

GBPPR 'Zine



Issue #67 / The Monthly Journal of the American Hacker / November 2009

"Does anybody think that the teabag, anti-government people are going to support them if they bring down health care? All it will do is confuse and dispirit Democratic voters, and it will encourage the extremists."

--- November 7, 2009 quote from the head nigger himself! I guess anyone who disagrees with the Mulatto Marxist is now an "extremist." Someone should tell Obongo the only "teabagger" to watch out for is that faggot Marxist kike Barney Frank in Congress.

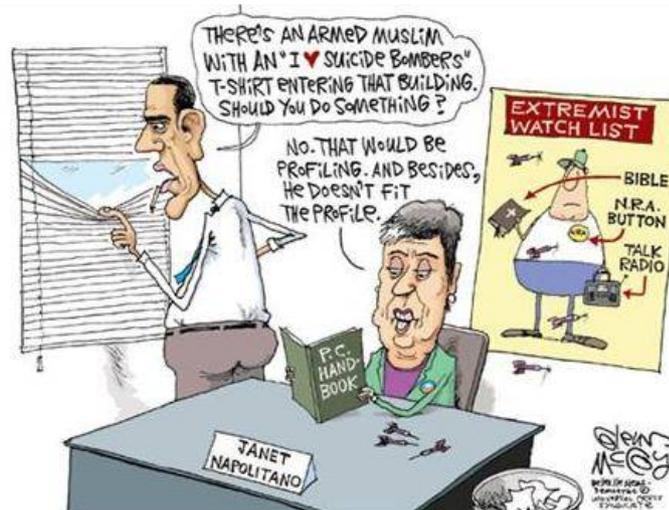


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Message Service System / #1A ESS (Part 1)

AT&T PRACTICE
Standard

AT&T 231-318-364
Issue 2, November 1987

MESSAGE SERVICE SYSTEM IMPLEMENTATION PROCEDURES (1AE9 AND LATER GENERIC PROGRAMS) 1A ESS™ SWITCH

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1. GENERAL

This practice provides procedures for implementing the MSS (Message Service System) feature in a 1A ESS switch environment. Included are translator descriptions, RC (recent change) verification information, and RC implementation procedures.

This practice is reissued to correct RC messages and to provide proper nomenclature for the Message Service System. As there are numerous changes, change arrows indicating addition or corrections are not used.

This practice is organized as follows:

- (a) Abbreviations and Acronyms (Part 2)
- (b) MSS Description and Definitions (Part 3)
- (c) Modified Translations for MSS (Part 4)
- (d) RC Verification Information (Part 5)
- (e) MSS Implementation (Part 6).

Items and fields shown in translator layouts and keywords shown in RC messages are not necessarily included in the list of abbreviations and acronyms. These items and keywords are defined in legends included in translator layouts, or in figures and/or in tables associated with the RC message.

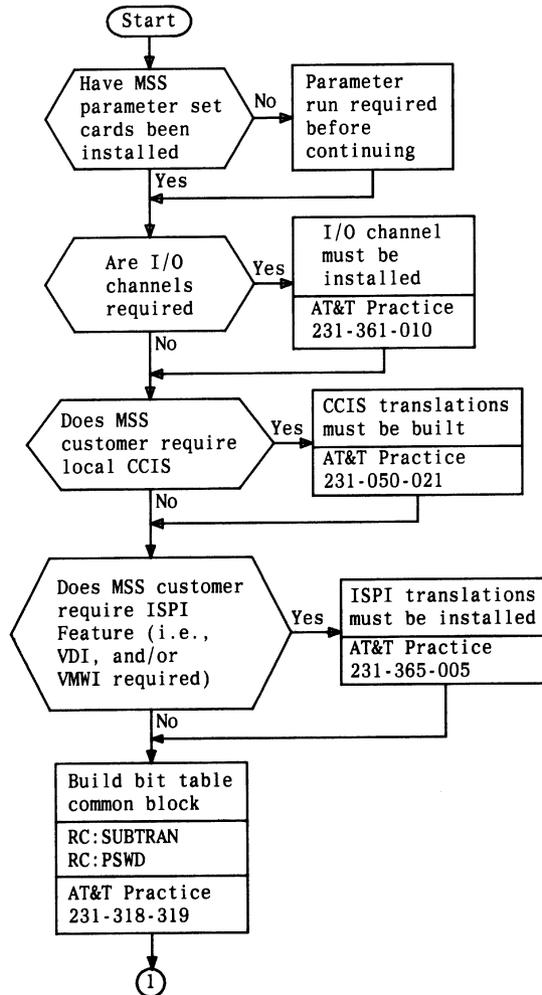
A flowchart showing the recommended sequence for implementing MSS RC translations is shown in Fig. 1. Detailed procedures are given in Part 6.

Note: The RC message keyword coverage shown in Part 6 does not preclude the use of optional words which might pertain to a central office. See the referenced source for complete coverage.

Refer to AT&T Practice 231-318-316 for general information on RC message formats and the interpretation of message flowcharts.

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Note:
Refer to first paragraph in 6.1 for details of prerequisites.

Fig. 1 — Message Service System Recent Change Implementation Flowchart (Sheet 1 of 2)

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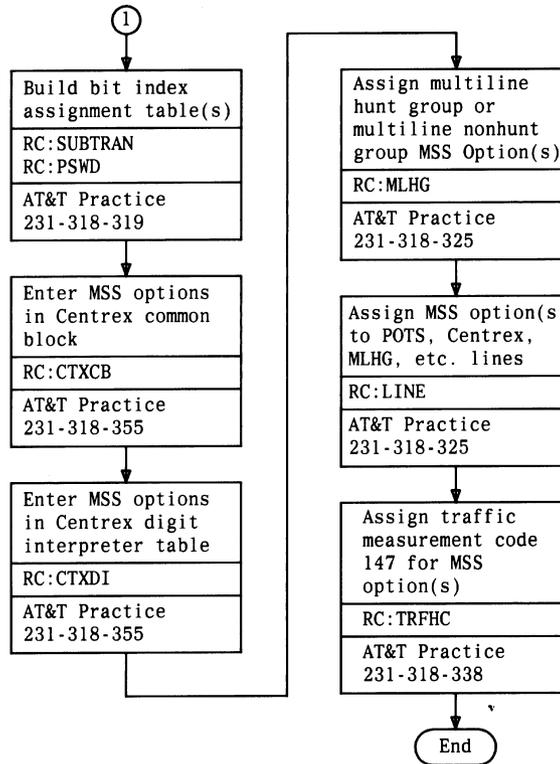


Fig. 1 — Message Service System Recent Change Implementation Flowchart (Sheet 2 of 2)

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The ORD (order) number is required in RC:LINE and RC:MLHG messages and is optional in all other RC messages. Keyword ORD number can be entered as follows:

ORD *m'n*

m' = Optional letter prefix (shown slashed because it may not always be present).

n = Decimal number. Leading zeros can be omitted (e.g., 1 through 9999999).

For example, each of the following is a valid external order number.

ORD 1234567

ORD F6

ORD 27

Refer to AT&T Practice 231-318-317 for RC message program listings, system acknowledgements, and RC18 and RC16 output messages.

Refer to the Translation Guide TG-1A for documentation of translation data and associated forms.

Refer to Translation Output Configuration PA-6A002 for information relating the translation memory (translators) and forms.

Refer to the Input/Output Message Manuals, IM-6A001 and OM-6A001, for a complete description of input and output messages.

Refer to AT&T Practice 231-390-170, Feature Document, for additional information describing the Message Service feature and attributes.

1.1 List of RC Message Indexes and PIDENTs

The RC message indexes and PIDENTs applicable to MSS are shown in Table A. This table contains a listing of the RC input messages and their corresponding message index number, message PIDENT, and program listing number. A separate message PIDENT is provided for each RC input message. The PIDENT is provided with information which is useful in interpreting RC18 and RC16 output messages. For further details of program listings, RC message indexes, and message PIDENTs, refer to AT&T Practice 231-318-317.

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TABLE A			
MSS RC MESSAGE INDEXES AND PIDENTS			
MESSAGE INDEX	RC MESSAGE	MESSAGE PIDENT	PR REFERENCE
21	RC:CTXCB	RCCX	PR-6A327
23	RC:CTXDI	RCXD	PR-6A368
0	RC:LINE	RCLI	PR-6A336
13	RC:MLHG	RCHG	PR-6A332
1	RC:PSWD	RCPS	PR-6A344
59	RC:GENT	RCGT	PR-6A378
99	RC:IOP	RCIO	PR-6A1147
38	RC:TRFHC	RCHC	PR-6A335

1.2 Flowchart Symbols

The following flowchart symbols are used in RC message flowcharts:

-  **OPTION Symbol:** The OPTION symbol is used to indicate that all flowlines leaving the symbol are optional. None, one, some, or all such flowlines may be selected.
-  **EXCLUSIVE OR Symbol:** The EXCLUSIVE OR symbol is used to indicate that exactly one of two or more flowlines leaving the symbol must be selected.
-  **NONEXCLUSIVE OR Symbol:** The NONEXCLUSIVE OR symbol is used to indicate that one or more of the flowlines leaving the symbol must be selected (no less than one, but more than one may be selected).
-  **AND Symbol:** The AND symbol is used to indicate that all flowlines leaving the symbol must be used.
-  **Repeatable Segment:** The repeatable segment symbol is used to indicate that the keyword unit or the specific group of keyword units within the segment bracket can be repeated within the RC message without reentering previous keyword units. Each segment is terminated by the percent sign.

In change message flowcharts, keywords without a variable shown are Y(ES)/N(O) keywords. When a Y(ES)/N(O) feature is added, enter the keyword; when a Y(ES)/N(O) feature is removed, enter the keyword followed by NO or N.

When using a change message flowchart, refer to the associated new message flowchart for valid combinations of keywords.

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2. GLOSSARY OF ABBREVIATIONS AND ACRONYMS

Abbreviations and acronyms used in this practice are listed in Table B.

TABLE B GLOSSARY OF ABBREVIATIONS AND ACRONYMS	
ABBREVIATION OR ACRONYM	DEFINITION
ACD	Automatic Call Distribution
AMA	Automatic Message Accounting
AMHT	Auxiliary Master Head Table
AMWI	Audible Message Waiting Indicator
BIATL	Bit Index Assignment Table for Lines
BRI	Base Route Index
BTN	Special Billing Telephone Number
60A	Customer Premises System Console
CCIS	Common Channel Interoffice Signaling Indicator
CFBL	Call Forwarding Busy Line
CFDA	Call Forwarding Don't Answer
CFV	Call Forwarding Variable
CO	Central Office
CSR	Centrex Station Rearrangement
CTC	Call Transfer Code
CTX	Centrex
CTXCB	Centrex Common Block
CTXDI	Centrex Digit Interpreter
CTXN	Centrex Number
CWD	Call Waiting Codes
DA 15	Selected Quarter Hour
DAG	Data Accumulation Group
DGE	End of Range Digits
DGS	Digits to be Interpreted
DLG	Data Link Group Number
DN	Directory Number
DNCL	Directory Number Class Number
DNYGPS	Deny Access to a Centrex Access Treatment Restriction Group
DP	Distributor Point Number
DPP	Distributor Point for Protection Number
FD	Feature Document
GST	Ground Start
HHT	Head Head Table

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TABLE B (Contd)	
GLOSSARY OF ABBREVIATIONS AND ACRONYMS	
ABBREVIATION OR ACRONYM	DEFINITION
HML	Multiline Hunting Group Number
HTY	Multiple Position Hunt
IOCHAN	Input/Output Channel
ISPI	Intelligent Simplex Peripheral Interface
LCC	Line Class Code
LCCIS	Local Common Channel Interoffice Signaling
LENCL	Line Equipment Number Class Word
MCC	Master Control Center
MDCSBIATG	Message Service Call Store Bit Index Assignment Table for Groups
MDCSBIATL	Message Service Call Store Bit Index Assignment Table for Lines
MDCSBIATH	Message Service Call Store Bit Index Assignment Table for Line History
MHT	Master Head Table
MLG	Multiline Group
MLHG	Multiline Hunt Group
MSAMA	Message Service Automatic Message Accounting
MSC	Message Service Center
MS	Message Service
MSI	Message Service Indicator
MSN	Master Scan Number
MSS	Message Service System
MWI	Message Waiting Indicator
OE	Originating Equipment
OTC	Operating Telephone Company
POTS	Plain Old Telephone Service
PTDT	Prohibit Terminating Disconnect Timing
RC	Recent Change
RDI	Remote Data Insert
SSTYP	Sub-subtype Number
STYP	Subtype Number
TDA	Translation Data Assembler
TER	Multiline Group Terminal Number
TMC	Traffic Measurement Code
TN	Telephone Number
TNN	Trunk Network Number
USOC	Universal Service Order Code
VDI	Voiceband Digital Interface
VDP	Voice Data Protection
VMWI	Visual Message Waiting Indicator

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3. MSS DESCRIPTION AND DEFINITIONS

The MSS (Message Service System) provides a centralized and personalized call coverage or message answering capability for Centrex and POTS customers alike on an intraoffice and interoffice basis. Station users wishing to have call coverage subscribe to this service utilizing one of the call forwarding options to route their calls to the MSC (message service center), thereby becoming MSS clients (see Note). The call forwarding options include the following:

- CFBL (Call Forwarding Busy Line)
- CFDA (Call Forwarding Don't Answer)
- CFV (Call Forwarding Variable)
- Make Busy/Night Transfer.

Note: A message service client is a telephone customer who either uses or subscribes to message services.

Refer to AT&T Practice 231-390-170, Feature Document, for further details concerning the Message Service feature.

One or more attendant positions are required at a MSC. An equipped attendant position requires answering equipment and a device to display/print call related information.

After the message has been received, the MSC has the option to activate an MWI (message waiting indicator) at the client set audibly in the form of stuttered dial tone or visually on the client's equipment. The MWI may be deactivated by the MSC or the message service client. Deactivation will normally be done after the message service client has received all stored messages.

Three types of MSC lines are available with certain considerations:

- POTS (plain old telephone service) — Abbreviated codes can be set up by the OTC (operating telephone company) for DNs that are MSCs and message clients.
- Centrex Group — There is **no** indicator for message service in the common block. Individual supplemental auxiliary blocks and DNCL3 words contain the indicator.
- Multiline Hunt Group — If the common block DNCL3 word is set for message service, all lines in the common block are considered message service. If common block DNCL3 word is **not** set for message service, and some members of the MLHG are to be message service, those members must have a DN and LEN set for message service. Also, a client must forward phone calls to these DNs.

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3.1 MWI (Message Waiting Indicator)

The MWI provides an audible or visual means of notifying a client that messages are waiting. Clients can choose to have either option. After receiving a message, a client can deactivate a MWI by dialing a MWI deactivation access code. Without MWI, the client has to call the MSC to inquire about messages.

3.1.1 AMWI (Audible Message Waiting Indicator)

The AMWI (audible message waiting indicator) is a standard stutter dial tone.

3.1.2 VMWI (Visual Message Waiting Indicator)

The optional VMWI option provides a visual indication of when a message is waiting. A client with VMWI can deactivate visual message indication by using assigned access codes. To provide optional VMWI, feature package ISPI (intelligent simplex peripheral interface) is required. (Refer to AT&T Practice 231-365-005 for ISPI implementation.)

3.2 Interoffice Signaling Option

If a MSC is not served by the same local switch as the MSS client, interoffice signaling is required. An optional feature package, LCCIS (local common channel interoffice signaling), is used for this purpose. (Refer to AT&T Practice 231-050-021 for more information.)

3.3 Message Service Center Interface

3.3.1 Data Link Interface

I/O channels are required for MSS to transmit data from the switching office to the customer premises' message service equipment. These channels use a standard RS-232 modem with asynchronous 1200 baud ASCII interface, which requires the customer equipment to meet the same requirement. Refer to AT&T Practice 231-302-305 for procedures to add, change, or delete I/O channels.

3.3.2 VDI (Voiceband Digital Interface)

To provide optional tip and ring signaling, which is necessary for the MSC attendant line voiceband digital signaling capability, feature package ISPI is required. (Refer to AT&T Practice 231-365-005 for ISPI implementation.)

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3.4 CSR (Centrex Station Rearrangements)

The CSR has the capability for adding or changing new keywords to the RC:LINE: input message for the MSS feature. This is done by allowing the keywords to be used with the existing CSR command, LNCHG. Refer to AT&T Practice 231-390-064, Feature Document, for additional information on CSR.

3.5 Automatic Message Accounting Indexes

There are three types of indexes used for the MSS feature. Rules for these indexes, when needed, follows.

3.5.1 Group Index

The group index (MLHG) is needed if the group is a MSC or has lines within the group that wants AMA (automatic message accounting) counts on a group basis. If the OTC charges a flat rate for MSS, no AMA record is needed, but an index of 1 is assigned.

3.5.2 Line Index

The line index is used when the message service line is not part of a group (MLHG or Centrex) or when AMA records are requested on message service lines that are members of a group (MLHG or Centrex). If OTC charges a flat rate for MSS, no AMA record is needed, but an index of 1 is assigned.

3.5.3 Line Index (for Line History)

This line index is needed for every line that is a MSC that has MWI set (Bit 23 of the LENCL1 word) on its line.

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4.2 MLHG (Multiline Hunt Group) Common Block

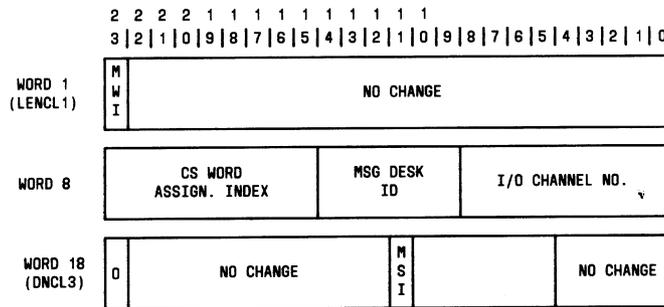
Word 1 (LENCL 1), bit 23 (Fig. 3) of the MLHG common block, contains the MWI for the group. When set (bit 23 = 1), all lines in the MLHG have message waiting option.

Word 8, bits 23 through 15, contains the message service call store index for the MLHG. This index is used to point to a block of words in call store where counts for AMA are stored.

Word 8, bits 14 through 9, contains the message service ID. If this field is nonzero, an I/O channel is required. This message service ID (range 1 through 63) should be unique to the I/O channel.

Word 8, bits 8 through 0, is used for the I/O channel number: where $24 \leq \text{IOCHAN} < 96$.

Word 18 (DNCL3), bit 11 when set, indicates that all lines are considered message service. If bit 11 is **not** set and some members of the MLHG are to be message service, those lines must have a DN and a LEN set for message service. All such clients must forward their phones to these DNs.



LEGEND:
 MWI - MESSAGE WAITING INDICATOR
 ID - IDENTIFICATION
 I/O - INPUT/OUTPUT
 MSI - MESSAGE SERVICE INDICATOR

Fig. 3 — Multiline Hunt Group Layout for MSS

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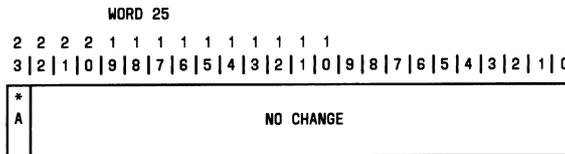
4.3 Centrex Common Block

Word 25, bit 23 (Fig. 4), provides for the Centrex group MWI. When set, all lines in the group have message waiting option.

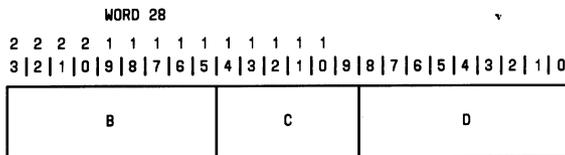
Word 28, bits 23 through 15, contains the message service call store index for the Centrex group. This index points to a block of words in the call store where AMA counts are stored. An index of 2 through 511 may be assigned.

Word 28, bits 14 through 9, is used for the Centrex group message center ID. This ID (range 1 through 63) is unique to the I/O channel.

Word 28, bits 8 through 0, assigns the I/O channel number: where $24 \leq \text{IOCHAN} < 96$.



A = CENTREX GROUP MESSAGE WAITING INDICATOR



B = MESSAGE CENTER AMA CALL STORE INDEX FOR GROUPS

C = CENTREX MESSAGE CENTER ID

D = I/O CHANNEL

Fig. 4 — Centrex Common Block Layout

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4.4 Centrex Digit Interpreter Table

The data word (data type 05) (Fig. 5) is used in routing to Centrex special services. A subtype of 28 is used for Centrex group message waiting. Also, a sub-subtype of 1 is used for MWI activation and a sub-subtype of 0 for MWI deactivation.

4.5 Prefixed Access Code Translator

The OTC may assign and change the MSS feature access codes. It is recommended that the OTC use any pair of available assignments from the *4X, *5X, or *7X series to activate and deactivate a message waiting. The data word (Fig. 6), uses a feature type of 28 for the MSS feature. A feature subtype of 1 is used for activation, and a feature subtype of 0 for deactivation.

4.6 Supplemental OE Auxiliary Block

Word 0 — Bit 4 (Fig. 7) indicates the presence or absence of the MSS optional word E.
If bit 4 = 1, optional word E is present.

Note 1: Word 0, bit 4 and optional word E applies to the supplemental LEN OE auxiliary block in the 1AE9 and later generics, and should be reserved in the RLEN OE auxiliary block for future development consistency.

Note 2: MSS is not supported for "packed" supplemental OE translators.

Word E (Optional):

- Bits 23 through 15 — AMA Message Service Call Store Index. If bits are set to 0, no call store word assignment. If bits are set 2 through 511, this indicates call store index for this message service line.

Note 3: An index of 1 is used when OTC is charging flat rate basis for MSS.

- Bit 14 — VMWI. If bit is set to 0, no visual message waiting. If bit is set to 1, visual message waiting available.
- Bit 12 — Message Service Indicator. If bit is set to 0, no message service. If bit is set to 1, the line is for a message service center.
- Bits 10 through 0 — Message Service Call Store Index for Line History. If bits are set to 0, no call store word assignment [also TDA (translation data assembler) default]. If bits are set 1 through 2047, this indicates call store index for this message center line with MWI option.

