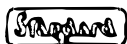


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The Signal Collector Box

OBJECTIVE

The signal collector box will be designed to collect signals transmitted electronically. The signals may be transmitted over hard wire or broadcast over the air. The signals may be of any frequency.

The box will collect the signals, record them, and play them back upon command.

DESCRIPTION OF BOX

The box will have one or more receiver units, a buffer unit, a recorder unit, and a playback unit.

Initially the box will be used to monitor signals transmitted over cable television where the number of channels being monitored could run from only one to over one hundred. In this application, the box would probably require one receiver unit per cable channel monitored. The receiver unit would receive the signal, add a data bit to identify ~~which channel~~ itself as the receiving receiver unit, and pass the signal on to the recorder through the buffer.

The buffer ~~who~~ would provide temporary storage for signals enroute to the recorder. The recorder would have the capacity to process only one signal at a time, and the buffer would permit several receivers to send signals to the recorder simultaneously without any getting lost.

The recorder would be a computer grade tape operation as found in word processing units, or a video tape recorder or another similar type of unit.

~~The playback unit would permit~~ The box would be

connected to a telephone line. When telephoned and commanded to dump its data by the central computer, the playback unit would permit the box to play the collected signals to the computer over the telephone. (The buffer would continue to collect signals while the tape was playing back.)

The tape recorder would be a sealed unit. Upon completion of playback, it would return to the start of the tape and commence recording data over the old signals.

DESCRIPTION OF SIGNALS

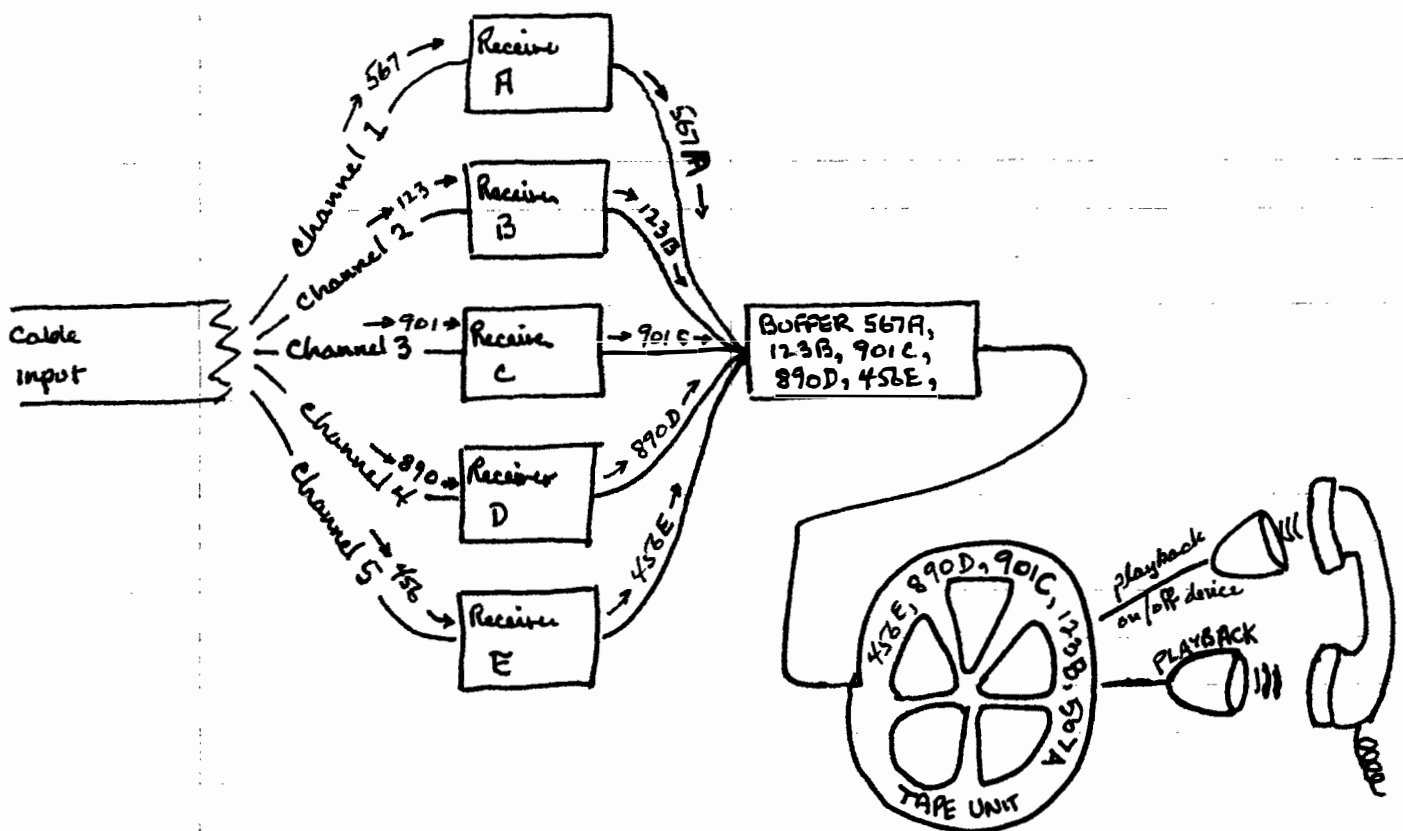
The signals will be brief bursts of data bits. The data bits may be alphabetic, numeric, alphanumeric, or other in their composition. The signal may be carried in the visual part of the cable channel or ~~the aural part or a combination of both~~ or the television broadcast or it may be in the aural part or in a combination of both. In other uses of the box the signal can be transmitted in any way.

The signal will start with an identifier that will activate the box and notify it that the signal is to be collected.

The signal should be transmitted in the briefest, most unobtrusive way possible.

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Drawing of box monitoring five channel cable system



The input to the box is ~~is probab~~ in the cable monitoring application is probably a converter box.
 On the other hand, this may not be necessary.
 Also check on the type of signals that word processors & computers communicate over telephone lines.

left blank

Modules

The box should be made in modules so that the number of receiver units and easily be increased and ~~so~~ malfunctioning parts can be replaced easily.

TIMER

It may be desirable to include a timer so that the time of receipt of signals can be included in data. The design of the box should provide for the inclusion at a future time of a clock module

SECURITY

Provision for a security module should also be made. When the computer telephones it must give a password before it is admitted to the data. Then before signing off it must give a second password before the data is erased. If it cannot give the second password, the box will record the fact on its tape and continue recording signals without erasing the tape.

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The Electronic Signal Generator

OBJECTIVE

The electronic signal generator is a companion piece to the signal collector box. It will generate the signals to be collected by the signal collector.

Witnessed to this point April 6, 1981
Eugene A. Savon

AT LUNCH
WITH JIM
CUDDIHY
4/7/81

I discussed the signal collector and generator devices with Jim Cuddihy at lunch today, April 7.

I stated that the box could have a variety of business applications and related one as collecting television network station break signals for billing the purpose of aiding the networks in billing cable systems.

We discussed where the signal should be carried in the frequency spectrum and Jim suggested the most efficient place would be in the audio range above the actual audio signal.

He asked me whether the input to the collector would be a converter box or whether it would be the cable itself. I suggested that I suspected that we would use certain elements of the converter, and that in effect, the input would be a point midway through the converter.

He asked me the word length of the data to be carried and I estimated it as a 40 bit word.

I told him that I had anticipated each word would have a leading bit which would identify it to the ~~radio~~ receiver units in the box as a bit of data to be collected. Jim responded that this would be costly because it would require that the box be tuned to all channels at all times.

We discussed the desirability of having a buffer and a tape unit or just a buffer alone. I observed that this was a question of the trade off between the cost of the units and the cost of the communicating with the units. I suggested that the tape was probably desirable to reduce the number of times the box was communicated with over the telephone.

Jim asked where the signal would be inserted, and I responded that it would be inserted at the point of program origination.

Returning to the question of where the signal was picked up by the box, Jim suggested that if the signal was included in the audio range, all we would require in the box would be the audio demodulator portion of the converter and perhaps it would be least costly to design it to sample all of the channels rather than having a receiver unit on each one. I responded that it wasn't essential to have a receiver on each ~~and~~ so as to be able to identify specifically which channel in a local system the signal came over. This would mean that the box potentially would be collecting all signals in the particular ~~above the audio range that the signals are~~ ~~transmitted on frequency that the signals are transmitted on.~~

Jim speculated on the need for a timer clock in

the box. I replied that a clock wasn't essential because the time could be inserted in Greenwich Mean Time at the point of signal's origination and the time that a local system ran the signal could be inferred from the signals immediately surrounding any given target signal on a box's tape.

Jim also observed that the box could be designed automatically to dump its memory, whether from tape or buffer, to a designated telephone number. I observed that the way the box was communicated with was a security issue, and I would have to reflect on this.

Jim and I discussed the terms of a potential working arrangement. He stated that he would like to design the system, and we could find someone to design the circuitry. I showed him my draft contract. He read it and stated that he was perfectly happy with its terms. I asked him if his employment terms with Teleprompter gave him the latitude to do this type of work without Teleprompter having a claim on it. He responded that he has that latitude. I asked him what the price for his services would be. He replied, "A dollar an hour." He added, "And if you make \$20 million perhaps you could remember me." I told him that I wanted to be co-inventor of the device, and he stated that that caused him ~~I told him that~~ no problem.

I told him that I would draft a contract, and we agreed to meet at his home at 9:00 tonight to execute it.

THOUGHTS
AFTER
LUNCH

After reflecting on the design points that we discussed at lunch, I think of the following points:

- We must ensure that the above-the-audio frequency that we choose doesn't interfere with potential expansion of ~~the~~ TV practice into such areas as stereophonic signal transmission.
- We must ensure that commercial video tape recorders capture ~~this above-the-audio signal~~ and retransmit this above-the-audio signal.
- I must check into the security of an 800 telephone number in the event we choose to have the boxes dump automatically. Also will Bell give us a contract that we can keep the same number forever? Should we have a default 800 number for possibility that the primary number is out of order? ~~Also will we probably need the capacity to~~ The box will probably be designed to dump automatically when a certain percentage of its tape capacity is filled but we will also want to be able to dump to the 800 number by giving a command to the box.
- If we are picking up all signals on our chosen frequency, we may wish to process the signals before recording them to tape to discard irrelevant signals and duplicate signals.

Witnessed to this point April 7, 1981
Eugene A. Darn

EMPLOYMENT AGREEMENT

This agreement incorporates only what appears in writing from this point in this book to the point below, at which it is signed by the parties to the agreement.

James W. Cuddihy of 523 East 14th Street, New York, N.Y. (hereinafter "Jim") hereby agrees to help John C. Harvey of 333 East 57th Street, New York, N.Y. (hereinafter "John") design and develop the devices known as the "signal collector box" and the "electronic signal generator" in exchange for \$1.00 (one dollar) per hour.

Jim agrees to notify John whenever the number of hours that Jim spends on this project reaches a multiple of twenty-five, and John agrees to pay Jim at that time. If, at any time, John asks Jim to halt work on the project, Jim will not work until instructed to continue.

Jim represents and warrants to John that no other party or employer has any legal right to the fruits of Jim's labor during those times when Jim will work on this project.

In consideration of this employment, Jim hereby assigns to John all right, title, and interest in any invention or discovery, whether patentable or not, that he conceives or actually reduces to practice while developing the abovementioned instruments. Additionally, Jim agrees to keep all matters related to these devices and all John's business plans confidential until John makes full public disclosure of them. 4/11

Employment Agreement continued

~~Either Jim or John may end Jim's employment under this agreement at any time by notifying the other. At such time, John agrees ^{to pay} Jim whatever is due him up to the time of notification, and Jim agrees to turn over to John all papers, drawings, models, devices, and any other objects and materials relating to this project.~~

Either Jim or John may end Jim's employment under this agreement at any time by notifying the other. At such time, John agrees to pay Jim whatever is due him at the time of notification, and Jim agrees to turn over to John all papers, drawings, models, devices, and any other objects and materials relating to this project.

The provisions of this agreement apply for five years after termination of this agreement.

