

GBPPR 'Zine



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"I have given my life to alleviate the sufferings of Africa. There is something that all White men who have lived here like I have must learn and know: that these individuals are a sub-race. They have neither the mental or emotional abilities to equate or share equally with White men in any functions of our civilization. I have given my life to try to bring unto them the advantages which our civilization must offer, but I have become well aware that we must retain this status: White the superior, and they the inferior. For whenever a White man seeks to live among them as their equals, they will destroy and devour him, and they will destroy all his work. And so for any existing relationship or any benefit to this people, let White men, from anywhere in the world, who would come to help Africa, remember that you must maintain this status: you the master and they the inferior, like children whom you would help or teach. Never fraternize with them as equals. Never accept them as your social equals or they will devour you. They will destroy you."

--- Dr. Albert Schweitzer, winner of the 1952 Nobel Prize for peace, in his 1961 book, *African Notebook*.

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**Operation,
Administration, and
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Introduction

This chapter contains system features that are used in the day-to-day operation, administration, and maintenance of the switching system. Some of the more obvious features that are inherent in all switching systems, such as dial tone, routing, and digit interpretation, are excluded.

Feature Definitions

Abbreviated Class Code [1AE11] enhancement increases the number of originating and terminating codes from 64 to 128. This means the originating and terminating abbreviated class code expansion tables increase in size from 256 words to 512 words. This feature can save memory by allowing additional lines to be abbreviated.

ACD-ESS Management Information System (AEMIS) [1E4/1AE4] (AT&T 231-090-413) provides an optional minicomputer based ACD-ESS Management Information System. This minicomputer is located on customer premises. It interfaces with the ESS switch via one or more data links. AEMIS is a management tool that provides accurate and timely selected system behavioral

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information to all levels of management. The report may be routed to CRTs, printers, or memory files. The feature groups required to provide AEMIS are ACD2, DLIO, and IRES. (Also see the 12A Customer Information System.)

Attached Processor System (APS) [1AE7] (254-200-001) provides additional physical memory in the 1A ESS switch by replacing current file store hardware and software with an AT&T 3B20D computer and associated memory. The APS feature group is required to provide this feature.

Attached Processor System Input/Output Message [1AP<1>1D.01] (AT&T 231-390-405, Appendix 1) provides another maintenance interface to the AT&T 3B20 duplex computer. Specifically this feature provides:

- a. The ability to enter and receive 3B messages from a 1A processor input/output terminal
- b. The MCC (master control center) status lamp monitor of APS equipment status
- c. The storage of APS alarmed maintenance messages.

Attached Processor System Pre-Conditioning Check (PREE) [1AE9.09] (AT&T 231-390-405, Appendix 1) is an enhancement to the system update process for 1A ESS switch APS offices. Loading of certain 1A ESS switch generic features requires prior APS feature activation. Failure to precondition the APS may result in lost AMA revenue and/or misrouted calls. PREE safeguards against this by verifying that in the presence of such features, if the APS has not been preconditioned, the system update will abort.

Audible Ringing [CC-1/1AE1] provides audible ringing to the calling party of the same pattern as the immediate ringing but not synchronized with it.

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Automated Board-to-Board Testing [CTX-6/1AE1] (AT&T 231-311-005) provides testing hardware to automatically test the large number of interoffice line connections which occur prior to an office cutover or an area transfer.

Automatic Broadcast Warning (ABCW) [1E3] (AT&T 231-190-365) is a system for applying program store overwrites to the 1 ESS switch. It allows input of the overwrite data either directly from paper tape or manually and provides automatic selection of applicable broadcast warning data under control of the 1 ESS switch. The broadcast warning data is automatically checked as it is entered. This feature provides automatic program store configuration control during overwrite application and a series of aids and simplifications of the required program store card manual operation.

Automatic Fault Location and System Reconfiguration [CC-1/1AE1] (AT&T 231-310-300, AT&T 231-310-310, and AT&T 231-310-320) provides extensive program and hardware facilities to detect system malfunctions. Faulty units are automatically identified and removed from service, duplicate units are switched into service, and maintenance personnel are notified that a malfunction has occurred.

Automatic Intercept System (AIS) [CTX-4/1AE1] (AT&T 231-090-115) provides the ESS switch with the capability to operate with the AIS. The AIS improves the method of processing calls to nonworking telephone numbers by automating and centralizing intercept service for large geographical areas.

Automatic Line Insulation Test (ALIT) [CC-1/1AE1] (AT&T 231-090-052) provides the means to check for insulation leaks in the insulation of wire, cable sheath, and cable terminals. All idle lines, except ground-start lines, are checked in sequential order for any line insulation failures.

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With the 1AE9.06 generic program, the **Automatic Line Insulation Test** enhancement provides a parameter to the TC-TIME input message that is used when initiating ALIT. The parameter provides the capability of automatically suspending testing at a given point. The capability to restart testing at the point where testing was suspended continues to work in the same manner as manual intervention. Currently, ALIT testing must be stopped manually with craft intervention.

Automatic Message Accounting (AMA) [CC-1/1AE1] provides the ESS switch facilities for automatically collecting, storing, and recording billing information for later processing by the RAO (Revenue Accounting Office). Two methods are available for recording AMA data.

- a. **Magnetic Tape** (AT&T 231-190-063 and AT&T 231-390-063) is recorded on magnetic tapes which are then carried to the RAO.
- b. **Teleprocessing** is sent to a processor where it is formatted and stored prior to being transmitted to the RAO. The methods used for the 1 ESS and 1A ESS switches differ. (See below.)

⇒ NOTE:

Other AMA features appear as separate entries herein. Refer to the Automatic Message Accounting heading in the index.

Automatic Message Accounting Standard Entries (AMASE) [1E7/1AE8A] (AT&T 231-390-069) reside primarily in the APS. Its function is to reformat the raw AMA data into the standard entries format required at the RAO. Output is either to a tape unit associated with the APS or directly to the RAO (teleprocessed) when polled. The AMAS and APS feature groups are required. The following features are optional with AMASE.

- a. **AMA Teleprocessing System (AMATPS) [1AE8A]** transmits the standard entries AMA data from the APS to the

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RAO when polled. It is contained in the AMAS feature group.

- b. **AMA Multiple Entries (AMAME) [1AE8]**, also known as METS (Multiple Entries Teleprocessing System), utilize the APS memory to hold the AMA register information while billable calls are in progress. This frees up duplicated call store space that would otherwise be required for AMA registers. The METS feature group is required. The AMASE and AMATPS features are prerequisites.