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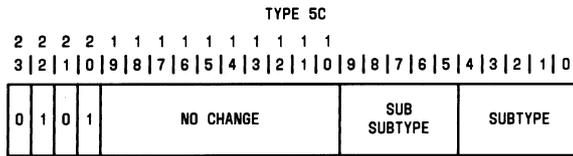


Fig. 5 — Centrex Digit Interpreter Table Layout

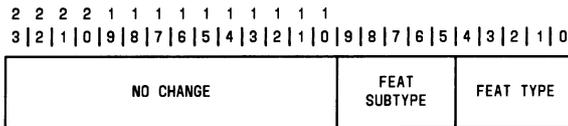
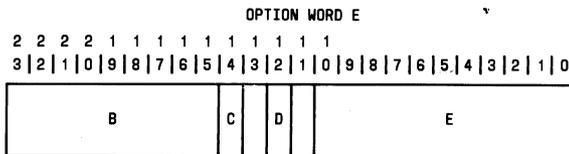
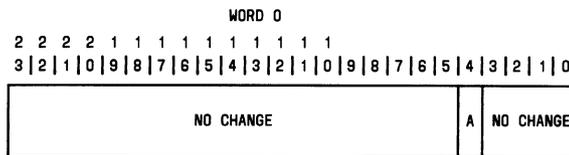


Fig. 6 — Prefixed Access Code Translator Layout



- LEGEND:
- A - OPTION WORD E INDICATOR
 - B - AMA MESSAGE DESK CALL STORE INDEX FOR LINES
 - C - VISUAL MESSAGE WAITING INDICATOR
 - D - MESSAGE SERVICE INDICATOR
 - E - MESSAGE DESK CALL STORE INDEX FOR LINE HISTORY ON MESSAGE DESK LINES WITH THE MWI OPTION

Fig. 7 — Supplement OE Auxiliary Block Layout

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4.7 Bit Table Common Block Layout

The bit table common block (MHT + 140) contains the address of a block of words that point to bit tables (Fig. 8). Words 0, 1, and 3 are used for MSS as follows.

4.7.1 Word 0

Word 0 contains the address of the MDCSBIATL (message service call store bit index assignment table for lines). This table is used by the RC message to assign an index to a message service line. The index allows AMA information to be temporarily stored in a call store table for each line that does not belong to a MLHG or Centrex group and to a line in the group that wants an individual AMA record made. This table is also used in unassigning an index no longer used for MSS. Valid indexes are from 2 through 511 and cannot be greater than the set card (MDLBLK) size.

Note: An index of 1 is used when OTC is charging on a flat rate basis.

4.7.2 Word 1

Word 1 contains the address of the MDCSBIATG (message service call store bit index assignment table for groups). This table is used by the RC message to assign an index to a message service center group (MLHG or Centrex). This index allows AMA information to be temporarily stored in a call store table for each group. This table is also used by the RC message to unassign an index. Valid indexes are from 1 through 511 and cannot be greater than the set card (MDGBLK) size.

Note: An index of 1 is used when OTC is charging on a flat rate basis.

4.7.3 Word 3

Word 3 contains the address of the MDCSBIATLH (message service call store bit index assignment table for line history). This table is used by the RC message to assign an index to a message service. This index allows line history information to be temporarily stored in a call store table for each message service that has the MWI option. This table is also used by the RC message to unassign an index. Valid indexes are from 1 through 2047 and cannot be greater than the set card (MDMBLK) size.

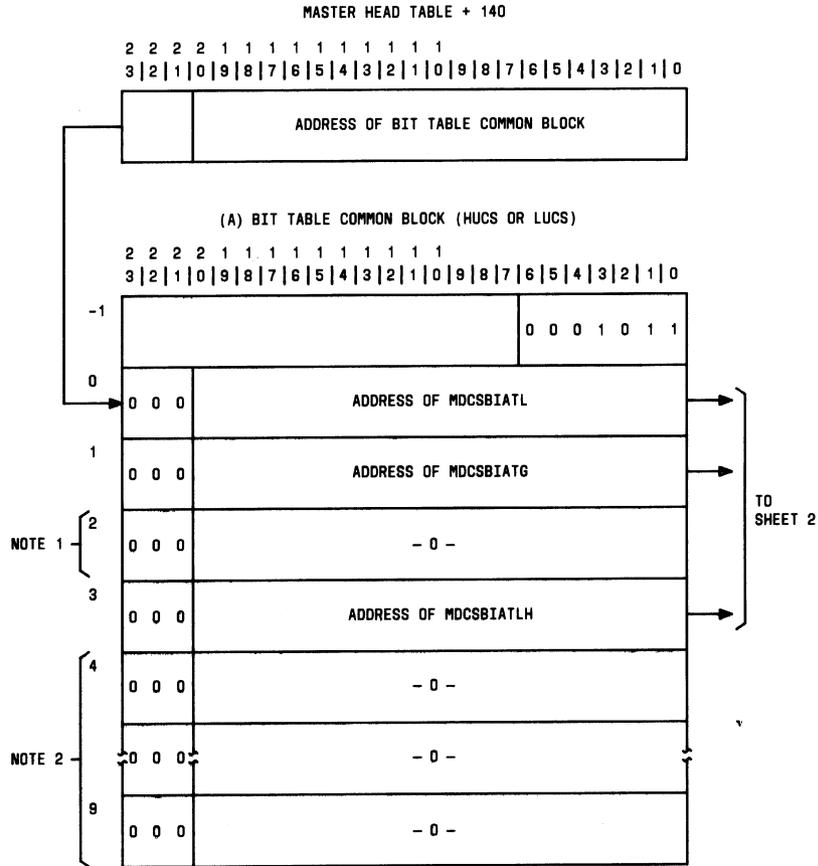
4.8 Traffic Count Translations

Traffic count data for the H (hourly), C (continuous), DA 15 (selected quarter hour), and S1 and S2 (special studies) traffic schedules are provided for MSS. The assigned TMC (traffic measurement code) is 147. The EGOs (equipment group or office count numbers) associated with TMC 147 are described below:

- EGO 000: — Unsuccessful attempts peg count. This counts the number of unsuccessful attempts to deliver call information to message service display station sets due to CCIS (common channel interoffice signaling) errors.
- EGO 001: — MWI activation access code peg count. This counts the number of times that MSC attempts to activate MWI.
- EGO 002: — MWI deactivation access code peg count. This counts the number of times that MSC attempts to deactivate MWI.
- EGO 003: — MWI deactivation access code peg count. This counts the number of times that a client dials the message waiting indicator deactivation access code.
- EGO 004: — Number of calls terminating to MSC which use a data link interface.
- EGO 005: — Number of calls terminating to MSC which use a VDI interface.

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- Notes:
1. WORD 2 USED BY ANOTHER FEATURE
 2. WORDS 4 THROUGH 9 USED FOR FUTURE FEATURES

LEGEND:

MDCSBIATL - MESSAGE DESK CALL STORE BIT
INDEX ASSIGNMENT TABLE FOR LINES

MDCSBIATG - MESSAGE DESK CALL STORE BIT
INDEX ASSIGNMENT TABLE FOR GROUPS

MDCSBIATLH - MESSAGE DESK CALL STORE BIT
INDEX ASSIGNMENT FOR TABLE LINE
HISTORY

Fig. 8 — Bit Table Common Block Layout (Sheet 1 of 2)

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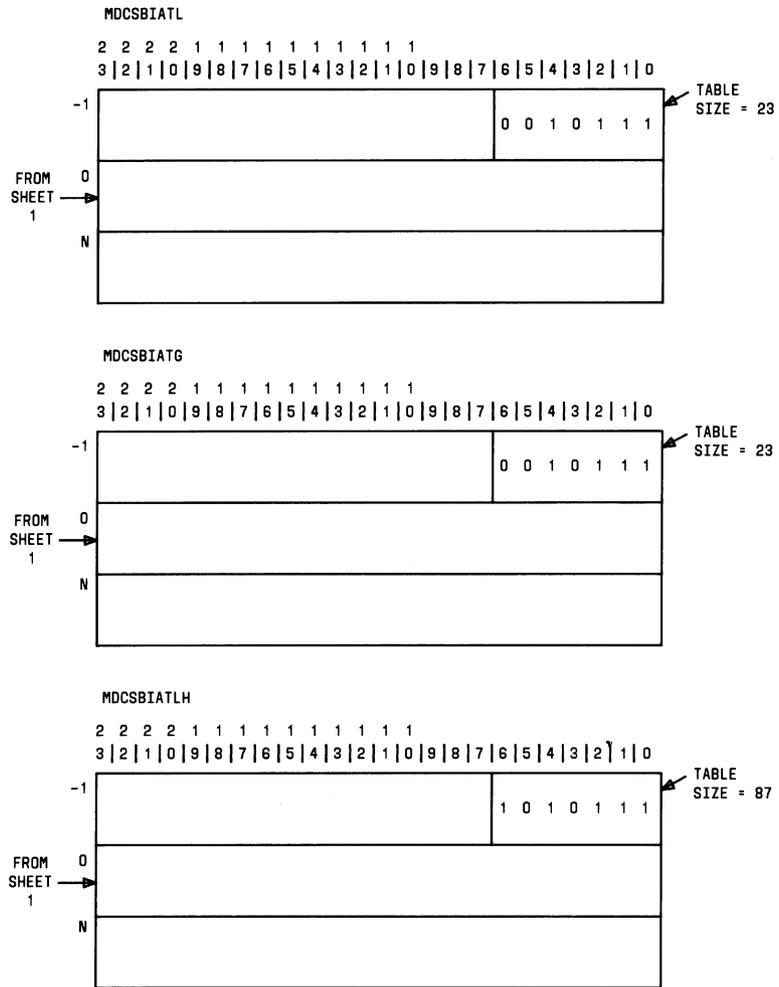


Fig. 8 — Bit Table Common Block Layout (Sheet 2 of 2)

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5. RECENT CHANGE VERIFICATION INFORMATION

5.1 VFY-DN Input Message

The VFY-DN message can be used to verify translation information pertaining to a DN (directory number) that has message service. The verify message data is provided via the TR01 output message. This message is used for POTS, MLH (multiline hunt), and Centrex individual line information.

5.2 VF:DNSVY Input Message

Refer to IM-6A001-01 for MSS related keyword options used in the VF:DNSVY message. This message surveys a range of DNs to identify and/or count those numbers having specific assignments or features (such as those with the MSS feature).

5.2.1 VF:DNSVY:FEATRS Input Message

The information requested by the VF:DNSVY:FEATRS verify message data is provided in the TR75 output message. This message surveys a DN or a range of DNs to identify and/or count those numbers having the MSS feature.

5.2.2 VF:DNSVY:LENDN Input Message

The VF:DNSVY:LENDN verify message data is provided in the TR109 output message. This message verifies the LENCL (line equipment number class word), the DNCL (directory number class word) information, CTXN(s), AMA call store index (MSS), visual message waiting option, message service center option, and call store index for the message service line.

5.3 VFY-CSTG-34 Input Message

The VF-CSTG-34 verify message requests specified information pertaining to a multiline hunt group with message service. A TR15 output message responds to the VF-CSTG-34 input message by displaying bit 23 of the LENCL1 (line equipment number class word 1) as the MWI (message waiting indicator) for the group, word 8 displaying call store word assignment, message service ID and I/O channel number, and word 18, bit 12 when set indicating message service indicator.

5.4 VFY-CSTG-35 Input Message

The VFY-CSTG-35 verify message requests specific Centrex group data. The resulting TR17 output message prints the Centrex common block (excluding the digit interpreter table) associated with the Centrex group specified in the input message. The MWI indicator, MSC call store index, Centrex group message center index, I/O channel number, etc., can all be verified by using this input message.

5.5 VFY-XDGNT Input Message

The VFY-XDGNT-43 verify message requests information in the Centrex digit interpreter table associated with the specified Centrex group. The TR02 output message data verifies whether the access code being verified is for activating or deactivating the MWI. The TR02 message also responds with the data type (05) and subtype (28) entries for message service.

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6. MSS IMPLEMENTATION

Refer to Fig. 1 for the MSS feature procedural implementation flowchart. The flowchart also makes reference to other documents that provide supporting information.

6.1 Prerequisites

The procedures listed below must be completed before MSS translations can be performed (also see Fig. 1):

- Generic program 1AE9 or later must be installed and operative
- Feature package 9FMDS, and set card 9SMDS must be set
- MSS options must be installed and operative, if required. MSS options include:
 - Data link interface (I/O channels)
 - LCCIS
 - AMWI
 - VMWI (ISPI feature also required)
 - VDI (ISPI feature also required)
 - ISPI (Required with options VMWI and/or VDI).
- If a MSC customer is a Centrex customer, the Centrex common block must be built.

Note: If Centrex translations have not been built, refer to AT&T Practice 231-367-001. Procedures for installing the I/O channels are given in AT&T Practice 231-361-010.

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6.2 Build Bit Table Common Block

The bit table common block is a fixed length table of 11 words (-1 word through word 9). The following procedure will seize, initialize, and link a block of memory to the AMHT (auxiliary master head table) and enter the bit table common block length into the -1 word of the HHT (head head table) length table.

1. Seize and initialize to zero an 11-word block of memory by typing:

```
RC:SUBTRAN:  
DATA 0  
LNG H11  
OTHER!
```

The system response should be an **RC18 17 0 INFO** message with the octal starting address (aaaaaaa) and length (bb) of the seized block and an **RC18 17 0 ACPT** message indicating acceptance of the RC:SUBTRAN: message.

Note: The address and length of the seized block should be recorded for future reference. The starting address (aaaaaaa) of the seized block represents the -1 word of the new bit table common block head table.

2. Enter the octal length of the seized memory block (bb) into the -1 word of the bit table common block by typing:

```
RC:PSWD:  
ADD aaaaaa  
OLDDAT 0  
DAT bb!
```

aaaaaaa = Starting address of the memory block seized in Step 1.
bb = Octal length of seized memory block.

The system response should be an **RC18 1 0 ACPT** message indicating the RC:PSWD message has been accepted.

3. Type the following message to determine if the bit table common block length has been entered correctly.

```
DUMP:CSS,ADR aaaaaa,L 1!
```

The system response should be a **DUMP:CSS** output message indicating the octal contents of the address (aaaaaaa). This value should agree with the octal length entered in Step 2.

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4. Add 1 to the starting address (aaaaaa) of the memory block seized in the previous step to obtain the address (cccccc) of word 0 for the bit table common block.
5. Link the seized block to the MHT (master head table) + 214 (octal) as follows:

```
RC:PSWD:  
ADD 7720214  
OLDDAT 0  
DAT ccccccl
```

cccccc = Octal address of word 0 found in Step 2.

The system should respond with an **RC18 1 0 ACPT** message indicating that the message was accepted.

6. Type the following message to determine if the bit table common block has been linked properly to the MHT.

```
DUMP:CSS,ADR 7720214,L 1!
```

The system response should be a **DUMP:CSS** output message indicating the octal contents of address 7720214. This value should agree with ccccccc, the octal address of word 0 of the new bit table common block linked to the MHT in Step 5.

7. Enter the octal length of the bit table common block into the MHT lengths table using the following message:

```
RC:PSWD  
ADD 7720614  
OLDDAT 0  
DAT bb!
```

bb = Octal length of bit table common block.

The system response should be an **RC18 1 0 ACPT** message indicating that the RC:PSWD message was accepted.

8. Type the following message to determine if the bit table common block length has been entered correctly into the head table lengths table.

```
DUMP:CSS,ADR 7720614,L 1!
```

The system response should be a **DUMP:CSS** output message indicating the octal contents of address 7720614. This value should agree with the octal length entered in Step 7.

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6.3 Build MDCSBIAT (Message Service Call Store Bit Index Assignment Tables) Subtranslators

6.3.1 Build MDCSBIATL (Message Service Call Store Bit Index Assignment Table for Lines)

The MDCSBIATL subtranslator is a 23-word block (words -1 through 21) of fixed length. The following procedure will seize, initialize, and link a subtranslator to the bit table common block (Fig.8).

1. Seize and initialize to zero a 23-word block of memory by typing:

```
RC:SUBTRAN:  
DATA 0  
LNG H23  
OTHER!
```

The system should respond with an **RC18 17 0 INFO** message with the octal starting address (ddddddd) and octal length (ee) of the seized block. Also, an **RC18 17 0 ACPT** message should print indicating that the RC:SUBTRAN: message was accepted.

Note: The address and length of the seized block should be recorded for future reference. The starting address (ddddddd) of the seized block represents the -1 word of the new MDCSBIATL subtranslator.

2. Enter the octal length (ee) of the seized memory block into the -1 word of the MDCSBIATL table by typing:

```
RC:PSWD:  
ADD ddddddd  
OLDDAT 0  
DAT ee!
```

ddddddd = Starting address of the memory block seized in Step 1.
ee = Octal length of seized memory block.

The system response should be an **RC18 1 0 ACPT** message indicating that the RC:PSWD message has been accepted.

3. Type the following message to determine if the MDCSBIATL subtranslator length has been entered correctly.

```
DUMP:CSS,ADR ddddddd,L 1!
```

The system response should be a **DUMP:CSS** output message indicating the octal contents of the address (ddddddd). This value should agree with the octal length (ee) entered in Step 2.

4. Add octal 1 to the starting address (ddddddd) of the memory block seized in the previous step to obtain the address of word 0 (ffffff) for the new MDCSBIATL table.

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5. Link the seized block to the bit table common block by typing:

```
RC:PSWD:  
ADD cccccc  
OLDDAT 0  
DAT fffffff!
```

ccccc = Address recorded in 6.2 (aaaaaa) + octal 1.
ffffff = Octal address of word 0 found in Step 4.

The system should respond with an **RC18 1 0 ACPT** message indicating that the message was accepted.

6. Type the following message to determine if the MDCSBIATL subtranslator has been linked properly to the bit table common block.

```
DUMP:CSS,ADR cccccc,L 1!
```

The system response should be a **DUMP:CSS** output message indicating the octal contents of address cccccc. This value should agree with the octal address of word 0 (ffffff) of the new MDCSBIATL subtranslator linked to the bit table common block.

6.3.2 Build MDCSBIATG (Message Service Call Store Bit Index Assignment Table for Groups)

The MDCSBIATG subtranslator is a 23-word block (words -1 through 21) of fixed length. The following procedure will seize, initialize, and link a subtranslator to the bit table common block (Fig. 8).

1. Seize and initialize to zero a 23-word block of memory by typing:

```
RC:SUBTRAN:  
DATA 0  
LNG H23  
OTHER!
```

The system should respond with an **RC18 17 0 INFO** message with the octal starting address (gggggg) and length (hh) of the seized block. Also, an **RC18 17 0 ACPT** message should print indicating that the RC:SUBTRAN: message was accepted.

Note: The address and length of the seized block should be recorded for future reference. The starting address (gggggg) of the seized block represents the -1 word of the new MDCSBIATG subtranslator.

GBPPR 2.4 GHz 'Warspying' Device

Overview

One of the newest toys people are playing with are cheap 2.4 GHz wireless video cameras. And, of course, another new hobby followed which was deemed "warspying." This basically consists of traveling around and trying to intercept the unencrypted analog video signal these units transmit. The two major manufactures of these little wireless video units, Wavecom and X10, both utilize the same four transmit/receive frequencies. They are usually:

<u>Channel</u>	<u>Operating Frequency (GHz)</u>	<u>TP Voltage</u>
A	2.411	3.31
B	2.434	3.65
C	2.453	3.94
D	2.473	4.20

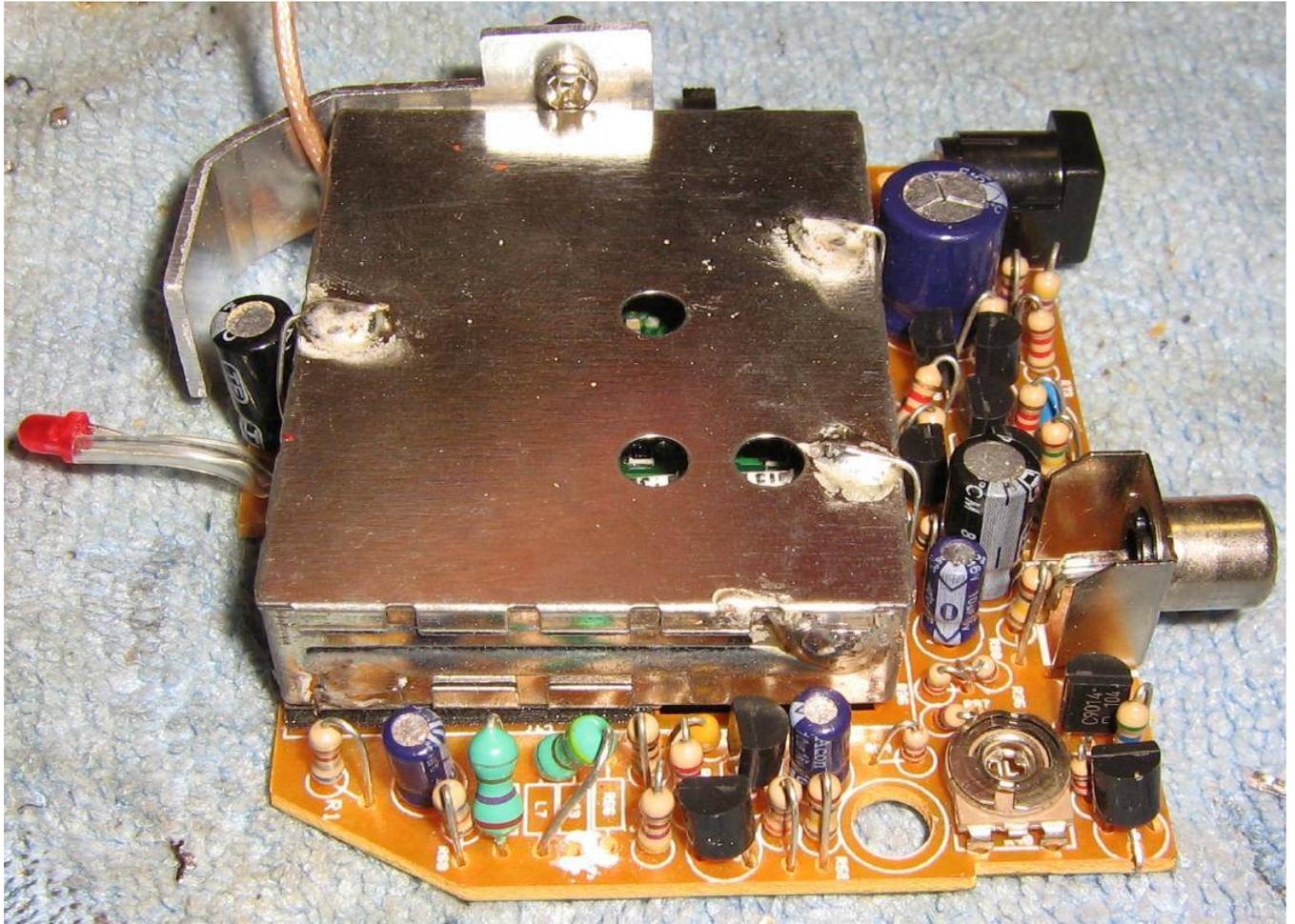
The "TP Voltage" value is the voltage I measured at the output of the 4-position "Channel Select" switch on a X10 Model VR36A Video Receiver. This is the switch that selects the unit's receiving frequency. As you can see, by adjusting the voltage at this point, you can also adjust the receive frequency. This means these units can be modified to receive "out-of-band" wireless video transmissions between approximately 2.3 – 2.7 GHz. This is handy, because some television stations can legally use frequencies outside of the standard unlicensed 2.4 GHz band (2.402–2.483 GHz) to operate their remote video links. You know, the video signals which are sent by those trucks with the microwave dish mounted on a pneumatic lift.

