

"THEY are afraid to say so in public, but many of the North's big–city mayors groan in private that their biggest and most worrisome problem is the crime rate among Negroes.

In 1,551 U.S. cities, according to the FBI tally for 1956, Negroes, making up 10% of the U.S. population, accounted for about 30% of all arrests, and 60% of the arrests for crimes involving violence or threat of bodily harm – murder, non–negligent manslaughter, rape, robbery and aggravated assault. In one city after another, the figures – where they are not hidden or suppressed by politicians – reveal a shocking pattern."

--- April 21, 1958 quote from the article "The Negro Crime Rate: A Failure in Integration" in *TIME* magazine. Change! *Oh...* Wait a minute...

(www.time.com/time/magazine/article/0,9171,810262,00.html)

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MESSAGE SERVICE SYSTEM FEATURE DOCUMENT 1A ESS[™] SWITCH AUTOPLEX[™] SYSTEM 100

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CUSTOMER BENEFIT

1.02 The AMSS feature can provide a mobile subscriber with a convenient way to avoid missing calls when busy on another call or when unavailable.

AVAILABILITY

1.03 The AMSS feature is initially available with the AUTOPLEX System 100 Release 2 (1AE8A.03) generic program.

1.04 The HAMRS (Hybrid AUTOPLEX System 100 Message Retrieval Service) custom feature is an enhancement to AMSS and is available with the 1AE9.06 and later generic programs (paragraph 2.04).

1.05 Please contact your AT&T Technologies' representative for feature licensing information.

FEATURE GROUPS

1.06 The HAMRS is an optional custom feature contained in the AMPSCP (System 100 call processing) feature package.

INCOMPATABILITIES

1.07 A given mobile subscriber cannot have customer changeable CCF (conditional call forwarding) and the System 100 AMSS feature at the same time.

2. USER PERSPECTIVE

2.01 The AMSS custom feature allows calls terminating to subscribing mobiles to be forwarded, with the MIN (mobile identification number) of the terminating mobile, to an appropriate message service system. Typically, the caller may leave a message for the called mobile and/or use an alternative as provided by the message service provider.

2.02 Mobile subscribers may retrieve messages by accessing their message service, dialing their MIN and a personal security code, and then dialing one of several request codes.

2.03 Alternately, mobile subscribers may call themselves (a revertive mobile to mobile call) and be forwarded to the message service. This procedure is more expedient for the user because only the 7-digit DN (directory number) of the mobile is dialed. The

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MIN does not have to be dialed since it is outpulsed as a function of AMSS.

2.04 Prior to the HAMRS enhancement, the latter method produced two AMA receords: one for the initial mobile to mobile call, and a second one for the forwarding of the base DN (i.e., the MIN) to the message service. The HAMRS feature addresses this specific disadvantage by eliminating the initial mobile-to-mobile AMA record for all revertive AMSS mobile-to-mobile calls.

FEATURE DESCRIPTION

2.05 The System 100 AMSS feature is built upon the service order CCF feature. The following services are offered:

- Subscriber Busy only
- · Subscriber No Answer only
- Subscriber Busy/No Answer combined.

2.06 Busy: Incoming calls will be forwarded to the message storage system only when the subscriber is busy with another call. No alert is provided indicating that the call is being forwarded.

2.07 No Answer: Incoming calls will be forwarded to the message storage system only in siturations of no answer. The calling party does not receive a recorded announcement saying the call is being forwarded. Calls are forwarded in the following situations:

- The subscriber does not respond to paging (two attempts) because the mobile unit is turned off, or it is not in the service area.
- The subscriber is alerted but does not answer within the specified period of alerting time-out (0 through 60 seconds).

2.08 Busy/No Answer: Subscriber receives either busy or no answer treatment depending upon the state of the mobile unit.

2.09 For the System 100 AMSS feature, the remote DN is the message storage system DN. This DN is used to derive a route index to the special trunk group associated with the message storage system.

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2.10 For a System 100 AMSS call, the switch outpulses the subscriber's MIN rather than the remote DN as for CCF. Upon receiving the MIN, the message storage system checks to determine if the digits correspond to a valid subscriber. If not, the call is considered erroneous or unauthorized and is not completed.

2.11 Any available outpulsing scheme can be used to transmit the digits. The type is specified in the route index expansion table.

INTERACTIONS

2.12 If the mobile subscriber has the Immediate Call Forwarding feature and it is activated, it takes precedence over the System 100 AMSS feature. That is, all incoming calls will forward to the specified telephone number.

2.13 If the mobile subscriber also has the Call Waiting feature and is busy on a call, an incoming call will alert the subscriber in the normal manner. However, if the subscriber does not respond to the alerting tone, the call is forwarded to the message storage system upon time-out.

3. ENGINEERING

HARDWARE

3.01 Miscellaneous trunk circuits (SD-1A236) are required as outgoing trunks to the message storage system.

SOFTWARE

A. Base Generic Program

3.02 The AMSS feature is available in the 1AE8.03 generic program; approximately 250 words are required for AMSS. THE HAMRS feature requires the 1AE9.06 generic program.

B. Optionally Loaded Feature Groups

3.03 The CCF feature package (MCFID, approximately 8000 words) must be loaded.

C. Parameters/Call Store Areas

3.04 Fast feature set card FF010 controls the AMSS feature. Fast feature set card FF041 controls the HAMRS feature.

D. Translations

3.05 Translation requirements are:

- Two words for route index expansion table per trunk group.
- Four words for trunk class code expansion table for the SD-1A236 trunks. Bit 15 in word 2 indicates that this is a System 100 AMSS trunk group.
- Two additional DN auxiliary block words per subscriber for storage of the message storage system DN.

REAL TIME

3.06 The System 100 AMSS feature requires a maximum of 8000 cycles to forward a call.

4. IMPLEMENTATION

SET CARDS

4.01 The FF010 set card is required for the System 100 AMSS feature. The FF041 set card is required for the HAMRS feature. Refer to the PG-1A for details.

TRANSLATION FORMS

4.02 The following tranaslation forms are applicable to the System 100 AMSS feature. Refer to the TG-1A for details.

- ESS 1101-Directory Number Record
- ESS 1107—Supplementary Information Record
- ESS 1204—Trunk Class Code Recrod.

RECENT CHANGE MESSAGES

4.03 To have the System 100 AMSS feature implemented the subscriber is assigned the CCF by using the following messages:

RC:MOBL;CHG:ORD n, TN bbbbbbb,NPA mmm,E6G! (Busy)

RC:MOBL;CHG:ORD n, TN bbbbbbb,NPA mmm,E9G! (No Answer)

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After assignment, this feature is implemented by using the following message:

RC:MOBL;CHG:ORD n, TN bbbbbbb,NPA mm,E6G CFN hhhhhhh! (Busy)

RC:MOBL;CHG:ORD n, TN bbbbbbb,NPA mm,E9G CFN hhhhhhh! (No Answer)

The feature is unassigned by using the following message:

RC:MOBL;CHG:ORD n, TN bbbbbbb,NPA mm,E6G no, CFN no! (Busy)

RC:MOBL;CHG:ORD n, TN bbbbbbbb,NPA mm,E9G no, CFN no! (No Answer)

where bbbbbbb = DN

hhhhhh = call forwarding DN mmm = numbering plan area n = order number E6G = call forwarding Busy E9G = call forwarding No Answer.

.

See Part 6 A(1) for details.