With the 1AE9.06 generic program, the **Automatic Message Accounting Standard Entries—Verification** is a standard option of the AMASE feature. This enhancement allows a central office to concurrently create and record old format billing records (except for statistical records such as INWATS overflow counts, ESSX-1 counts, and carrier interconnect overflow counts, etc.) on a 1A ESS switch tape and send standard format billing records to a Host Collector. This option provides the operating company with the ability to match and compare billing records made by both systems. The AMASE/VFY option is turned on or off by the craft personnel.

Automatic Message Accounting Standard Entry Verify On/Off [1AE10.11] enhancement provides the ability to activate/deactivate AMASE/VFY via an input message. This feature also activates AMVF by having the AMASE Verification bit set in the office option table. Since both methods of activation are possible, AMASE/VFY must be deactivated by the same method by which it was activated.

The AVOE enhancement is part of the AMASE feature package and does not require any special TDA or PDA changes. With the METS (Multiple Entry Teleprocessing System), the benefits of AMASE Verification are lost since under that system AMA records are not assembled in the 1A ESS switch; and thus no complete AMA records are available to be written to tape.

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Automatic Message Accounting Transmitter (AMAT) Interface [1E7] (AT&T 231-190-068) is a computer system replacement for the tape recorders used to record 1 ESS switch AMA data. The AMAT receives, reformats, and teleprocesses AMA data to the RAO reliably, efficiently, and in a standardized format.

Automatic Overload Controls [CC-1/1AE1] (AT&T 231-190-190, AT&T 231-390-190) are inherent in system operational design and automatically provide controls for hardware, software, and real-time overload.

Automatic Positioning of AMA Beginning-of-Tape Mark (APBOT) [CTX-6/1AE1] (AT&T 231-190-063, AT&T 231-390-063) automatically positions the beginning-of-tape mark after a new reel of tape is mounted on the AMA tape transport.

Belt Line Control of Test Facilities [CTX-5/1AE1] (AT&T 231-301-020) provides a convenient means for central office maintenance personnel working on a trouble condition to control the start of particular test conditions over the frame belt line rather than from the MCC.

Bridge Lifter [CC-1/1AE1] is used in a central office for superimposing one circuit on another without interrupting the continuity of the first.

Building Alarms Summary Message [1E7/1AE7] provides an alarm summary for all building and power alarms that are still active subsequent to the originally generated alarm message. The summary can be initiated by the 1 and 1A ESS switches on a routine basis or it may be triggered by the SCC via input request to the ESS switches.

Bylink—Reverse Battery Supervision Dial Pulse [CC-1/1AE1] provides for immediate registration of dial pulse upon seizure, usually under subscriber control. This is used for calls incoming from step-by-step offices.

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Call Gapping [1E8A/1AE8A] (AT&T 231-190-305 and AT&T 231-390-305) provides manual code controls of originating carrier traffic based on a specific carrier access code (ignoring the destination code) or based on a specific destination code (ignoring any carrier access code). Call gapping sets an upper limit on the rate at which attempts to a particular code are allowed out of an ESS switch. The rate is controlled by spacing the outgoing attempts.

With the 1AE10.06 generic program, the **Improved Network Management Call Gapping** enhancement allows call gapping on the home NPA (numbering plan area) in a multiple NPA, multiple rate center environment and/or on conflict codes. This enhancement will also allow call gapping on a ten-digit intraoffice calling type call.

Calling Line Identification (CLID) [CTX-1/1AE1] (AT&T 231-090-083) provides the means in the ESS switch to determine and record the DN of any local incoming call or TNN of a tandem or toll call when a call is placed to a specified DN. This aids in tracing the source of calls to customers who have been receiving harassing, abusive, obscene, or threatening calls.

With the 1AE10.03 generic program, the **Calling Line Identification** enhancement enables network managers to use the CLID (Calling Line Identification) feature to identify the calling line when the home NPA is part of the dialed digits. (Also see End-to-End Call Trace.)

Carrier Group Alarm (CGA) (AT&T 231-090-084) provides action to immediately remove from service any trunks associated with a failed carrier system, and provides automatic restoral to service when the carrier system is restored.

- a. **Hardware CGA [CC-1/1AE1]** uses special circuits or hardware for detecting carrier failures on incoming or outgoing trunks (2-wire and HILO 4-wire). The hardware CGA

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provides immediate "real time" detection and restoral of carrier group failures due to continuous monitoring.

- b. **Software CGA [1E7/1AE7]** results when a continuity check fails on a seized carrier trunk and another trunk in the same carrier group fails the same test. If a carrier group failure is determined, all associated idle trunks are immediately removed from service. Calls-in-progress on busy trunks of the failed carrier group are camped on. These trunks are removed from service when idled. A minor alarm is then generated and group blocking messages are sent to the far-end office. The software CGA provides near "real-time" detection of carrier group restoral by means of periodic monitoring of trunks in the alarmed software CGA group. Carrier group restoral results from either a successful periodic test or a far-end office notification, whichever occurs first. Effective with the 1AE8A generic program (1A ESS switch only), the SCG feature group is required.

Carrier Interconnect Inhibit Term Inter-LATA AMA [1AE9.08] (AT&T 231-090-120) allows the craftsperson to inhibit all terminating unanswered IC/INC AMA records by utilizing the AMA-BILL-options input message. If it is desired to monitor the records generated by a particular carrier or carriers (up to five), the craftsperson can enter these carriers on a phase protected list. The protected list is such that any TUIC records for these carriers are recorded, while all other terminating unanswered records are discarded.

Carrier Trunk Conditioning Recognition (CTCR) [1AE8A] (AT&T 231-390-156) minimizes the impact of remote end failures of carriers on the 1A ESS switch where these carriers operate in a tandem arrangement. The initial application of the CTCR feature provides an interface with the DACS (Digital Access and Cross-Connect System) (a microprocessor-controlled digital terminal that provides improved utilization of carrier facilities between offices).

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For PTS (per trunk signaling) trunks, the CTCR feature recognizes trunk conditioning (failure notification) signals from the DACS for outgoing (except loop signaling) and 2-way trunks on a per-trunk basis. Recovery software allows the ESS switch to return individual trunks to service as the failure is corrected. (Loop signaling outgoing trunks use software carrier group alarm for PTS trunks.) The CTCR and SCG feature groups are required.

Cellular Mobile Radio Office (CMRO) Interface [1AE7] (AT&T 231-390-212) provides the control point between a Cellular Mobile Telephone System and the exchange network. The CMRO cell sites, mobile units, cell site trunks, and data links make up the Cellular Mobile Telephone System. The Cellular Mobile Telephone System is located within the mobile service area and is interconnected to one or more class 5 switching offices by voice trunk facilities supplied by the telephone company. These class 5 switching offices are known as zone offices.