CHARTER

James W. Budden
4/7/81

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FURTHER THOUGHTS

Before getting together with Jim yesterday, it occurred to me that for tiered systems the box will need to be adapted to be able to identify the tiers and which tiers signals come over.

MEETING WITH JIM CUDDELL AT 9PM 4/7/81

Jim and I sat down at his living room table. I showed him the document on pages 12 and 13 of this book, ~~was to~~ he read it. We both executed it and also executed two xerox copies of it, one of which he kept. Jim then said, "At last Jim employed."

(Besides the one executed copy of the employment agreement, I also give Jim xerox's of pages 3 through 10 of this book. He had not read that portion of this book before I left.)

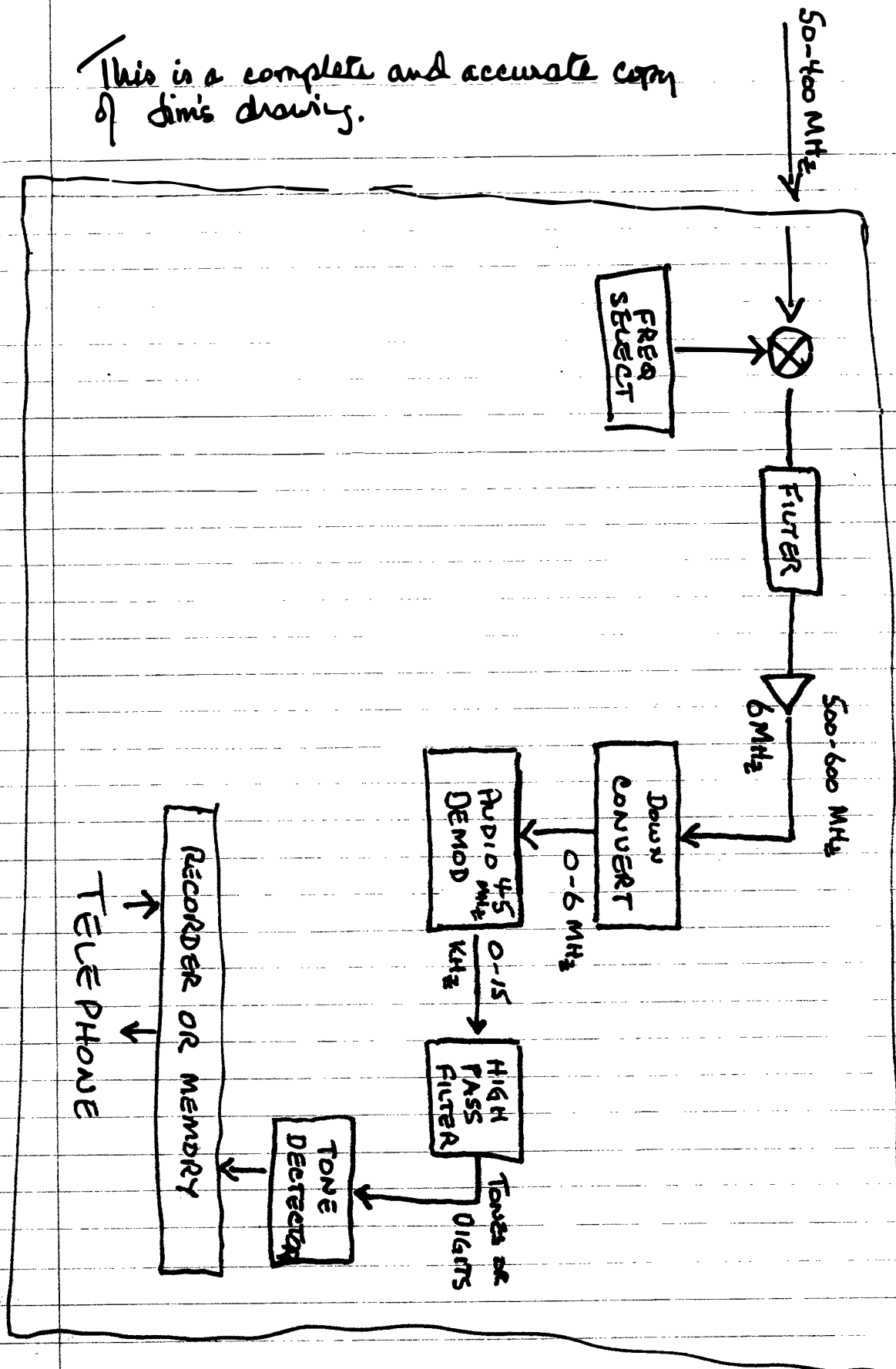
Having executed the agreement with him, I then explained the business purpose for the signal collector. I explained that the box ~~could be~~ would be introduced initially for the collection of signals transmitted over cable but that ~~it was~~ the process would rapidly be expanded to include signals transmitted over broadcast TV and radio. I firmly believe that there will be further commercial applications.

We discussed the data to be transmitted in the signals and agreed that potential word length should not need to exceed 50 bits.

Jim sketched out a box design that I have copied ~~on to the reverse page~~. Potential box designs taking about 5 minutes to do it, that I have copied onto the reverse page.

This is a complete and accurate copy
of Jim's drawing.

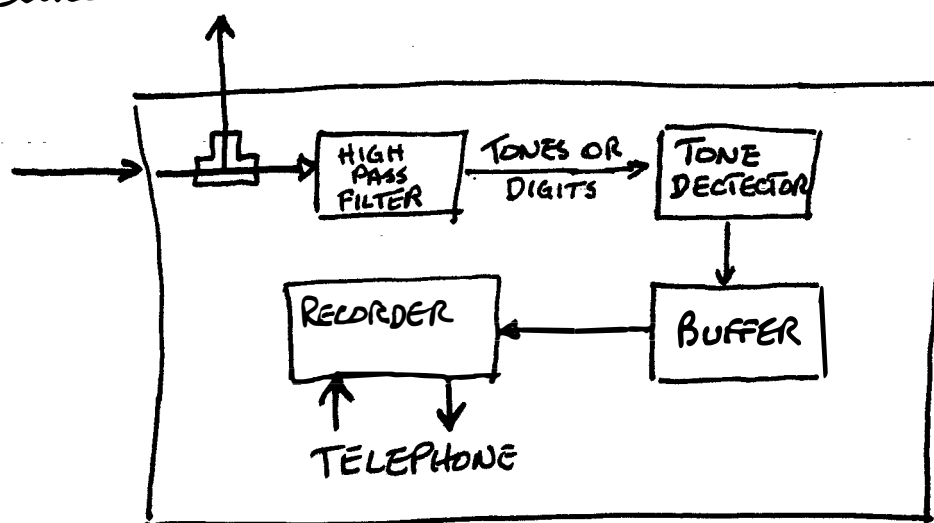
CABLE TV SIGNAL COLLECTOR BOX



SECOND
BUSINESS
PURPOSE

This morning, April 8, while ruminating, I realized that ~~on~~ the signal collector box could, with modifications, accomplish a second business objective.

In this configuration the box would look like:



In this application the recorder may not be necessary and we may, instead, have two buffers. Also we may require a video filter.

Witnessed to this point April 9, 1981
 Eugene A. Savin

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FURTHER THOUGHTS

TELEPHONES

To minimize operating costs, the box probably should not have its own ~~link to~~ independent telephone line. Rather it should share a phone connection with ~~some~~ its host's telephone. Perhaps it would only transmit during nighttime hours.

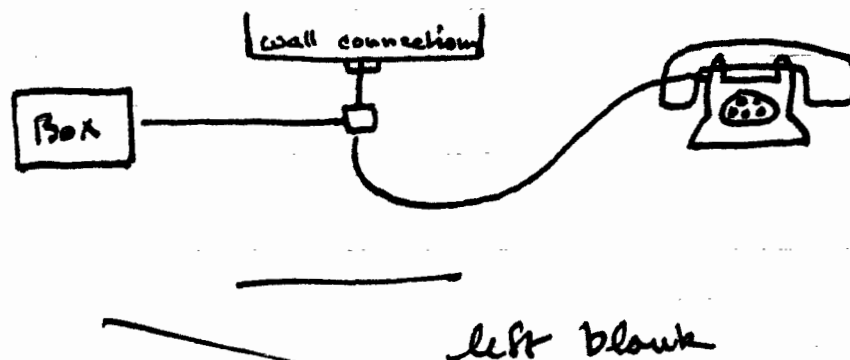
It would only make outgoing calls.

The computer would accept and process ~~the~~ the box's data only if the proper end-of-transmission signal were received. If someone were to pick up the party line phone in the midst of a box to computer transmission, the ~~box~~ ~~to would be~~ computer would break off the transmission and would dump the box's data. The box would only call when it had ~~a dial tone for 30 seconds~~ ~~an uninterrupted dial tone for 30 seconds~~. If the box had gotten a busy signal when it called ~~there would be~~ or had been interrupted, it would not call again for 10 minutes.

When the computer received the end-of-transmission signal, the computer would instruct the box to go back to the start point on its tape and record over old data.

There would be several lights and a button on the outside of the box. A green light would signal that the box was on. A red light would signal that the box was sufficiently full to want to communicate with the computer but had not been able to reach the computer. The button would manually set in motion a call to the computer.

The telephone link might look like:



COMPETITORS

4/10/81

Jim telephoned today to say that he had met yesterday with some people from the company that is the Bell Labs of Canada who had shown him an addressable converter that has many features similar to our box. He indicated that their converter is not precisely like ours and rather apparently is not ~~on~~ targeted at our business purposes. He indicated that they have applied for patents.

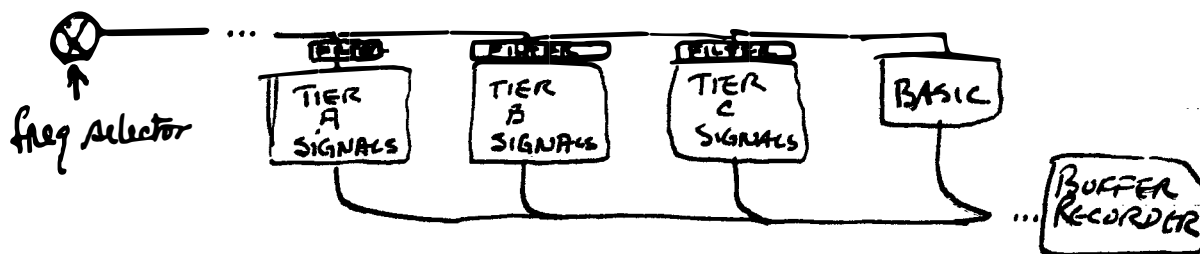
~~We~~

We must move rapidly, among other things, to get over-the-air TV and radio patents on our system.

TIERING
CONSIDERATIONS

Perhaps the answer to the tiering problem is to install ~~one box~~ in two boxes in each system for that system's each of that system's tiers.

Or — Design the boxes with the capacity for a series of shunts at an appropriate points in the box similar to a coin sorting machine:



where a bit of data would be added as an identifier as the signals went through the various shunts.

To
MINIMIZE
THE NUMBER
OF SIGNALS
RECORDED,
TRANSMITTED
BY PHONE,
AND
PROCESSED
BY THE
COMPUTER

Our buffer should ~~pro~~ compare incoming signals with one another and transmit no more than two copies of any given signal to the recorder. All other identical signals should be discarded.



Tiers &
Ratings
Boxes

It would be useful if the ratings boxes could ~~be~~ identify which tiers & pay services the viewer could receive. Obviously this could be stored in the computer and analysis of signals would tell something. But it would be nice if the boxes signal would regularly disclose this information.