5. ADMINISTRATION

MEASUREMENTS

5.01 The System 100 AMSS trunk groups peg, usage, and overflow counts may be used to engineer AMSS.

AMA (AUTOMATIC MESSAGE ACCOUNTING)

5.02 The forwarding of incoming mobile unit calls has a special AMA record written. When a call is placed to the subscriber DN, the AMA record for the call resembles that of a mobile unit origination. The differences are the fields containing the call type and voice channel usage time. The A2 data group indicates the call transfer services, while the voice channel seizure and release fields are interpreted as mobile telephone switching office voice trunk seizure and release time. This time interval includes any voice channel usage time (30 seconds) that could occur in the don't answer service of this feature. See Part 6 A(5) for details concerning AMA records.

Page 4 4 Pages 5.03 The HAMRS feature eliminates the initial mobile to mobile V32 AMA (originating AMA) record for all revertive AMSS mobile to mobile calls. This occurs when a mobile dials itself (using the 7-digit DN of the mobile) to retrieve messages. The AMA entry generated to record the forwarding of the base station to the remote DN remains unchanged.

6. REFERENCES

A. AT&T Practices

- 1. 231-218-301—Recent Change Formats and Implementation—Descriptiona nd Procedures— AUTOPLEX System 100
- 231-290-600—Mobile Telephone Switching Office Feature—Feature Document—AUTOPLEX System 100
- 231-290-607—Immediate Call Forwarding Feature—Feature Document—AUTOPLEX System 100
- 4. 231-290-608—Conditional Call Forwarding Feature—Feature Document-AUTOPLEX System 100
- 5. 231-290-620—Automatic Message Accounting—Feature Document.

B. Other Documentation

- 1. Input Message Manual IM-6A001
- 2. Office Parameter Specification PA-6A001
- 3. Output Message Manual OM-6A001
- 4. Parameter Guide PG-1A
- 5. Translation Guide TG-1A
- 6. Translation Output Configuration PA-6A002.

7. COMMENT FORM

7.01 A comment form is located at the back of this practice to provide a communications channel from the user to the writer.

AT&T PRACTICE Standard AT&T 231-290-633 Issue 1, December 1987

AMA DUMP FOR SELECTED CUSTOMERS FEATURE DOCUMENT 1A ESS[™] SWITCH AUTOPLEX[™] SYSTEM 100

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1. INTRODUCTION

DEFINITION

1.01 The AMDSC (Automatic Message Accounting Dump for Selected Customers) feature allows AMA (automatic message accounting) records for specific mobiles or groups of mobiles to be output on a specified TTY channel in addition to being recorded on AMA tape.

1.02 This feature operates independently from the IAMAD (Immediate AMA Dump) feature.

ECONOMIC WORTH

1.03 This feature provides selected mobile customers with immediate AMA data for billing purposes (e.g., for a group of mobiles associated with a fleet of rental cars).

AVAILABILITY

1.04 The AMDSC feature is initially available in the 1AE9.06 PPU (periodic partial update) of the 1AE9 generic program.

FEATURE GROUPS

1.05 The AMDSC feature is an optional custom feature that is contained in the AMPSCP (System 100 call processing) feature package.

FEATURE ASSIGNMENT

1.06 This feature is provided on a per MTSO (mobile telephone switching office) basis via fast feature set card FF042.

2. USER PERSPECTIVE

USER PROFILE

2.01 This feature is designed to provide call data for selected mobile DNs (directory numbers) in all cases. The call data may include AMA record data and/or the SNs (serial numbers) of the mobiles under study.

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FEATURE DESCRIPTION

A. General

2.02 The AMDSC feature is similar to, but separate

from, the 1A ESS switch IAMAD feature. Both IAMAD and AMDSC may be active concurrently. Refer to Part 6 A(6) for IAMAD information. Additionally, the AMDSC development adds two new capabilities to the existing IAMAD feature (paragraph 2.05).

2.03 When an AMA record is generated for a call, the AMDSC data base relation (Fig. 1) is searched. If the current AMA record is for a DN in that relation, the record is formatted according to the parameters in the AMDSC data base entry representing that DN. (Refer to Part 4.) The data is then output to the specified TTY channel(s). After the AMDSC relation has been processed, control is passed to the IAMAD feature. Any records associated with the DUMP:AMA study DN (paragraph 2.06) are also output to the requesting TTY channel.

2.04 With the IAMAD feature, only one DN may be under study (i.e., input via the DUMP:AMA message) at a time. The AMDSC feature allows for study of multiple DNs. One or more individual (and/or inclusive ranges) of mobile DNs may be entered in the AMDSC data base. Refer to Part 4 for data base modifications.

B. AMDSC Enhancements to IAMAD

2.05 This practice primarily concerns the AMDSC feature. However, the enhancements that AMDSC provides to the IAMAD feature are documented for completeness. The IAMAD feature is designed to be used by the MTSO to immediately verify that AMA records are being properly generated against one specific DN. The AMDSC feature enhances the basic IAMAD functions as follows:

- (a) Serial number inclusion may be requested on the output message.
- (b) AMA data exclusion may be requested on the output message.

2.06 The IAMAD feature can be activated from any allowable TTY by inputting the following message. Refer to Part 6 B(1).

23 22 21 20 19 18 17 13 | 12 | 11 | 10 | 9 0 (WORD -1) Ω 0 WRDN (NOTE) FROM AMI HEAD TABLE, 0 WRDN 0 0 NUMBER OF ENTRIES -1 (1/2N -1) WORD 0 WORD 12 ŧ 0 0 NPA (100D1 + 10D2 + D3 - 111) * t TTY CHANNEL NUMBER § ENTRY NXX (100D1 + 10D2 + D3 - 111) D4 (BCD) YYY (100D1 + 10D2 + D3 - 111) WORD N-1 WORD N NOTE : 11. Size of data block: If nonzero (in Word 0), it must be >2, <32, and odd. If >31, then WRDN=0 (in Word 0); the true word number is in the minus one word (Word -1), and it is even. Valid values for Word -1 are any even number between 4 and 8190, inclusive. * RANGE INDICATOR † SERIAL NUMBER FLAG ‡ NO AMA DATA FLAG § INACTIVE ENTRY FLAG LEGEND: BCD - BINARY CODED DECIMAL. INACTIVE ENTRY FLAG - O = ACTIVE ENTRY. 1 = INACTIVE ENTRY (IGNORE ENTRY). NO AMA DATA FLAG - O = INCLUDE AMA DATA WITH OUTPUT. 1 = DO NOT INCLUDE AMA DATA WITH OUTPUT (IGNORE IF PREVIOUS ENTRY'S "RANGE INDICATOR" = 1.) NPA NXX D4 YYY - EXTENDED MIN (10 DIGITS WITH ZEROES AS TENS). RANGE INDICATOR - O = INDIVIDUAL ENTRY (NOT A RANGE). 1 = LOWER BOUND OF A RANGE ENTRY (NEXT ENTRY IS THE UPPER BOUND). SERIAL NUMBER FLAG - DO NOT INCLUDE SERIAL NUMBER WITH OUTPUT. DO INCLUDE SERIAL NUMBER WITH OUTPUT. (IGNORE IF PREVIOUS ENTRY'S "RANGE INDICATOR" = 1.) TTY CHANNEL NUMBER - TTY CHANNEL/CLASS FOR ENTRY OUTPUT. LEGEND: TTY CHANNEL NUMBER - TTY CHANNEL/CLASS FOR ENTRY OUTPUT. WRDN - WORD NUMBER (SEE NOTE).