Central Control Clock Speed-Up [1E7] (AT&T 231-105-305) provides the capability to help offset real time capacity effects of the 1E7 generic program supervision restructuring through the use of a multiple speed microsecond clock system and CC/SP machine cycle time reduction.

Centralized Automatic Message Accounting (CAMA) [CTX-6/1AE1] (AT&T 231-090-278) enables the ESS switch to provide toll billing for subtending class 5 central offices on an ANI (automatic number identification) or ONI (operator number identification) basis. The feature groups required for CAMA (2W) are CAMA and HLCA; the feature groups for CAMA (4W) are CAMA and HL4W.

The following related features are included in the referenced document.

- a. **CAMA Operation Connections During Office Growth (COCO) [1E5/1AE5]** is used for gradual retrofit of a HILO 4-wire network into an existing 2-wire office. This feature

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allows incoming CAMA calls (over 2-wire trunks) to be connected to CAMA operators (on HILO 4-wire trunks) for ONI during a retrofit period of several months. CAMA calls not requiring ONI are not affected. The feature groups required to provide COCO are COCO, CAMA, HL4W, and HLCA.

- b. **CAMA Terminating Party Disconnect Actions [CTX-7/1AE1]** provide 10- or 11-second timing before transmitting a terminating party disconnect signal on a CAMA incoming trunk and tearing down the call with the originating party still off-hook. Lack of this delay can result in false originations.

Charge Delay Timing (CHDR) [CTX-7/1AE1] reduces the charge delay timing on coin and certain other calls from 2 to 4 seconds to 600 to 800 ms.

Class 5 Operation—Local End Office Switching [CC-1/1AE9] is a central office trunking entity where telephone loops are terminated for purposes of interconnection to each other and to the network. A trunking entity is that grouping of central office equipment at which a central office or a group of central office codes are trunked in common for network access. Local central offices are arranged to process both originating and terminating traffic.

Code 100-Type Test Line [CTX-4/1AE1] (AT&T 231-090-098) provides a termination at the terminating end of a trunk which provides a means for making far-end to near-end loss and noise measurements.

Code 101-Type Test Line [CTX-1/1AE1] (AT&T 231-090-100) provides a communication path and test line to a testboard or test position which can be reached over any trunk incoming to a switching system served by that test position. The code 101 test line is used in reporting troubles, making manual transmission tests, etc.

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Code 102-Type Test Line [CC-1/1AE1] (AT&T 231-090-101) provides a test termination to a 1000-Hz test source at the terminating end of a trunk for one-way transmission measurements.

Code 103-Type Test Line [CTX-7/1AE1] (AT&T 231-090-094) provides a connection to a supervisory and signaling test circuit for overall testing on incoming intertoll trunks equipped with ring forward (rering) features.

Code 104-Type Test Line [CTX-7/1AE1] (AT&T 231-090-342) provides a test termination for 2-way transmission testing and one-way noise checking.

Code 105-Type Test Line [CTX-4/1AE1] (AT&T 231-090-099), with an ATMS responder, provides for automatic 2-way loss and noise measurements of telephone trunks and lines requiring transmission testing.

Code 107-Type Test Line [1E6/1AE6] (AT&T 231-090-102) is available for offices which serve customers with switched data service access lines. It provides the capability for testing data link facilities using tone and timing test circuits. When a code 107-type test line is provided in a particular office, it may be utilized to serve customers of another nearby office through an interoffice trunk.

Code 108-Type Test Line [CTX-7/1AE1] (AT&T 231-090-404) provides the far-end loop-around termination for in-service testing of echo suppressors. It is used with the 58-type echo suppressor measuring system.

Combined Touch-Tone and Dial Pulse on Incoming Tie Trunks [CTX-4/1AE1] (AT&T 231-090-105) give the ESS switch the ability to receive station-generated touch-tone or dial pulse address signals on incoming tie trunks.

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Common Channel Interoffice Signaling (CCIS) (AT&T 231-090-416) provides for exchanging information between processor-equipped switching systems over a network of signaling data links between offices in the telephone network. All signaling data, including the supervisory and address signals necessary to control call setup and takedown, as well as network management signals, are exchanged by these systems over the signaling links.

- a. **Local CCIS [1E7/1AE7]** provides line-to-CCIS trunk and CCIS trunk-to-line connections as well as CCIS trunk-to-trunk connections in local offices. The feature groups required to provide Local CCIS are CILC, CIPC, PDL, PUC, and effective with 1E8A/1AE8A generic programs, SCG.
- b. **Toll CCIS [1E5/1AE5]** provides CCIS-to-CCIS or CCIS-to-PTS trunk connections in toll offices. Feature groups required to provide Toll CCIS are CI2W (2-wire) or CIHL (HILO), CIPC, PDL, PUC, and, effective with 1E8A/1AE8A generic programs, SCG. (For 1E6/1AE6 generic programs, 2400 was used in lieu of CIPC, PDL, and PUC.)

The following features are included with the 1E7/1AE7 CCIS features:

1. CCIS Network Management provides the capability to accept and respond to dynamic overload control and group signaling congestion signals received via CCIS data links.
2. Data Link Group for CCIS With PUC/DL provides the software for CCIS operation with PUC/DL.

Conflicting Area Code and Office Code Operation [CTX-5/1AE1] (AT&T 231-048-304) and **[1AE9]** (AT&T 231-318-336). Some numbering plan areas are exhausting their supply of office codes in the form NNX, and office codes in the form N 0/1 X are assigned. When a conflict exists, a prefix (access) code or additional digit timing after the seventh digit differentiates between 7- and 10-digit calls.

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Customer Originated Recent Change (CORC) [1E6/1AE6] (AT&T 231-104-305 and AT&T 231-300-020) provides call store recent change areas to store customer related data. The features for which CORC areas have been provided include:

- Customer Station Rearrangements
- Customer Changeable Speed Calling
- Call Forwarding Variable
- Authorization Codes and Treatment Groups (EPSCS)
- Authorization Codes and FRLs (ETS)
- Busy/Idle Status Indicators.

Capabilities available with the CORC feature include:

- Manual RC Controls
- Automatic RC Controls
- RC Area Limits
- RC Area Status
- RC Type Limits
- RC Type Counts
- RC Auxiliary Block Usage.

Cut-Through to Operator After Local Intercept [CTX-6/1AE1] (AT&T 231-090-122) provides access to an operator when a call reaches an ESS switch intercept announcement and the customer needs further assistance.

Data Compression [1AE10.04] (AT&T 231-390-069) feature enables the APS to send compressed AMA data to a HOC (host collector) when compressed AMA data is requested by the HOC. The APS can still send noncompressed AMA data when noncompressed AMA data is requested. The compressed AMA

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data will take less time to be teleprocessed and, as a result, save money.