Pictures & Construction Notes



Overview of the "X10 Model No. VR36A 2.4 GHz Wireless Video Receiver" for use with X10's wireless camera systems operating in the unlicensed 2.4 GHz band.

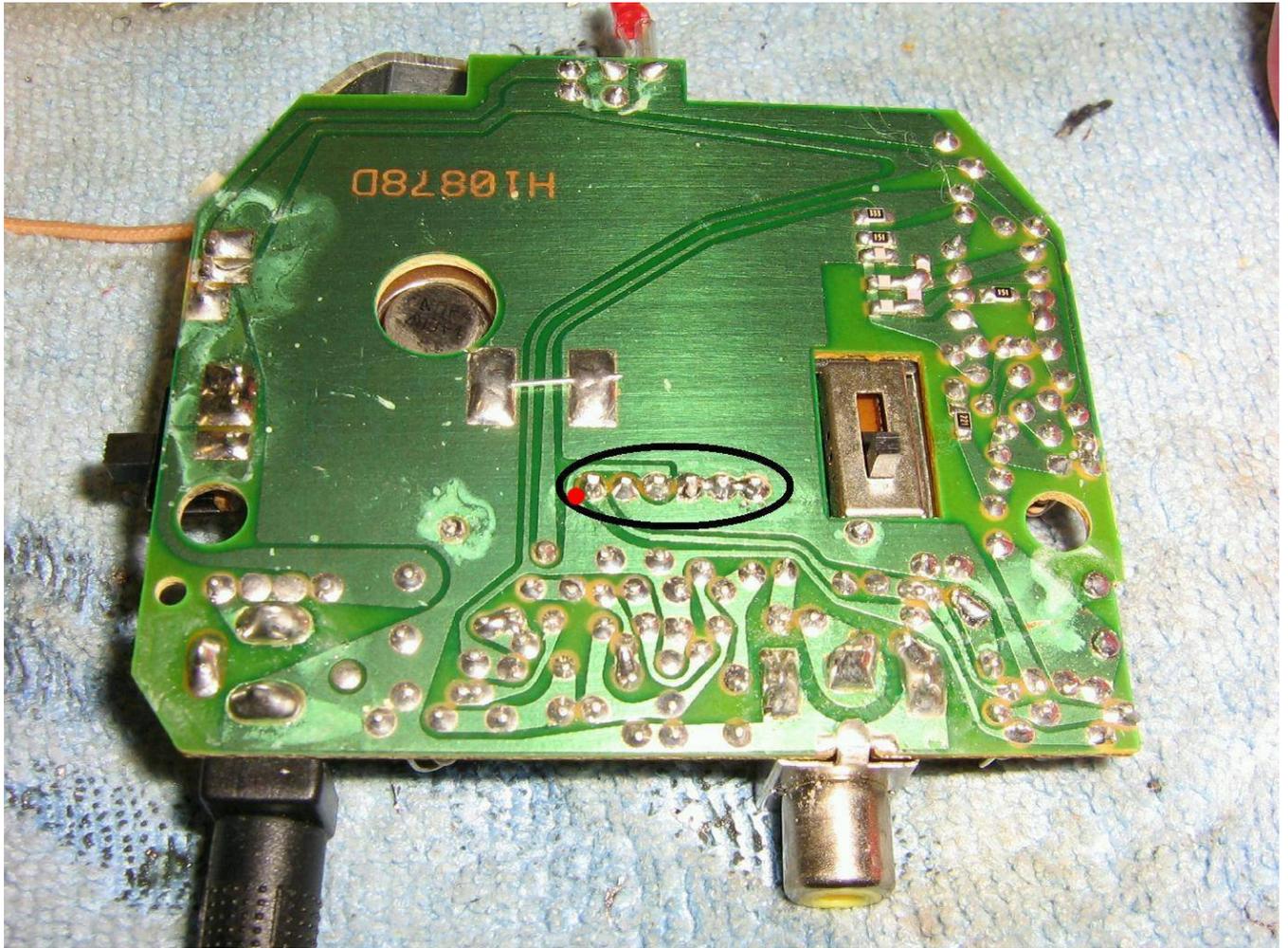
Note that the stock antenna is just a simple little patch antenna.



Internal view of the X10 VR36A receiver.

The power LED is on the left. The actual 2.4 GHz video receiver module is the silver box in the middle. The +9 VDC power input is via the connector on the top-right. The video output signal is via the RCA jack on the bottom-right.

The 2.4 GHz video receiver module only has four main connections. The 2.4 GHz antenna input (via the coax connection on the upper-left), +5 VDC for power, baseband video out, and ground.



Underside view of the X10 VR36A receiver.

+9 VDC power input is on the lower-left, and the video output is on the lower-right.

The 4-position "Channel Select" switch is on the right-side. The switch is in the "Channel A" position.

The six pins circled are the connections to the actual 2.4 GHz video receiver module.

Four of them are ground, one is +5 VDC, and one (red dot) is the baseband video output.



Overview of the 2.4 GHz video receiver module.

The antenna input is via the piece of coax on the upper-right. It is amplified around 16 dB using a Sirenza SGA-3486 MMIC and then high-pass filtered before entering the shielded mixer/local oscillator section. This module, and most others, use an IF output frequency of 480 MHz and a low-side local oscillator. This means to receive a video signal at 2.45 GHz, the local oscillator needs to be set to 1.97 GHz.

This is where the "Channel Select" switch comes into play. As you can see in the above photo, the switch is used to select between four different resistive voltage dividers which determine the voltage on the local oscillator's tuning line. The two potentiometers appear to be "fine tune" controls for this voltage. The "TP Voltages" in the chart at the beginning of this article were taken at the plated through-hole labeled **TP** in the above photo.

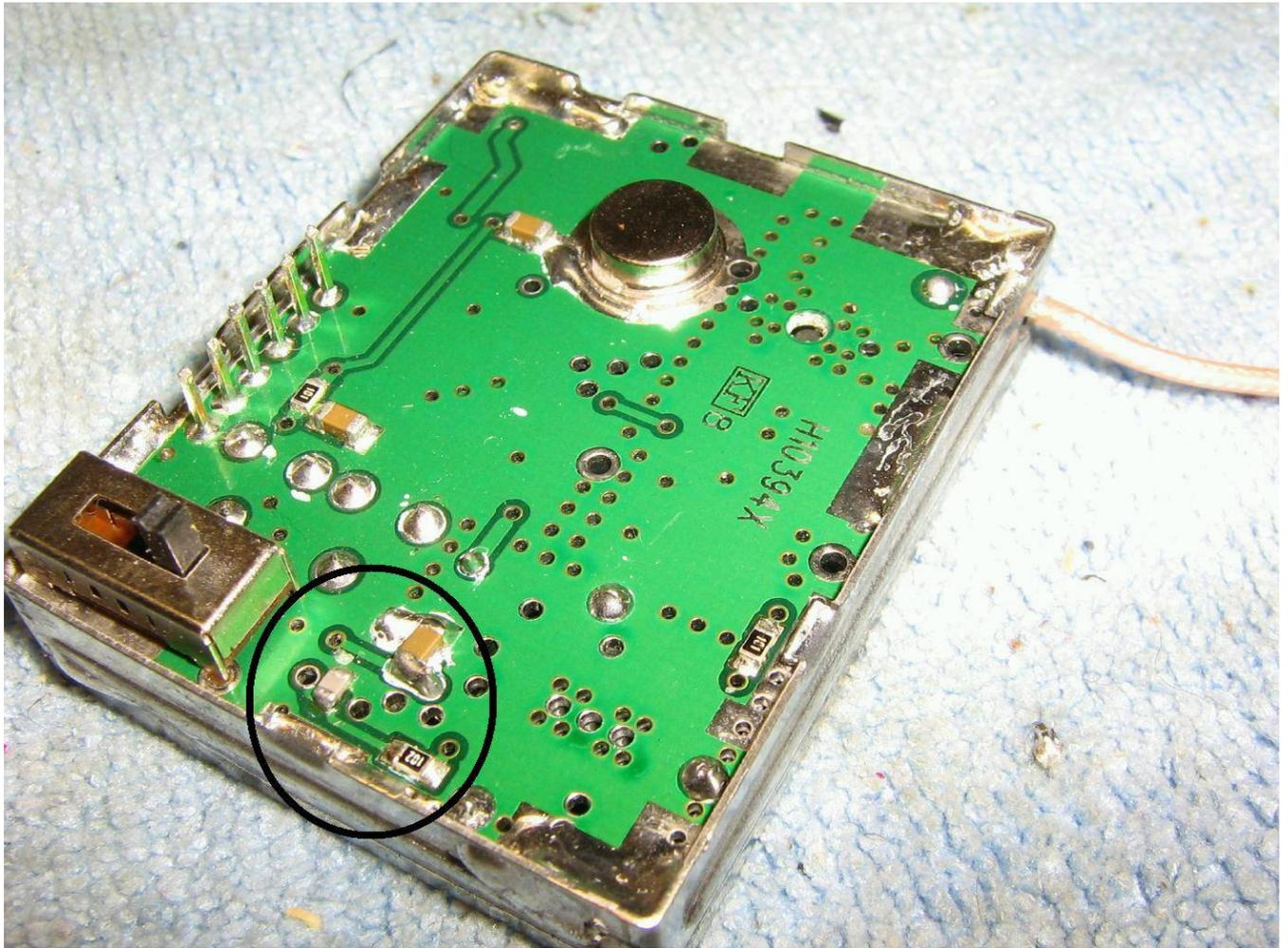
The idea is that by manually adjusting the voltage on this local oscillator tuning line, we can then make the module receive "out-of-band" video signals.



Alternate internal view of the 2.4 GHz video receiver module.

You'll need to remove the 2.4 GHz video receiver module to perform the next modifications.

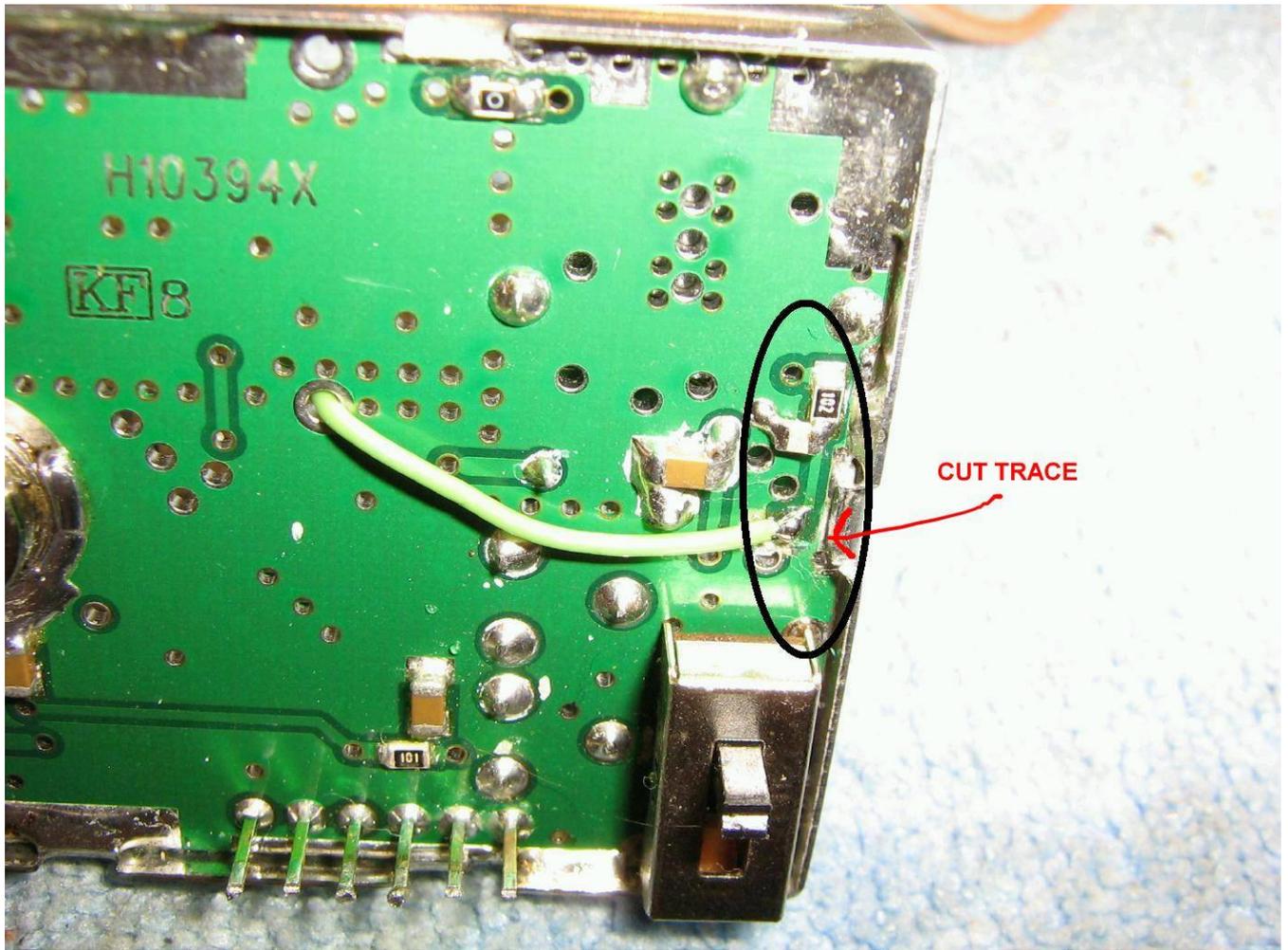
This is a little better view of the voltage-dividing resistors and the "Channel Select" switch pin-out.



Bottom view of the 2.4 GHz video receiver module.

The circled portion is the voltage tuning line input for the mixer/local oscillator section.

A series 1,000 ohm resistor and shunt capacitor help to form a low-pass filter to remove any noise on the tuning line.



Overview of the manual tuning modification.

You'll need to cut the trace on the voltage tuning line (right after the plated through-hole) and move the shunt capacitor next to the 1,000 ohm resistor.

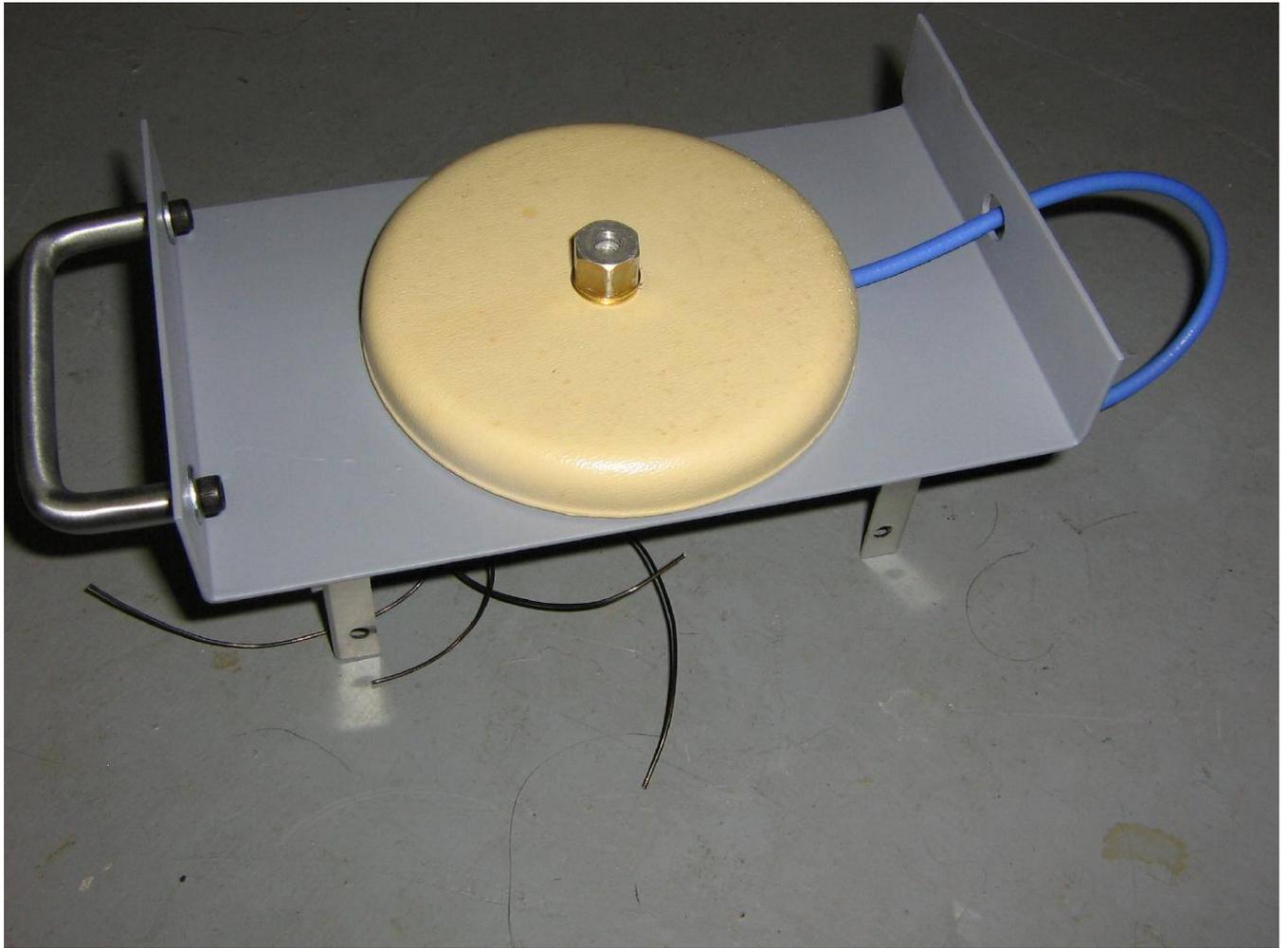
Then you'll solder an extension wire onto this "new" voltage tuning line and route it to the top of the board.



Overview of the "new" external voltage tuning line.

I ran it to a panel-mounted 1,000 pF feed-through capacitor. This capacitor is optional, but very helpful.

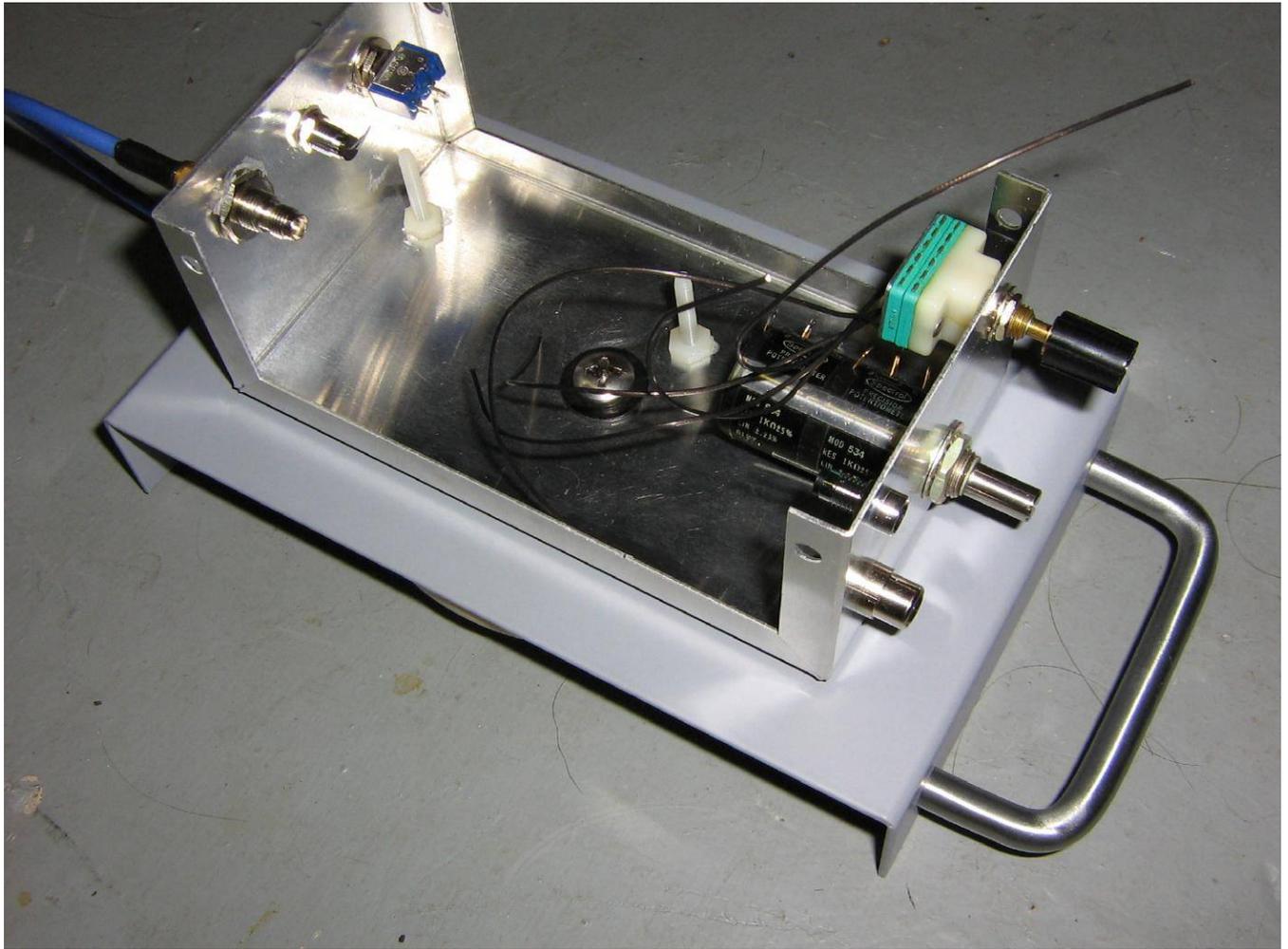
Also, you may wish to add a better piece of coax on the module's RF input. I added a piece of nice Teflon coax with a male SMA connector.