Witnessed to this point April 10, 1981
Eugene A. ~~Lamm~~

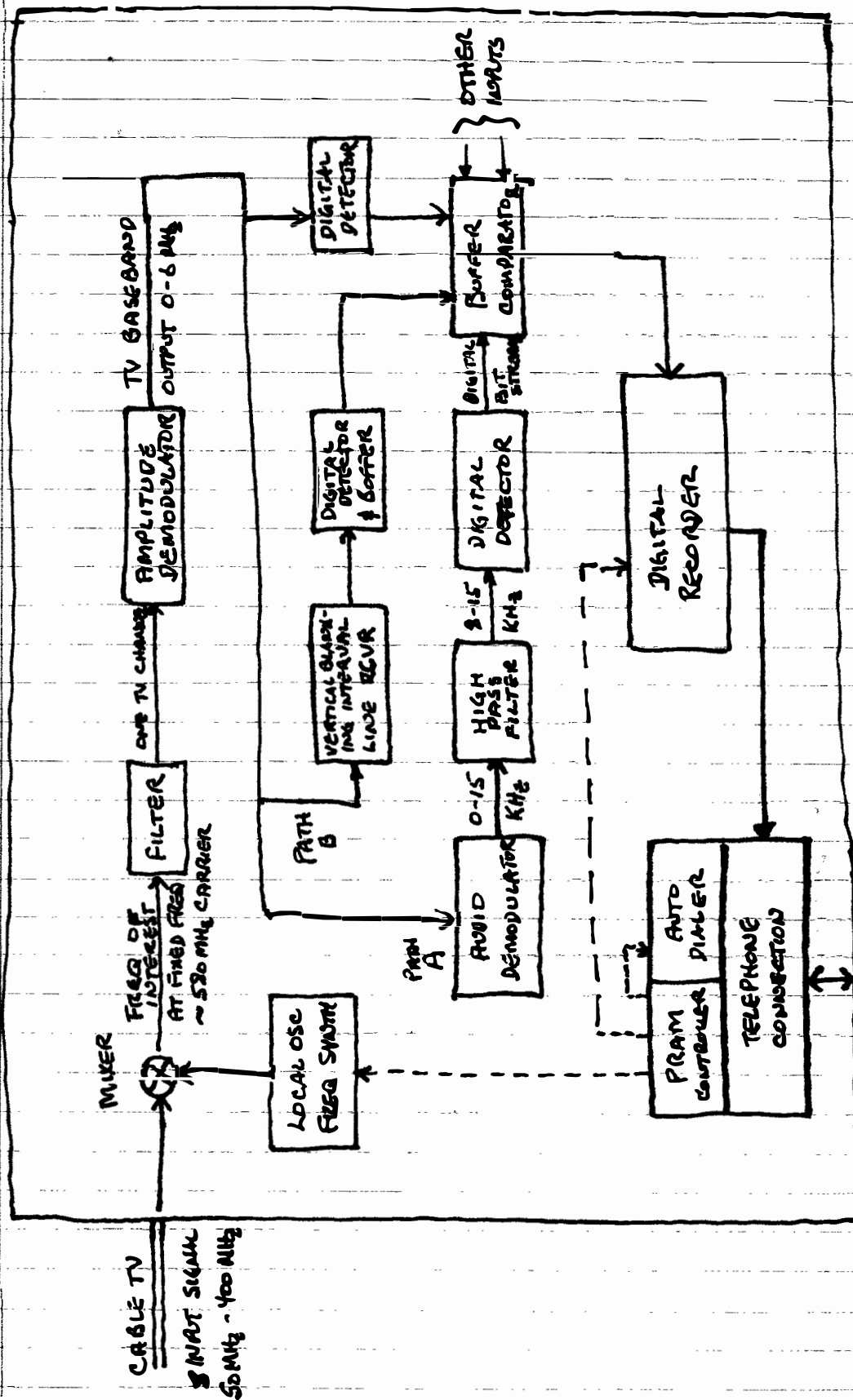
Meeting with
CUDDIHY
ON 4/11/81

Jim and I sat down at his dining room table and he gave me the diagrams reproduced here on pages 19 and 20.

We discussed the second business purpose noted above and he stated that the Broadcast Signal Box could handle this process.

I asked him if the signals could be transmitted in any way besides audio. He responded that they could also be transmitted in the video and over other frequencies. We modified the box to accommodate signals transmitted

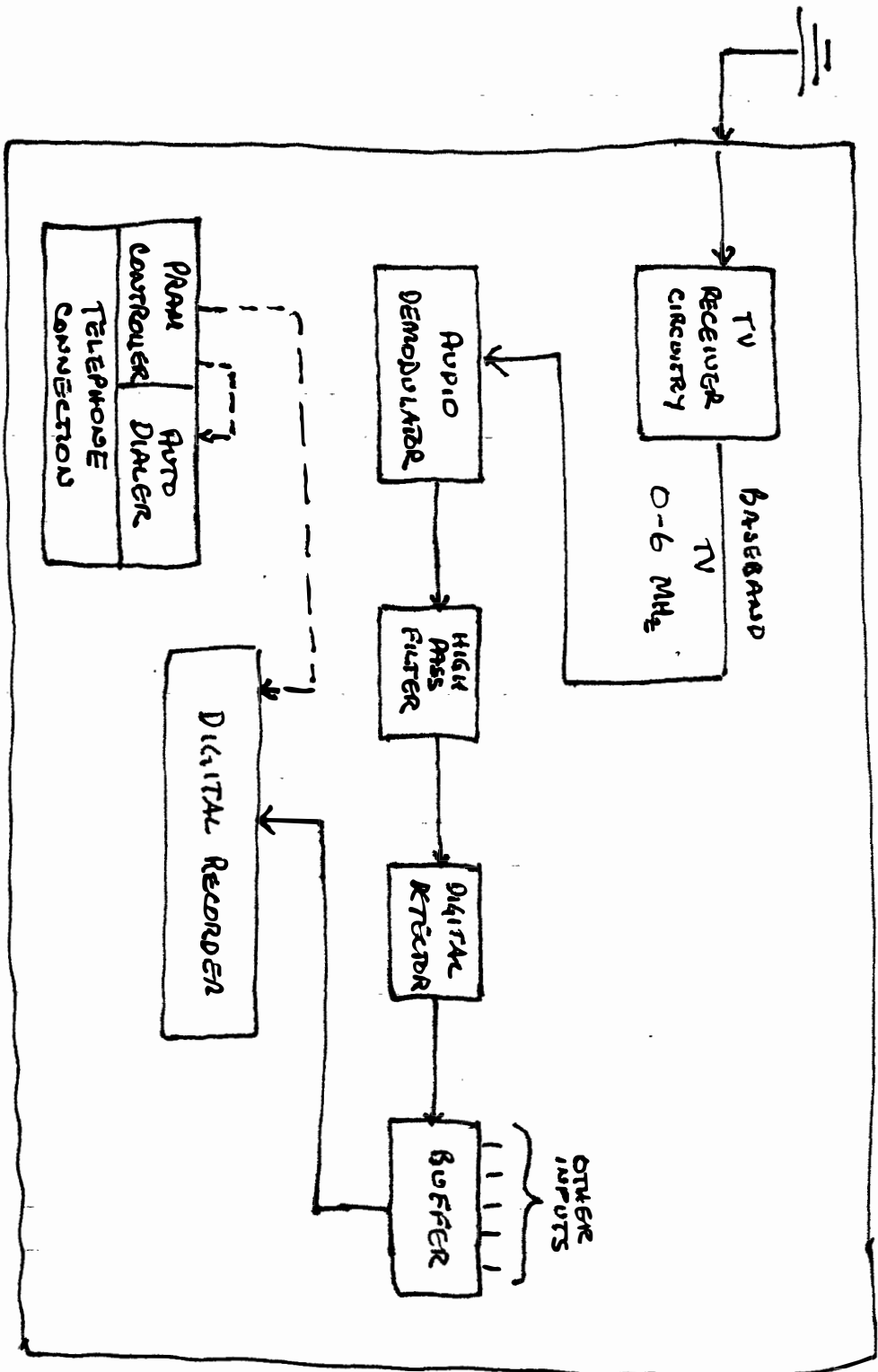
CABLE TV SIGNAL COLLECTOR BOX - AUDIO, VIDEO & SEPARATE SIGNALING TECHNIQUES



TELEPHONE
INTERFACE

Audio signaling - PATH A
Video " - PATH B
Separate " - PATH C

BROADCAST TV SIGNAL CONVERTER BOX



in these other fashions. (The drawing on page 20 has not been so modified.)

We discussed the desirability of identifying tiers, and left this issue largely unresolved.

Also we discussed a ~~timer~~ clock, and he suggested that one could be put in the PRAM Controller.

We also agreed to the buffer-comparator to discard duplicate signals.

THOUGHTS

The path from the local osc freq synth should probably be control information.

Path C probably requires receiving equipment.

Witnessed to this point April 13, 1981
11:59 A.M. Eugene A. Laron

THE SIGNAL GENERATOR

It might be best to design the box in such a way that the minimum number of signal generators are necessary.

This would require a signal flow from the "local osc freq synth switch" to the first buffer to identify the channel/frequency over which the signal came.

It would also require a timer associated with the PRAM Controller to mark the digital recorder perhaps every 15 minutes.

Perhaps two buffers may be desirable in tandem. The first marks the incoming signal with its channel identifier. The second is the standard buffer/comparator.

Witnessed to this point April 21, 1981
2:06 P.M. Eugene A. Laron

ENCRYPTION SYSTEM

An encryption system may be desirable to prevent future devices in TV receivers from identifying and tuning commercials out.

The device would read the code on a videotape and alter it before it is telecast. The receiving equipment & system would then ~~decode the~~ ~~over~~ decrypt the encrypted code signal. The encrypters & receiving equipment would be given the key for encryption/decryption over the telephone when it contacted the central computer to dump its collected data.

Method for changing the encryption code

To minimize the amount of data stored in the collection boxes' memories, the boxes would need to be able to identify a situation where the encrypted signal changes but the code that is encrypted remains the same. In such a situation, the boxes would count the new signal merely as a continuation of the old signal. Such a situation could arise at a time when the encryption code changes by the program or commercial remain the same and hence the identification code remains unchanged.

The technique for changing the encryption code would be to tie the change to the time. The time code ~~on~~ element of the identification code would never be encrypted and the time code would identify to the signal collector boxes which encryption code is being used.

The encryption system obviously would make it difficult for other companies to compete in gathering our data. But with many boxes around the country holding the ~~code~~ encryption codes, it would probably be fairly easy for a determined competitor to crack the code. To prevent this, it may be desirable to have a two stage encryption system. At the ~~originator~~ point of broadcast origination, the identification

code would be encrypted twice. The collection boxes would decrypt the code they receive once and store the codes with one level of encryption. The central computer would decode the second level encryption.

The box level encryption code could be changed frequently thus discouraging the use of the codes to tune out commercials. The computer level encryption code ~~would~~ could be changed as only as necessary to discourage competitors.

This system supposes that the programs have codes on them just as the commercials do. But the codes broadcast on the programs don't have to identify the programs in any way - they merely have to be codes so that the receivers trying to eliminate commercials couldn't eliminate the commercials by eliminating anything with a code. The program related codes ~~would~~ would also change frequently so the ~~the~~ receivers couldn't eliminate commercials by eliminating 30 seconds everything a code changes.

Witnessed to this joint August 24, 1981 3:44 P.M. -
Eugene A. Davron

Further to
encryption
system

The week after filing our Signal Processor patent, Mark Grossman and I had lunch with Steve Pirrino. Steve commented that the term encoded and encrypted had different meanings to engineers. I drew from his inferred from his explanation that once a signal was demodulated from a carrier transmission and decoded from its embedded position in a programming, it could still be in a form that would be scrambled or meaningless which form could be rendered meaningful in ways that engineers would consider either decryption or decoding.

My objective in labeling device 10 in Fig 1 of the patent application a "decrypter" and discussing it throughout the application as a decrypter was not to limit myself in

the processes that could be used to render a demodulated, decoded but scrambled signal meaningful. Rather I wanted to be clear throughout the presentation to use ~~strong~~ language that would distinguish the stage of decoding ~~an embedded~~ a signal embedded in programming from the stage of rendering a signal so decoded into a meaningful form. Thus by decryption I have meant anything that serves as means or methods for ~~an~~ decoding, decrypting, deciphering, or otherwise rendering an obscured signal into a meaningful form.

Witnessed to this point December 15, 1981 3:35 P.M.
Eugene A. Savin.

METHOD TO
DISCOURAGE
PIRACY

To this point our system has contemplated discouraging piracy and facilitating pay-per-view pricing by having the signal processor capable of decrypting encrypted instruction signals.