Delay Activation of Recent Change Message (RCDY) [CTX-7] (AT&T 231-048-301) allows recent change messages with "Delay" specified to be accepted, checked for validity, and then stored in the RC area without being activated. A delay message can be activated or canceled by another RC message or it can be activated by the activation phone. A message is provided to verify the delayed activation blocks for a specified order number, all service orders, or all the order numbers. An abbreviated or detailed form of the output can be requested.

Denied Service Signature for Local Test Desk [1AE9.07] enhancement provides the denied service signature for the 1/1A ESS switch local test desk. The denied service signature provides a 1-second burst of dial tone followed by silence when a request to test subscriber line equipment for dial tone is made. This is done for lines that are denied terminating, denied origination, or full denial, thus preventing expensive false dispatches by Automatic Repair Service Bureau Maintenance Centers.

Desks, Interface With [CC-1/1AE1] (AT&T 231-090-108) provides an ESS switch with the capability to operate with standard central office desks. The interface between ESS switches and the following types of desks consist basically of one or more trunk circuits.

- a. **Directory Assistance Desks Interface** provides connections for routing DN information requests made by local subscribers, as well as by subscribers located in distant offices, to an information desk. It is also used by toll switchboard operators desiring rate and route information for a toll call.
- b. **Local Test Desk Interface** provides a connection to a local test desk in a local or remote location via an outgoing trunk circuit. This connection is used by installers when checking out subscriber installations. It allows the test desk to have

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control of a connection after answer and to have a clear tip and ring connection to a subscriber's telephone for testing. The interface circuit allows the test desk, upon receipt of a complaint, to verify that a trouble does exist and whether it is located in the central office or in its associated outside plant.

- c. **Repair Service Desk Interface** provides connections to repair service bureau desks in local or remote locations for the purpose of handling various subscriber complaints regarding improper telephone service.

Directory Numbers Associated With Route Indexes [1AE9.09] allows the craft a means for verifying which DNs are associated with RIs. This enhancement provides the craft with the verify capabilities to search through an entire office or a specific input range of DNs for those DNs which are associated with a specific input RI, or for those DNs which are associated with a RI which falls within a specific input RI range.

Detailed Billing on Hotel/Motel Rate Calls [1AE7] (AT&T 231-090-402) provides the capability to permit traffic studies to support decisions to convert hotel/motel lines to measured service. This feature is available with 1AE7 (1A ESS switch only).

Detailed Billing on Timed and Untimed Message Unit Calls (DUMB) [CTX-6/1AE1] replaces AMA type-of-entry codes 17 and 18 with type-of-entry codes 22 and 23, respectively, in AMA data.

Diagnose Trunk-Out-of-Service List [CTX-6/1AE1] allows all trunks on the trunk-out-of-service list to be diagnosed upon TTY or test panel request.

Diagnostic Programs [1E3/1AE4] [254-280-230 (1A ESS switch)] automatically isolate the failure in a faulty unit to relatively few quickly changeable spare parts. The diagnostic test results are printed out on the maintenance TTY.

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Dial Long Lines Circuit [CC-1/1AE1] allows the conductor loop resistance over which dialing, supervision, and ringing signals may be validly transmitted and received to be increased beyond the maximum office range by inserting this circuit between a line circuit and associated stations.

Dial Pulse Repeating Diagnostic (DPRP) [1E6/1AE6] (AT&T 231-090-254) provides diagnostics for dial repeating tie trunk circuits. The feature group required to provide DPRP is DPRP.

Dial Tone Speed Measurement [CC-1/1AE1] provides measurement and accumulation of the number of dial tone delays exceeding 3 seconds during the traffic measurement periods. The accumulated data is retrieved by the TTY.

Digital Carrier Trunk (DCT) [1E6/1AE6] (AT&T 231-090-152) allows an ESS switch to operate with a digital carrier trunking arrangement. This trunking arrangement replaces the existing combination of ESS switch trunk circuits and carrier channel units by combined channel units controlled by a microprocessor.

The DCT feature provides an interface with T-carrier line and 1 and 1A ESS switches via digital facilities terminated in a DCTF (digital carrier trunk frame). The DCTF utilizes a peripheral PUC (peripheral unit controller) with duplicated microprocessor and digital carrier trunk banks. The PUC serves as the interface with the ESS switch processor and provides for trunk state control, trunk supervisory scanning, and maintenance functions. The feature groups required to provide DCT are PUC and DCT.

Digital Carrier Trunk Continuity and Polarity Test [1AE9.06] (AT&T 231-090-152) enhancement provides line side tip and ring continuity and polarity tests. These changes to the diagnostic program for "Common System 48 Channel PCM Bank Type DCT CCU (Combined Channel Unit)" -SD-3C329-01 improve the maintainability of these circuits. The changes help to resolve tip/ring reversals when the DCT CCUs are installed. The test circuit being

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used, SD-1A226-01 continuity and polarity test circuit, is an existing circuit and is a required test circuit in every switch.

With the 1AE9.07 generic program, the **Digital Carrier Trunk Incoming Continuity and Polarity Diagnostic** enhancement provides for manual (TTY or trunk test panel) requested continuity polarity diagnostic tests for incoming DCT. This enhancement will also include a test of the line side ferrod for nonsaturation in an idle state. The diagnostic TTY output messages (TN01, TN04, and TN05) will print with TC2 (test code 2) set to 5 indicating the continuity polarity test was performed on the trunk.

Directory Assistance Charging (DAMA) [1E3/1AE4] (AT&T 231-090-344) provides for generating charging data on calls to directory assistance.

Disconnect Record at Calling Customer Hang-Up [CTX-6/1AE1] puts time of calling party hang-up in AMA disconnect record or time-out on timed disconnect rather than time of first party hang-up.

Division of Revenue Measurements (AT&T 231-090-346) provide the capabilities to collect and display peg and usage counts required to perform the division of revenue function. Usage counts are available with **1E8A/1AE8A and later**. The feature group required is DRPC.

Division of Revenue Peg Counts (DRPC) [1E3/1AE4] (AT&T 231-090-350) enable the ESS switch office to record various traffic measurements that are required to perform the division of revenue function. The DRPC feature is optionally loaded after 1E5/1AE5. The feature group required to provide DRPC is DRPC. (Note AT&T 231-090-346 must be used with 1E8A/1AE8A and later. [See above.]

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E&M [CC-1/1AE1] is a technique for transferring information between a trunk circuit and a separate signaling circuit over two leads designated "E" (receive) and "M" (transmit).