For this project, we'll mount the 2.4 GHz video receiver to the back of an old California Amplifier 2.5 GHz MMDS integrated downconverter and 22-element Yagi antenna.

You'll want to replace the stock coax on the Yagi with something of higher quality and with a RF connector. This will allow you to use the antenna for other projects, if so needed.

A handle was also added to the back plate of the Yagi antenna for mounting or holding.

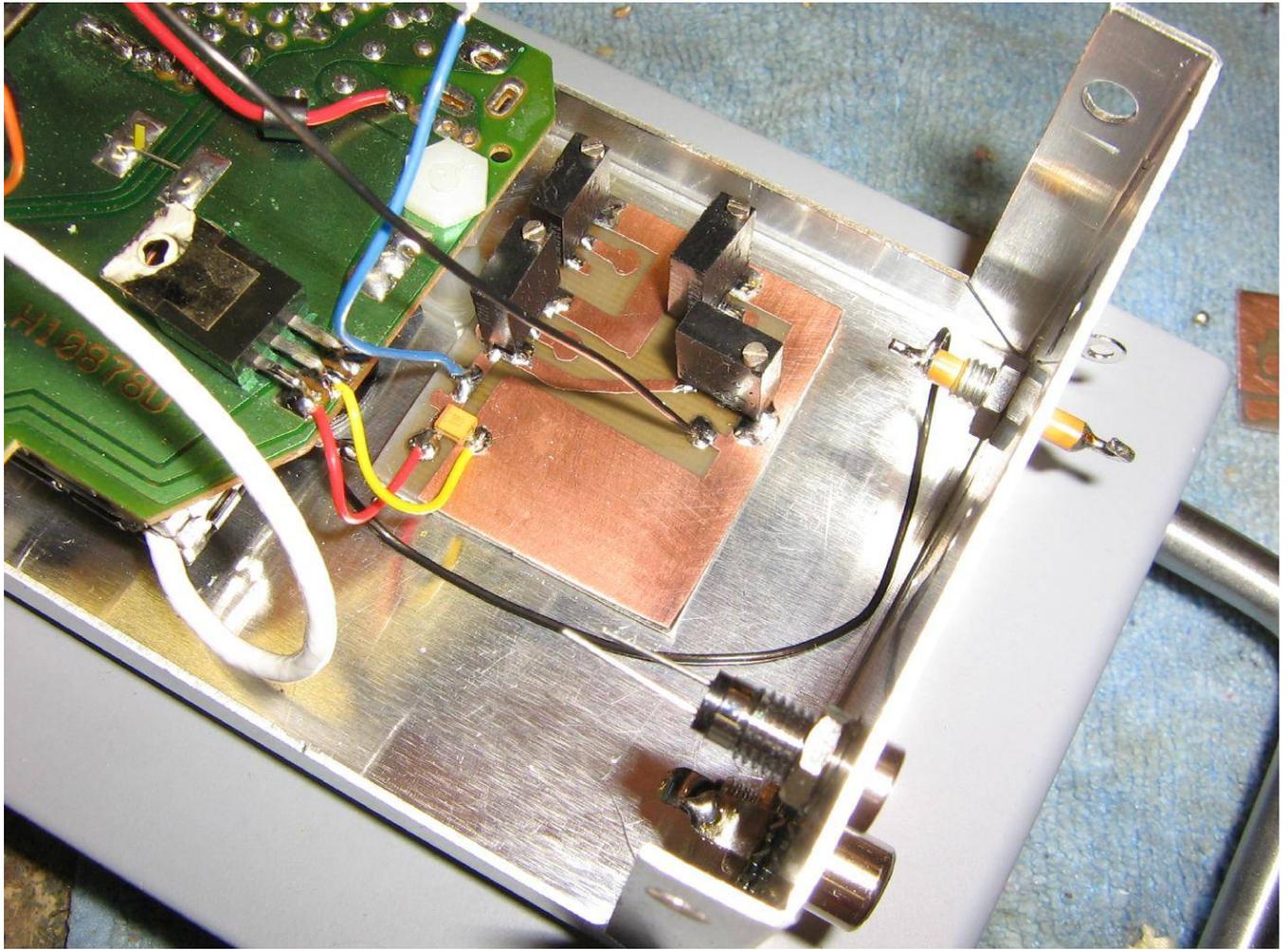


Case overview used to hold the modified VR36A receiver.

The stock downconverter was removed and a stainless steel 1/4–20 bolt was added to secure both the antenna parts and the aluminum project case. The circuit board of the VR36A will be mounted to the case using some nylon stand-offs and hardware.

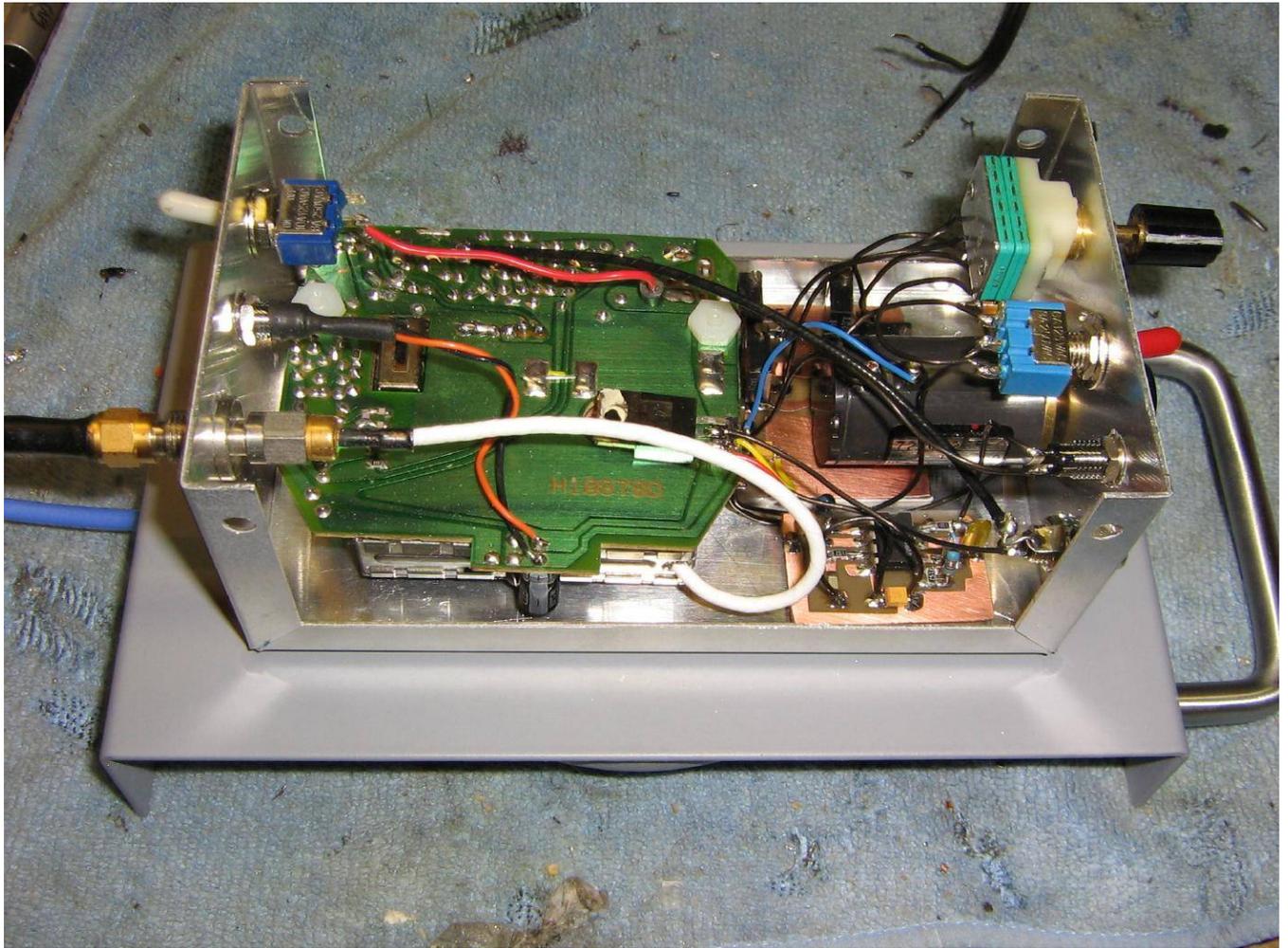
A panel-mount, feed-through female SMA-to-SMA connector is used to bring the RF signal into the module. Next to that is a panel-mounted LED and the power switch.

The panel-mount switch with the green back is a 4-position switch. Next to the switch is a multiturn 1,000 ohm potentiometer, and a RCA jack for the video output.



Overview of the potentiometers for setting the voltage levels which correspond to each of the four stock channels.

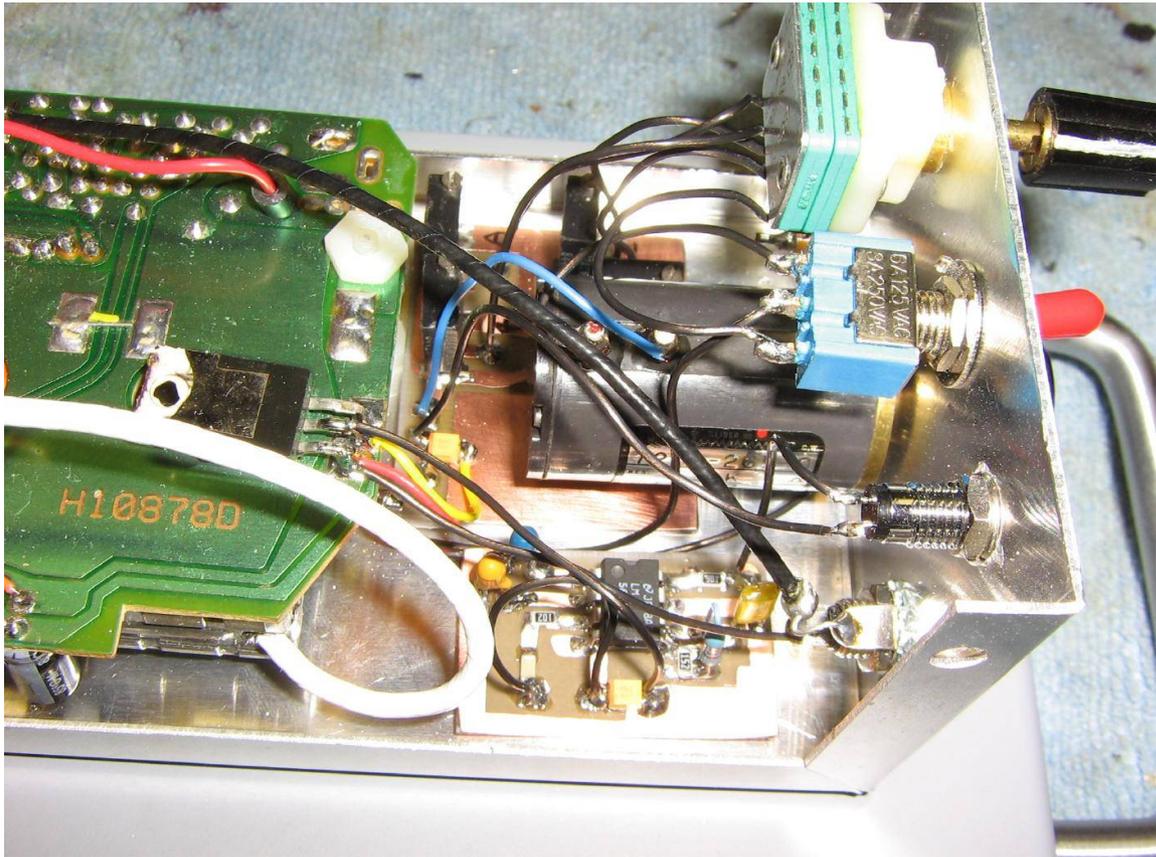
An optional feed-through capacitor (upper-right) was added as a test point to externally monitor the voltage on the module's tuning line.



Completed 'warspying' device overview.

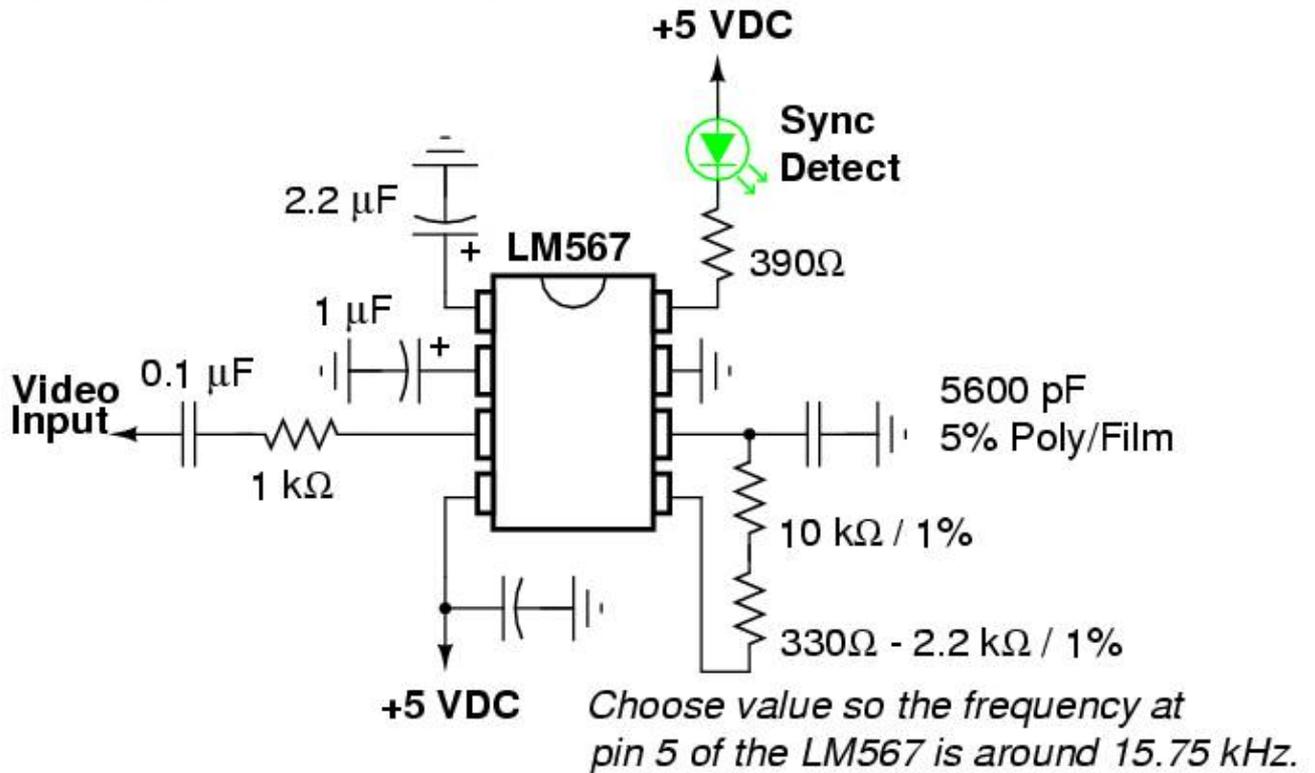
An optional 15.75 kHz horizontal synchronization detector circuit using a LM567 tone decoder was added to help determine if you are actually receiving a video signal.

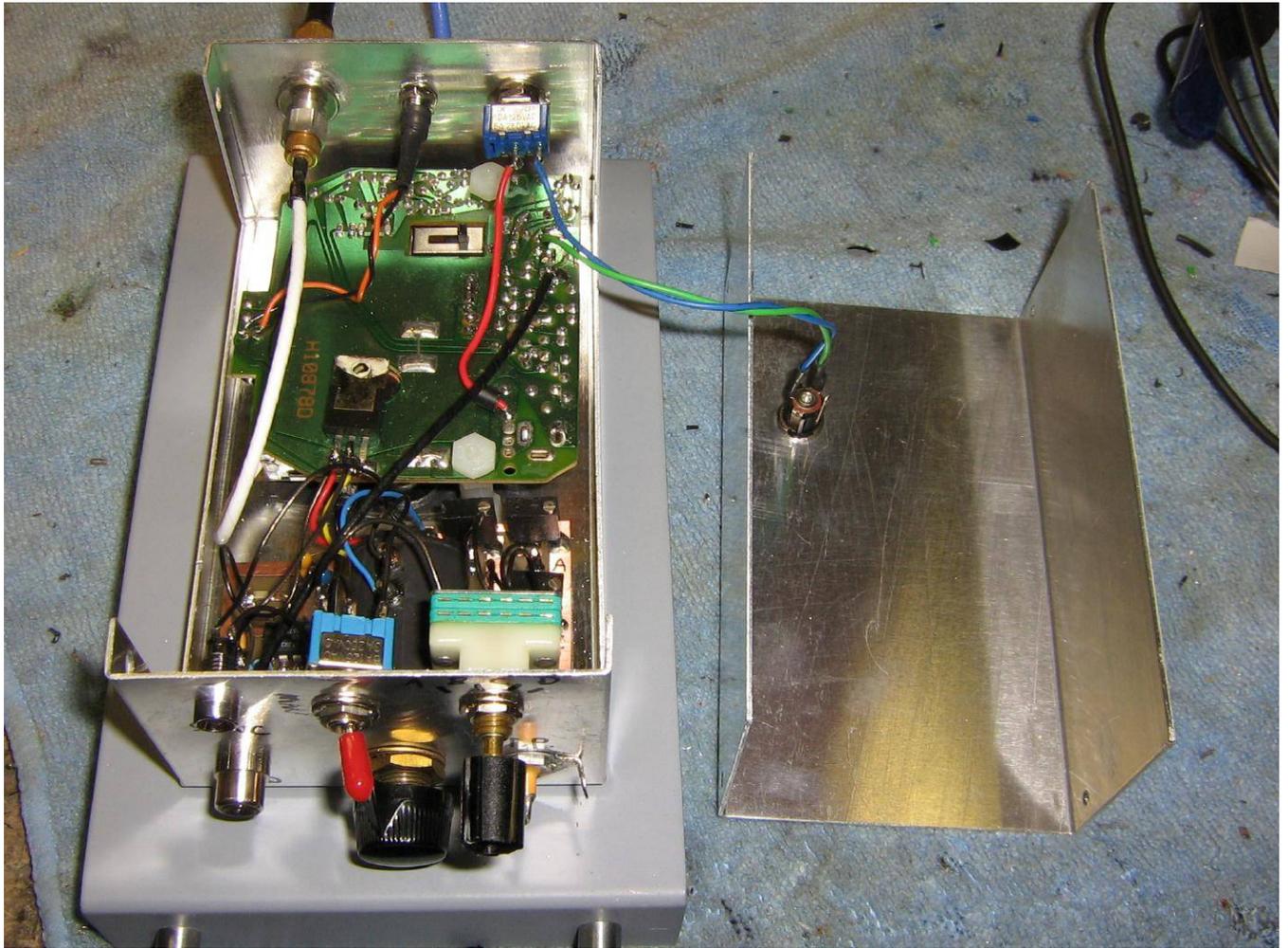
You should also try and replace the stock 7805 voltage regulator with one which has better noise and voltage stability specifications.



Closeup view.

15.575 kHz Horizontal Synchronization Frequency Detector

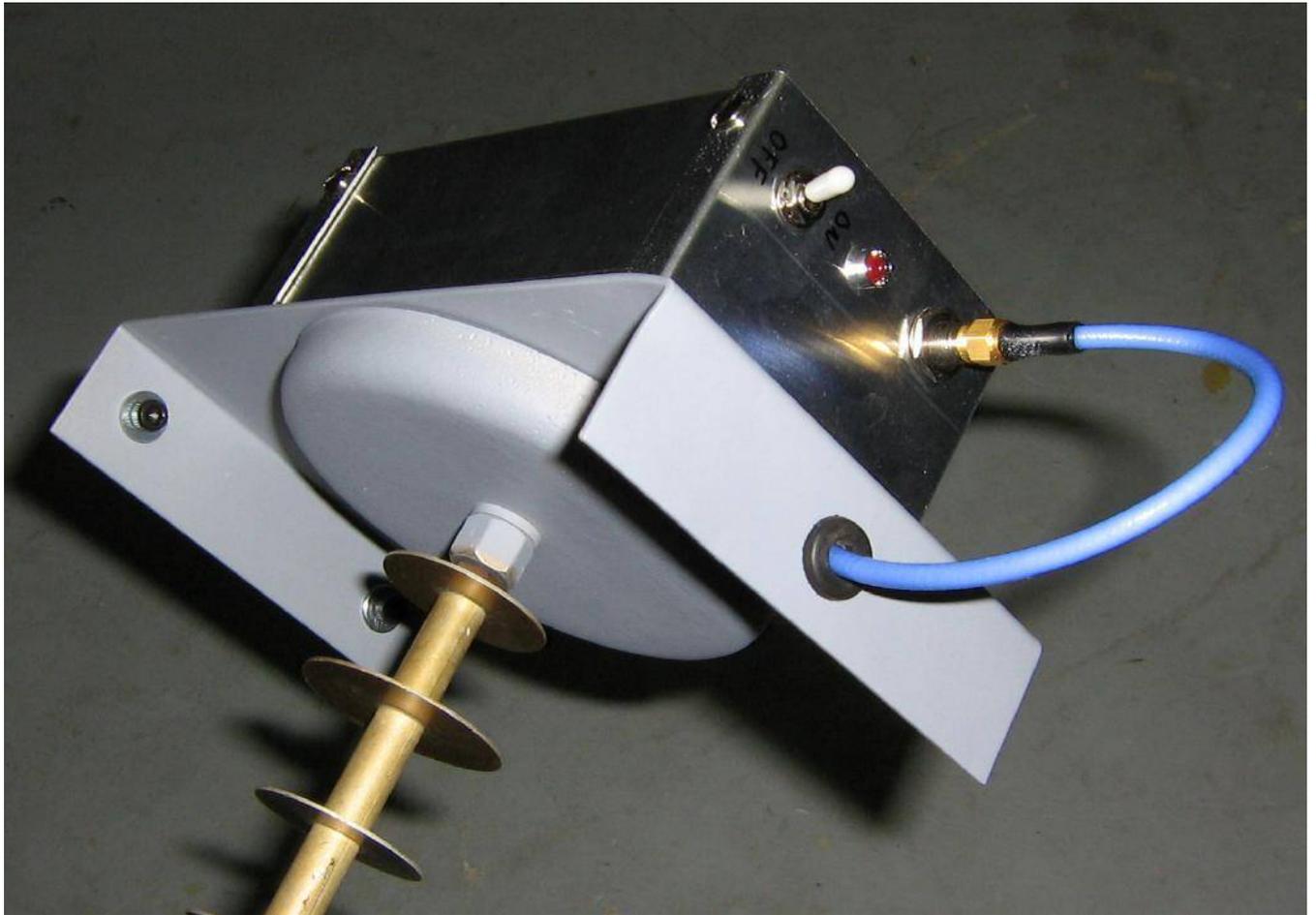




Alternate internal view.