It is also possible to discourage piracy by changing the videocomp computer programming ~~in~~ periodically in the computer to which the signal processor passes the signals. In this fashion, if the local consumer/viewer doesn't have both the appropriate videocomp programming and a signal processor with the appropriate decryption codes, his system will not work properly.

It would also be possible to discourage consumer/viewers from sharing videocomp programs with each other (thereby weakening the effectiveness of this scrambling technique) by ~~issuing the~~ ~~max~~ issuing the videocomp programming in multiple editions, each of which will work ~~with only with~~ with matched decryption codes -- and only with the matched code. The videocomp programming is delivered by mail -- or electronically in video programming transmissions processed through the signal

processor -- while the codes are delivered to the signal processor by telephone -- or electronically. Unless the viewer/consumer has received the appropriate editions of both the codes and the videocassette programming, his system won't work. It isn't enough to borrow and copy his neighbor's videocassette programming.

Witnessed to this joint April 9, 1982 1:17 P.M.
 Eugene A. Davis.

METHOD TO
 SWITCH CHANNELS
 AT A SIGNAL
 FROM THE POINT
 OF ORIGINATOR
 & BACK TO
 ORIGINAL
 CHANNEL
 AUTOMATICALLY

+
 METHOD FOR
 AUTHORIZING
 PAY-PER-USE

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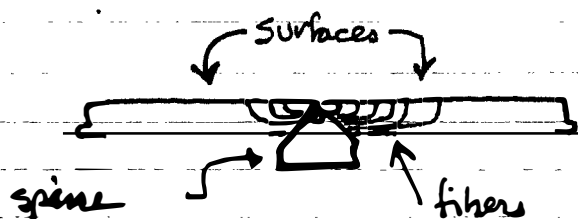
The test starts at this point Eugene A. Love 10:40 AM. 11/10/81.

The Electronic Book

The object of this invention is to develop a device that has the advantages of a book, magazine or newspaper -- it is portable, unbreakable, and relatively small and light-weight -- and also the advantages of electronic display devices such as TV sets -- it can change images rapidly and very inexpensively -- teamed with video recorder/players -- it can store for presentation a very sizeable quantity of material which quantity can be changed by merely replacing an insert such as a cassette or disc etc.

The ~~operating~~ ~~electronic~~ device will probably be designed to resemble a book. When opened it will present two surfaces corresponding to pages. The operating electronics will probably be in the spine. The two surfaces may ~~carry~~ present the ends of thousands of plexiglas or plastic fibers each conveyed from the spine to specific points on the surface. Each fiber may carry light or may not. The light may be white or some color such as red, yellow, or blue. The fiber itself may be tinted so that it conveys a color if any light source is applied to it. The fibers may be covered or deployed in such a fashion that the light is observable only at their ends. The light will may originate in the spine or it may originate under the two separate surfaces.

A cross-sectional diagram of the book may be:



The book may have a rechargeable battery and electronic circuitry in its spine and may operate ~~or~~ with something replaceable -- like cassettes -- providing the programming -- or text.

Witnessed to this print Eugene A. Garm 10:41AM
11/10/81.

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This is the point at which text starts Engel A. Linn
July 19, 1981

VIDEO/COMPUTER SIGNAL INTERFACE

OBJECTIVE

THE INTERFACE DEVICE IS INTENDED TO RECEIVE SIGNALS TRANSMITTED ELECTRONICALLY OVER OVER-THE-AIR TELEVISION BROADCASTS, CABLE, OR OTHER MEANS FOR TELECASTING AND COMMUNICATE SUCH SIGNALS TO COMPUTERS. THE SIGNALS WILL CONSTITUTE INSTRUCTIONS TO THE COMPUTERS. THE SIGNALS MAY BE DIRECTED TO OTHER TYPES OF EQUIPMENT AND MAY CONVEY INSTRUCTIONS TO THESE TYPES OF EQUIPMENT.

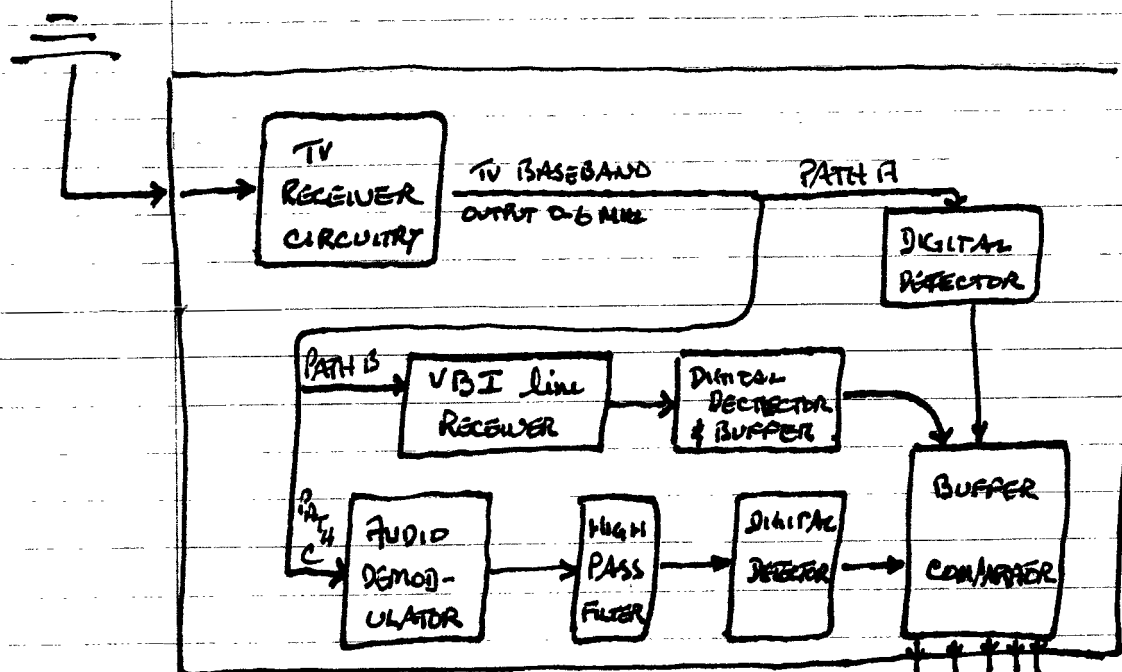
As with the Signal System described earlier, the signal can be communicated over the audio or the video or in another way.

The box can work independent of the television or it can be incorporated into the television or into a Betamax type recorder.

Essentially the device will resemble the broadcast TV signal collector box related on page 20 modified, as described for the video and "Other" signal collecting process. At the buffer/comparator point, however, the device will transmit the signals to the relevant external equipment. The device will have the capacity to include a clock and memory to permit it to pass time delayed signals to the relevant equipment.

~~with~~ The device should probably constitute a small computer, programmable in limited ways by the owner.

VIDEO / COMPUTER SIGNAL INTERFACE



PATH A SEPARATE SIGNALING TECHNIQUES

PATH B VIDEO SIGNALING

PATH C AUDIO SIGNALING

JACK PORTS TO
OTHER EQUIPMENT OR
LINKS WITH OTHER
INTERNAL POINTS

IN a TV set or a Betamax type recorder which contains TV receiver circuitry, the interface device would constitute a module (sold as an option on the basic set and probably a replaceable module) that would constitute one or more of the three paths & the buffer converter.

This device constitutes, also, ~~and~~ an improved television curing mechanism & system.

Witnessed & attested to point Eugene A. Lamm 1:15 P.M.
July 10, 1981.

On July 8th, 1981 at 6:17 P.M. Mr. John Harvey indicated to me that he had a new device to be written up in anticipation of a patent filing. Eugene A. Savin.

We have decided to include these apparatus and method-methods in our signal collector system and apply for a patent on apparatuses and methods that both transfer signals and record them instruction and information to external equipment and record the signals as well.

Witnessed to this point. Eugene A. Savin 11:46 AM
October 16, 1981.

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This is the point at which the text starts. February 25, 1986

The Multichannel Videocomp Receiver

... The concept of a single channel videocomp broadcast was described in the 1981 patent filing and the first set of accepted claims, issuing in 1986, cover these ~~device~~ apparatuses and methods.

The objective here is to describe a multichannel device.

A limitation of videocomp is that the control instructions that tell the receiver computers what to generate and when must precede the transmission of the overlay to the TV sets by enough time for the multiplicity of receiving stations to compute the data and construct their overlay images. Furthermore, this can take quite a while. Furthermore, the most efficient way to control the underlying calculations is probably not to treat each overlay as a discrete and entirely separate computation. Many overlays can relate to each other and have common steps of computation. For example, three consecutive overlays could show the performance of viewers' overall portfolios then their stock portfolios then their bond portfolios. In this example, the performance of stock and bond portfolios would be used to be calculated in order to calculate the performance of overall portfolios. It would not be sensible to recompute performance for the subsequent overlays.

To provide the greatest flexibility the 1981 filing specified that the instructions regarding what to generate and in what order are ~~transmitted~~ transmitted early in the Wall Street Week program.

But this causes a problem when one goes to a multi channel videocomp environment.

At present, TV viewers are accustomed

to "spinning" their TV dials any time they wish to see whether some program on some channel other than the one they are watching is the program they would prefer to watch.

But ~~in the~~ with only the apparatus and methods disclosed in the 1981 filing, if they spin the dial at any time other than the very start of the program they are switching to, they will have missed program control instructions that relate to the program they switch to and they probably will not get a satisfactory videocomp presentation. Likewise they will be in danger of also losing control instructions that relate to the program they switch from and probably won't get a satisfactory presentation if they switch back.

My objective here is to describe the apparatus and methods necessary to correct this limitation.

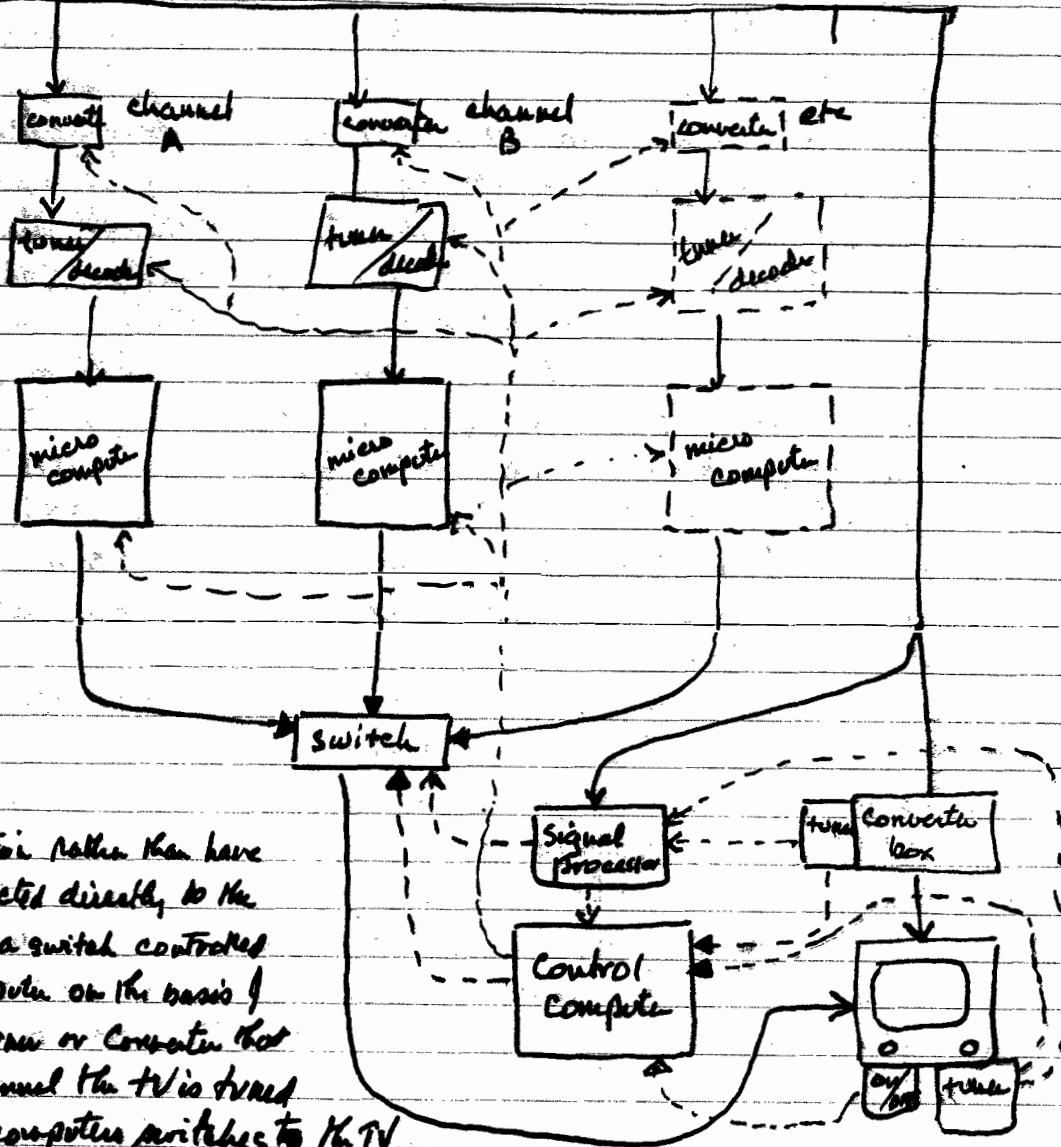
First, this is not merely a problem of receiving all appropriate signals; in order for a viewer to switch channels and tune to a program that presents videocomp from the outset, the computer and apparatus must have been processing the videocomp instructions before the viewer tuned to the channel. For example, suppose a viewer switched too the Wall Street Week just as the host was saying, "And here is how your portfolio performed." It is not enough for the computer to have received the instructions to generate the overlay. The computer must also have processed the instructions, calculated the performance of the portfolio and created an image of that performance. Furthermore, if one switched away from a ~~one photo~~ program then back, one's apparatus would lack material necessary if it had discontinued process material relating to the channel switched away from.