"E" Digit Unblocking [CTX-4/1AE1] is a guard against 0 or 1 in "E" Digit Unblocking" the "E" digit position on 10-digit DDD calls (excluding access code) which is removed in order to permit customer dialing to DNs of the form N0/1X-XXXX.

Echo Suppressor Control [1E4] minimizes speech clipping problems caused by an excessive number of enabled echo suppressors in multilink trunk connections.

Emergency Ringback [CC-1/1AE1] provides for reception of signals from a manual toll switchboard to cause the system to rering a calling customer and reestablish a talking connection to the switchboard. To provide this capability, calls to manual toll switchboards are not considered to have ended until a disconnect signal is received from the connected operator. This capability is not required for calls to a TSPS operator.

Enhanced Reroute Controls [1AE8A] (AT&T 231-390-305) provide flexible reroute controls for network management. Flexible reroute controls contain all the control information in the input command. (With preprogrammed reroute controls, all control data must be stored in translations.) Flexible commands can be entered from the EADAS/NM center, the local NM TTY, or the SCC. The NMER feature group is required.

Expansion of Teletypewriter Channels (TTEX) [1E3] increase the maximum possible number of teletypewriter (TTY) channels available with the 1 ESS switch from 16 to 23.

Extended Plant Measurements [CTX-5/1AE1] provide plant management with a concise, quantitative summary of central office hardware performance and its impact on customer service.

Operation, Administration, and Maintenance Features

Fraud Prevention on Terminating Calls [1E3/1AE4] prevents possible "black box" fraud. Upon detection of an on-hook condition and the network path is opened, the terminating line supervision is restored to the line's ferrod, thereby preventing conversation during the on-hook interval. The network path is restored if the line returns off-hook before disconnect timing is completed.

General Unit Type Recent Change Message [1E3/1AE4] [AT&T 231-048-305 and AT&T 231-318-319 (1AE9)] is provided to facilitate the addition, change, or deletion of a UTYN (unit type translator) auxiliary block.

Glare Resolution [1E4/1AE4] (AT&T 231-090-054) provides the capability to resolve simultaneous seizures (referred to as glare) of 2-way trunks. The glare resolution capability is available for 2-way trunks arranged for either toll CCIS or per trunk signaling.

Ground Start [CC-1/1AE1] allows an origination to be detected as the result of completing an electrical circuit by applying a ground to one side of the loop facilities at the customer location.

High-Low (Hi-Lo) Supervision [CC-1/1AE1] uses battery and ground through high and low resistance to signify changes from on-hook and off-hook.

Identification of Network Path Associated With a False Answer [CC-1/1AE1] (AT&T 231-051-001) allows the TTY on demand to print out the network path from a transmitter to a loop supervision outgoing trunk if a reversal (false answer) is detected at the end of outpulsing.

Immediate Ringing [CC-1/1AE1] provides 20-Hz ringing of 2 seconds on and 4 seconds off in three phases so that the system can always connect the called line to an active phase of ringing.

#1A ESS Operation, Administration, and Maintenance Features

Operation, Administration, and Maintenance Features

Improved Junctor Testing [1E7/1AE7] provides the capability to make AC continuity and crosstalk measurements on junctors automatically or as manually requested.

Improved Minitrunk Signal Distributor Diagnostic [1E7/1AE7] (AT&T 231-050-002) provides a comprehensive diagnostic of the selection matrix for the minitrunk family of signal distributors (miniaturized universal trunk, combined miscellaneous trunk, HILO universal trunk and the HILO miscellaneous trunk).

Improved Outgoing Trunk Diagnostics [1E7/1AE7] is the conversion of all trunk and service circuit diagnostic programs into the common TDL (trunk diagnostic language) macro package. This conversion improves readability and understandability and reduces the number of specialized routines.

Improved Peripheral Recovery Strategy [1E7/1AE7] decreases recovery time and reduces the number of lost and misdirected calls during the recovery interval.

Improvements to 3/6-Digit Translations [1E7/1AE7] [AT&T 231-090-154 (ETS) and AT&T 231-190-148 (EPSCS)] conserve rate centers and program store by limiting each private network customer to one rate center, one 3-digit translator, and one 6-digit translator per NPA for time-of-day routing.

Inactive Line [1E7/1AE7] (AT&T 231-090-125) provides a method for deactivation and reactivation of certain individual lines or groups of lines without affecting their assigned telephone numbers and other translation data associated with these lines.

Incoming Trunk Service Observing (ITSO) [1E5/1AE5] (AT&T 231-090-410) allows the telephone company to monitor incoming trunk (per trunk signaling or CCIS) traffic that completes to another trunk or completes to a terminating line. The ITSO feature is applicable to 2-wire toll or local/toll offices. The feature group required to provide ITSO is ITSO. (Also see Service Evaluation—HILO.)

Operation, Administration, and Maintenance Features

Incoming Trunk Service Observing/HILO Conversion for CCS7 [1AE10.02] (AT&T 231-090-500 and AT&T 231-090-410) enhancement allows CCS7 2-wire and 4-wire calls to be observed by the Incoming Trunk Service Observing. The ITSO feature provides the ability to perform service observing on incoming 2-wire trunk traffic that completes to a trunk or line. ITSO also performs service observing on incoming HILO 4-wire trunk traffic that completes to a trunk.

Initial AMA Entry on All AMA Call Attempts (IAAC) [CTX-6/1AE1] are generated for all incompleting calls that otherwise would have been chargeable. The entries are of standard format with unavailable information (answer and disconnect times) filled in by noncheck dummy characters.

Intelligent Simplex Peripheral Interface (ISPI) [1AE9] (AT&T 231-365-005) provides an interactive announcement system to support new call processing features such as LASS.

Intelligent Simplex Peripheral Interface Firmware Issue Retrieval and ISPI Heartbeat [1AE9.11] enhancement tests provided for ISPI controllers run continuously in the background on all active controllers for the following issue of firmware:

- For ASC - MC6A002-A1, Issue 4 and later
- For ISU - MC6A004-A1, Issue 5 and later.

The heartbeat test provides a sanity check on both of the IOP channels connected to the controller. This enhancement also checks the issue numbers of the firmware to determine if heartbeat tests can run for a given controller.

Intelligent Simplex Peripheral Interface Message Handler [1AE9.07] enhancement provides the craft personnel with the specific reason why a request to the ISPI controllers is rejected. Requests from clients (features such as LASS or MSS) are sent to the ISPI Message Handler which in turn passes the message to the

#1A ESS Operation, Administration, and Maintenance Features

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ISPI controllers. The ISPI Message Handler enhancement prints a TTY output message when the request is rejected by the ISPI Message Handler system indicating a more specific reason for failure. Also, the TNN will be put on the trunk maintenance list if the client is now a maintenance client.