Fig. 1—AMDSC Data Relation

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DUMP:AMA:TN aaaaaaa[,SN[,ONLY]]!

Where a is an intraoffice telephone number, SN causes inclusion of the transmitted serial number with AMA DUMP, and ONLY causes AMA data to be omitted from AMA DUMP.

2.07 Assuming the input is accepted, an AMA DUMP output message is printed every time an AMA record is made against the study DN. This output message has the following format. Refer to Part 6 B(3).

AMA DUMP aaa aaaa bbbbbbbbbb ccccc ccccc

ссссс ссссс

Where a is an intraoffice telephone number, b is the transmitted SN, and c represents a word of AMA buffer data as it appears on the AMA record.

2.08 The SN is output only if the SN keyword is used in the DUMP:AMA input message. If the ONLY keyword is used in the DUMP:AMA input message, c does not appear.

2.09 The IAMAD capability is deactivated by inputting the STOP:AMADUMP message. The AMDSC feature is not deactivated by this message.

INTERACTION

2.10 The AMDSC feature requires the IAMAD custom feature to be effective. Refer to Part 6 A(6).

3. ENGINEERING

HARDWARE

3.01 Not applicable.

SOFTWARE

A. Base Generic Program

3.02 The generic code required for the AMDSC feature is initially available with the 1AE9.06 generic program.

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B. Optionally Loaded Feature Groups

3.03 Not applicable. The AMDSC feature is a custom feature that is associated with the AMPSCP feature package.

C. Parameters/Call Store Areas

3.04 The AMDSC feature is controlled by fast feature set card FF042. The IAMAD custom feature (set card FFC101) is required for AMDSC to be effective.

D. Translations

3.05 The AMDSC data block (Fig. 1) allows for a list of MINs (mobile identification numbers) to request AMA DUMP output for specific DNs. The list also allows a unique TTY channel specification for each entry.

3.06 The AMDSC data block is pointed to from word 12 of the AMI (System 100 miscellaneous information) head table (auxiliary master head table + 43). The AMDSC data block currently has a maximum size of 8190 words. This allows for 4094 entries plus the first two data block words. It may be built in either higher or lower UCS (unduplicated call store).

4. IMPLEMENTATION

4.01 In order to minimize overhead involved in growing this block, its initial size should be set to a reasonable maximum for the current engineering period.

4.02 All entries in the AMDSC data block must be in ascending full MIN order (i.e., ordered by the full 32-bit MIN) beginning at entry 0 (words 1 and 2). Unused entries, if any, should be set to zeroes and must follow the last valid entry in the table.

4.03 If the range indicator (Fig. 1) for an entry is set, it indicates that this entry is the lower bound (inclusive) of a sequential range of full MINs (with zeroes as tens) and that the next entry is the upper bound (inclusive) of that range. When an entry represents a lower bound, only the TTY channel and the MIN attributes of the next entry are meaningful. All other attributes of the next entry are ignored.

4.04 The TTY channel attribute may be an actual channel number (if less than 96) or a channel class indicating a predefined set of channels (if greater than 95).

4.05 The SN attribute indicates that the SN should be included with the output.

4.06 The inactive flag indicates that this entry (or this entry and the next if range=1) should be ignored. This allows for the inclusion of "place holders", thus minimizing block rearrangement.

4.07 The "no AMA data" flag indicates that the AMA data portion of the output is to be omitted.

SET CARDS

4.08 Set card FF042 activates the AMDSC feature. Set card FFC101 (IAMAD) must also be active.

RECENT CHANGE MESSAGES

4.09 All additions and deletions to the AMDSC data block must be done manually via the RC:PSWD or IN:OWBUF procedures. Refer to Part 6 A(2) and A(5).

VERIFICATION

4.10 Verification of the AMDSC data block is done manually via the VF:DATA:DUMP input message.

5. ADMINISTRATION

5.01 Not applicable.

6. SUPPLEMENTARY INFORMATION

REFERENCES

6.01 The following documentation contains information related to or affected by the AMDSC feature.

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A. AT&T Practices

- 231-200-005 Mobile Telephone Switching Office, Cell Site, and Subscriber Unit System Description—AUTOPLEX System 100
- (2) 231-218-301 Recent Change Formats and Implementation Description Procedures
- (3) 231-290-600 Mobile Telephone Switching Office Feature
- (4) 231-290-620 Automatic Message Accounting Feature—AUTOPLEX System 100
- (5) 231-318-319 GENT, PSBLK, PSWD, SUBTRAN Recent Change Formats
- (6) 231-390-382 Immediate AMA Dump Capability.

B. Other Documentation

- (1) Input Message Manual IM-6A001
- (2) Office Parameter Specification PA-6A001
- (3) Output Message Manual OM-6A001
- (4) Parameter Guide PG-1A
- (5) Translation Guide TG-1A
- (6) Translation Output Configuration PA-6A002.

7. COMMENT FORM

7.01 A comment form is located at the back of this practice to provide a communications channel from the user to the writer.

8. ISSUING ORGANIZATION

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Simple Method to Stop a Power Meter

Overview

Here is a simple method to temporarily stop the spinning rotor disk in a common single-phase AC kilowatt-hour meter.

These are the glass-shelled meters on the side of buildings which monitor AC power usage for power company billing purposes. The meters are basically mechanical AC current monitors in which an inducted magnetic field spins a rotor disk connected to a mechanical linkage. The linkage then controls a mechanical counter which displays the number of turns the rotor disk has made. The more AC current drawn, the faster the disk spins and the higher the count.

In the good ole' days, there were people ("meter readers") who would go around writing down the count on the meters to determine your bill for that month. The newer kilowatt-hour meters can now be externally "polled" using data-over-powerline technology, similar to a carrier current transmitter, eliminating the need for meter readers.

If you can find a way to remotely slow down the rotor disk, then it's also possible to "slow" your power bill! There are methods which involve using large electromagnets around the glass shell of the kilowatt-hour meter to induce eddy currents or to effect the retarding magnets inside the meter. Though I always found the idea of using lots of AC power to skip out on paying for lots of AC power amusing... There are even methods which induce large voltage spikes at the proper point along the AC waveform to prevent the meter from registering the current draw. Those methods are not exactly 100% guaranteed to work and newer meters can contain countermeasures to prevent external fiddling...

The only surefire way to stop the rotor disk is to stick something inside the meter's glass shell which physically touches the disk. This is alot easier than it sounds...

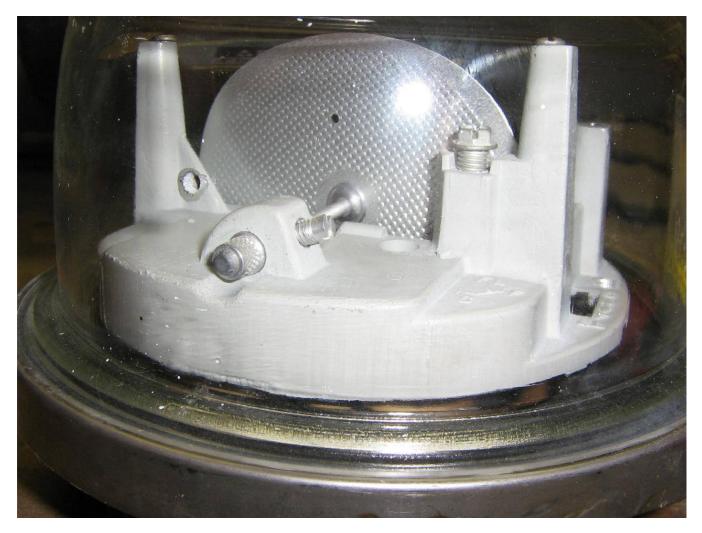
The method described here involves using a diamond-tipped rotary bit in a Dremel tool and drilling a tiny hole at the bottom of the glass shell. A small piece of wire is then inserted into the hole to rub up against the spinning rotor disk.