Originally, I was going to use an internally-mounted 9 volt battery, but the current draw is quite high, 300 mA or so, and the battery would die quickly.

An external power jack was added to run the circuit from a 12 volt lead-acid battery pack or cigarette lighter.



Finished case overview.

Power switch, power LED, and SMA jack for RF input.

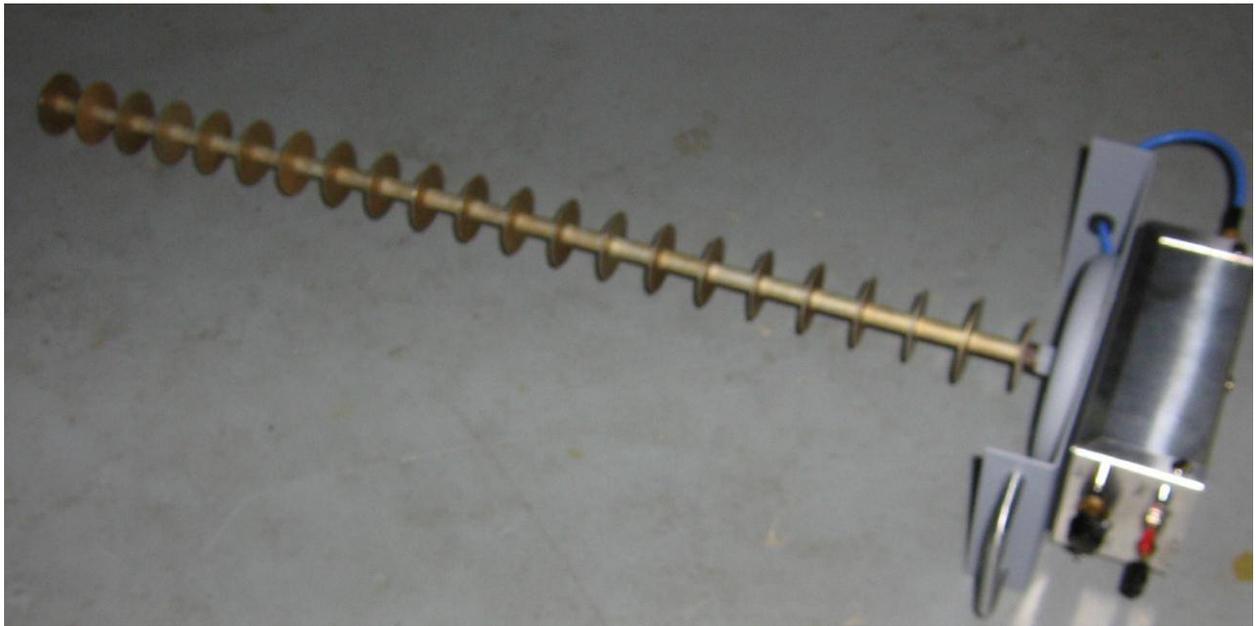


Finished case overview.

Video output and 15.75 kHz horizontal synchronization detection LED on the left.

Selector switch to choose between the four stock channels and manual tuning. The multiturn 1,000 ohm manual tuning potentiometer is in the middle.

The new 4-position channel select switch and the tuning voltage test point are on the right.



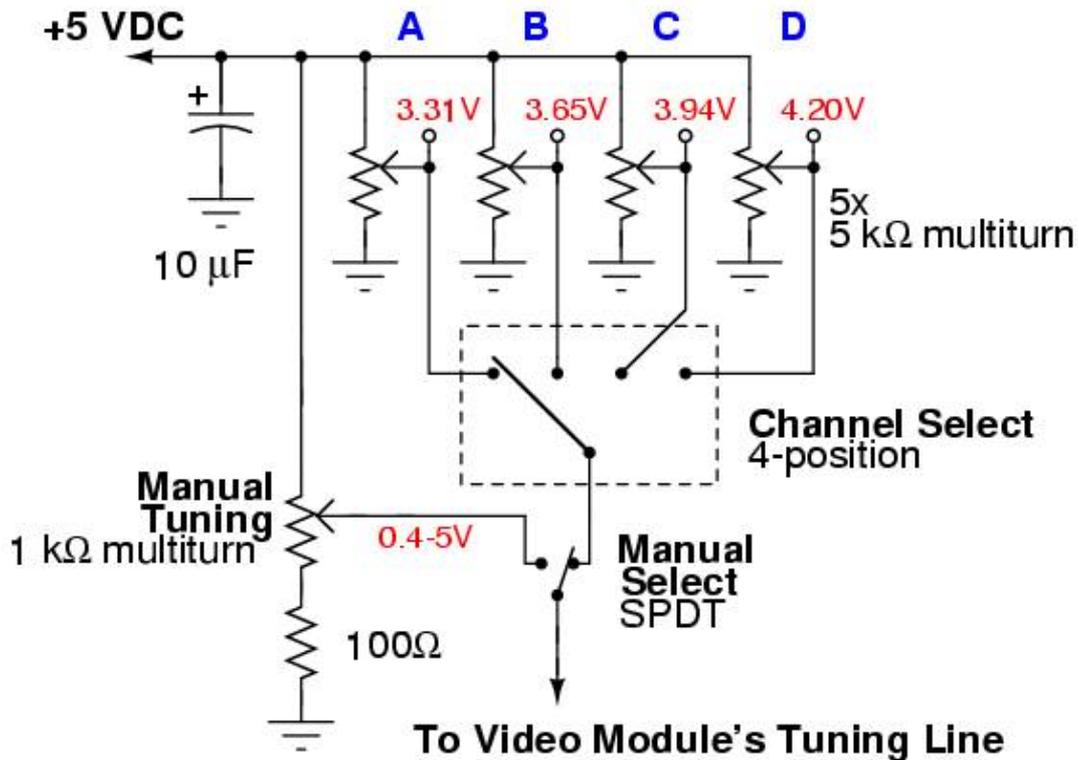
Finished overview.

The video output can be monitored via a battery-powered TV, or other monitor, with a "video input" jack.

The "Portable Video Camera Viewer" project discussed in *GBPPR 'Zine*, Issue #22 will also work.

"A" is the default channel for the corresponding X10 transmitters.

X10 Wireless Receiver Manual Tuning



WARSPYING



by Particle Bored

Are you having a hard time figuring out what to do with your X10 camera now that you are done playing practical jokes on friends and family? For less than \$50 you can put the X10 receiver in your car and begin screwing around with complete strangers.

Standard disclaimer: I don't accept responsibility for my own actions, so I definitely won't assume responsibility for yours. If TV's in vehicles are illegal in your area, or should you get decapitated from a TV flying around in your car it's your problem.

Here is what you will need to get started:
Jensen J53-BW TV/Monitor (only \$25 at Target)
X10 Receiver
DC Power cord with "L" connector
DC Power "Y" adapter
Velcro

The Jensen TV is a 5" black and white portable monitor that has both video and audio RCA input jacks. It can run on AC, DC, or batteries and comes with a car lighter adapter.

The X10 receiver is intended for indoor use, so it is shipped with only an AC adapter. If you look at the output of the adapter though, you'll see that it is 12 volt DC which means you can run the receiver straight off your car battery. Since I wanted the system to be easily removed, I decided to power it with another lighter cord (the one with the "L" connector). It is positive-tipped, so make sure you have the polarity right.

Now plug everything together. Nearly all of the connectors can only go in one place. The RCA connectors are fully color-coded, so if you

can't figure out how to do it, fire up the IM client on your Mac and ask your grandmother.

I mounted the monitor and receiver on my dashboard with Velcro. If this method obstructs your view you can put the monitor on the passenger seat or floor. Make sure you don't mount anything where it might hinder the deployment of an airbag.

Now hit the road. I found my first camera within 60 seconds on the very next block. I typically find one about every 15 minutes.

In closing here are a few things I learned the first day:

- Don't worry about the channel switch on your receiver - most folks leave it on the default channel "A".

- The transmitters have a range of only around 100 yards so you will need to be somewhat close to your target.

- You'll tend to get audio before video, so you'll know you are onto something when the static on the TV goes away. Keep your eyes on the road and pull over when you start receiving audio.

- You'll notice several definite patterns appear on the monitor at times. For example, I have seen both narrow and wide horizontal lines. If you identify the devices that cause them, write to the Letters section of *2600* and let everyone know. I would bet one of them is a 2.4 GHz cordless phone....

- I was able to get perfect cable TV twice. Is someone using wireless for extensions or something?

GBPPR Homebrew Radar Experiment

Magnetron Pulse Transformer

Overview

The magnetron pulse transformer is a passive device which couples both the high-voltage pulse from the modulator and low-voltage filament current to the radar magnetron's cathode/filament connection. This is another important section of our homebrew radar project, and another one which I have no idea how to build! The overall electrical concepts are well documented, but I've yet to find any decent documentation on all the nitty-gritty little details you need to build such a device.

The magnetron pulse transformer we'll be building will have a 1-to-4 "step-up" turns ratio. This is because our radar modulator outputs a 1,000 volt pulse and the 2.45 GHz magnetron we are using needs to see around 4,000 volts. The transformer's primary winding will be 10 turns of #20 enameled wire and the secondary will be 40 turns of bifilar-wound #18 enameled wire. The transformer's core will be from a salvaged computer monitor's (CRT) high-voltage switching power supply. The secondary winding will also need to carry the fairly high-current (10 Amps) for the magnetron's 3.3 VAC filament voltage. In order to maintain the sharp rise and fall times for the magnetron's trigger voltage pulses, and to avoid any distortion, the actual number of turns making up the transformer should be quite low. You'll also want to maintain low-leakage inductance and proper high-voltage isolation between the transformer's core itself and the primary and secondary windings. To help with high-voltage insulation within the transformer, you can wrap the core's legs and windings with several layers of Teflon plumber's tape. This tape will also protect the enameled wires from the ferrite core's sharp edges.

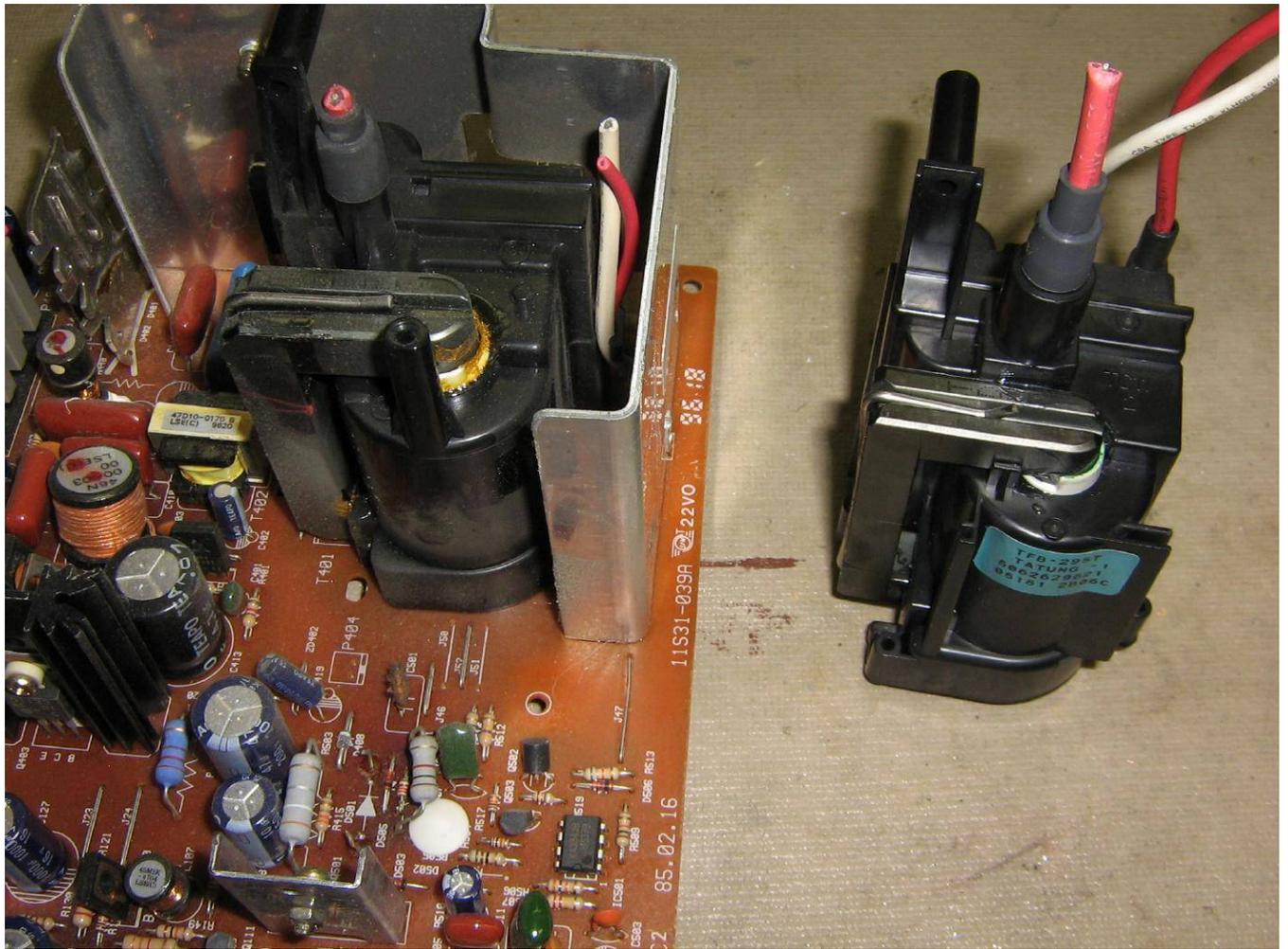
This transformer will also perform the proper impedance matching between the magnetron and the modulator's Pulse-Forming Network (PFN). Using a transformer with a 1-to-4 turns ratio will transform the 100 ohm source impedance of our PFN, which is connected to the primary, up to a load of around 1,600 ohms on the secondary. With an approximate 4,000 volt output and 1,600 ohm load impedance, the peak current through the magnetron will be around 2.5 Amps. Some magnetron's may not like this high of a current pulse, so there may be some experimenting still to come.

With an efficiency of around 40-50%, we could possibly get a microwave oven magnetron to emit a *peak* RF pulse between 4,000 and 5,000 watts for a microsecond or so. That is, of course, if the magnetron doesn't arc over or go into "mode" conditions where it doesn't oscillate or oscillates at the wrong frequency. That little 2.45 GHz CW magnetron in your kitchen really isn't made for this pulse application, but we'll try...

For the transformer's core, we'll be using the rectangular ferrite core from an old computer monitor's high-voltage "flyback" switching power supply. I have *no idea* if this is the proper ferrite core material to use, or if a powdered-iron core may be better, but you should be able to find these ferrite cores for free. Powdered-iron cores tend to handle higher temperatures a little better than ferrite cores and won't easily saturate under a high current load.

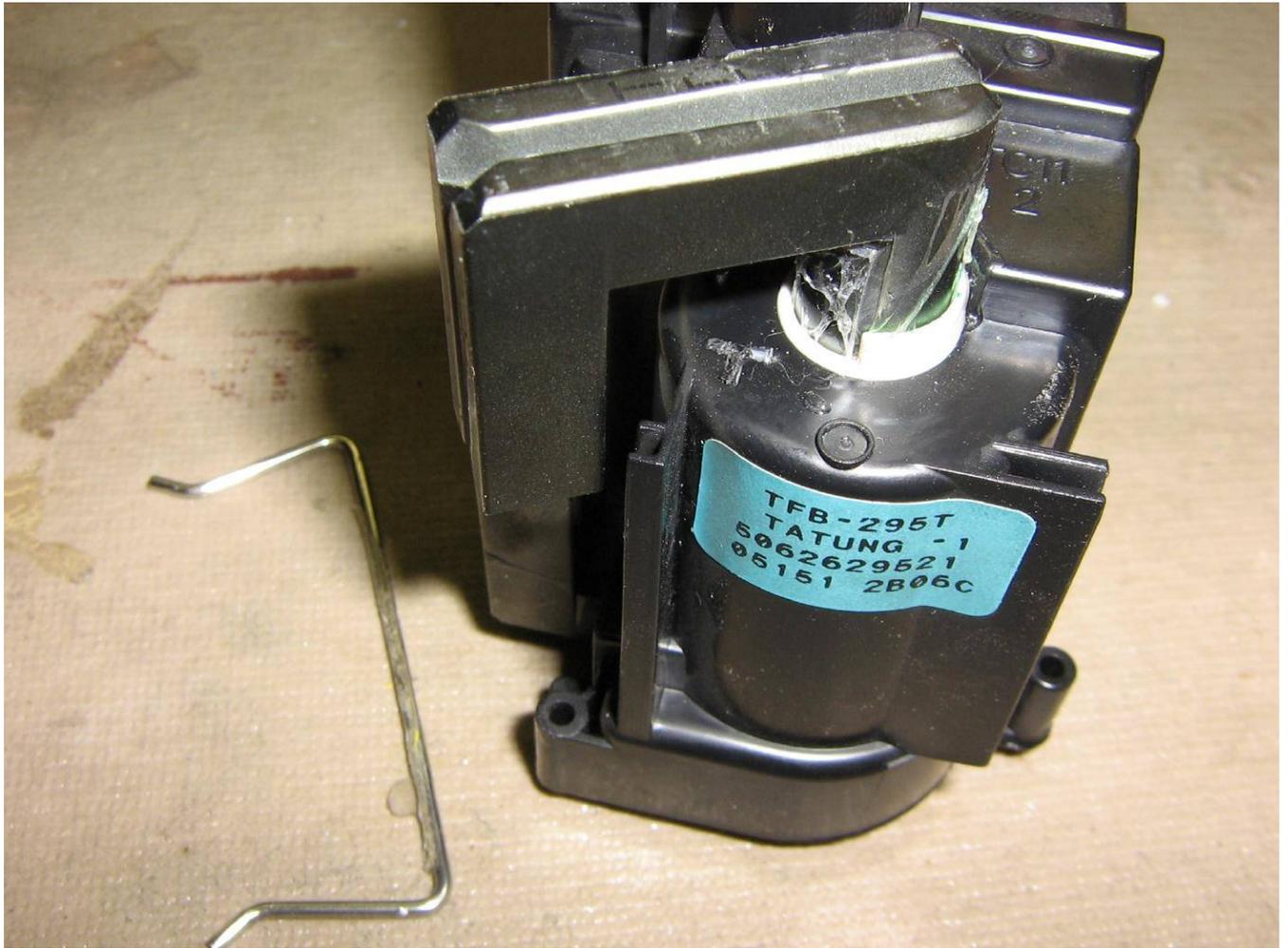
A standalone low-voltage (3.3 VAC) transformer will be needed for the magnetron's filament. You can sometimes find these transformers in older microwave ovens, or you can just tap the low-voltage winding from a regular microwave oven transformer. The transformer should have proper high-voltage (+4 kV) insulation.

Pictures & Construction Notes



The high-voltage "flyback" switching power supply section in an old CRT-based computer monitor.

The power supply's transformer windings are wrapped around a large ferrite core.



The ferrite core is split into two pieces and may be glued into place.

Remove the retaining clip and use a hot air gun to heat the entire transformer assembly.

Very gently tap the sides of the transformer with a rubber mallet to help loosen the glue. If the ferrite core does break, it is possible to glue the broken pieces back together, but this is not recommended!