International Direct Distance Dialing (LAMA Arrangement)

[CTX-4/1AE1] (AT&T 231-090-159) provides for station-to-station overseas calls prefixed by the access code 011. Country code plus national number can be from 7 to 12 digits. The gateway code plus the overseas number is outpulsed in two stages. Local AMA records are made of all answered calls.

International Direct Distance Dialing (TSPS Arrangement)

[CTX-7/1AE1] (AT&T 231-090-159) provides for routing of IDDD calls via TSPS, extends IDDD capabilities to coin and multiparty lines, permits customer dialing of special toll IDDD calls, and gives dial access to overseas operators.

Line Access to Trunk and Line Test Panel (LATP) [1E3/1AE4]

(AT&T 231-090-100) allows a call originated from a line to terminate at the TLTP. This is accomplished by dialing a 7-digit DN from the originating line.

Line and Interface Maintenance [1E3/1AE4] (AT&T 231-090-052)

provides sequential and single line demand tests on idle, position busy, or out-of-service ACD lines equipped with AICs (agent interface circuits). The sequential tests include all ALIT and AIC tests. Single line tests also include off-hook tests.

Line Service Overload Strategy (LSOS) (AT&T 231-090-195) efficiently handles all originating service requests and ensures service to essential (class A) lines during office overload conditions.

Operation, Administration, and Maintenance Features

The LSOS feature is in reality two features. These features are as follows:

- a. The **Improved Overload Strategy (IOS) [1E6/1AE6]** employs a LIFO (last-in, first-out) algorithm that results in a more graceful decline in service under overload conditions.
- b. The **Essential Service Protection (ESP) [1E7/1AE7]** establishes priority service for class A originations during office overload conditions.



NOTE:

The ESP feature replaces the Line Load Control feature described in AT&T 231-190-190 and AT&T 231-390-190.

Local Area Signaling Services enhancements provide the craft with the following capability:

- a. **Local Area Signaling Services Option Word L Recent Change [1AE9.06 and 1AE10.01]** enhancement allows the assigning of LASS features more efficiently. Currently, the initial assignment of LASS features to an individual line requires the craft person to specify each LASS feature being allowed and the type of access (usage-sensitive, subscription, or denied). Any LASS feature not assigned at this time defaults to 0 (usage-sensitive). The craft person must deny each feature not wanted. This enhancement allows the setup of a default option word L in the office option table. Recent change uses the default option word L to fill in the unspecified fields.
- b. **Local Area Signaling Services Verify for Line Equipment Number [1AE9.06 and 1AE10.01]** enhancement generates a display of those LASS features associated with a given LEN provided that the LEN is assigned usage-sensitive, subscription billing, or denied access. This display eliminates the need for randomly choosing the individual LASS features with associated billing until the right combination is displayed. This capability only allows for the

#1A ESS Operation, Administration, and Maintenance Features

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display of LASS features designated in option word "L" of the LEN supplementary auxiliary block. No additional software or hardware is required.

- c. **Local Area Signaling Services Directory Number Verify [1AE9.07 and 1AE10.01]** enhancement extends the LEN verify enhancement to verify the LASS Usage-Sensitive/Subscription Billing features associated with the DN. The option word L of the LEN supplementary auxiliary block is required to be built in LUCS.
- d. **Verify of the Local Area Signaling Services Feature Restrictions Access on a Line [1AE9.09 and 1AE10.04]** enhancement allows the craft a means for verifying a DN's ability to access LASS features (AR, COT, DA, SCR, SCF, AC, and AR2). The enhancement will combine the restrictions at all levels and show whether a DN is denied access, or what type of billing (usage-sensitive, subscription) a DN is assigned for each individual LASS feature. A simple verify request will use the PACT translator or CTXDI, CLSI translator, and option word L of the LEN supplementary auxiliary block to determine a DN's accessibility and/or billing type for each individual LASS feature.
- e. **Option Word L Removal [1AE9.10 and 1AE10.05]** enhancement results in a savings of allocated call store words. If a line is restricted access to all LASS features at the PACT (prefixed access code translator) CTXDI [centrex digit interpreter (for CTX lines)] and/or class of service information levels, option word L in the LEN supplementary auxiliary block will not be built. This access checking is performed when running an RC:LINE: new or change message.

#1A ESS Operation, Administration, and Maintenance Features

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Local Automatic Message Accounting (LAMA) [CC-1/1AE1] is an arrangement where the AMA equipment is collocated with the ESS switch.

Loop [CC-1/1AE1] is a metallic loop formed by trunk conductors and termination bridges. The impedance of the loop is changed by openings and closures in the transmitting circuitry which provide the on-hook and off-hook signals.

Loop Range Extension (LRE) [1E6/1AE6] (AT&T 231-090-160) provides 3- or 6-dB gain when used with fully loaded loops from 1500- to 2800-ohms conductor loop resistance. The amount of gain is inserted automatically by the range extension circuit depending upon loop resistance. The LRE feature also provides battery boost, dial pulse repeating, and ring-trip assistance. An automatic bypass capability allows the range extension circuit to be used with short loops of less than 1500 ohms conductor loop resistance. The LRE feature group is required.

The LRE feature refers to the central office components (hardware and software) of the CREG (concentrated range extension with gain) system that extends the office signaling and supervisory range beyond the nominal 1500-ohm limit and provides voice frequency gain for proper transmission.

Loop Start [CC-1/1AE1] indicates the origination of a call by closing the tip and ring loop through the telephone set.

Mapping of TRCA and CORC Blocks by Data Mapping [1AE9.06] (AT&T 231-104-305 and AT&T 231-300-291) enhancement has been made to DMAPLIB (1 and 2) to also map the TRCA and CORC blocks during a translations update as well. The enhancement is transparent to the craft. Currently, mapping of the TRCA and CORC blocks is only possible with a PDA and/or generic update.

#1A ESS Operation, Administration, and Maintenance Features

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With the 1AE9.09 generic program, the **Retrieval of Customer Originated Recent Change Block Address** enhancement is used to store the remote directory number for interoffice Call Forwarding Variable and Call Forwarding Over Private Facilities. The address of this CORC block is difficult to derive manually. This enhancement provides a new input message to retrieve the address and size of the CFCB (call forwarding CORC blocks) associated with the input DN. The existing TR20 output message is used to print the CORC block address and size in response to the new TAG-CFCB input message. The format of the message is "TAG-CFCB-xxxxxx.", where xxxxxx is the 7-digit forwarded base DN.