One obvious solution is to have one

entire computer processing instructions for every channel one might wish to wish

Fig 1

multichannel transmission



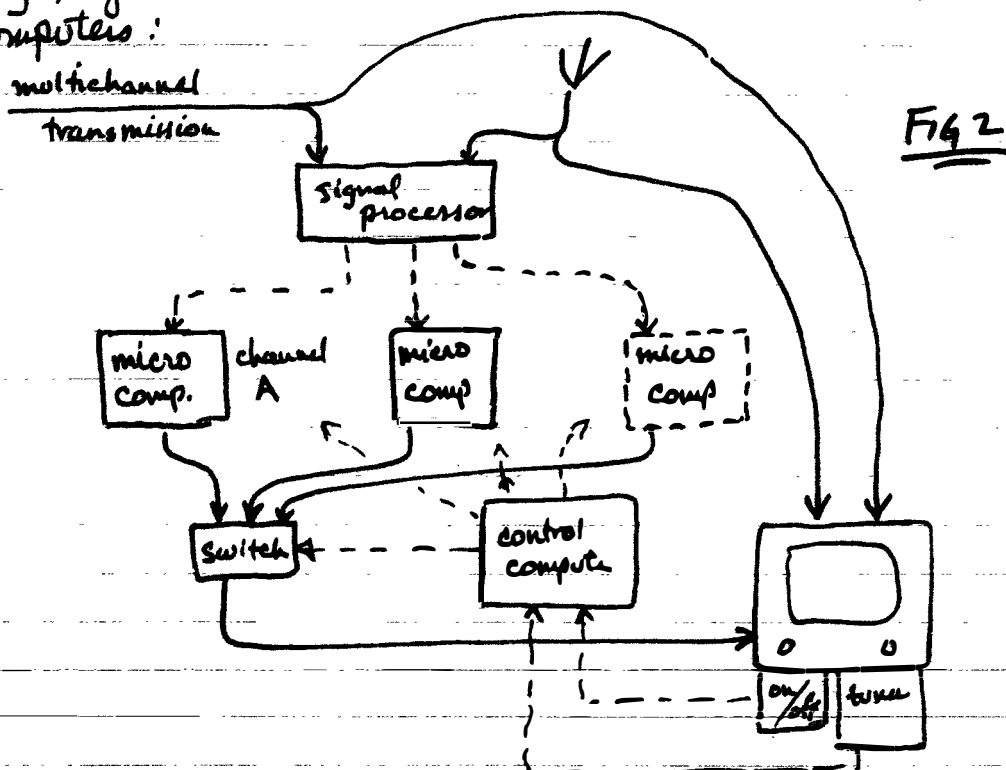
In this configuration rather than have each micro connected directly to the TV I have put in a switch controlled by the control computer on the basis of data from the TV tuner or converter that indicates the channel the TV is tuned to. The control computer switches the TV to the ^{output of the} appropriate channel computer.

In this case the instructions for each channel would be processed fully all the time the apparatus was on by a dedicated converter/tuner/decoder/computer which would process each channel fully so long as the TV set was on. When the TV was turned on or off, then a digital signal would be transmitted from TV on/off switch.

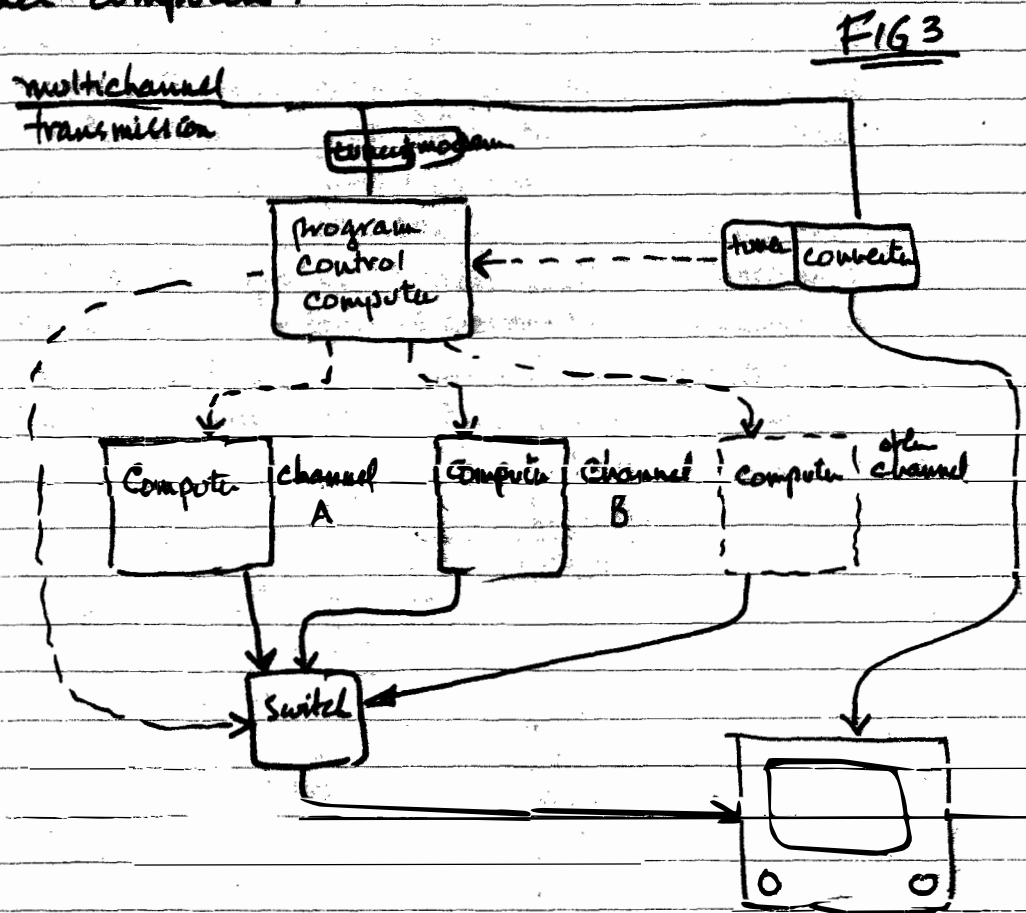
to the control computer which would activate or deactivate all equipment accordingly

(But this might occur at a time when signals had already been sent which would be missed if ~~often~~ the receiver apparatus were off. ... To avoid this the dedicated channel apparatus could be active and processing all the time ... or it could operate under control of signal processor and control computer to operate on active channels whenever the signal processor detected signals and determined them to be active. The signal processor would inform the control computer whenever a channel became active or inactive and the control computer would activate or deactivate the dedicated channel apparatus accordingly.)

A disadvantage with this technique would be the substantial duplication of converter/tuner/decoder equipment. This disadvantage could be overcome in ~~a multichannel system such as a cable channel television system~~ by having the signal processor detect the incoming signals and itself transfer them to the dedicated microcomputers:



Alternately the cable system headend could consolidate all instructions onto one channel of digital transmission carefully preceding each discrete ~~sign~~ transmission of instructions with a signal designating the proper channel apparatus to receive and process the instructions and transmit ~~these~~ digital transmission channel to the program control computer which itself would transfer the signals to the dedicated channel computers:



A disadvantage with this configuration is the ~~to~~ potential for duplication in the channel computers. They could all operate on the same power supply and potentially they could share a clock. Beyond this there is the fact that they must all have access

to the users data which means that it would be desirable for them all to share memory records such as fixed disk drives or floppies.

Ultimately we get to the point where the channel computer can be pared down to cards or boards that are installable on a motherboard. These boards have CPUs, video RAM, ROM as required, and operating RAM for holding instructions and data in processing. They have input capacity for receiving program instructions from the program control computer, data from the user's ~~active~~ memory records and main active RAM memory, and such other instructions and data as may be transmitted to them. They have capacity to request data from the users main RAM and memory devices. They have the capacity to output signals from video RAM to the switch that can connect overlays to the TV. They may have other capacities.

In this operation, we can have two control computers that these channel cards are plugged into. One could be physically mounted below the cards and the other on top of the cards.

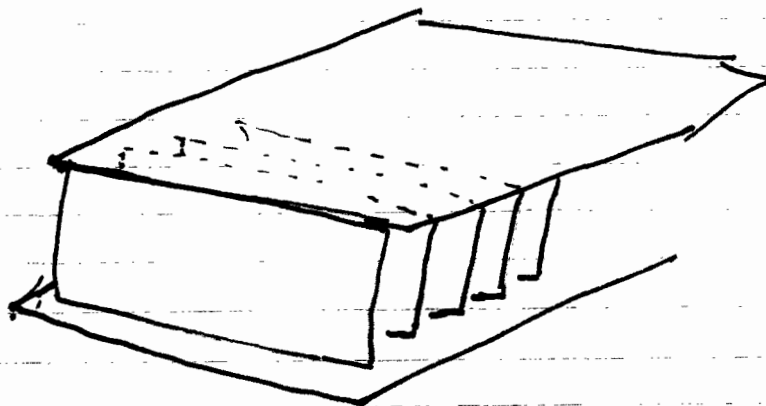
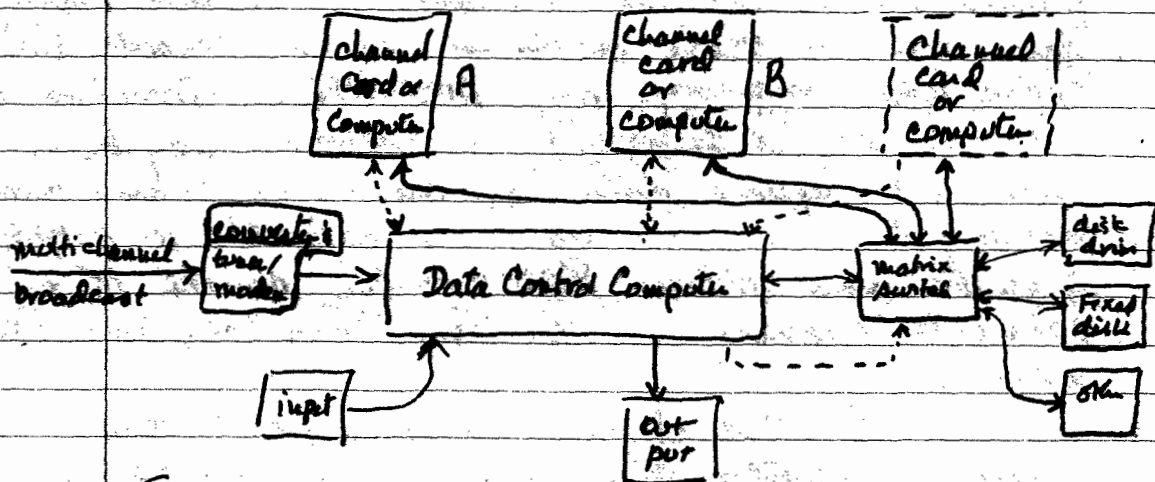


FIG 4

In this configuration, one of the cards could serve as the communications linking the top and bottom computers directly.

