with a complimentary soul. However, the tech-check is limited to only those who attend a meeting. I think an electronic means of collecting and distributing information would provide an invaluable service to all of us. As I write this, we are in the process of getting an FTP site on the InterNet. [See John Beezer's announcement on page 6.] If and when this is set up, we can post everyone's bio's and provide a means for people to seek out and find each other. It takes me and my tele-



phone (and my poor memory!) out of the loop. It helps us spread information much more efficiently. If you don't have a modem yet — get one now! In the mean time, I think we should start compiling a database of people's bio's that can be sent to anyone who needs help on a project. Anyone who has ideas on how to create, maintain, and distribute this database is invited (begged) to contact me (see below for contact information).

I also believe we should review our policy of not accepting money from members. The reason each of us pays no dues is because we have wanted to keep this process open to everyone, and we really haven't needed money so why collect it? So far, all our expenses (to copy and mail the newsletter, mainly) have been covered by our corporate sponsors: Rane Corporation and Lone Wolf Corporation (three cheers for these two companies!). However, with no budget of our own, we are inherently limited in what we can

do. We can't make field trips to cool places, can't fly in VIPs to share their work with us, can't rent equipment for our meetings, can't provide space for our members to present their art, and so on. Expanding corporate sponsorship is a possibility, but then we have to make it worth our sponsor's money which leads to a whole bunch of questions like: are we selling out, can we remain absolutely free of undesirable influences (e.g. the profit motive), and so on. I throw this question out to the group. How should we grow our mem-

bership and services without boosting capital resources? Or, do we even want to grow? Should we just stay where we are?

Please email me (bobmoses@pan.com), fax me (206-347-7757), or mail me (10802 47th Ave West, Mukilteo WA, 98275) your thoughts and feelings on these issues. Please don't call me, my telephone rings too much as it is. That's what started this whole lovely mess in the first place.

# WANTED: FREELANCE ARTWORK FOR NEW SEATTLE COMPUTER NEWSPAPER

The Computer Wave Newspaper is shooting for a May 1, 1994 publication and could use your help. We are interested in both artwork and writers. Our story editor would love to get in touch with some of the writers in your group. Please feel free to pass my information along to any artist as well.

## The Computer Wave Newspaper Artists Guidelines:

The Computer Wave Newspaper is a brand new, monthly, computer and technology publication with a circulation of over 100,000 and beginning May 1, 1994 will be distributed free of charge throughout the greater Seattle metropolitan area.

Computer Wave Newspaper has three main areas of focus: Business, Global Computing, and Multimedia. We also have a general computing section, InfoWave, which will feature all types of articles related to the subject of computer and digital technology.

We are currently accepting submissions to be considered for publication. All artwork must deal with computer,

digital technology, or related topics. They need not be specific to the Seattle region, although those will stand a better chance of publication.

Computer Wave Newspaper pays for artwork published, but is negotiable. Artwork is accepted in both hard copy and as software. When packaging the artwork to be mailed to the



Computer Wave, take special care to protect it against any damage that may be incurred by our postal system. The Computer Wave is not responsible for damaged or lost art due to the error of the postal system.

Submissions should be on an IBM 3 1/2" or 5 1/4" disks. Submissions will also be accepted by attached E-mail and sent to [Sambvca@hebron.connected.com](mailto:Sambvca@hebron.connected.com). Hard copies are to be mailed to the Computer Wave's address shown below. Payment will be made upon publication of the article in the Computer Wave Newspaper and will be based on the negotiated price between the art director and the artist. Unsolicited articles are accepted. The artist will be notified of acceptance of publication within 30 days. Unaccepted articles will be returned only if they are accompanied by a self-addressed envelope or container. A padded envelope or container is highly suggested. For a list of current and future editorial topics, please write or E-mail:

Paul Langelier  
Art & Layout Manager  
The Computer Wave Newspaper  
824 NE 45Th Suite 46  
Seattle, WA 98105  
Bus (206) 284-5476 Ext. 526  
BBS (206) 283-1020  
[Sambvca@hebron.connected.com](mailto:Sambvca@hebron.connected.com)

## FTP SITE INFO!

By John Beezer

I always seem to have the same two feelings when we introduce ourselves at the beginning of each Cyberartist's meeting:

1. I can't believe I still get so nervous speaking in front of a large group and
2. it's quite an amazing group of people to be speaking in front of, I wish I could talk to everybody one-on-one.