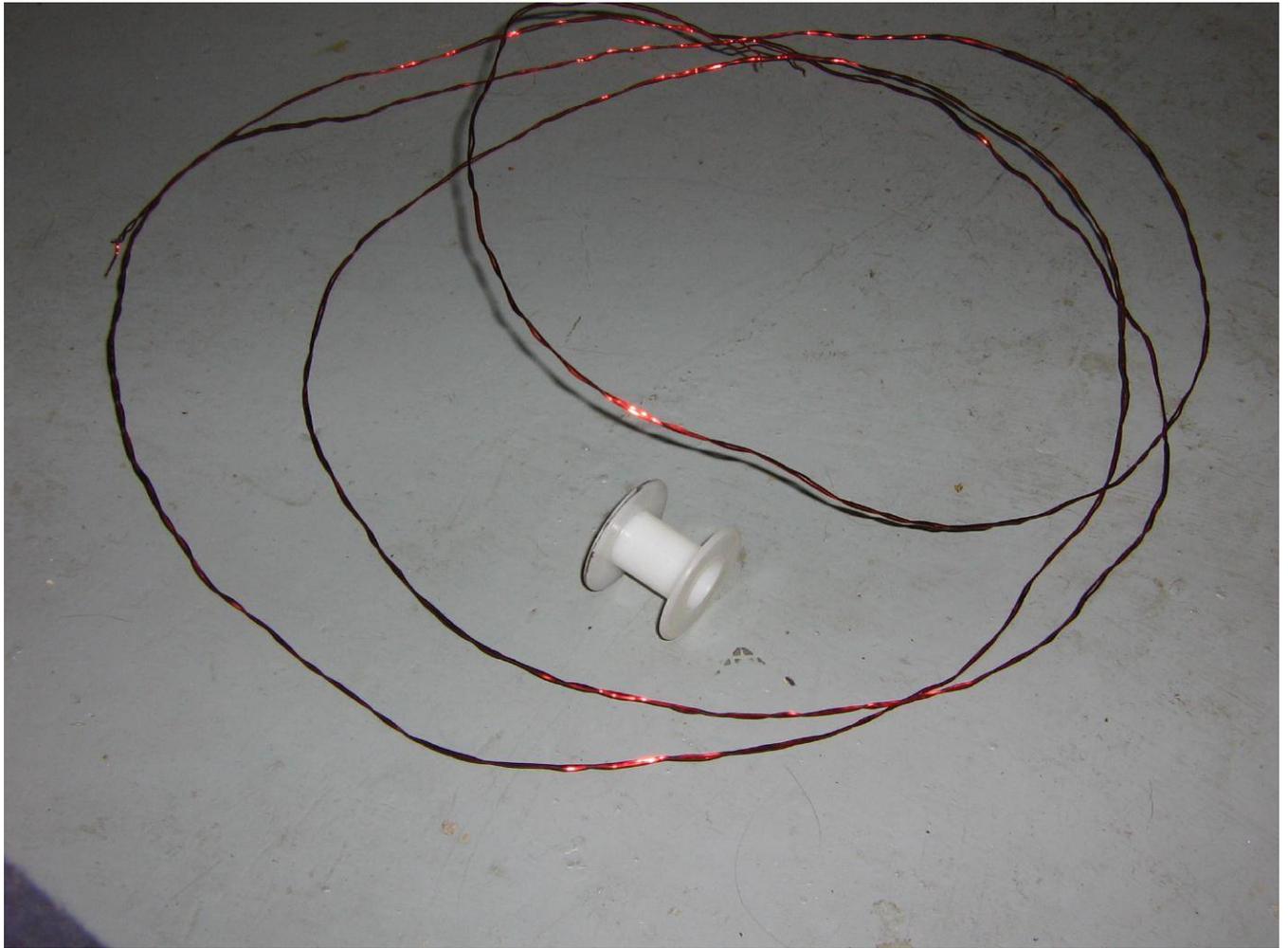


The enameled wire we'll be using and some example ferrite cores on the upper-left.

Believe it or not, you can buy small rolls of enameled wire at hobby stores like [Hobby Lobby](#) and [Michaels](#). They should stock different colors of #18 and #20 (and smaller gauges) of enameled wire for use in homemade jewelry and other stupid girl stuff.

For the secondary winding, try to use the largest wire gauge available to help reduce the voltage drop caused by the large current draw from the magnetron's filament.

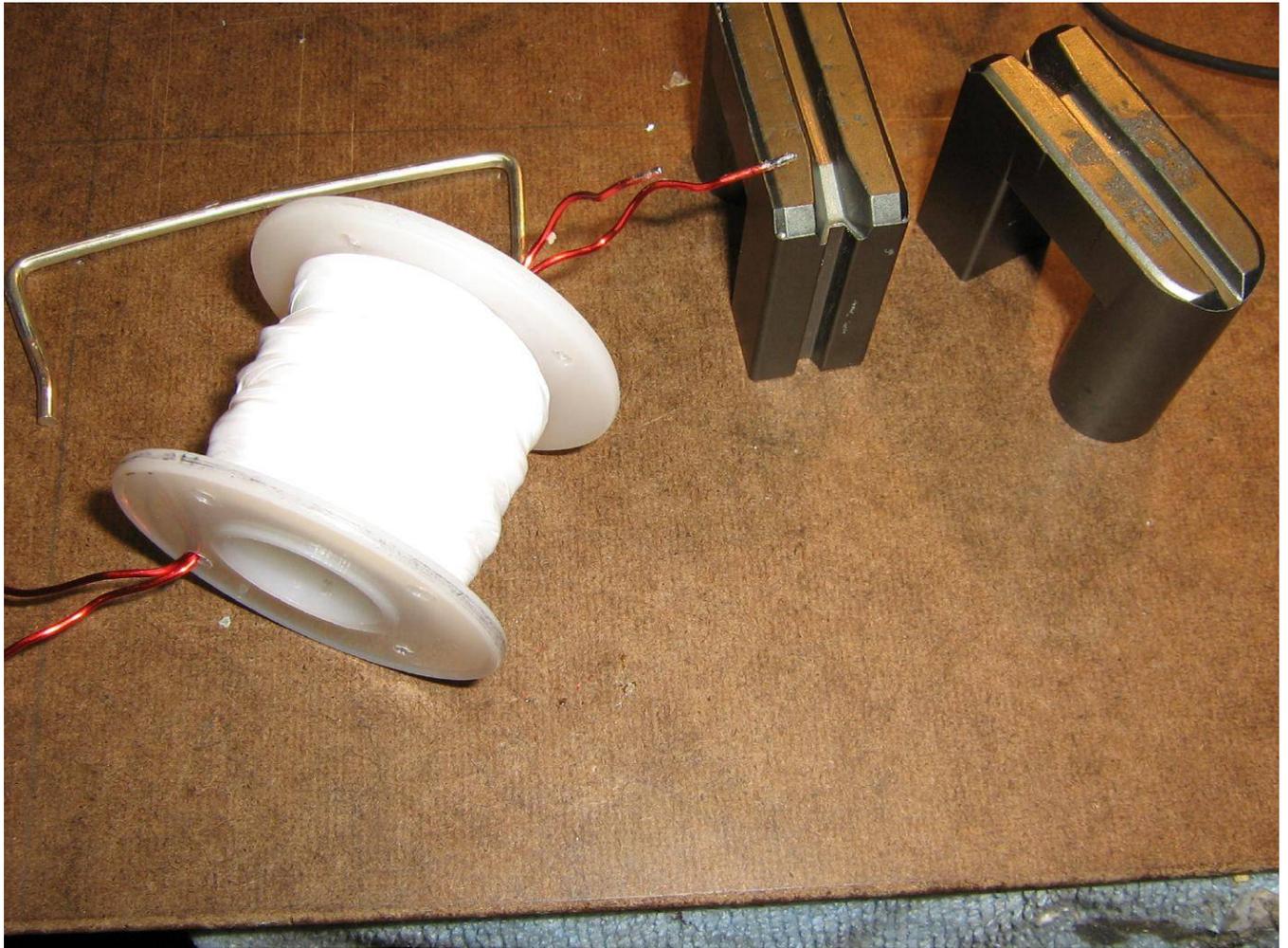
Try to use different colored wires to help identify each winding.



Bifilar wind (i.e. twist together) two pieces of #18 enameled wire.

I forget the final length you need, but I think it was around 13 feet.

You don't need very many "twists per inch," just loosely twist the two wires together to prevent them from coming apart.



We'll be wrapping this secondary winding on an old plastic bobbin from the pre-tinned #24 bus wire you can buy at Radio Shack (#278-1341).

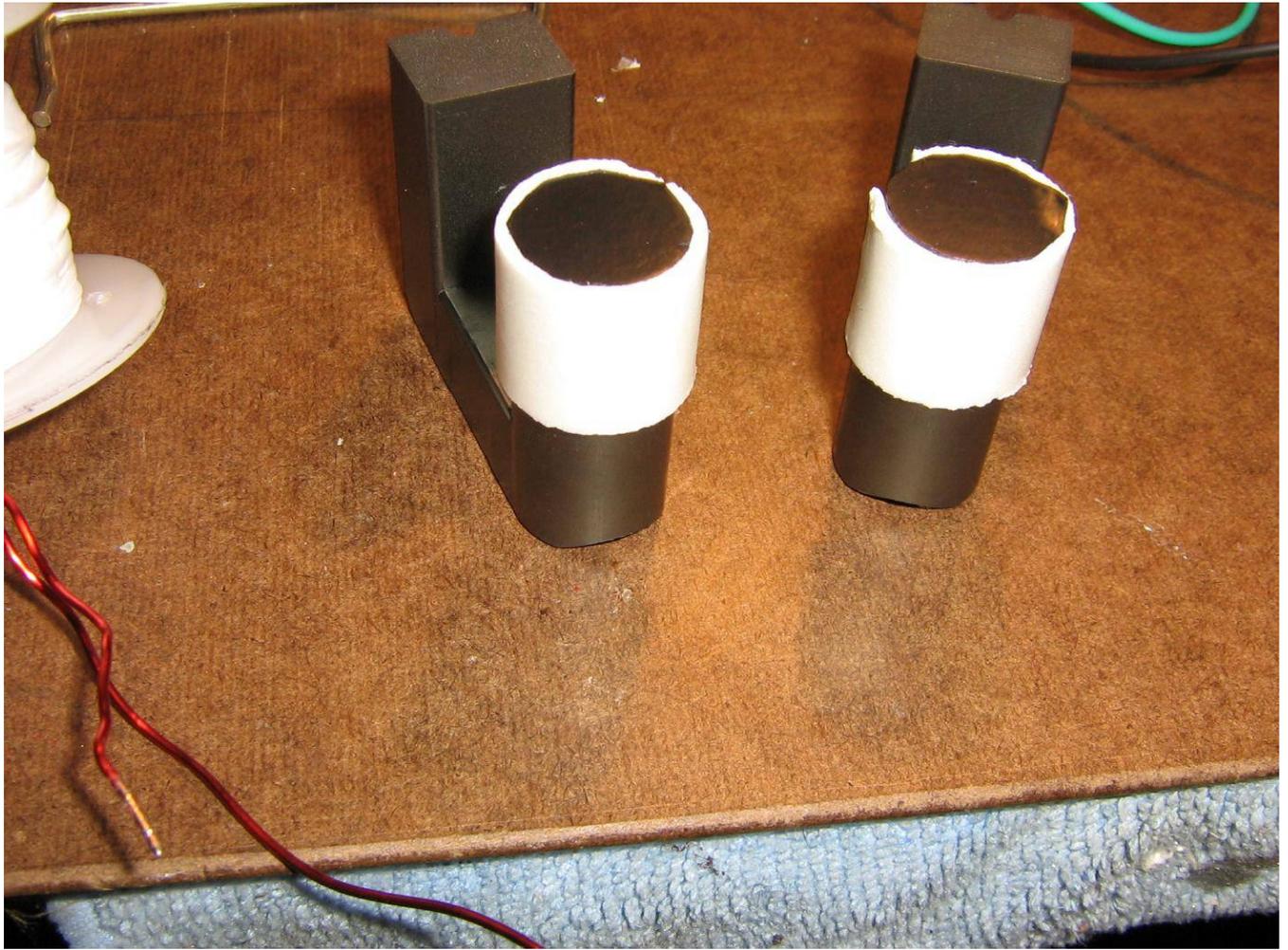
Wrap a layer of double-sided tape on the plastic bobbin before winding the 40 turns of the secondary to hold the initial windings in place.

When finished, wrap the entire coil with several layers of Teflon plumber's tape.



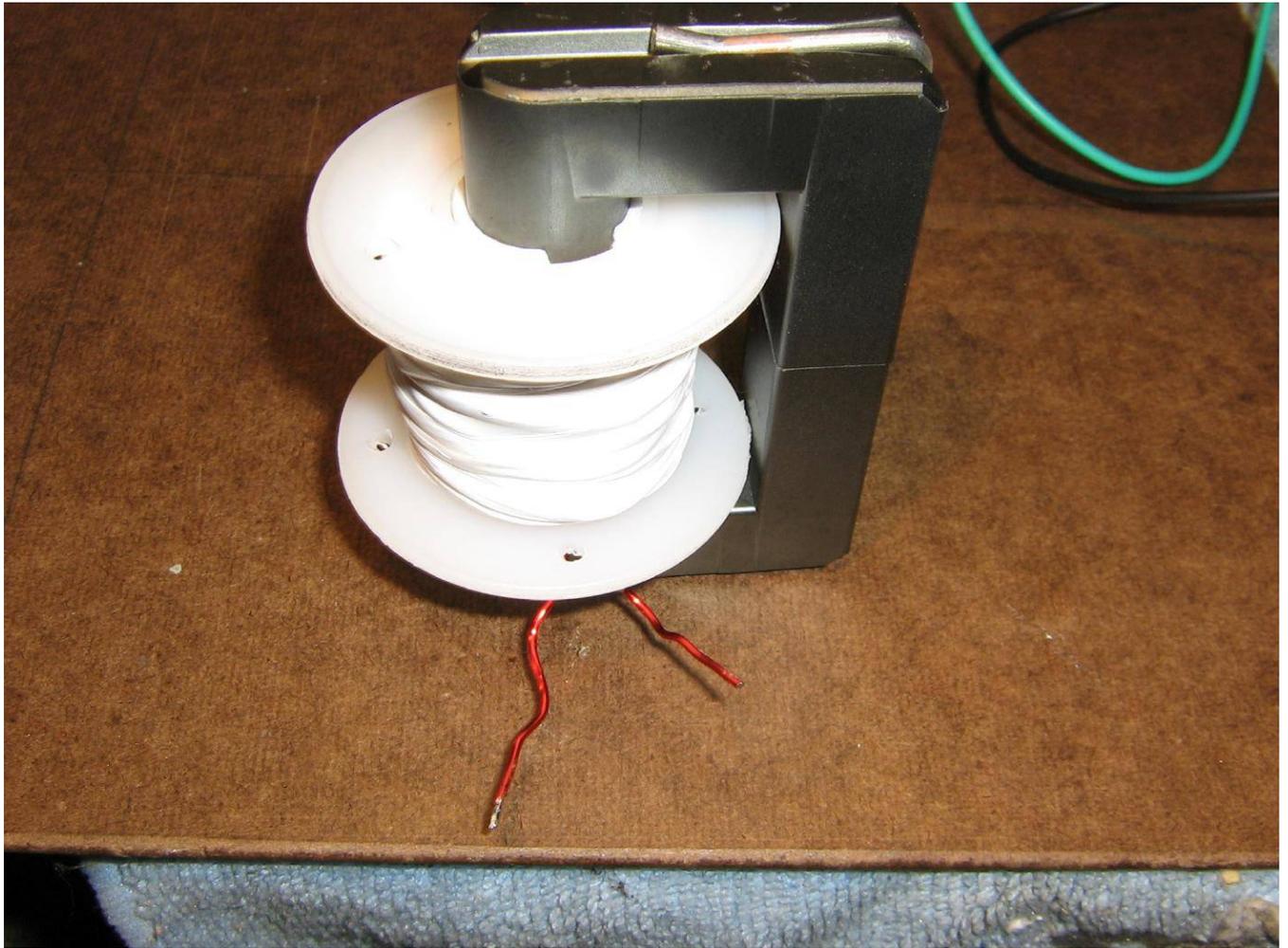
In order to keep the ferrite core from saturating, you can add a small air gap to one of the core's legs.

I have no idea how large this gap should be (the equations make no sense), so I just used two layers of 3M Super 88 electrical tape.



To secure the secondary coil to the ferrite core, wrap the legs with some double-sided tape.

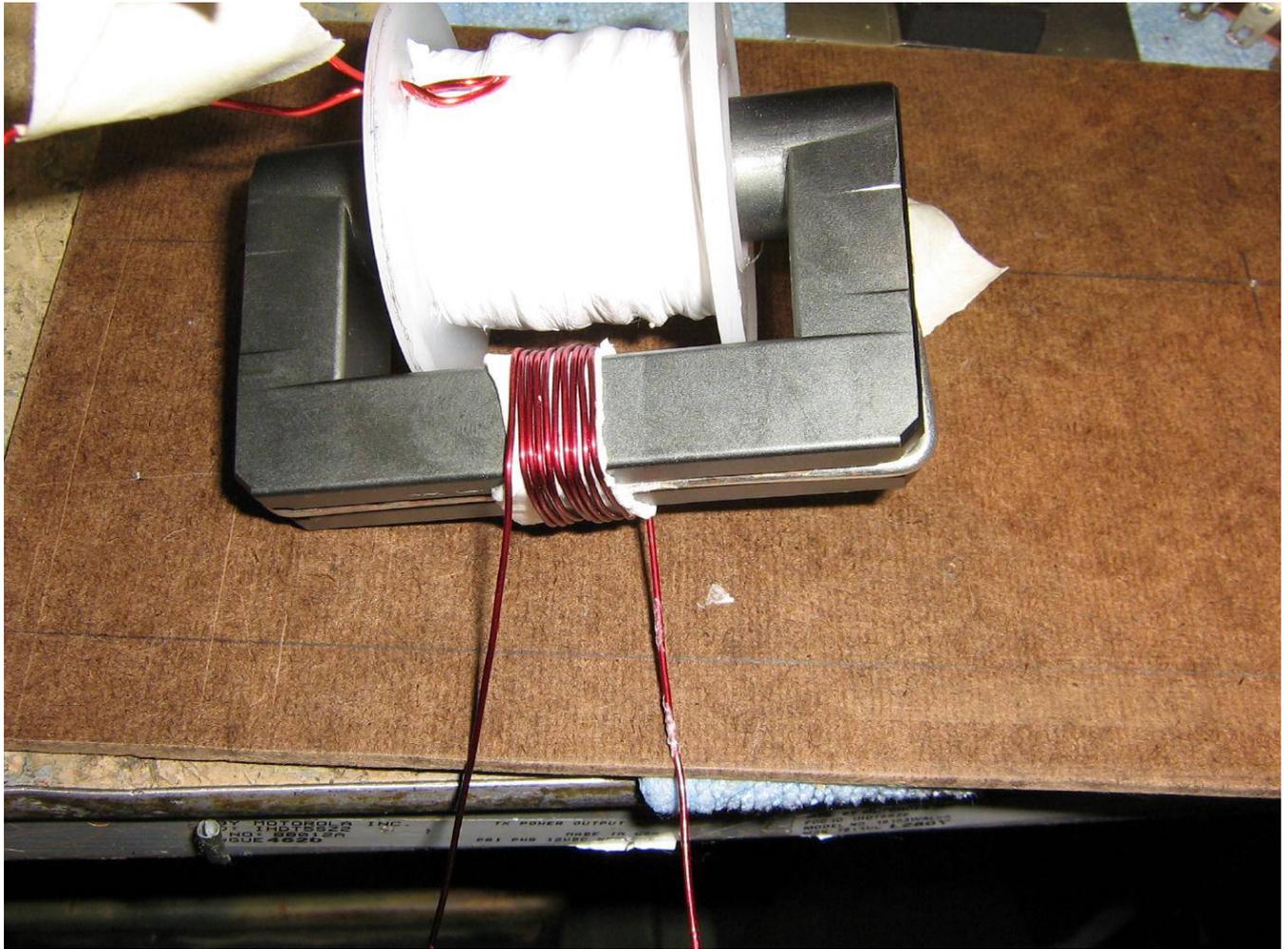
Add as many layers that are needed to prevent the coil assembly from moving.



Center the coil form around the ferrite core's legs using double-sided tape to fill any gaps.

Be sure to attach the ferrite core's retaining clip and identify and label the each of the wires which make up the primary and secondary windings.

You'll need to watch out for polarity issues when finally connecting the transformer.

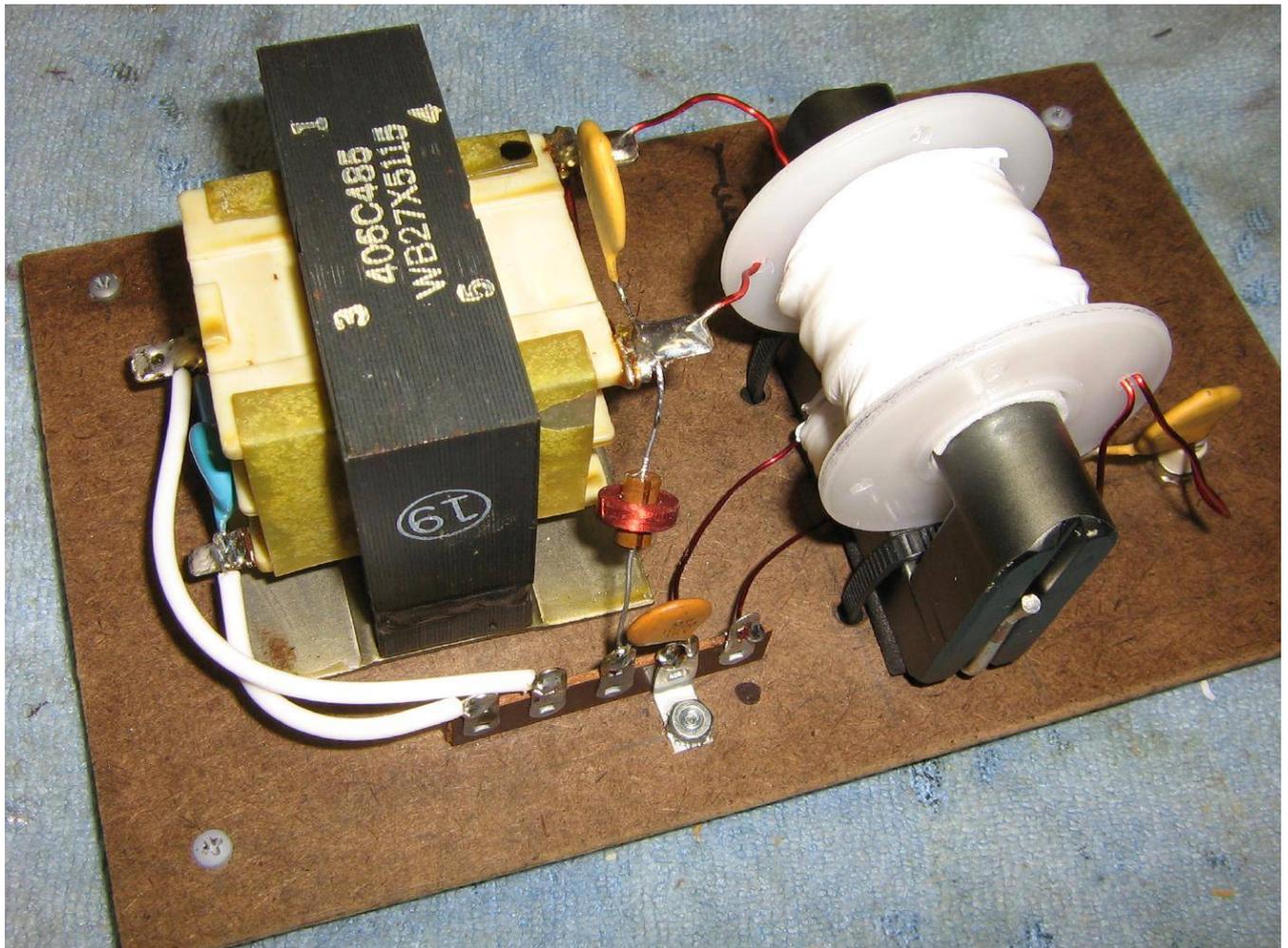


Winding the 10 turn primary.