In this configuration, one computer -- the top for example -- could handle the program control and switching functions shown in FIG 3 while the other could handle accessing the user's data and could serve as the user's input to the system.

In this system the bottom or Data Control Computer could look like this:



The Data Control receives data from one or more broadcasts and processes/records it according to the ~~desired~~ instructions of the user. Following established flow control & error checking techniques, the channel computer call for information from the data control computer. The data cont. comp. can even assign a disk drive to a card.

Working with the program control computer the data control computer can reassign channels to the channel cards... For example, suppose the viewer has 10 videocamp channels available to him. Looking at the evening's schedule he can plan what he wishes to watch over the course of the evening. The data control computer over which he has control, operates to achieve the organization's viewership. Suppose he has only 5 channel cards and wishes to watch program on 3 channels. The

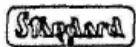
data control computer instructs the program control computer to input the program, on the 3 desired channels into the first three cards for the entire evening ... Then the data control computer assigns the Allen 2 in accordance with the viewer's general viewing patterns which it has in memory in comparison with the nature of the programming which is conveyed by a transmission that identifies and relates the nature of the programming.

Witnessed to this joint February 25, 1986
Roger A. [Signature]

John Harvey

333 East 57th St.

New York, NY 10022



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The Signal Collector Box

OBJECTIVE The signal collector box will be designed to collect signals transmitted electronically. The signals may be transmitted over hard wire or broadcast over the air. The signals may be of any frequency.

 The box will collect the signals, record them, and play them back upon command.

**DESCRIPTION
OF BOX** The box will have one or more receiver units, a buffer unit, a recorder unit, and a playback unit.

 Initially the box will be used to monitor signals transmitted over cable television where the number of channels being monitored could run from only one to over one hundred. In this application, the box would probably require one receiver unit per cable channel monitored. The receiver unit would receive the signal, add a data bit to identify ~~which channel~~ itself as the receiving receiver unit, and pass the signal on to the recorder through the buffer.

 The buffer ~~who~~ would provide temporary storage for signals enroute to the recorder. The recorder would have the capacity to process only one signal at a time, and the buffer would permit several receivers to send signals to the recorder simultaneously without any getting lost.

 The recorder would be a computer grade tape operation as found in word processing units, or a video tape recorder or another similar type of unit.

~~The playback unit would permit~~ The box would be

connected to a telephone line. When telephoned and commanded to dump its data by the central computer, the playback unit would permit the box to play the collected signals to the computer over the telephone. (The buffer would continue to collect signals while the tape was playing back.)

The tape recorder would be a sealed unit. Upon completion of playback, it would return to the start of the tape and commence recording data over the old signals.

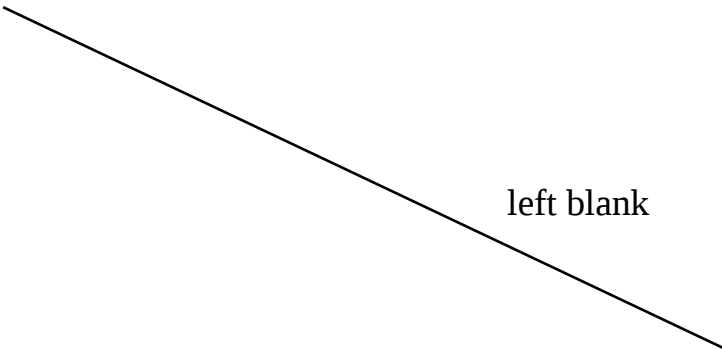
DESCRIPTION
OF SIGNALS

The signals will be brief bursts of data bits. The data bits may be alphabetic, numeric, alphanumeric, or others in their composition. The signal may be carried in the visual part of the television ~~television, lifegible text~~ cable channel or the aural part or a combination of both, or the television broadcast or it may be in the aural part or in a combination of both. In other uses of the box the signal can be transmitted in any way.

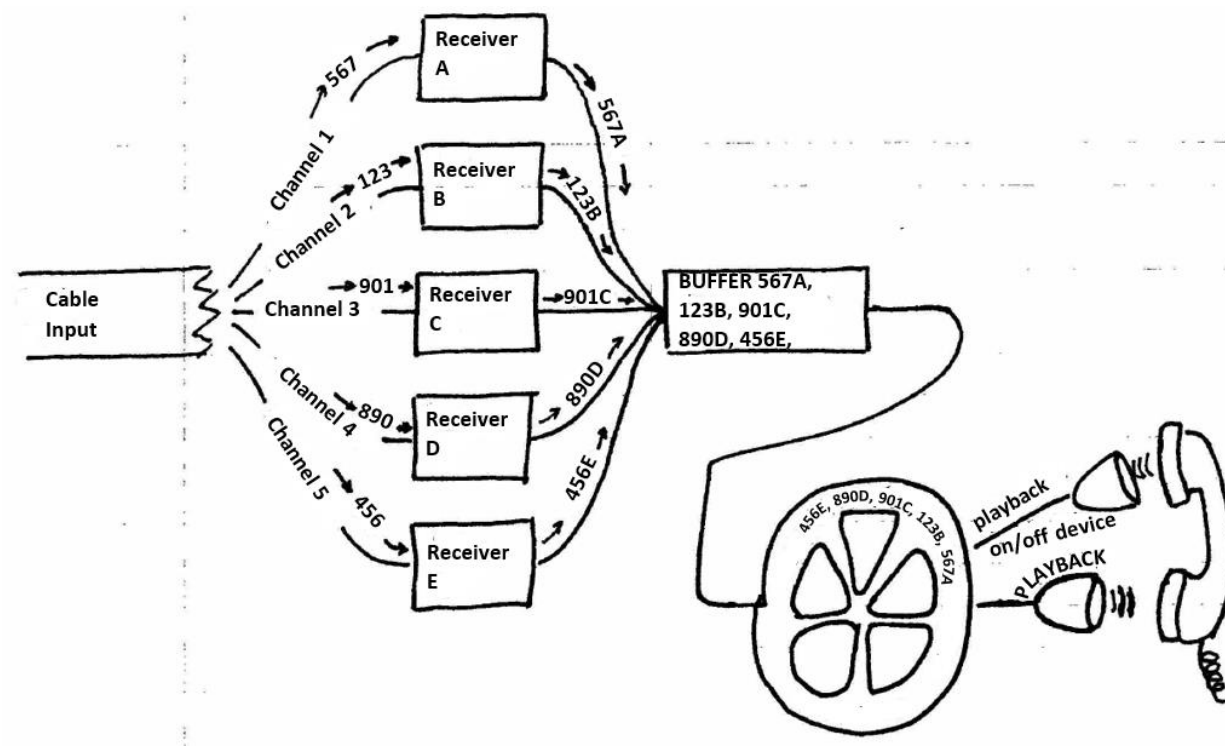
The signal will start with an identifier that will activate the box and notify it that the signal is to be collected.

The signal should be transmitted in this briefest, most unobvious way possible.

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Drawing of box monitoring five channel cable system



The input to the box is ~~probab~~ in the cable monitoring application is probably a converter box.

On the other hand, this may not be necessary

Also check on the type of signals that word processors and computers communicate over telephone lines.

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6

Modules

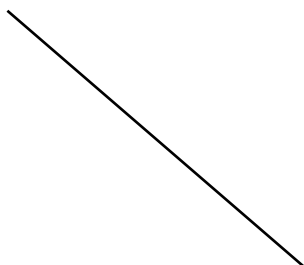
The box should be made in modules so that the number of receiver units can easily be increased and so malfunctioning parts can be replaced easily.

Timer

It may be desirable to include a timer so that the time of receipt of signals can be included in data. The design of the box should provide for the inclusion at a future time of a clock module

SECURITY

Provision for a security module should also be made. When the computer telephones it must give a password before it is admitted to the data. Then before signing off it must give a second password before the data is erased. If it cannot give the second password, the box will record the fact on its tape and continue recording signals without erasing the tape.



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The Electronic Signal Generator

OBJECTIVE The electronic signal generates a companion piece to the signal collector box. It will generate the signals to be collected by the signal collector.

Witnessed to this point April 6, 1981
Eugene A. Savon

LUNCH
 WITH JIM
 CUDDIHY
 4/7/81

I discussed the signal collector and generator devices with Jim Cuddihy at lunch today, April 7.

I stated that the box could have a variety of businesses applications and related one as collecting television network station break signals for ~~billing~~ the purpose of aiding the networks in billing cable systems.

We discussed where the signal should be carried in the frequency spectrum and Jim suggested the most efficient place would be in the audio range above the actual audio signal.

He asked me whether the input to the collector would be a converter box or whether it would be the cable itself. I suggested that I suspected that we would use certain elements of the converter and that, in effect, the input would be a point midway through the converter.

He asked me the word length of the data to be carried and I estimated it as a 40 bit word.

I told him that I had anticipated each word would have a leading bit which would identify it to the receiver units in the box as a bit of data to be collected. Jim responded that this would be costly because it would require that the box be tuned to all channels at all times.

We discussed the desirability of having a buffer and a tape unit or just a buffer alone, I observed that this was a question of the trade off between the cost of the units and the cost of the communicating with the units. I suggested that the tape was probably desirable to reduce the number of times the box was communicated with over the telephone.

Jim asked where the signal would be inserted, and I responded that it would be inserted at the point of programming origination.

Returning to the question of where the signal was picked up by the box, Jim suggested that if the signal was ~~included~~ in the audio range, all we would require in the box would be the audio demodulator portion of the converter and perhaps it would be least costly to design it to sample all of the channels rather than having a receiver unit on each one. I responded that it wasn't essential to have a receiver on each so as to be able to identify specifically, which channel in a local system the signal came over. This would mean that the box potentially would be collecting all signals in the particular above-the-audio ~~range that the signals are transmitted on~~ frequency that the signals are transmitted on.

Jim speculated on the need for a clock in

the box. I replied that a clock wasn't essential because the time could be inserted in Greenwich Mean Time at the point of signal origination and the time that a local system ran the signal could be inferred from the signals immediately surrounding any given signal on a box's tape.

Jim also observed that the box could be designed automatically to dump its memory, whether from tape or buffer, to a designated telephone number. I observed that the way the box was communicated with was a security issue, and I would have to reflect on this.

Jim and I discussed the terms of a potential working arrangement. He stated that he would like to design the system, and we could find someone to design the circuitry. I showed him my draft contract. He read it and stated that he was perfectly happy with its terms. I asked him if his employment terms with Teleprompter gave him the latitude to do this type of work without Teleprompter having a claim on it. He responded that he has that latitude. I asked him what the price for his services would be. He replied, "A dollar an hour." He added, "And if you make \$20 million perhaps you could remember me." I told him that I wanted to be co-inventor on the device, and he stated that that caused him ~~I told him that~~ no problem.

I told him that I would draft a contract, and we agreed to meet at his home at 9:00 tonight to execute it.

10

THOUGHTS AFTER LUNCH

After reflecting on the design points that we discussed at lunch, I think of the following points:

- We must ensure that the above-the-audio frequency that we choose doesn't interfere with potential expansion of ~~illegible~~ TV practice into such areas as stereophonic signal transmission.
- We must ensure that commercial video tape recorders capture ~~this above the audio signal~~ and retransmit this above the audio signal.
- I must check into the security of an 800 telephone number in the event we choose to have the boxes dump automatically. Also will Bell give us a contract that we can keep the same number forever? Should we have a default 800 number for possibility that the primary number is out of order? ~~Also will will probably need the capacity to~~ The box will probably be designed to dump automatically when a certain percentage of its tape capacity is filled but we will also want to be able to dump to the 800 number by giving a command to the box.
- If we are picking up all signals on our chosen frequency, we may wish to process the signals before recording them to tape to discard irrelevant signals and duplicate signals.