Maybe the technology we're all experimenting with can help here. I propose that we establish a membership list that includes all the important informa-

tion about each of us, keep it up-to-date and make it available over the Internet. To accomplish this, I'm willing to offer my public FTP directory at [eskimo.com](http://eskimo.com) as a storage place and I'm also willing to enter the information into the database.

*[Since this was written, the SysOp of Eskimo North has offered us our own FTP site!]*

For those without Internet access, I'll hand out forms at the next meeting which you can return to me, though I prefer to keep the whole operation on-line as much as possible. (It's easier to cut-and-paste than it is to manually transcribe informa-

tion.) By our next meeting we should have a publically accessible file listing our names, addresses, special interests and skills.

Hopefully, this will lead to e-mail discussions and other forms of contact outside of our regular meetings. Possibly in the near future it would also make sense to start an on-line mailing list for announcements and ongoing debates.

Our group offers incredible potential for different kinds of people to collaborate on amazing new things. I hope this will be another step towards making it all happen.

# Mr. Einar's Neighborhood

By Einar Ask

The more things change the more they stay the same.

Bob wrote a great essay in last month's newsletter about the dangers of letting computers and technology take the human aspect out of art. He made several great comments about technology and its use in modern electronic music. One question he asked was "What is it about electronic music that robs its soul?" This is a subject which I regularly ramble on about to my wife, Juli, so she has helped me collect some of my own views on the subject. These are just a series of observations in no particular order. If you have more comments of your own - E-mail me or I'll see ya at the meeting!

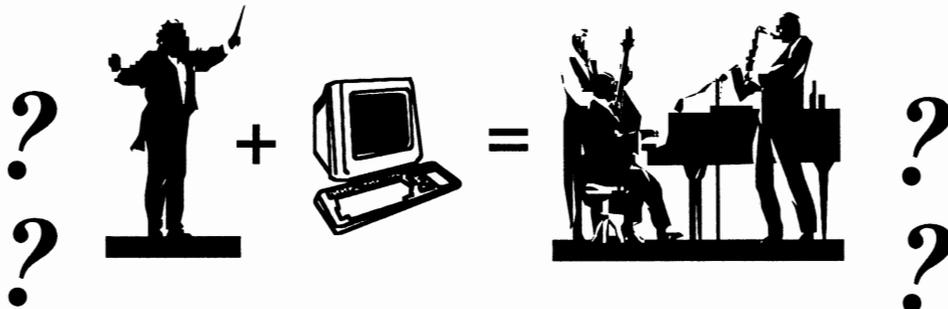
First of all, Bob's article left me with one huge question: What is "electronic" music? Is it anything that you play from a keyboard? Is it anything that is quantized? Is it computer generated? Is it recording a live band to hard disk and then editing it on screen to make the recording "perfect"? Is it MIDI files? Is it sampled drum loops?

When I was in High School, electronic music was much easier to define. Tangerine Dream had a distinguishable electronic sound. They used good old analog computers with new presets. In my mind electronic bands still have synthesizers the size of upright pianos! and no drum machines or MIDI! This hardly seems accurate these days.

In last month's Keyboard Magazine, Trent Reznor was quoted as saying "When I think of a drum I think of a button on a drum machine." Maybe that defines where electronic music is today. We're seeing the new interfaces replace entire methods of creation. It's like thinking of typing a letter and picturing the Word screen on a computer, not a typewriter. That's a good example of changing technology. What Trent Reznor

can do these days with one finger consistently and easily used to involve a labor intensive amount of knob twiddling and key pressing at just the right time.