Secure the wires using double-sided tape, then secure them with several layers of Teflon plumber's tape.

The final inductance measurements for this transformer were:

	<u>Turns</u>	<u>Wire Gauge</u>	<u>Measured Inductance</u>
Primary	10	#20	67 μ H
Secondary	40 bifilar	#18	620 μ H per winding



Completed magnetron pulse transformer with the matching filament transformer.

This entire assembly is mounted on some old clipboard material to help with proper high-voltage isolation. The ferrite core is secured using some pieces of foam and zip-ties.

The 3.3 VAC magnetron filament transformer is on the left, with its 120 VAC primary input connections brought out to some solder terminals (white wires).

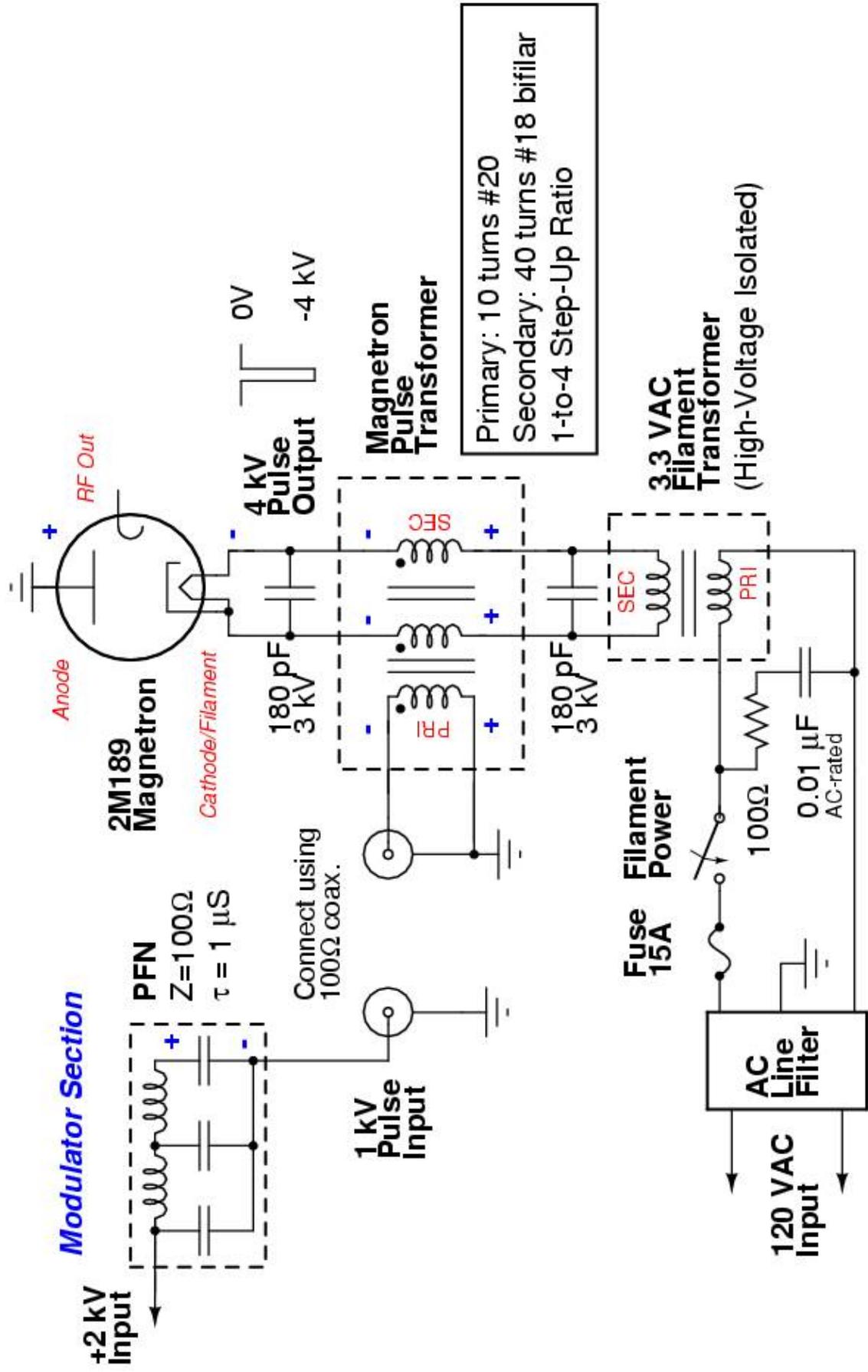
The 180 pF capacitors help to "even out" the voltage pulse between the two secondary windings before it is applied to the magnetron.

In the above photo, one of the secondary windings is tapped with a series 1 mH inductor and 0.01 μ F capacitor to ground. This forms a little low-pass filter to see if it's possible to measure the magnetron's average current. This is optional and very experimental right now.

I have no idea what ferrite material this transformer core is made out of, but an old issue of *QST* mentioned some of them use "Ferroxcube 1F19-3C6A" material.

The ferrite deflection yoke from around the neck of an old TV or computer monitor CRT may also work, and can also be found for free.

Magnetron Pulse Transformer Block Diagram



frequencies at a sufficiently high voltage exhibit a greater tendency for arcing and for ionizing the air than power line frequency.

As can be seen, a step-up transformer is used to bring the 50/60 Hz a.c. up to sufficient potential to produce continuous actuation of a spark gap. Such a spark gap acts as a rapid-fire switch, interrupting the current twice per cycle. These current waveforms are very steep and are able to shock-excite the resonant circuit at a low radio frequency. The nice thing about this technique is that the hazardous low frequency a.c. is completely isolated from the output. An ordinary automobile spark plug suffices well for experimental purposes. Also, a Model-T type induction coil can be used to operate the spark plug. In any event, optimum operation depends upon energy back-up and on satisfying the resonance of the secondary output winding. This may call for a bit of 'cut and try' regarding both the high voltage capacitor and the design of the radio frequency output transformer.

Transformer technique for skirting high voltage problems

An interesting and useful transformer technique derives from radar technology. In many systems, it is desirable to deliver high voltage pulses to a magnetron which then becomes the source of the microwave radiation. The pulses are formed by a high power modulator at a selected pulse repetition rate and applied to the magnetron through a pulse transformer. As the magnetron has the format of a simple diode vacuum tube, the circuit implementation appears straightforward enough. Some practical problems loom up, however.

A more or less garden variety pulse transformer with an appropriate step-up ratio might be considered to supply the 20 kV or so pulses between the cathode and anode structure of the magnetron. Because of the magnetron's construction, it is common practice to apply negative-going pulses to the cathode filament terminal thereby enabling the anode structure together with the metal outer portion of the tube to be at ground potential. This is in the interests of safety and also obviates any need to insulate the magnetron from chassis metal. Insofar as concerns the operation of the tube, it 'sees' the required positive anode with respect to cathode polarity condition.

It can be seen by referring to Fig. 5.4 that the use of a two-winding pulse transformer would result in the filament being at a very high voltage with respect to ground. This, of course, would call for a large and costly filament transformer with a high voltage insulated secondary winding. Even if this 'brute force' technique were pursued, it is likely that there would be problems because of degradation of the pulse shape. Fortunately, a clever deployment of a three-winding pulse transformer can allow use of an ordinary filament transformer and at the same time enable the magnetron to operate with its anode structure at ground potential.

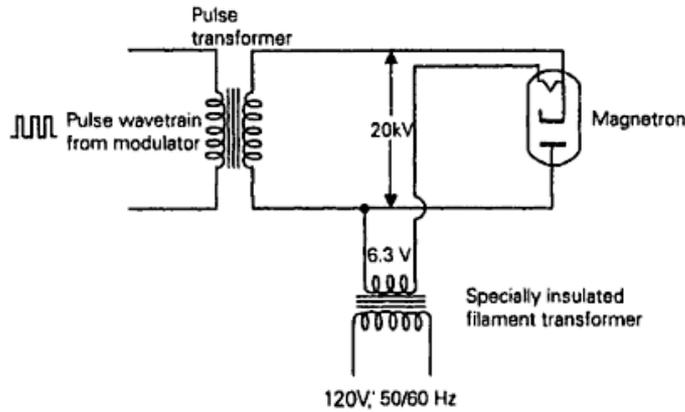


Figure 5.4 'Brute-force' circuitry for the operation of a magnetron. Although conceptually simple, this arrangement poses size, weight and cost problems; moreover, it would not be easy to preserve pulse shape fidelity. The prime difficulty centres around the required high voltage insulation for the secondary winding of the filament transformer. Note that the pulse transformer secondary must be wound with wire capable of carrying the filament current of the magnetron.

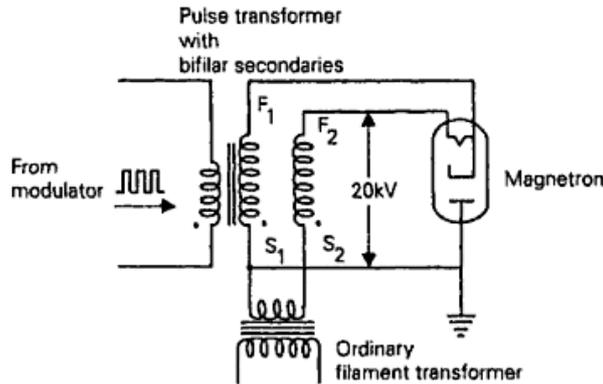


Figure 5.5 Magnetron drive scheme using three-winding pulse transformer. The bifilar-wound secondaries remove the high voltage insulation requirement from the filament transformer. At the same time, the anode structure of the magnetron operates at ground potential.

A basic circuit of a three-winding pulse transformer used for driving a microwave magnetron is shown in Fig. 5.5. The two secondary windings are bifilar-wound with conductor sizes capable of carrying the magnetron filament current. Because these secondaries are identical, there is zero

potential between winding ends S_1 and S_2 . Similarly, there is zero potential between winding ends F_1 and F_2 . Note that the filament transformer 'sees' only ground or near ground potential. Therefore, no high voltage insulation is needed in the construction of the filament transformer. The anode structure of the magnetron is also at ground potential, but negatively polarized high voltage is applied to its cathode. This provides the same operation one would expect from a grounded cathode circuit with positive anode.

Overall, this transformer scheme leads to a system featuring safety, reliability, freedom from flash-overs and savings in cost and weight. This setup also proves helpful in attaining pulse integrity of the microwave bursts. The phasing-dots depicted for the three windings are proper for a modulator delivering positive-going pulses to the primary. For negatively-going modulation pulses, the phasing of the primary winding would be reversed. (Or, alternatively, the phasing of the two secondaries could be reversed *as a pair*.)

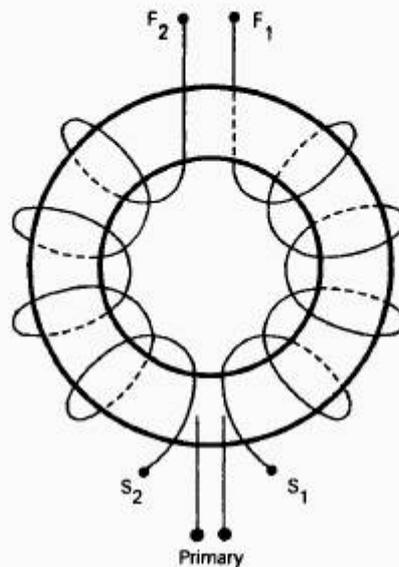


Figure 5.6 An alternative winding format for a pulse transformer. Note that one secondary is wound in a clockwise direction, while its mate is wound in a counter clockwise direction. In operation, there is zero potential between F_2 and F_1 ; likewise, there is zero potential between S_2 and S_1 . This transformer provides the same features as the bifilar-wound type. The construction utilizes insulation between the core and the primary and then again between the primary and the secondaries.

An alternative winding format for a high voltage pulse transformer is shown in Fig. 5.6. The circuit connections remain the same as the transformer shown in Fig. 5.5 except that bifilar windings are not used for the secondaries. Instead, the secondaries comprise two separate windings.

These windings are wound in *opposite* directions. In Fig. 5.6 the primary winding is not seen because it is beneath the insulation that separates the primary from the secondaries. As with the bifilar type, this pulse transformer enables the anode structure of a magnetron to be at ground potential, with negatively polarized pulses applied to the cathode. This pulse transformer also frees the magnetron filament transformer from requiring high voltage insulation.

Both of these pulse transformers have been commonly made with step-up ratios of 4 or 5 to 1. The 20 kV, or so, developed in the secondaries has been found convenient for popular magnetrons. At the same time, 4 or 5 kV has been readily forthcoming from modulators feeding the primary. The experimenter may wish to incorporate these winding techniques in other high voltage applications such as photo-flash, laser or X-ray apparatus.

A novel winding pattern

At high radio frequencies, certain departures from conventional practice often pay dividends in performance. Consider, for example, the two toroidal transformers shown in Fig. 5.7. Both have *bifilar* windings and both have one to one transformation ratios. The transformer at A may be said to be conventionally wound. It is good in many respects and will be found to have tight coupling and minimal leakage inductance. However, at high frequencies and high power levels, the capacitance between the physically-close leads can prove troublesome. Because the potential between the start and finish ends of the windings can be quite high, a very small capacitance is sufficient to produce an undesired resonance or to limit the tuning range. Even worse, there is the possibility of *voltage breakdown* and subsequent arcing.

Transformer B retains the good features of transformer A but the start and finish leads of the windings are physically far apart. The capacitive effect prevalent in transformer A is practically absent. Also, the likelihood of *arcing* is greatly reduced. As in transformer A, transformer B utilizes almost the entire core. The electromagnetic operation of the two transformers is practically identical, despite their different winding patterns.

Note what has been done in the winding of transformer B. Half of the winding is in one direction and half is in the opposite direction. Contrary to one's first thought, this does not bring about cancellation of the inductance. Indeed, overall inductance is about N^2 or four times the inductance of each half-winding. This is due to the manner in which the series connection of the two half-windings is made. One might say that the phasing of the two half-windings is additive. If it is practically feasible, it is a good idea to have the interconnecting coil segment go right across the central region of the toroid as depicted in transformer B. Otherwise, there is nothing remarkable about this winding technique. At lower frequencies and/or power levels

it might show no advantages. Also, either type may prove best suited to a particular PC board layout.

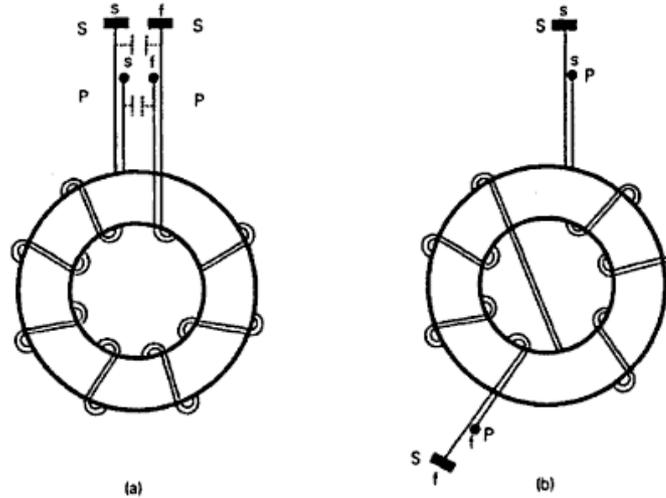


Figure 5.7 Winding techniques for high frequency toroidal transformers. Both are 1:1 bifilar-wound types, but with different winding patterns. (a) This is a conventional winding. Note the physical proximity of the start and finish leads in both primary and secondary windings. At high frequencies, these lead capacitances can exert strong effects on tuning, broadbanding and Q values. In transmitters, arc-overs can occur because the highest RF potentials exist between these leads. (b) With this super toroid winding pattern, the start and finish leads are far apart. End lead capacitance is reduced to a negligible level and voltage arc-over is no longer likely.

Other techniques for high voltage transformation

Modern versions of the Tesla coil can make use of solid-state devices to generate the harmonic-rich pulse to excite the primary of the Tesla coil. (Of course, the so-called Tesla coil is actually an RF transformer.) Perhaps, however, most of these implementations more closely resemble the flyback circuits used to generate high voltage in television sets. It is not easy to replace a spark gap or a mechanical interruptor with a solid-state device when truly high voltage is required from the Tesla coil arrangement and attempts to do so remain on an experimental basis. The problems are with the rise and fall times of such devices as Triacs, SCRs, GTOs and IGBTs. Power MOSFETs are faster and lend themselves to easy paralleling.

A compromise can be made by using any of the above devices in conjunction with a step-up transformer to operate a spark gap. The only

AT&T's "Customer Not Ready" Process for Switch Translations

Overview

This document will outline the changes that need to be made to switch translations on AT&T's Prime trunk and line services to complete the "Customer Not Ready" process.

The Customer Not Ready (CNR) process allows for billing the customer for the installed circuit 30 calendar days after the Local Exchange Carrier's Concurred Due Date (LCDD), even if the customer is not ready to accept the service. All efforts will be made to work with the customer to get them to accept the circuit on the due date and within 30 calendar days after the due date expires. If the coordinated efforts are not effective, the AT&T's Provisioning Service will begin billing the customer for the circuit (CNR billing) 30 calendar days after the LEC's concurred due date.

Part 1: DMS Switch

Step One *(Applicable to Prime Digital, PrimeXpress, PrimePlex, and PrimeConnect trunks)*

Change the Billing Telephone Number (BTN) in the translation(s) to the provided AT&T Local Network Service's telephone number.

Position on the customer's CLLI in table TRKGRP (Trunk Group):

```
-----  
# The BTN in this PrimeXpress example is: 4102295900  
>TABLE TRKGRP  
>POS CYVLMDDKHA1_2W  
CYVLMDDKHA1_2W PX 0 NPDGP NCRT 2W NIL ASEQ N NC0003 CYVL 410 410 LCL NONE RTE1 CYVL N N 759  
LOCL 4102295900 NODIALTN N Y 0222 Y L238 N $  
  
# The BTN in this PrimePlex PRI example is: 4433943737  
>TABLE TRKGRP  
>POS OWMLMDFHHA0_PRI  
OWMLMDFHHA0_PRI PRA 0 NPDGP NCRT ASEQ 4433943737 (PRI1 335)$ $  
-----
```

Use the table editor command `CHA` to change the "BILLDN" field.

Step Two

Remove any Telephone Numbers (TN) which may be in the routing tables.

Verify that there are no TNs (AT&T Local Network Services or ported) in the switch routing to customer trunks:

```
-----  
>TABLE DNROUTE  
>LIS ALL(4 EQ IBNRTE/2/3 XXXX)  
-----
```

Remove any TNs associated with the customer's route(s) in `SERVORD` using the `OUTDN` command. Do *not* delete from table `DNROUTE` (Directory Number Route). This includes any local TNs.

Step Three

Populate critical dates and update the order log.

Complete the TDD critical date and include in the Access Service Request (ASR) log notes the following:

- The Local Network Service TN that was added to any translations.
- If all TNs routing to customer have been removed.
- Full customer name and 10 digit phone number.

Step One *(Applicable to PrimePath, Prime NBX, and PrimePath NBX trunks)*

Add the Special Billing (SPB) option.

The SPB option allows a number other than the subscriber's directory number to be used for billing.

The Switch Production Agent will add the Special Billing (SPB) option using SERVORD to every line:

```
>SERVORD
SO:
>ADO                               # Add Option
SONUMBER: NOW 3 12 5 PM
>                                     # Hit 'Enter'
DN_OR_LEN:
>SA12 35 0 01 08                   # Line Equipment Number
OPTION:
>SPB                               # Special Billing Option
SPBDN:
>NPANXXXXXX                         # Add Billing TN
OPTION:
>$                                   # End
COMMAND AS ENTERED:
ADO NOW 3 12 5 PM SA12 35 0 01 08 (SPB NPANXXXXXX) $
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>Y
```

Complete for all DS0 lines, including related orders.

Step Two

Populate critical dates and update the order log.

Complete the TDD critical date and include in the Access Service Request (ASR) log notes the following:

- The Local Network Service TN that was added to any translations.
- If all TNs routing to customer have been removed.
- Full customer name and 10 digit phone number.

Part 2: #5 ESS Switch

Step One *(Applicable to Prime Digital, PrimeXpress, PrimePlex, and PrimeConnect trunks)*

Change the Billing Telephone Number (BTN) in the translation(s) to the provided AT&T Local Network Service's telephone number.

Change the BTN in Recent Change/View 5.1, field #242:

```
-----  
233. DATARATE          _____      244. SPA BILL DN      _____  
234. INVERSION        N                245. SDN STAT GRP    N  
235. WB RATE          _____      246. SPA SUPV        N  
236. WB TSA TYPE      _____      247. ANI6             N  
237. INTER SM TRK     N                248. ANI7             N  
238. DIR CON DN       _____      249. TOPAS TPNUM     _____  
239. FACILITY TYPE    _____      250. ASI PROXY       N  
240. FACILITY NBR     _____      251. FGD CIC SZ      _____  
241. RTE NBR PLAN     _____      252. SPEECH TRMTS    N  
242. BILLING DN       9168305000      253. MLT ISLC OPT    N  
243. ACP SDN          _____      254. MAI              S  
-----
```

Step Two

Change the main Directory Number (DN) in the translation(s) to the provided AT&T Local Network Service's telephone number.