That little hole will be a *huge* giveaway if an inspector were to ever look at your meter (which power companies can legally come on your property to do), so have a story ready. Ramble something about "sons of Obama" poking around the neighborhood... Paint around the meter's housing and "accidentally" get some paint on the bottom of the glass shell to give the hole a bit of camouflage.

The power companies are pretty good at monitoring their overall power usage for any losses, so this is not something you'd want to do very often, but for quick peak current draws like a welder or induction heater – fuck 'em!

You may want to practice on someone else's meter before hand. You should have made a note of all the houses in your neighborhood with Obama election signs. Those places will be good for practice... If you should ever need to remove the glass shell for any reason, you'll need to clip that little tag on the bottom and twist the glass shell a 1/8 turn to the left. If you're good, and use two clip-on heatsinks, you can solder the cut wire in those plastic "tamperproof" tags back together. Use hobby model "weathering" techniques to hide your handiwork. It should be noted that newer kilowatt-hour meters contain tilt sensors, so only physically move the meter itself at an enemy's location.

Pictures & Construction Notes



Overview of a hole in the rotor disk on a General Electric CL200 kilowatt-hour meter.

This is a good place to stick a wire in to physically prevent the disk from spinning.



Overview of the Harbor Freight Tools 50-Piece Diamond Rotary Point Set (Item #36252).

This tool set contains a number of useful bits for drilling or grinding glass.



Create a flat spot first.

Because the kilowatt-hour meter's glass shell is curved, you'll need to first create a flat spot on the bottom before drilling the main hole. This will help to keep the bit from wandering when drilling.

There are a number of "flat" bits in the tool set perfect for this.



Making the hole using a conical bit about 1.75–inch from front of glass shell.

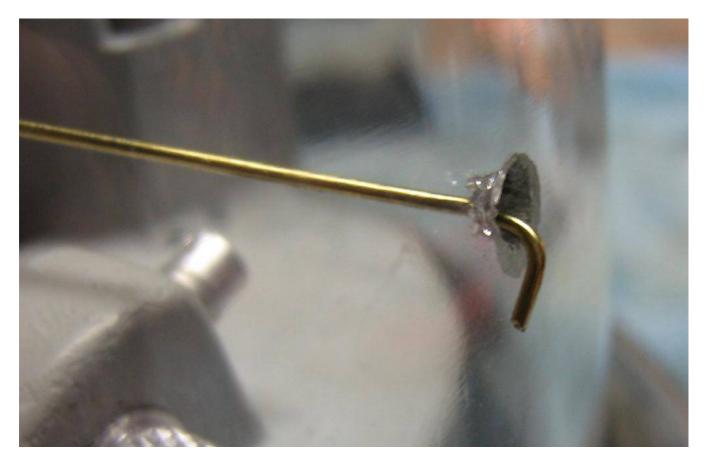
You mostly "grind" away instead of actually drilling. Avoid applying too much pressure to prevent the glass from cracking.

I'm sure with some practice and higher-quality tools you could make this hole under 1/16-inch in diameter.



Closeup of the final hole.

The heat actually melted the glass as I didn't use any sort of coolant spray.



A small wire hook was made using a piece of K&S Metals #1602 0.032-inch brass wire about 3 inches long.



The wire passes through the small hole in the rotor disk perfectly.

If you can't reach the hole, just rubbing the wire against the rotor disk is often enough to slow it down.

A piece of electrical tape keeps the wire in place when in use.

Continuously Variable Bandwidth Audio Filter

Overview

This is a high-performance switched-capacitor audio filter based around two Maxim MAX295 8th-order Butterworth filter ICs and a couple of TL071 op-amps. The Maxim MAX295s each have an approximately 48 dB/octave dropoff at their low-pass cutoff frequency and will provide a maximum out-of-band attenuation of almost 100 dB. This filter is ideal for just about eliminating any high frequency audio hiss and also greatly attenuating any 60/50 Hz hum on an incoming audio signal.

This project is an updated design based on an article by Denton Bramwell (K7OWJ) which originally appeared in the July 1995 issue of *QST*. A copy of that original *QST* article will appear at the end of this article.

The 3 dB low–pass Frequency Cutoff (F_{c}) of the two MAX295s is controlled with a simple variable clock generator based around the standard 555 timer IC. The 3 dB low–pass cutoff of the MAX295 filters in this circuit design can be varied from approximately 640 Hz to 4500 Hz. This is an ideal range for most "speech frequency" specific audio applications. The MAX295 is capable of handling signals up to around 50 kHz. The MAX295's F_{c} is equal to the input clock rate divided by 50. For example: If the 555 timer is set to 165,000 Hz (165 kHz) then the MAX295's low–pass cutoff frequency will be 3300 Hz.

Because the MAX295 like to see a clock frequency with a 50% duty cycle, a 4013 flip–flop will be added on the output of the 555 timer to provide this. The 4013 flip–flop generates a clean 50% duty cycle square wave regardless of the duty cycle of the driving 555 timer clock signal.

The flip–flop "divides–by–2" its input signal, so take this into account if you need to redo the timing resistors/capacitor for the 555 timer. The final frequency output of flip–flop in this circuit will be variable from around 32 kHz to 223 kHz.

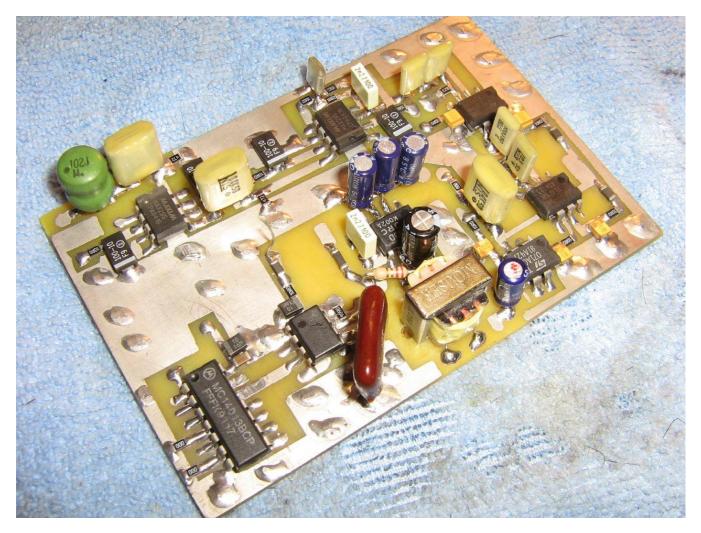
The TL071 op–amps are for additional high–pass filtering (300 Hz) of the audio signal. They are not really needed, but it is highly recommended to add a little bit of high–pass filtering to the audio chain. One of the TL071 op–amps is configured to act as a buffer for the final output signal.