*Witnessed to this point April 7, 1981
Eugene A. Savon*

EMPLOYMENT AGREEMENT

This agreement incorporates only what appears in writing from this point in this book to the point below, at which it is signed by the parties to the agreement.

James W. Cuddihy of 523 East 14th Street, New York, NY (hereinafter “Jim”) hereby agrees to help John C. Harvey of 333 East 57th Street, New York, NY (hereinafter “John”) design and develop the devices known as the “signal collector box” and the “electronic signal generator” in exchange for \$1.00 (one dollar) per hour.

Jim agrees to notify John whenever the number of hours that Jim spends on this project reaches a multiple of twenty-five, and John agrees to pay Jim at that time. If, at any time, John asks Jim to halt work on the project, Jim will not work until instructed to continue.

John represents and warrants to John that no other party or employer has any legal right to the fruits of Jim’s labor during those times when Jim will work on this project.

In consideration of this employment, Jim hereby assigns to John all right, title, and interest in any invention or discovery, whether patentable or not, that he conceives or actually reduces to practice while developing the abovementioned instruments. Additionally, Jim agrees to keep all matters related to these devices and all John’s business plans confidential until John makes full public disclosure of them. *[John C. Harvey’s Initials]*

Employment Agreement continued

[John C.
Harvey's
Initials]

[James W.
Cuddihy's
Initials]

~~Either Jim or John may end Jim's employment under this agreement at any time by notifying the other. At such time, John agrees ^{to pay} Jim whatever is due him up to the time of notification, and Jim agrees to turn over to John all papers, diagrams, models, devices, and any other objects and materials relating to this project.~~

Either Jim or John may end Jim's employment under this agreement at any time by notifying the other. At such time, John agrees to pay Jim whatever is due him at the time of notification, and Jim agrees to turn over to John all papers, drawings, models, devices, and any other objects and materials relating to this project.

The provisions of this agreement apply for five years after termination of this agreement.

J. C. Harvey

James W. Cuddihy
4/7/81

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FURTHER
THOUGHTS

Before getting together with Jim yesterday, it occurred to me that for tiered systems the box will need to be adapted to be able to identify the tiers and which tiers signals come over.

MEETING
WITH JIM
CUDDIHY
AT 9PM
4/7/81

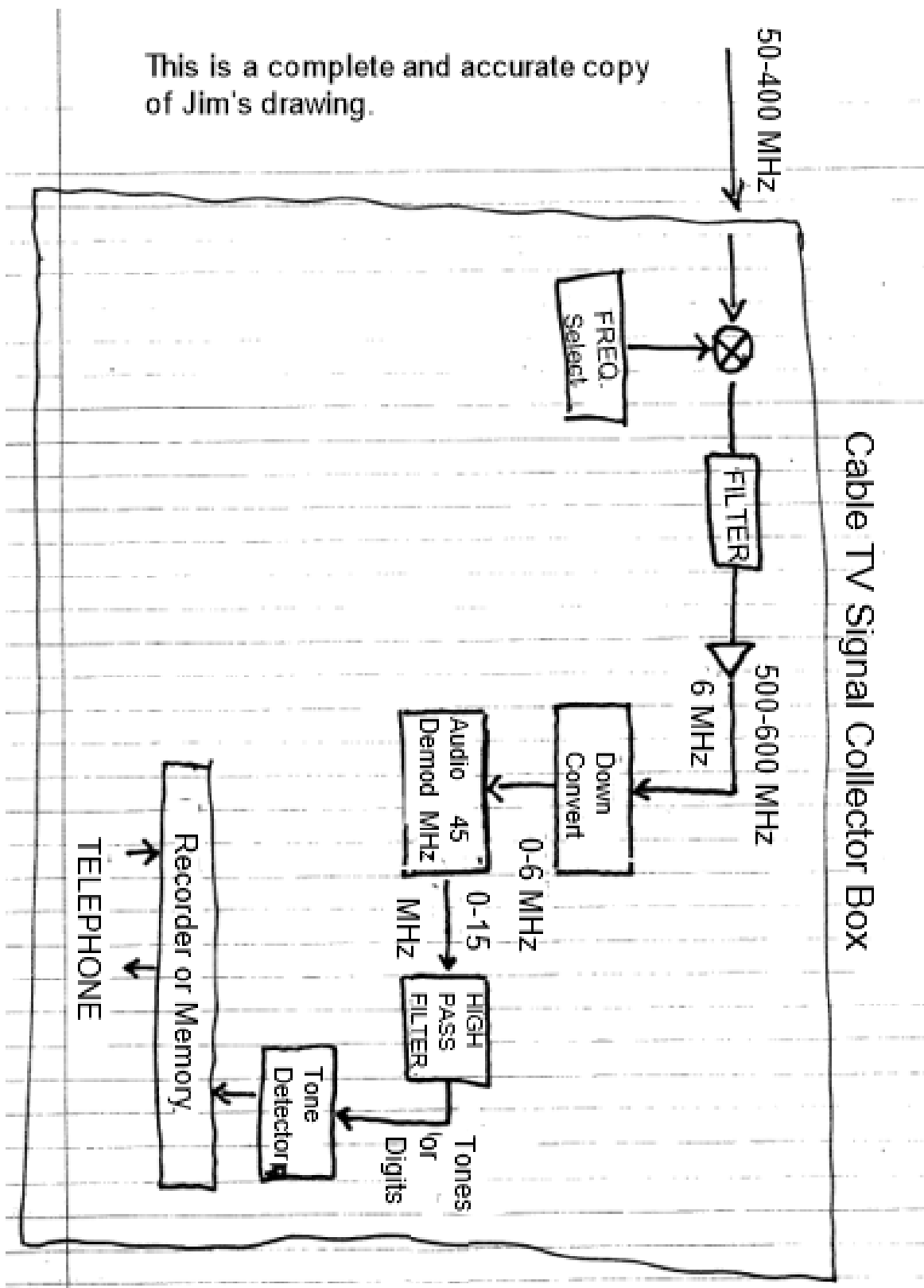
Jim and I sat down at his living room table. I showed him the document on pages 12 and 13 of this book. He read it. We both executed it and also executed two xerox copies of it, one of which he kept. Jim then said, "At least I'm employed."

(Beside the one executed copy of the employment agreement, I also give Jim xerox's of pages 3 through 10 of this book. He had not read that portion of this book before I left.)

Having executed the agreement with him, I then explained the business purpose for the signal collector. I explained that the box would be introduced initially for the collection of signals transmitted over cable but that the process would rapidly be expanded to include signals transmitted over broadcast TV and radio. I firmly believe that there will be further commercial applications.

We discussed the data to be transmitted in the signals and agreed that potential word lengths should not need to exceed 50 bits.

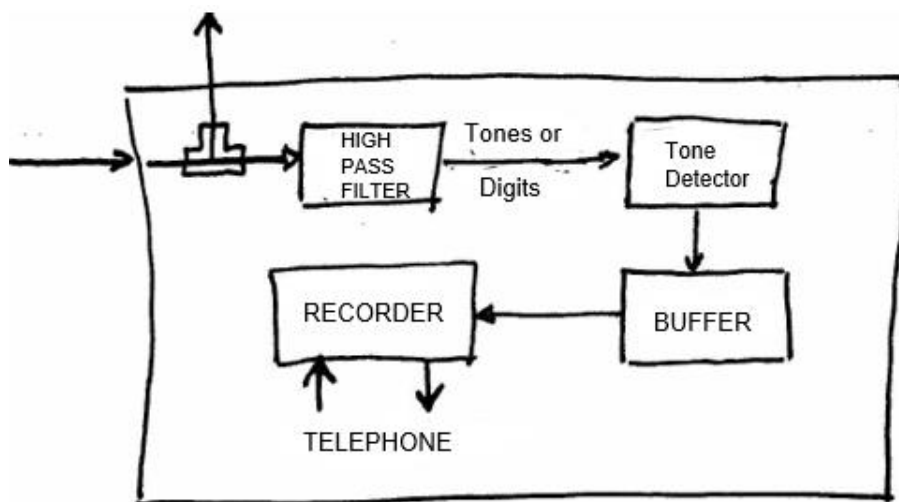
Jim sketched out a ~~box design that I have copied on to the reverse page~~ potential box design, taking about 5 minutes to do it, that I have copied onto the reverse page.



SECOND
BUSINESS
PURPOSE

This morning, April 8, while ruminating, I realized that the signal collector box could, with modifications, accomplish a second business objective.

In this configuration the box would look like:



In this application the recorder may not be necessary and we may, instead, have two buffers. Also we may require a video filter.

Witnessed to this point April 9, 1981
Eugene A. Savon.

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FURTHER THOUGHTS

To minimize operating costs, the box probably should not have its own ~~line to~~ independent telephone line. Rather it should share a phone connection with ~~someone's~~ its hosts telephone. Perhaps it would only transmit during nighttime hours.

TELEPHONES

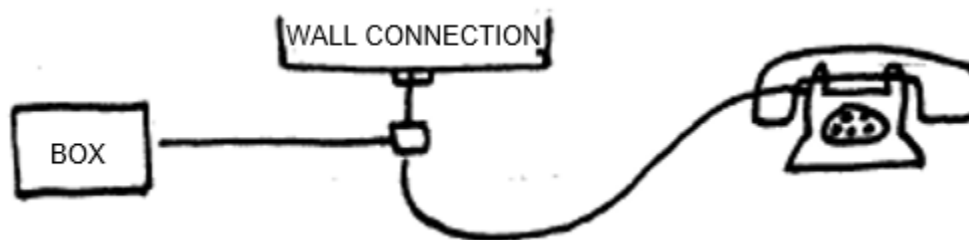
It would only make outgoing calls.

The computer would accept and process ~~its~~ the box's data only if the proper end-of-transmission signal were received. If someone were to pick up the party line phone in the midst of a box to computer transmission, the computer would break off the transmission and would dump the box's data. The box would only call when it had a ~~{illegible text}~~ dial tone. ~~{Illegible text}~~ If the box had gotten a busy signal when it called ~~there would be~~ or had been interrupted, it would not call again for 10 minutes.

When the computer received the end-of-transmission signal, the computer would instruct the box to go back to the start point on its tape and record over old data.

There would be several lights and a button on the outside of the box. A green light would signal that the box was on. A red light would signal that the box was sufficiently full to want to communicate with the computer but had not been able to reach the computer. The button would manually set in a motion a call to the computer.

The telephone link might look like:



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COMPETITORS

4/10/81

Jim telephoned today to say that he had met yesterday with some people from the company that is the Bell Labs of Canada who had shown him an addressable connector that has many features similar to our box. He indicated that their converter is not precisely like ours and rather apparently is not targeted at our business purposes. He indicated that they have applied for patents.

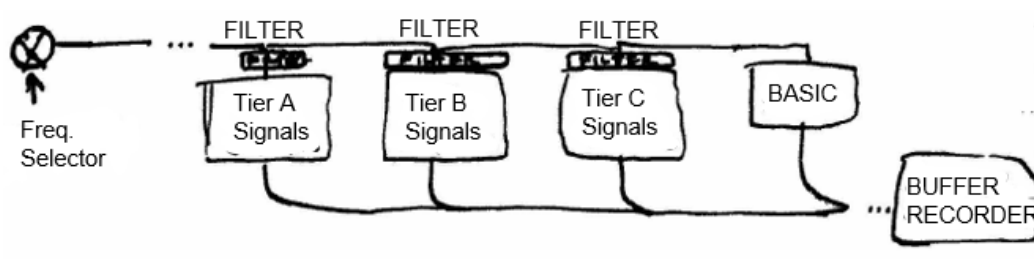
We

We must move rapidly, among other things, to get over-the-air TV and radio patents on our system.

TIERING CONSIDERATIONS

Perhaps the answer to the tiering problem is to install ~~one box in~~ two boxes in each system from each for ~~that system's~~ each of that systems tiers.