Change the main DN in Recent Change/View 5.1, field #142:

```
-----  
134. STA ID           _____      146. CPN DISC        N  
135. UUI              N                147. INHIBIT TCM     N  
136. CODE SET7       _____      148. RDTA GRP        N  
137. SDN DAS          _____      149. E911 CPN        N  
138. CBC              N                150. CPN BILLING     N  
139. DEDICATED SRV   _____      151. ALLOW AMA        N  
140. VOICE CUT THRU  NORMAL          152. STD RN SRC      N  
141. DATA CUT THRU  NORMAL          153. RN SCR          N  
142. MAIN DN          9168305000      154. RN DISC         N  
143. CPN DN OPT       NONE            155. RN BILLING      N  
144. PRIV OVER        N                156. ALW DATA ONLY  N  
-----
```

Step Three

Remove any TNs that may be in routing tables and delete all DIDs associated with the RTI.

Go to Recent Change/View 1.5 and 4.14 and query by RTI (Route Index) or HRI:

```
-----  
*1. TN      9164310208      SPEC TRN      NONE  
22. RAX     1                COMP LOSS     _____  
23. LCC     DID  
38. RTI     422                SCD SCNING    N  
    HRI     _____      127. LRN INDEX _____  
57. TSTCODE NONE          129. NON COND TRIG N  
59. RMK     SACP0300406  
-----
```

Step Four

Populate critical dates and update the order log.

Complete the TDD critical date and include in the Access Service Request (ASR) log notes the following:

- The Local Network Service TN that was added to any translations.
- If all TNs routing to customer have been removed.
- Full customer name and 10 digit phone number.

Step One *(Applicable to PrimePath, Prime NBX, and PrimePath NBX trunks)*

Add the BTN provided on the Access Service Request.

In Recent Change/View 1.6, field #19 add the BTN from the service request:

```
-----  
*1. TN          9168309911      18. MFRI          N          30. BRCS          Y  
*2. OE          _____      19. BTN (NOT=TN) 9168309910   31. BAUTO         N  
*5. PTY         _____      MULTIDN          N          32. SHARED        N  
*6. MLHG        _____      DEPENDN          N          33. SAUTO         N  
*7. MEMB        _____      22. RAX           11         34. FLS           N  
                _____      23. LCC           4AI        35. SUSO          N  
    9. CHNG TN   9168309911      LATA            _____ 36. SUST          N  
10. CHNG OE    N 00600117102  25. COIN          N          37. ICP           N  
11. CHNG PTY   I                26. GST           N          38. RTI           _____  
14. CHNG MLHG  _____      27. EL           N          HRI             _____  
15. CHNG MEMB  _____      28. SERHLN        _____ 40. BCK LNK      N  
16. NEW TN     _____      29. TTC           Y          41. NODL          N  
-----
```

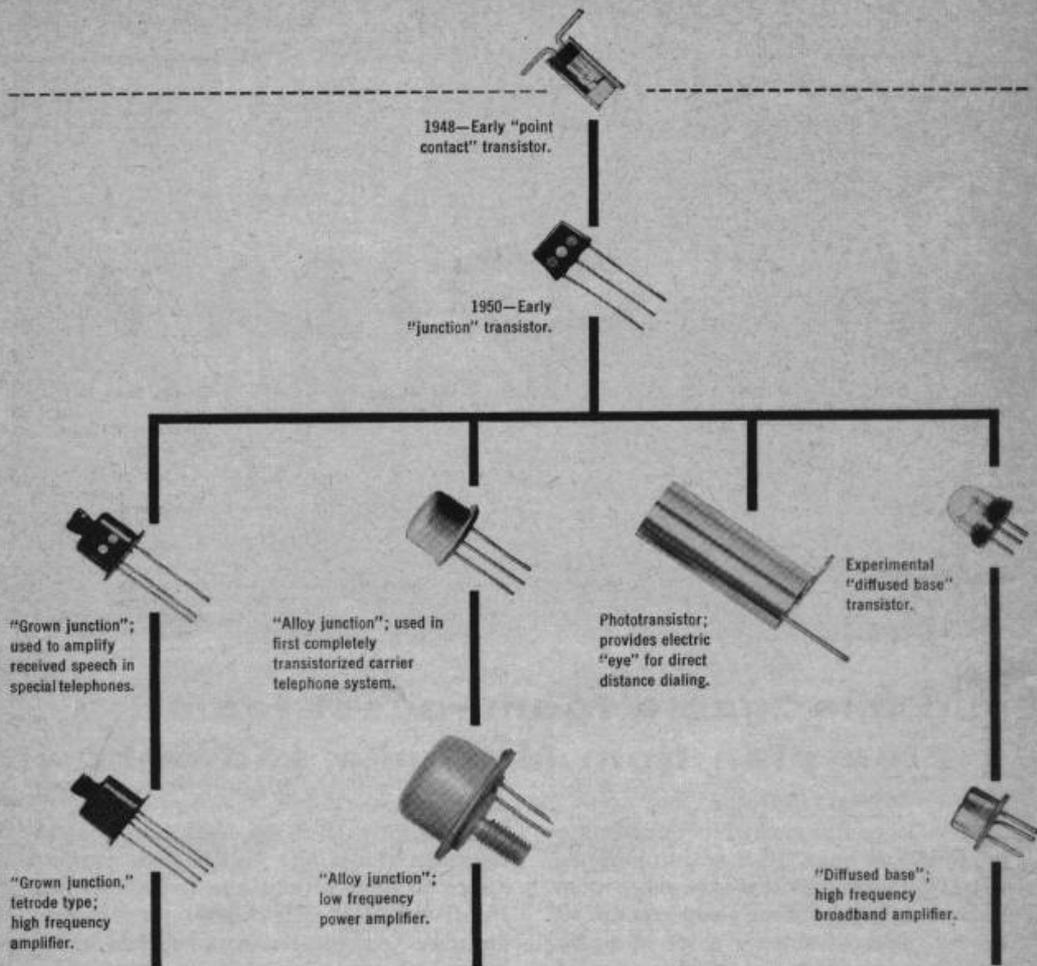
Step Two

Populate critical dates and update the order log.

Complete the TDD critical date and include in the Access Service Request (ASR) log notes the following:

- The Local Network Service TN that was added to any translations.
- If all TNs routing to customer have been removed.
- Full customer name and 10 digit phone number.

TRANSISTORS—first family of electronics



In 1948 Bell scientists announced their invention of the transistor—a tiny device able to amplify signals a hundred thousand times using a small fraction of the power of an electron tube. From this original “point contact” transistor has grown a distinguished family of immense usefulness to electronics. Some of its leading members are shown here, in approximate actual size, with their type names.

For telephony the transistor has opened the way for notable advances in instruments, transmission and switching. Elsewhere it has opened the way to advances in hearing aids,

television, computers, portable radios and numerous military applications.

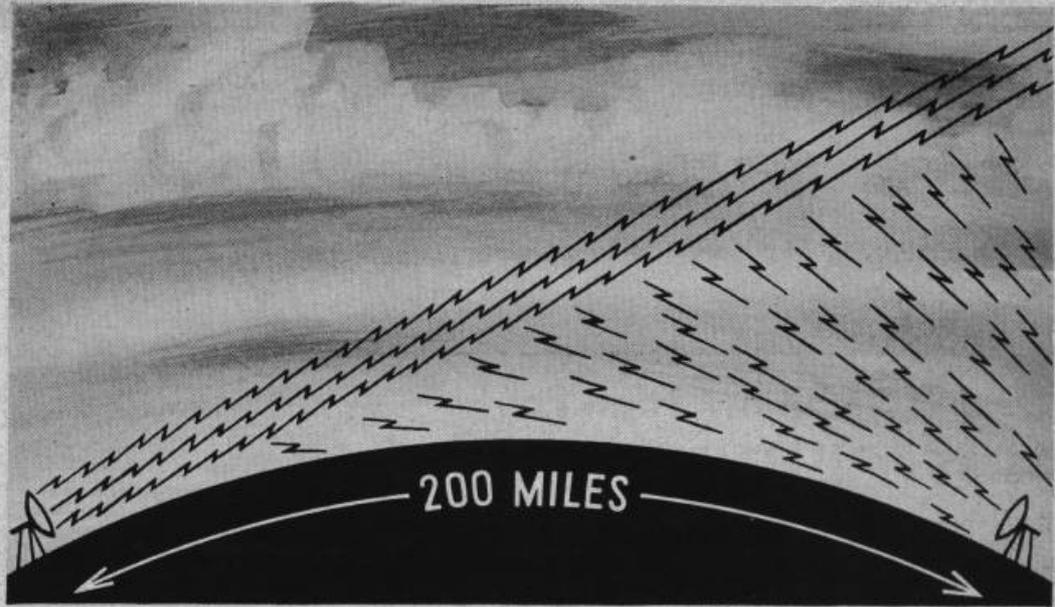
Bell’s transistor family is typical of the Bell Laboratories research that helps keep your telephone service the world’s best—and at the same time contributes importantly to other fields of technology.

**BELL TELEPHONE
LABORATORIES**



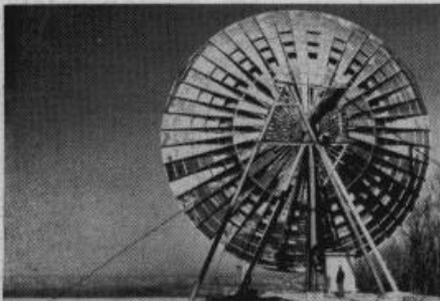
World center of communications research and development

POPULAR MECHANICS



Highly schematic drawing shows possible distribution of energy in ultra-high-frequency "over-the-horizon" transmission. Effect is similar to that of a powerful searchlight whose beam points into the sky. Light can be seen miles away from behind a hill even when searchlight lens is invisible.

SOMETHING NEW ON THE TELEPHONE HORIZON



This experimental 60-foot antenna (rear view) photographed at the Bell Telephone Laboratories in Holmdel, New Jersey, is designed for study of "over-the-horizon" phenomena.

**BELL TELEPHONE
LABORATORIES**



*Improving telephone service for America
provides careers for creative men in
scientific and technical fields.*

6 POPULAR SCIENCE

Telephone conversations and television pictures can now travel by ultra-high-frequency radio waves far beyond the horizon. This was recently demonstrated by Bell Telephone Laboratories and Massachusetts Institute of Technology scientists using "over-the-horizon" wave propagation, an important recent development in the radio transmission field.

This technique makes possible 200-mile spans from station to station, instead of the 30-mile paths used for present line-of-sight transmission. It opens the way to ultra-high frequencies across water or over rugged terrain, where relay stations would be difficult to build.

In standard microwave line-of-sight transmission the stations are so spaced that the main beam can be used. But some signals drop off this main beam as it shoots outward into space. They reach distant points beyond the horizon after reflection or scattering by the atmosphere. The greater power and larger antennas of the "over-the-horizon" system permit recapture of some of these tiny signals and make them useful carriers.

New York Telephone Company men watch as a crossbar dial system reports to its test frames at exchange "Watkins 9," New York.



A Dial System Speaks for Itself

As dial systems have been improved, so also have the means of keeping them at top efficiency. Even before trouble appears, test frames, developed in Bell Telephone Laboratories, are constantly at work sending trial calls along the telephone highways. Flashing lamps report anything that has gone wrong, and the fault is quickly located and cleared.

If trouble prevents one of the highways from completing your call, another is

selected at once so that your call can go through without delay. Then on the test frames lights flash up telling which highway was defective and on what section of that highway the trouble occurred.

Whenever Bell Laboratories designs a new telephone system, plans are made for its maintenance, test equipment is designed, and key personnel trained. Thus foresight keeps your Bell telephone system in apple-pie order.



BELL TELEPHONE LABORATORIES EXPLORING AND INVENTING; DEVSING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

End of Issue #67



Any Questions?

Editorial and Rants

"Race doesn't matter!" Wait... What?

Might have to take out some judges in the future...

N.Y. Village Gets New Voting Rules to Aid Hispanics

November 6, 2009 – *From: cnsnews.com*

By Jim Fitzgerald, Associated Press

White Plains, N.Y. (AP) – A federal judge imposed an unusual election system on a suburban village Friday, nearly two years after finding that the existing system was unfair to Hispanics.

The village, Port Chester, is run by a mayor and six trustees. Under the new system, called cumulative voting, residents will be allowed to cast as many as six votes for one trustee candidate.

No Hispanic had ever been elected trustee or mayor in the village 25 miles northeast of New York City, although the population of 28,000 is about half Hispanic. The ruling is likely to mean that the village will have trustee elections next year for the first time since 2006.

Village officials said they were elated that Judge Stephen Robinson had not ordered that Port Chester be divided into districts.

"We got our preferred remedy of choice," said village attorney Anthony Piscionere.

Under cumulative voting, all six trustee positions would be at stake in each election and voters would have six votes each. A voter could cast six votes for one candidate, one for each of six candidates, or any other combination of six or fewer votes.

Lawyers said last year that cumulative voting was not used for municipal elections anywhere else in New York.

Both sides told the judge Friday they would work together to come up with a plan to implement the new system and educate voters about it. The judge said he hoped elections could be held in June.

"Port Chester is committed to making this a model," Piscionere said.

In January 2008, Robinson ruled in favor of a Justice Department lawsuit that said Port Chester's existing system violated the Voting Rights Act by diluting Hispanics' votes.

Under the outlawed system, two of Port Chester's six trustee seats were up each election year and the entire village chose from the candidates. Most voters were white, and white candidates always won.

After ruling in the federal government's favor, the judge asked both sides to suggest a new system that would solve the problem. Meanwhile, elections were suspended.

The Justice Department's plan would have divided the village into six districts, with each electing one trustee. One district would be drawn to include Hispanic neighborhoods, increasing the chances that a Hispanic-backed candidate would be elected.

Port Chester officials, however, noted that because many Hispanics are not citizens, the special Hispanic district would have fewer eligible voters than other districts. That would violate the one-person, one-vote requirement of the Constitution, village attorneys said.

The village also said cumulative voting would be more likely to elect more than one Hispanic-backed trustee. And it would spare the village the expense of drawing new boundaries, redrawing them every 10 years and maintaining multiple polling places.

Currently, the village Board of Trustees has three holdovers from before 2006, two appointees picked by the other members and one vacancy.



That's how you teach dirty illegal spics to vote!

Note that the census is used to determine congressional voting districts. Who cares if they are fair, I guess.

You're better off spending the next election day reloading...

Senate Blocks Census U.S.–Citizenship Question

November 5, 2009 – From: news.yahoo.com

By Andrew Taylor, Associated Press

WASHINGTON – Senate Democrats have blocked a GOP attempt to require next year's census forms to ask people whether they are a U.S. citizen.

The proposal by Louisiana Republican Sen. David Vitter was aimed at excluding immigrants from the population totals that are used to figure the number of congressional representatives for each state. Critics said Vitter's plan would discourage immigrants from responding to the census and would be hugely expensive. They also said that it's long been settled law that the apportionment of congressional seats is determined by the number of people living in each state, regardless of whether they are citizens. A separate survey already collects the data.

The plan fell after a 60–39 procedural vote made it ineligible for attachment to a bill funding the census.



Millions in "stimulus" tax dollars wasted on projects that Boy Scouts should (and would) be doing for free.

SEIU members are also the purple-shirt thugs being bussed into the health care townhall meetings.

How's that "change" working out?

Union Troubled by Eagle Scout Project in Allentown

November 15, 2009 – From: www.mcall.com

By Jarrett Renshaw

In pursuit of an Eagle Scout badge, Kevin Anderson, 17, has toiled for more than 200 hours over several weeks to clear a walking path in an east Allentown park.

Little did the do-gooder know that his altruistic act would put him in the cross hairs of the city's largest municipal union.

Nick Balzano, president of the local Service Employees International Union, told Allentown City Council Tuesday that the union is considering filing a grievance against the city for allowing Anderson to clear a 1,000-foot walking and biking path at Kimmets Lock Park.

"We'll be looking into the Cub Scout or Boy Scout who did the trails," Balzano told the council.

Balzano said Saturday he isn't targeting Boy Scouts. But given the city's decision in July to lay off 39 SEIU members, Balzano said "there's to be no volunteers." No one except union members may pick up a hoe or shovel, plant a flower or clear a walking path.

"We would hope that the well-intentioned efforts of an Eagle Scout candidate would not be challenged by the union," said Mayor Ed Pawlowski in an e-mail Friday. "This young man is performing a great service to the community. His efforts should be recognized as such."

Balzano said Saturday the union is still looking into the matter and might cut the city a break.

"We are probably going to let this one go," Balzano said.

The possible entanglement of a local Boy Scout in a union dispute underscores the frustration and anger SEIU members feel after being the lone city union to suffer layoffs in the ongoing financial crisis. It may also serve as a preview of future labor battles as the city tries to outsource some necessary jobs as a result of the layoffs.

Anderson, a junior and varsity soccer player at Southern Lehigh High School, is a member of Boy Scout Troop 301 of Center Valley.

He got the idea for the trail while taking hikes along the partially complete, 165-mile Delaware and Lehigh National Heritage Corridor. He noticed there were a few missing connections to the trail in Kimmets Lock Park, which is on the Lehigh River near Dauphin Street. He already has logged 250 hours trying to carve out a walking and biking trail along the river.

"I decided to do my part in completing this part of the trail. In that way, others could enjoy walking along the river, without having to walk on the busy road," Anderson said in an e-mail Friday.

During last week's budget hearings, where City Council reviewed the Public Works and Park and Recreation departments' funding requests, it was made clear that the layoffs and early retirements — all of which have led to the lowest city staffing levels in two decades — are bound to create union disputes in the weeks and months ahead.

For example, the city currently does not have an electrician available because of the layoffs and an employee on an extended sick leave. As a result, the city has been forced to hire an outside union electrician to oversee the installation for the popular Lights on the Parkway holiday display.

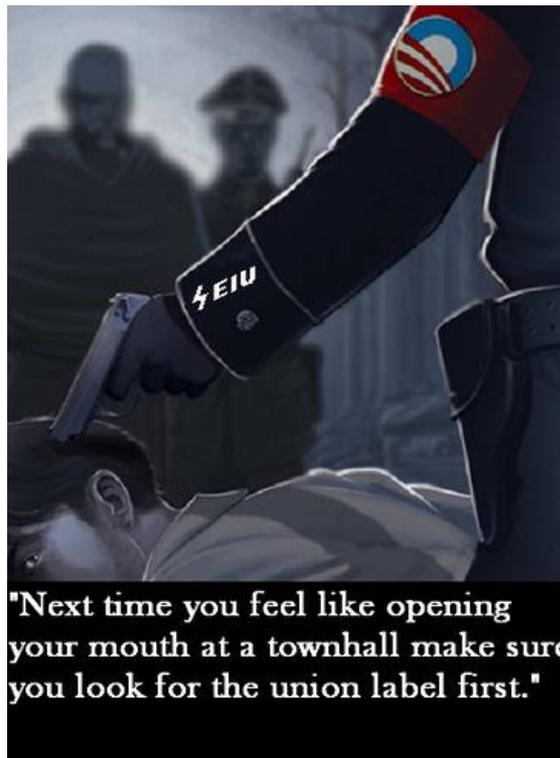
"In the spirit of the holiday, we decided to let that go," Balzano said.

Greg Weitzel, head of the Parks and Recreation Department, which lost 17 full-time employees as a result of the layoffs and retirements, said the low staffing levels will require more outsourcing of labor and a greater reliance on volunteers.

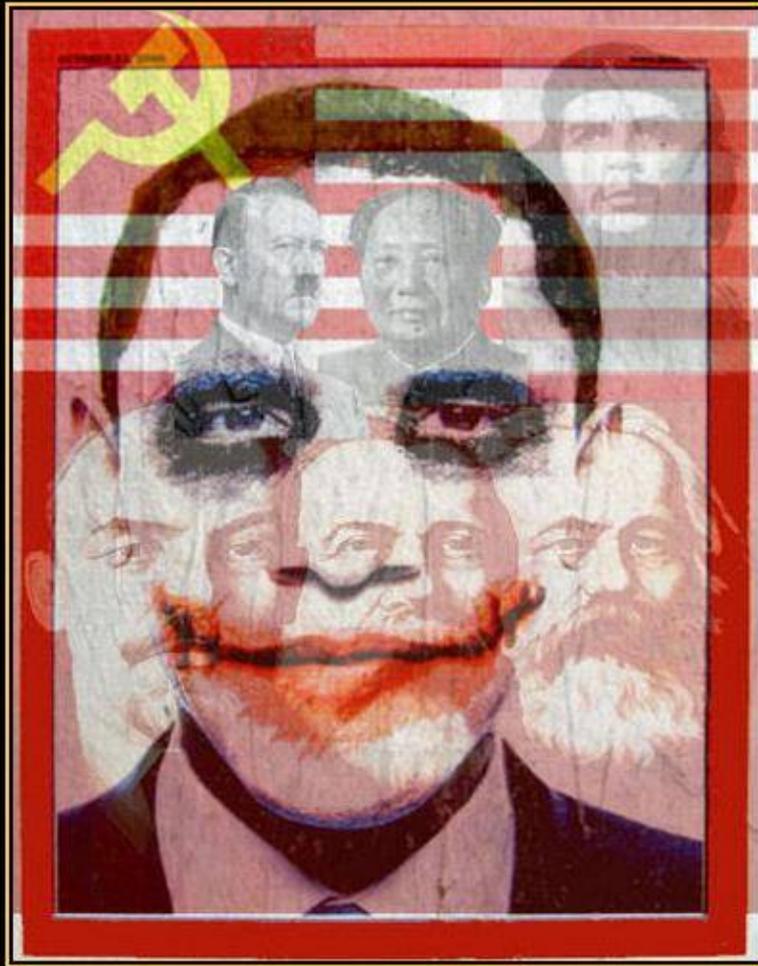
"There are some things that we can do in-house and other things we will have to bid out," Weitzel said Tuesday. "We originally had plans to do more with our labor force, but now we have to bid out that work."



www.purplepeoplebeaters.com



"Next time you feel like opening your mouth at a townhall make sure you look for the union label first."



TRANSPARENCY: THE PROMISE

DO YOU SEE IT YET?





"Change *has* come to America."

-- Barack Obama, Victory speech in US presidential election, November 4, 2008.



"You guys make a pretty good photo op."