A JRC NJM2113 (or Motorola MC34119) low–noise audio power amplifier was added for driving standard low–impedance (8/16/32 ohm) headphones or a speaker. An isolation transformer isolates the 1/8–inch headphone jack from the metal case of the project box.

The two MAX295s have a fairly high negative voltage current draw (25 mA), so a V–Infinity VAT1–S5–D15–SMT switching negative (+/– 15 VDC) voltage converter will be used to generate the negative voltage. Standard 7660–type negative voltage generators are not recommended as they will "droop" under the high current load, plus they'll add additional in–band switching noise to the final audio signal.

The TL071 op-amps will be run at +/- 15 VDC for maximum dynamic range and to avoid any audio clipping. A 79L05 negative voltage regulator will be used to provide the -5 VDC for the MAX295s from the -15 VDC rail.

Pictures & Construction Notes



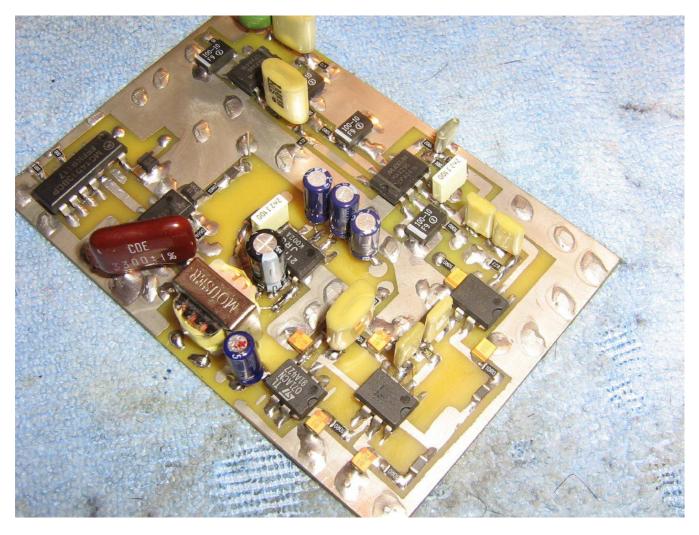
Overview of the Continuously Variable Bandwidth Audio Filter circuit board.

The 4013 and 555 timer for the clock generator are on the lower–left. By pure luck I managed to find a 1% tolerance 3300 pF silver mica capacitor (the reddish–brown thing) for the 555 timer. This will help to significantly stablize the final output clock signal. Try to find a capacitor with at least a 5% tolerance over a wide temperature range.

The two Maxim MAX295s are along the top of the circuit board. Metal-film resistors and polystyrene capacitors were used in the coupling stages for maximum performance. An optional 1 mH inductor on the audio input signal helps to knock down any low-frequency RF noise on the incoming audio signal.

The TL071 op-amps for the 300 Hz high-pass filters are along the right-side of the PC board.

The NJM2113 low-noise audio power amplifier is in the middle, with a Mouser 42TL004 200-to-8 ohm matching transformer on its output. This is required to isolate the headphone jack from the metal of the case.



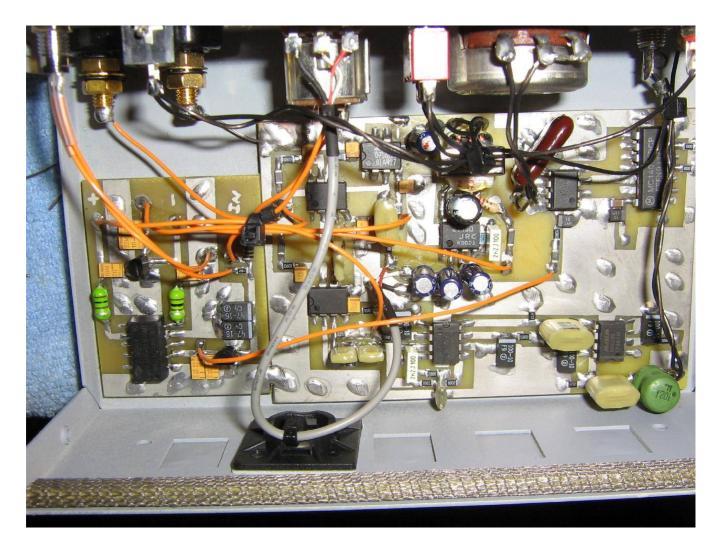
Alternate view of the Continuously Variable Bandwidth Audio Filter circuit board.



Overview of the circuit's power supply module.

It's based around a V–Infinity VAT1–S5–D15–SMT switching voltage converter. This module takes regulated +5 VDC from a 78L05 and outputs +/– 15 VDC. 100 μ H inductors on the output of the converter help to knock down any switching noise.

A 79L05 negative voltage regulator generates the -5 VDC from the -15 VDC rail.



Mounting the circuit board inside an old printer switch case.

The banana jacks on the upper–left are for the +12 VDC power input.

Above the banana jacks are a panel–mounted LED for a power indicator and a 1/8–inch stereo jack for the low–impedance audio (headphone) output.

The middle 10 kohm potentiometer is for the volume. It has an integrated switch to control the main DC power to the circuit.

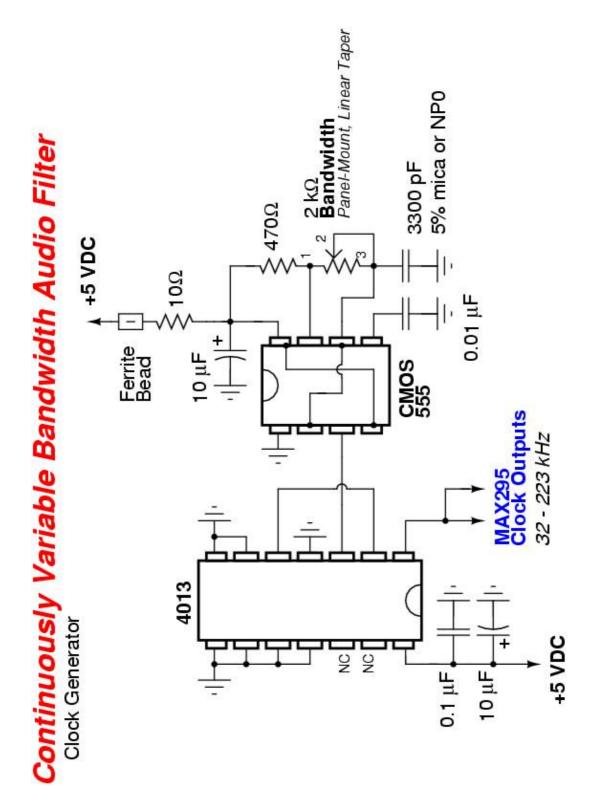
The larger 2 kohm potentiometer is the clock generator frequency control.