Memory Expansion [1AE7] (AT&T 231-300-014) expands the memory spectrum for the 1A ESS switch. The addressable memory for both program store and call store is doubled with this feature.

Message Detail Recording on Tie Trunks (TAMA) [1E4/1AE4] (AT&T 231-090-417) provides an AMA record of tie trunk or FX trunk call originations on a per access code basis. The TAMA feature group is required.

Mixed Concentration Ratio [1E5/1AE5] (AT&T 231-031-010) allows an office to operate with a mixture of heavy and regular LLN concentrator ratios. This permits an office which is currently heavy to grow more economically with 4:1 regular networks.

Modify Midnight Routine Exercise and Give MAC-REX Status [1E7/1AE7] provides a means of inhibiting routine exercises from running on selected out-of-service units. Equipment is placed in this status via TTY I/O interface.

Monitoring Recent Change Area [CTX-7] (AT&T 231-104-305) is provided to report the status and composition of the RC area. It will be printed once upon TTY request or hourly when the RC is 80 percent full.

Computer Products Plus – Telecoupler II Acoustic Coupler Overview

Overview

The acoustic coupler was one of the must-have hacking tools back in the 1980s and early 1990s. The acoustic coupler allowed you to connect your modem to a phone which didn't have an exposed RJ-11 jack. Of course, what this meant, was you could now connect your modem up to a payphone. Then, armed with a list of "borrowed" calling card numbers, a cheap laptop computer, a good external modem, and a decent terminal program – you could hack the planet!

Using payphones for your hacking expeditions yielded a certain amount of anonymity (and alot of line noise). Hacking from a payphone using an acoustic coupler usually limited your maximum connection speed to around 1200 bps or so. You could sometimes hit 2400 bps if there was no ketchup inside the little airholes on the receiver... A good external modem was also a necessary tool. External modems were used because their LEDs gave a good indication of any problems with traffic flow, and they could also be "hard" disconnected by just turning them off. The hardest part of portable hacking was often trying to find a good terminal program which could handle all the weird emulations and connect rate settings out there. Several sites would use weird modem speed rates, like 600 bps, as a security measure. The terminal program (and modem) also had to allow manual dialing & connection, and still function if there was no dial tone. You would often do all the dialing by hand using the payphone's own keypad, then when you heard the remote modem answer, try to initiate a manual connection sequence. A portable Radio Shack telephone amplifier with an induction pick-up coil was also a handy tool to monitor the modem connection "off-hook."

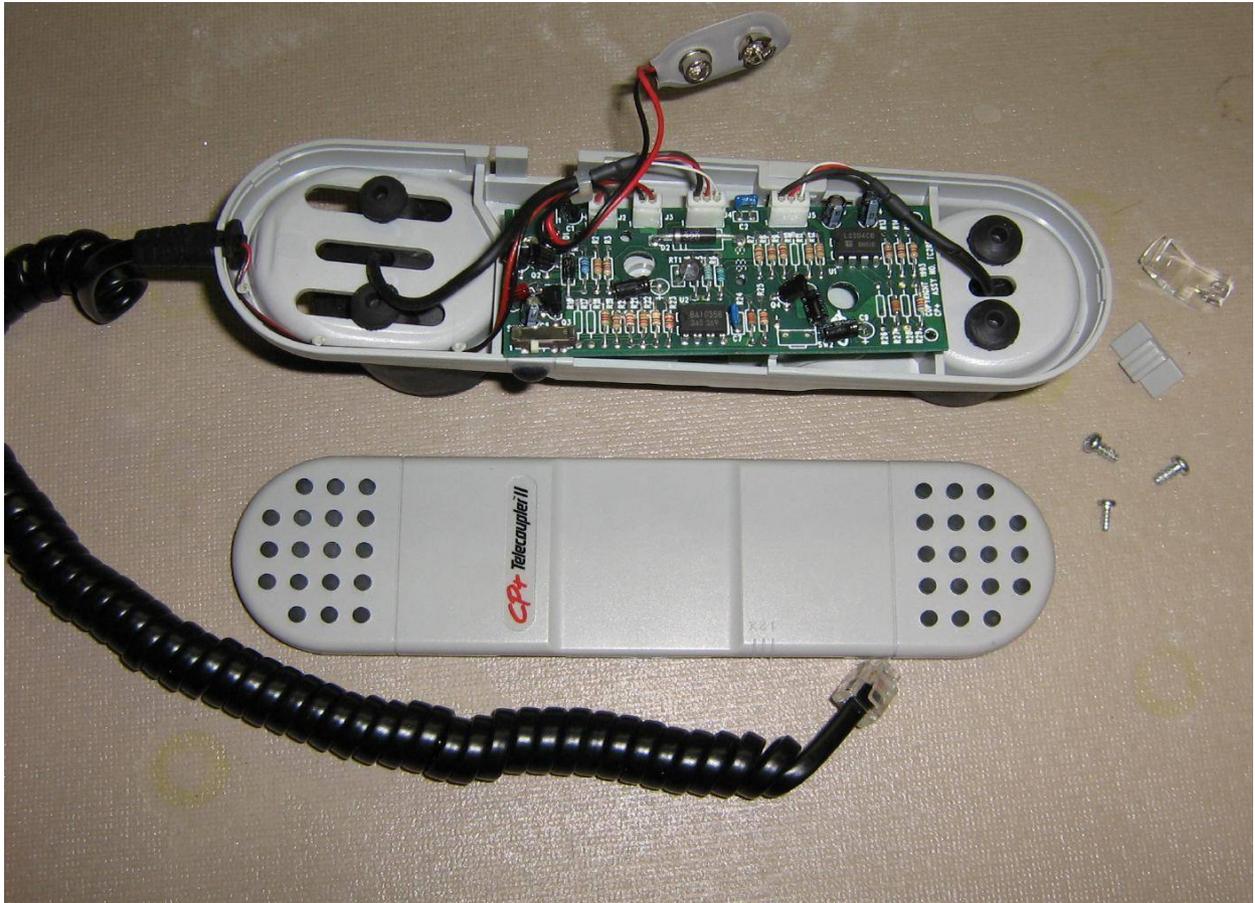
The pictures shown here are of a Computer Products Plus (CP+) Telecoupler II High-Speed Modem Coupler from around 1993 or so. As you can see, there is not much to it. After being strapped to a payphone's handset, the coupler picks up the receive audio using an electric microphone and an op-amp with a good phase and frequency response. The audio is then slightly amplified, RC filtered, and sent off to the modem's RJ-11 jack using a simple coupling circuit. On the transmit side, the signal from the modem is again slightly amplified, RC filtered, and then fed into a standard 600 ohm speaker. A portion of the transmitted signal is fed back into the receive op-amp (sidetone). This appears to be the only "confusing" part of the reverse engineering the coupler.