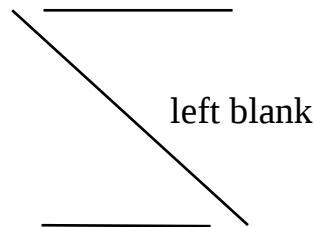
Or – Design the boxes with the capacity for a series of shunts at an appropriate point in the box similar to a coin sorting machine:



where a bit of data would be added as an identifier as the signals went through the various shunts.

TO
MINIMIZE
THE NUMBER
OF SIGNALS
RECORDED,
TRANSMITTED
BY PHONE,
AND
PROCESSED
BY THE
COMPUTER

Our buffer should compare incoming signals with one another and transmit no more than two copies of any given signal to the recorder. All other identical signals should be discarded.



TIERS &
RATINGS
BOXES

It would be useful if the ratings boxes could be a identify which tiers and pay services the viewer could receive. Obviously, this could be stored in the computer and analysis of signals would tell something. But it would be nice if the box signal would regularly disclose this information.

Witnessed to this point April 10, 1981
Eugene A. Savon

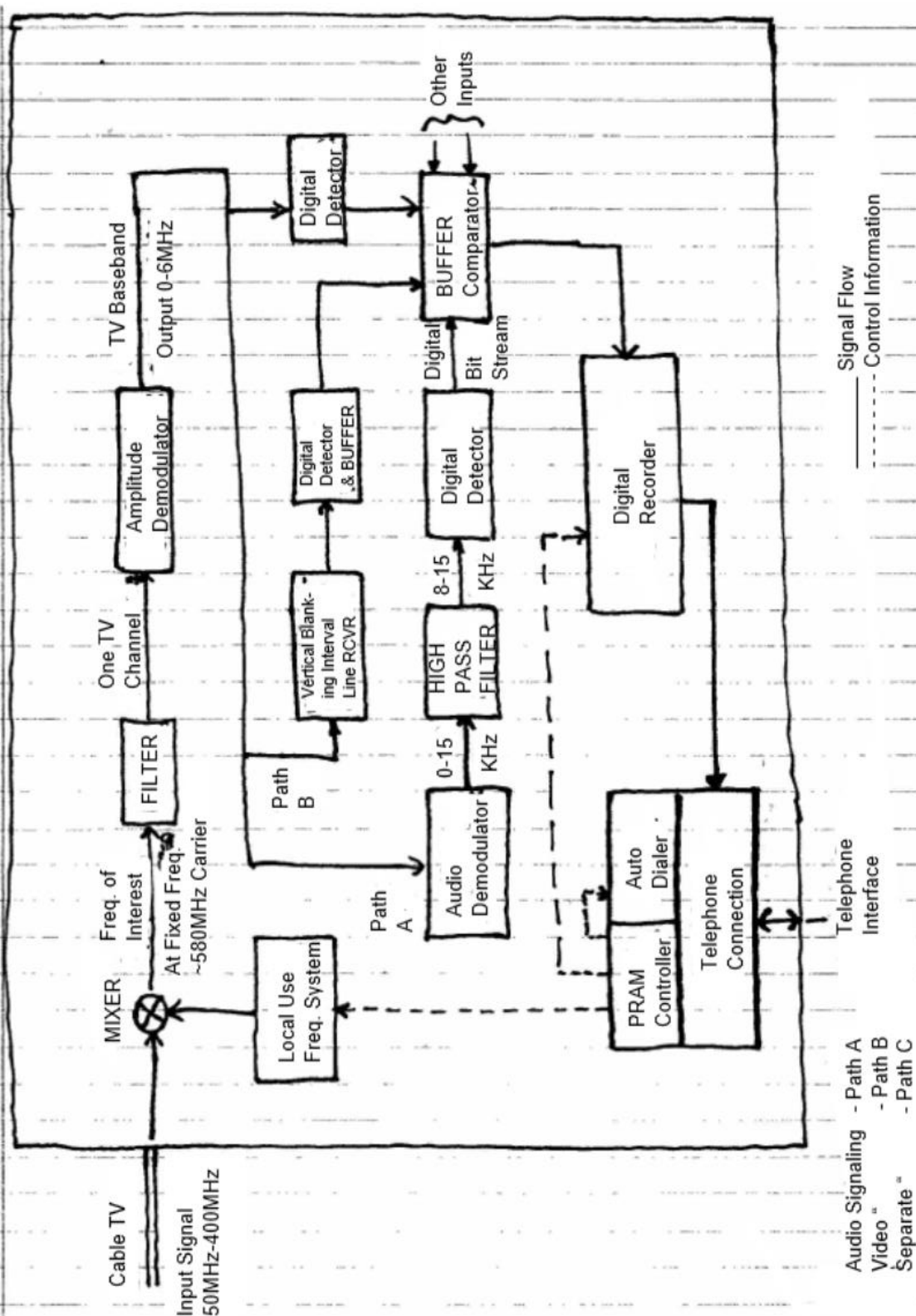
MEETING
WITH
CUDDIHY ON
4/11/81

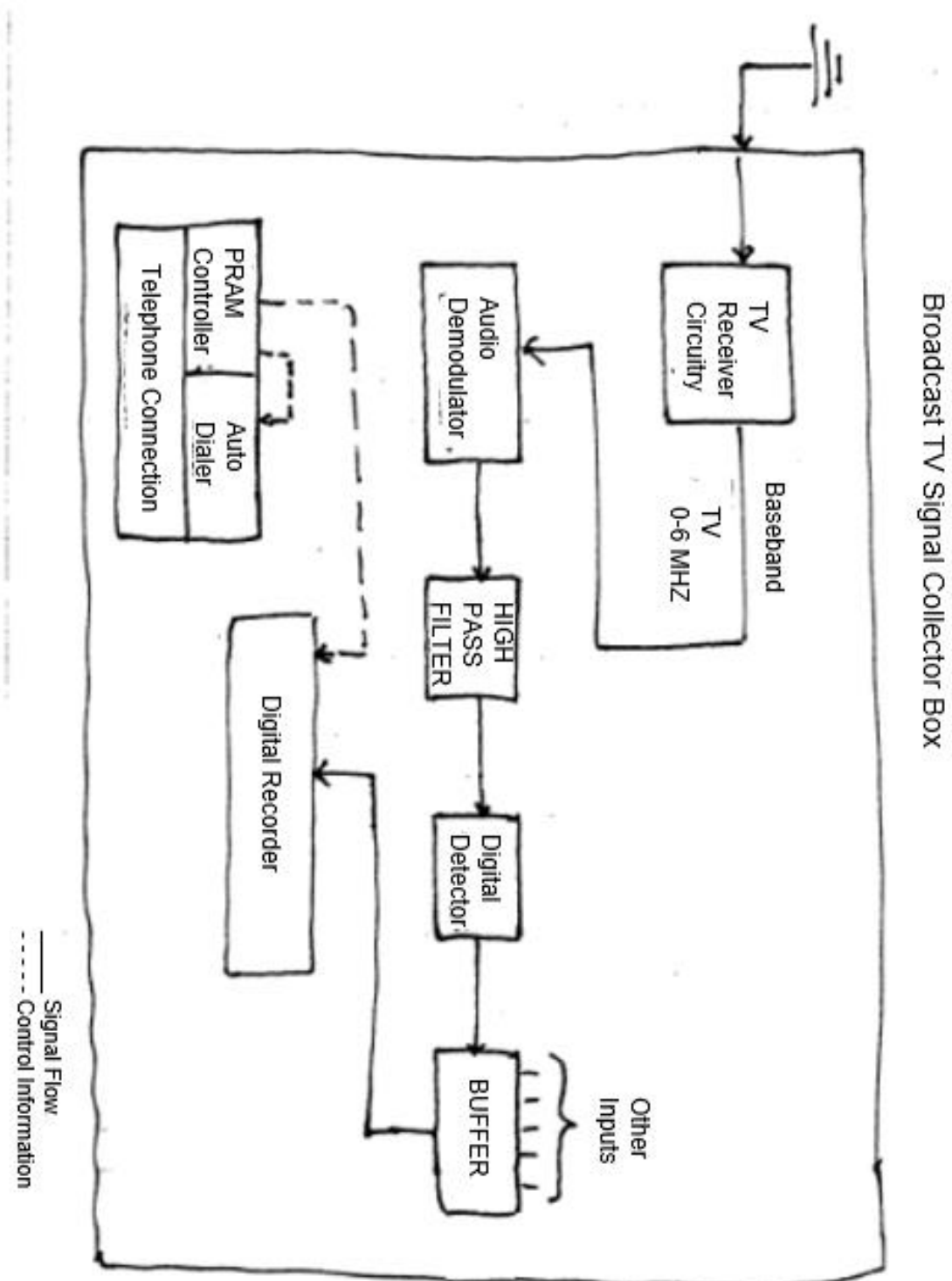
Jim and I sat down at his dining room table and he gave me the diagrams reproduced here on pages 19 and 20.

We discussed the second business purpose noted above and he observed that the Broadcast Signal Box could handle this process.

I asked him if the signals could be transmitted in any way besides audio. He responded that they could also be transmitted in the video and over other frequencies. We modified the box to accommodate signals transmitted

CABLE TV SIGNAL COLLECTOR BOX – AUDIO, VIDEO & SEPARATE SIGNALING TECHNIQUES





in these other fashions. (The drawing on page 20 has not been so modified.)

We discussed the desirability of identifying tiers, and left this issue largely unresolved.

Also we discussed a clock, and he suggested that one could be put in the PRAM converter.

We also agreed to the buffer-comparator to discard duplicate signals.

THOUGHTS

The path from the local osc freq signal should probably be control information.

Path C probably requires receiving equipment.

Witnessed to this point April 13, 1981

11:59 A.M. Eugene A. Savon

THE
SIGNAL
GENERATOR

It might be best to design the box in such a way that the minimum number of signal generators are necessary.

This would require a signal flow from the "local ~~illegible text~~ osc freq ~~switch~~ switch" to the buffer to identify the channel/frequency over which the signal came.

It would also require a timer associated with the PRAM controller to mark the digital recorder perhaps every 15 minutes.

Perhaps two buffers may be desirable in tandem. The first marks the incoming signal with its channel identifier. The second is the standard buffer/comparator.

Witnessed to this point April 21, 1981

2:06 P.M. Eugene A. Savon

ENCRYPTION SYSTEM

An encryption system may be desirable to prevent future devices in TV receivers from identifying and tuning commercials out.

The device would read the code on a videotape and alter it before it is telecast. The receiving equipment and system would then ~~decode the [illegible text]~~ decrypt the encrypted code signal. The encrypters and receiving equipment would be given the key for encryption/decryption over the telephone when it contacted the central computer to dump its collected data.

Method For changing the encryption code

To minimize the amount of data stored in the collection boxes' memories, the boxes would need to be able to identify a situation where the encrypted signal changes but the code that is encrypted remains the same. In such a situation, the boxes would count the new signal merely as a continuation of the old signal. Such a situation could arise at a time when the encryption code changes but the program or commercial remains the same and hence the identification code remains unchanged.

The technique for changing the encryption code would be to tie the change to the time. The time code ~~on each~~ element of the identification code would never be encrypted and the time code would identify to the signal collector boxes which encryption code is being used.

The encryption system obviously would make it difficult for other companies to compete in gathering our data. But with many boxes around the country holding the encryption codes, it would probably be fairly easy for a determined competitor to crack the code. To prevent this, it may be desirable to have a two stage encryption system. At the ~~origination~~ point of broadcast origination, the identification

code would be encrypted twice. The collection boxes would decrypt the code they receive once and store the codes with one level of encryption. The central computer would decode the second level encryption.

The box level encryption code could be changed frequently thus discouraging the use of the codes to tune out commercials. The computer level encryption code could be changed only as necessary to discourage competitors.

This system supposes that the programs have codes on them just as the commercials do. But the codes broadcast on the programs don't have to identify the programs in any way – they merely have to be codes so that receivers trying to eliminate commercials couldn't eliminate the commercials by eliminating everything with a code. The program related codes would also change frequently so the ~~box~~ receivers couldn't eliminate commercials by eliminating 30 seconds every time a code changes.

Witnessed to this point – August 24, 1981 3:44PM – Eugene A. Savon.