Technology changes the way we do things, but in the arts, the quality of the content remains the same. What causes the perceived lack of soul in electronic music has more to do with the artist than the technol-



ogy. For example, although I use word processors and possess the technology to write great novels, it is unlikely that I could write the great modern novel just because I had the ability to check my spelling and grammar electronically. The soul of the artwork must come from within the artist.

So it is with electronic music.

A lot of us have sequencers and some MIDI gear, but I can only think of one in our midst who excels in using it to make great art (to my own ear). As hard as I try, I'll never sound like him, because I don't have the same musical training or the same artistic vision. And that's great! Everything that he does is thus unexpected by me and the resulting music is very enjoyable and very human - because he is actually able to play his own music. (There's a lot of my own music that I have never played and wouldn't know how if I tried!) Consequently, some of us who can't play for beans use sequencers to slug out our musical concepts and then manipulate them into something we want to call art. And everyone seems to approach this differently.

Some electronic musicians want their product to sound "human" but even if they fail, I don't think it's a failure. Art is subjective, and perhaps a piece of music is made interesting by being sort of a cyborg - neither completely mechanical nor completely natural.

Tom Vigal (The Great One) wrote an article in this newsletter about serendipity - happy accidents. I find that working with computers and so many finicky keyboards and older modules forces the odd "happy accident" which does not occur as often for me in a "real band" situation. Sometimes it's an odd sound that I stumble across, sometimes a whole riff is created by some weird mis-cue or cross channeling on the sequencer.

You know, I don't find that I am replacing human musicians by using MIDI. What I find is that I am creating music at 2:00 am in my own home all by myself because that's the only time I have to do it. In my situation the real alternative to recording everything by myself is to do nothing at all!

Regarding drum programming: There is no way that a hacker like me who can't play drums is going to fool a real drummer into thinking that he's listening to another real drummer in a song of mine. If my drums sound too "natural" I worry that a listener will try to analyze the drum parts to see if he could play them. I therefore sometimes try to make my sequenced stuff sound as sequenced as possible. It's part of the effect. On the other hand, I have noticed that big name "electronic musicians" use humans in the studio and live for both the human sound and the human look - I'm thinking of Howard Jones, Herbie Hancock and Thomas Dolby - and that works for them.

A lot of us do get obsessed with needing the latest equipment, as Bob said last month,

**Continued on page 8**

but on behalf of a lot of electronic musicians out there I need to say that I am mostly obsessed with music. And I still write songs on and for acoustic guitar sometimes. There is this strange belief that new technologies will always replace older ones. People thought radio would die when television came out. and now people think multi-media is going to replace so many existing forms of entertainment. I believe it won't because the art has not yet come to make the technology interesting enough, all the other forms of entertainment will still exist, and for some weird reason most new technologies attempt to closely resemble previous technologies. In-

teractive TV will be far more interesting when it isn't TV at all.

We still use the Post Office even though we have Email and faxes. We still like talk to people face to face, even though the telephone could save the trip. And I still would rather play guitar than push buttons on a sequencer.

What I think is really funny about all of this MIDI/ electronic music/ art stuff, is that the concept of working alone and playing all the parts by yourself is not old. I bet a lot of us used to do cassette to cassette dubs in the mid seventies adding a new part with every generation just to work out a song. I still use a four track. I have lots of tapes of songs that I recorded with guitar, bass, vocals, and some simple keyboard lines. But no MIDI

was involved. The main thing was making music..

Of course now you can write hits with less effort, fix bad notes, record digitally, quantize, shift pitches...

Which brings me to the Shameless Plug of the Month:

I am releasing my very first cassette, which I will bring to the next meeting. I have included one full hour of my various approaches to electronic music, from strictly quantized and very harsh pieces to one fairly analog song Juli and I did in the middle of the night on the PortaStudio ten years ago — no extra charge for the hiss. If you're interested, see me at the meeting.

See ya!  
Einar

*Important Notice!  
The April meeting will be held  
Monday, April 11th.  
Due to the Laurie Anderson show  
on the 4th.*

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**Northwest CyberArtists**

10802 47th Avenue West  
Mukilteo, WA 98275-5098



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