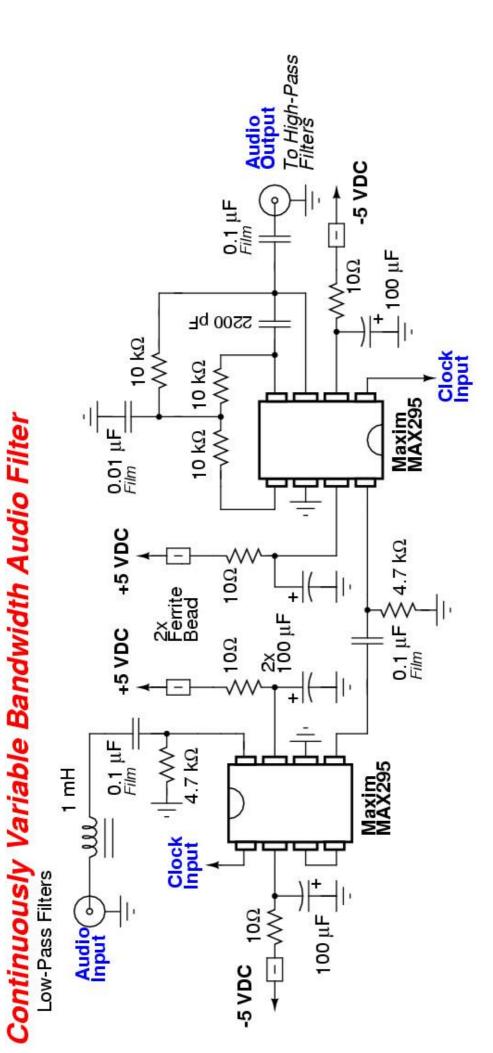


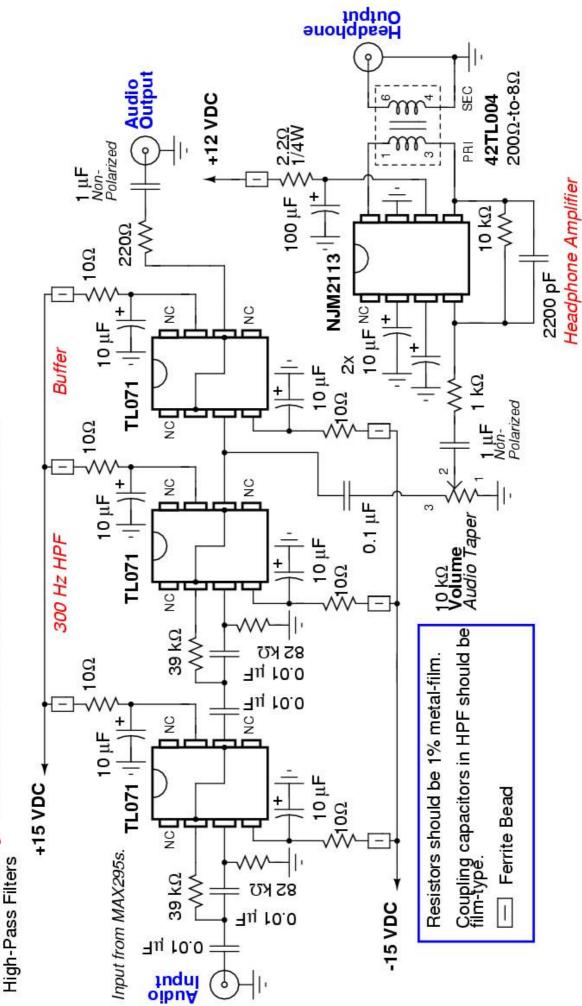
Alternate internal overview.

The audio input/output is via the RCA jacks along the front panel's left-side.

An optional SPDT switch connects the input audio directly to the audio output RCA jack to bypass the filter.

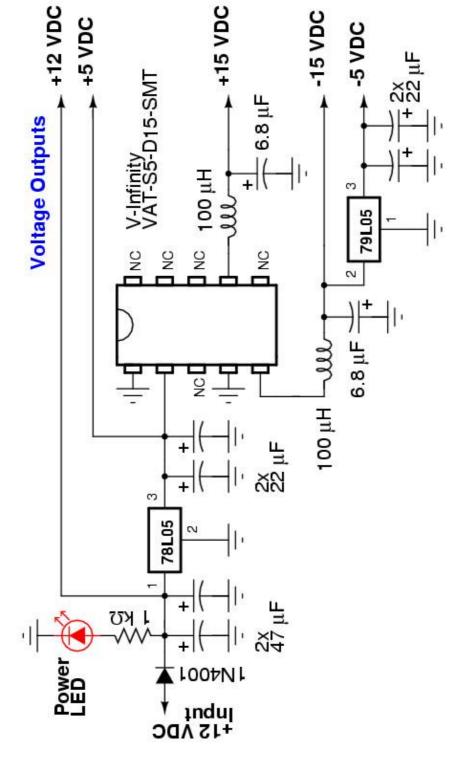






Continuously Variable Bandwidth Audio Filter





A Continuously Variable **Bandwidth Audio Filter**

Using a pair of new ICs, you can build a high-performance filter quite simply!

By Denton Bramwell, K7OWJ 3139 Royalton Heights Rd St Joseph, MI 49085

introduction to audio active filters My came after I bought my first Heath HW-8-that ever-popular, directconversion QRP CW transceiver. I soon discovered that the HW-8's performance with WIDE selectivity performed beyond all expectations. It was truly wide! The NARROW selectivity however, left a bit to be desired.

About that time, Solid State Design for the Radio Amateur1 had just hit the street, with its erudite explanation of audio active filters suitable for amateur CW use. After a bit of calculating and experimenting, I built a five-stage low-pass audio filter with a total attenuation of 60 dB per octave. This positively respectable filter dramatically improved the performance of the HW-8's NARROW selectivity, making CW operation quite pleasant.

Over the years, that same arrangement was more or less standard in my homebrew projects-until now. New technology has made the old approach pale by comparison.

General Description

Maxim² markets a series of useful filter (and other) chips that exhibit excellent performance. The filter described here rolls off at an impressive 96 dB per octave. Best of all, the upper cutoff frequency can be continuously varied to accommodate any reasonable desired bandwidth! My filter is set up for a -3 dB bandwidth ranging from 450 Hz for CW to 2700 Hz for voice. The filter's bandwidth is determined by merely adjusting a potentiometer. The effect is most remarkable!

Maxim's switched-capacitor-chip family provides Bessel, Butterworth and elliptic low-pass designs. I'm sure they'll all work admirably, but I chose the Butterworth version. It's got a flat passband-which is excellent if you're cascading stages-and the ultimate rejection and noise/distortion characteristics are superb. I could have used the MAX291 or the MAX295. Both

¹Notes appear on page 32.

Q57-30

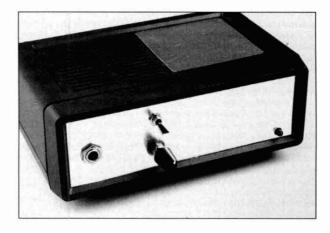


Table 1

Selected	Maxim Fi	Iter ICs		
Part Number	Filter Type	Unit Price (\$ US)	Rolloff Characteristics	Notes
MAX291 MAX295	8th-order Butterwort	6 h	48 dB/octave; about 110 dB ultimate	Maximum flatness in the passband; excellent ultimate rejection
MAX293 MAX297	8th-order elliptic	6	-80 dB at 1.5 X the corner frequency; about 80 dB ultimate	Probably an excellent choice for a single-IC, fixed- frequency filter. A MAX297

Note: For single-chip, fixed-frequency filters using the MAX295 and MAX297, the corner frequency can be set by a single capacitor connected between pin 1 and ground. The internal clock frequency, F_i, is determined by the value of the clock capacitor, C, according to the formula: $f_{I(kHz)} = 10^5 + 3C_{(pF)}$. The corner frequency equals $\frac{1}{50}$ of the clock frequency.

cost the same, but because the '295 offers slightly better distortion characteristics, I chose it.

These ICs are exceptionally easy to apply (see Table 1). If you want but one stage (48 dB per octave) and you don't need to vary the filter's bandwidth, all that's required are ±5-V supplies and a single capacitor. Working with an oscillator internal to the IC, the capacitor sets the clock rate. All you do is attach input and output lines. By adding a few inexpensive components, a single-voltage power supply can be used to power the filter.

The '295 will not operate on voltages much higher than ±5 (split supply) or

+10 V (a single supply). If you try to run the IC directly from a 12-V supply, you risk popping the chip because a potential of 12 V between the supply leads is the rated absolute maximum.

can directly replace a MAX295, if steeper rolloff is

ripple is acceptable

needed and more in-band

Circuit Description

Refer to Figure 1. Incoming audio from the receiver passes through a simple RC high-pass filter, and on to U1. U1's output is coupled through another simple RC highpass filter to the input of U2. U2's output is filtered by two more stages of active RC high-passing using 741 op amps (U3 and U4). This fixes a -3 dB point about 300 Hz on the low-frequency side of the filter and

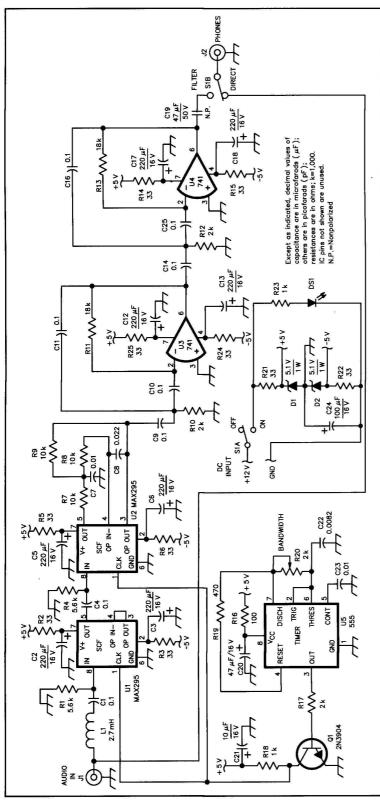


Figure 1—Schematic diagram of the continuously variable audio filter. Unless otherwise specified, resistors are ¹/₄-W, 5%-tolerance carbon-composition or film units. Equivalent parts can be substituted. C2, C3, C5, C6, C12, C13, C17, C18—220 μ F, 16 V electrolytic C19—47 μ F, 50 V nonpolarized C20—47 μ F, 16 V electrolytic or tantalum C21—10 μ F, 16 V electrolytic or tantalum C24—100 μ F, 16 V electrolytic or tantalum D1, D2—5.1-V, 1-W Zener diode (1N4733) DS1—LED J1, J2—Phono jack L1—2.7 mH (optional) C1—2N3904 R20—2-kΩ linear-taper potentiometer S1—DPDT toggle U1, U2—MAX295 (available from Digi-Key Corp, 701 Brooks Ave S, PO Box 677, Thief River Falls, MN 56701-0677, tel: 800-344-4539, 218-681-6674; fax: 218-681-3880) U3, U4—741 op amp U5—555 timer

a completely adjustable -3 dB point on the high side. The results are astonishing!

One might debate whether it's really necessary to use 220- μ F capacitors for decoupling the stages. I candidly admit I'm not sure it is. However, early on in my experiments with fixed-RC active filters, I learned that good decoupling is absolutely necessary to achieve good ultimate rejection. (Dual and quad op amps can't be decoupled from each other because they all use the same supply!) The 220- μ F capacitors have a reactance of 2.9 Ω at 250 Hz. You may get by with smaller capacitance values.

Up to 5 mV of clock feedthrough can appear with the audio at the output of the '295. Conveniently, Maxim provides an op amp within the '295 for RC active filtering use to suppress clock leakage. This is accomplished by C7, C8, R7, R8 and R9, which are set up for a corner frequency of 3.4 kHz.

For continuously variable bandwidth service, it's necessary to use an external clock to feed the MAX295s (U1 and U2). For this I chose a 555 timer (U5), configured as an astable multivibrator, whose output frequency can be conveniently controlled by a potentiometer (R20). The corner frequency of the '295 is 1/50 of the clock frequency. With the components shown, U5 delivers 37 kHz to 180 kHz, for a corner frequency ranging from 740 to 3,600 Hz. I had to do a bit of cut and try on the clock. The 555 worked exactly as calculated when running on 12 V, but required tweaking the values shown when the supply voltage dropped to 5 V. Also, the endto-end resistance of most potentiometers is usually not tightly controlled, so the actual clock range you obtain may be a bit different from mine. My 2-k Ω potentiometer measured 1.85 k Ω , so in general, some

July 1995 31

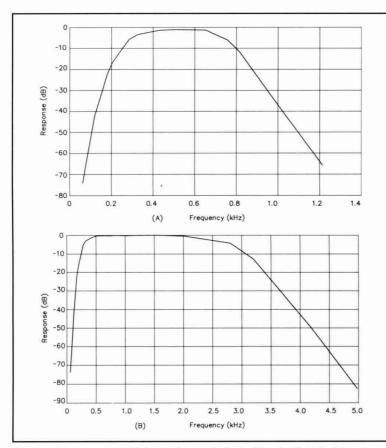


Figure 2-Filter response with the clock set at 37.6 kHz (A) and 149.4 kHz (B).

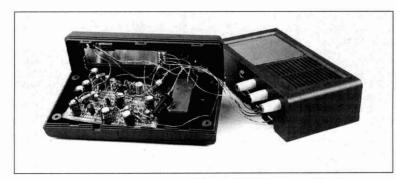


Figure 3-An inside view of the prototype. (Ugly, isn't it? So is the outside...)

builders may get a slightly wider clock range than I did.

My planned environment for this filter provides \pm 5-V supplies (the negative supply must deliver about 25 mA), so I made no effort to adjust the circuit for singlesupply operation. If you want to operate this filter from a single 12-V supply, you can create a virtual ground by stacking two Zener diodes (see the inset of Figure 1).⁴ If you use this approach (rather than using separate positive and negative supplies, be sure that the common (ground) line of the filter's PC board never meets the ground for the rest of your station! The filter's ground must float. If you enclose your filter in a plastic box as I did (and the jacks are thus mounted in plastic), it's okay for the incoming audio and the 12-V supply to share the same return.

Construction

I built my filter on a general-purpose prototyping board using point-to-point wiring, but PC boards are available.³ Layout is noncritical. The enclosure for this project was an afterthought—an empty clockradio enclosure I had in my junk box. It made the project *totally* ugly thus adhering to the guidelines of "ugly construction."

In Use

With S1 off, the filter receives no power and the headphones are connected directly to the receiver output. With S1 on, power is applied to the filter and the headphones are connected to the filter output. Because the filter has unity gain, the input and output audio levels are equal, so there's no need to adjust your receiver's audio gain control when switching the filter in and out of the line.

Summary

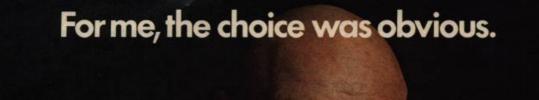
On-the-air results are very pleasing indeed. It's quite interesting to set a receiver for full bandwidth, tune to a busy region of a band and listen as the interfering signals drop into oblivion as you simply rotate the **BANDWIDTH** control knob. With an attenuation of 96 dB per octave, only a small adjustment of the **BANDWIDTH** potentiometer moves a signal from very bothersome to below the noise. By itself, the audio filter provides skirts as deep and as steep as better-quality IF filters.

The unit's distributed high-pass filtering makes a quite noticeable reduction in lowfrequency grunts and rumbles. It also colors the atmospheric noise a bit. With the pot set for maximum width, you'll hear the apparent pitch of the background noise shift slightly upward when you turn on the filter. This shift represents noise you no longer have to cope with when copying a station.

Notes

- ¹Wes Hayward, W7ZOI, and Doug DeMaw, W1FB, *Solid State Design*, (Newington: ARRL, 1986).
- ARRL, 1986). ²Maxim Integrated Products, Inc, 120 San Gabriel Dr, Sunnyvale, CA 94086, tel 408-737-7600. Maxim ICs are available from several sources including Digi-Key Corp, 701 Brooks Ave S, PO Box 677, Thief River Falls, MN 56701-0677, tel 800-344-4539, 218-681-6674, fax 218-681-3880. ^{3DC} beachagene and sellable from EAB Circuits
- 218-681-6674, fax 218-681-3880.
 3PC boards are available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269.
 Price: \$6 plus \$1.50 shipping. A PC-board template package is available free from the ARRL. Address your request for the BRAMWELL VARIABLE AUDIO FILTER TEMPLELT to the Technical Department Secretary, 225 Main St, Newington, CT 06111-1494. Please include a business-size envelope with one First-Class stamp.
- I tried using an inverting switching regulator IC to provide the required negative voltage, but couldn't tame the high noise level produced by the chip. Another approach (not tried) would be to use a MAX660 CMOS voltage converter charge pump. This IC—and two 150-μF capacitors—will accept a positive-voltage input between 1.5 and 5.5 V and output a negative voltage of the same value with load currents of up to 100 mA, easily handling this filter's requirement. The MAX660 is available in an 8-pin DIP.





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What could be more obvious?







Any Questions?

Editorial and Rants

I love this story... No problems showing an ID when they think they're getting "free" money from Obongo, but can't show an ID when it comes time to vote!

People Line Up for Pre-Paid Debit Cards That Don't Work

April 16, 2012 – From: abclocal.go.com

by Sarah Wallace

BRONX (WABC) -- What is drawing huge crowds in the Bronx, people lining up around the block, to get into a storefront that houses a tax preparation office, what's really going on?

And what's the involvement of a California bank that issues pre-paid debit cards? Eyewitness News is still trying to get straight answers.

People who went to the storefront asked Eyewitness News to investigate after they claim they were promised thousands of dollars in government surplus money that would be put on pre-paid debit cards.

Now, the bank that issues those debit cards has put out a warning.

"I'd like to talk to the boss," Eyewitness News Investigative Reporter Sarah Wallace said. "He's not here," security at E&M Multi–Services said.

The security team outside E&M Multi–Services in the Bronx didn't want to answer Eyewitness News' questions.

They tried to repeatedly block Eyewitness News from talking to customers lined up outside the storefront location that says it's a tax preparation business.

"Why are you stopping?" Wallace asked. "Cause I want to," security said.

On a recent day, Eyewitness News watched as the head of security barked crowd control orders and collected copies of social security cards and state IDs to take up the back stairs through the 99 cent store.

So what is everyone here for? Some didn't want to show their faces.

"What did they say about Obama?" Wallace asked. "That we would get a thousand dollars and you would sign," a person in line said.

"And you would get a thousand dollars? This was Obama stimulus money?" Wallace asked.

"Yes," the person answered, "I activated the card and there was nothing on it." "Are you giving away free money?" Wallace asked. "Get that camera out of my face," Security said.

"You gave them your social security card, so you were going to get a thousand dollars?" Wallace asked. "Yes," a man answered. The owner finally appeared.

"Ma'am I'm going to say one more time, I run an income tax business," the owner said, "Aim the camera at that sign."

"I know some people who were promised \$1,000 on a card, are you offering that?" Wallace asked.

"I said no," the owner said. "Did they help you with your tax refund?" Wallace asked a woman.

"No," she said. The customer told Eyewitness News she'd already filed her taxes elsewhere.

"I gave them a copy of my benefit card, social security number," the woman said. She says she got a card with no money on it.

The California bank that issues those cards told Eyewitness News there have been allegations of illegal activity involving debit cards sent to E&M and the bank has now recorded a message on its toll free number.

"If you are attempting to access your funds and you received your credit card from E&M Multi–Services. First California Bank has frozen your card because of suspicious activity related to tax refunds," the message stated.

Eyewitness News went back Monday to try to ask about the bank's investigation. It would be pretty easy to correct any rumors, but the tax preparer allows the lines to continue.

He says there's no stimulus money and that people only get refunds if they're entitled to them.

It's unclear why people are asked to hand over all their personal information.



Occupy a... Treadmill!



These fucking kikes are behind the flooding of White countries with third–world trash, but now they don't want that same "multiculturalism" and "diversity" to effect Israel! Note how Benny calls them "illegal migrants," but when Mexicans flood into the U.S. they are labeled "undocumented workers." See the Jew...

Netanyahu: African Migrants Could Overrun Israel

May 20, 2012 - From: ap.org

JERUSALEM (AP) -- Prime Minister Benjamin Netanyahu is warning that Israel could be swamped by illegal migrants from Africa.

The mounting number of migrants is high on the national agenda following a series of crimes, including rapes, that have been blamed on the newcomers.

Netanyahu says the influx is "threatening the fabric of Israeli society, its national security and its national identity."

He says if Israel doesn't stop it, then "60,000 infiltrators are liable to become 600,000, and lead to the eradication of Israel as a Jewish and democratic state."

More than 50,000 Africans have poured into Israel since 2005, seeking to escape persecution and poverty.

Some Israelis believe their country, created after the Holocaust, must help the oppressed.



The Jews at the New York Times recently ran this anti-Catholic ad from the Jews at the "Freedom From Religion Foundation:"



a year of our newspaper Freethought Today, and supports FFRF's vital legal advocacy and litigation.

FREEDOM DEPENDS ON FREETHIN	NKERS
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Make payable to "FFRF." Dues & donations are tax-deductible. FFRF protects confidentiality and will not divulge, rent, sell, or share its mailing list.





AFDI/SIOA is a human rights organization dedicated to freedom of speech, freedom of religion, freedom of conscience and individual rights.

SIONATIONS.ORG AMERICANFREEDOMDEFENSE.ORG

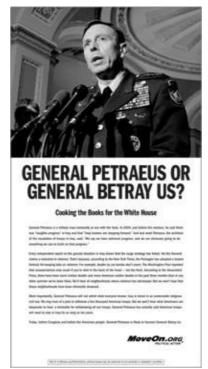


The Jews at the *New York Times* stuttered and stammered trying to come up with an excuse for not running the anti–Muslim ad, but eventually settled on saying that particular advertisement could "harm the troops."

dailycaller.com/2012/03/14/times-nixes-anti-islam-ad-runs-anti-catholic-ad

Huh?!

This is from the very same *New York Times* which ran several WikiLeaks funding advertisements and a full–page "anti–Petraeus" ad from the Jews at MoveOn.org when Bush was president!



Remember this? It's since been deleted from MoveOn.org's website! Change! web.archive.org/web/20080607115339/http://pol.moveon.org/petraeus_ad.html



See the Jew...