At low-speeds (2400 bps and lower), the modem uses in-band audio tones to represent the ones and zeros of the digital data stream. The modem transmits a 1070 Hz tone for a binary "0" and a 1270 Hz tone for a binary "1". On receive, it recognizes a 2025 Hz tone for a binary "0" and a 2225 Hz tone for a binary "1". These frequencies are for the source modem *originating* the transmission. The frequency assignments are reversed for the *destination* modem receiving the information.

Modem Audio Tones

	Modem Transmitting Tone (Hz)		Modem Receiving Tone (Hz)	
	0	1	0	1
Modem Called Computer	1070	1270	2025	2225
Computer Called Modem	2025	2225	1070	1270

Pictures

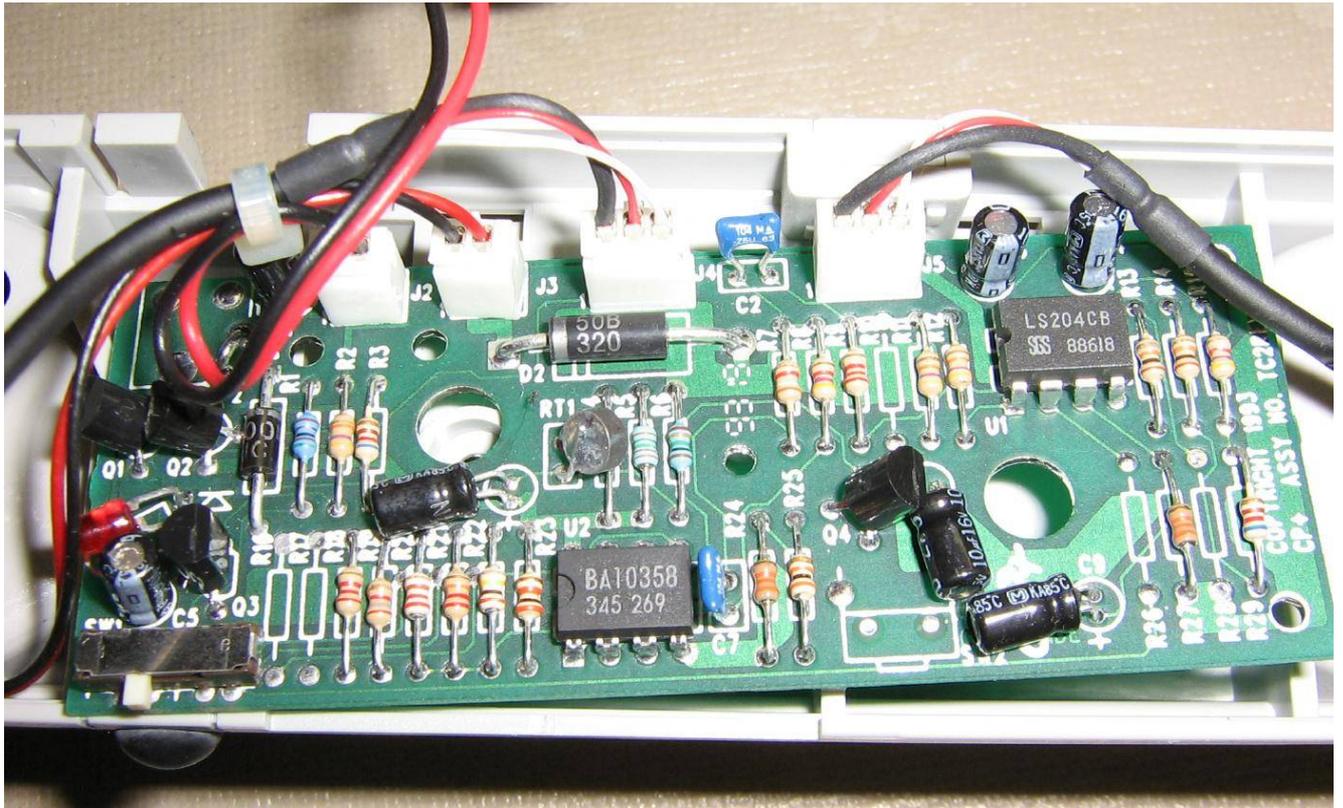


Internal view of the Telecoupler II. The "transmit" speaker is on the left, the "receive" microphone is on the right.

The acoustic coupler is powered from a single 9 volt battery.



Alternate view. Speaker is on the left, electric microphone is on the right. The battery compartment is in the middle.



Closeup internal view. The "transmit" section is on the left, the "receive" section is on the right.

Across the top, jacks "J2" are the 9 volt battery connection, "J3" is the line input (from the modem), "J4" is the transmit speaker, "J5" is the receive microphone.

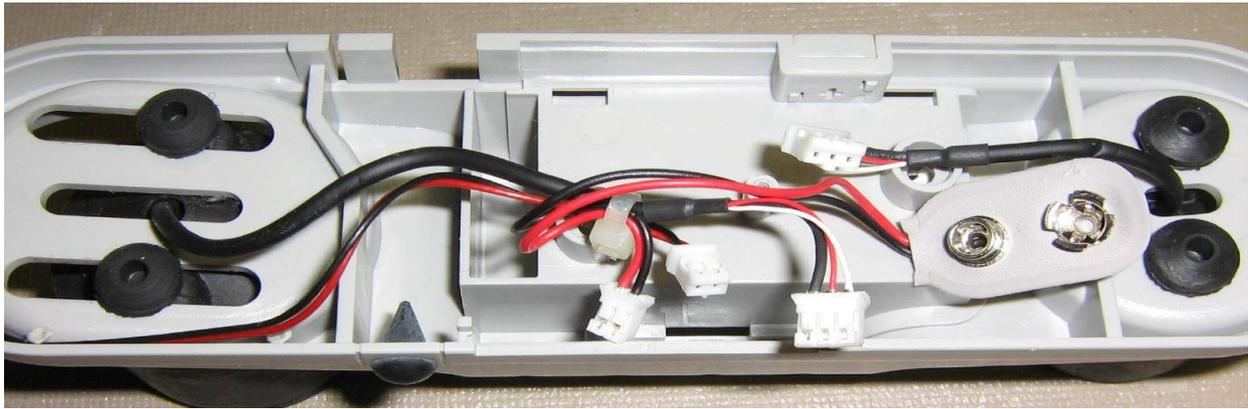
The BA10358 dual ground-sense op-amp is for "transmit."

The LS204CB low-distortion, low-noise op-amp is for "receive". The DC coupler capacitor from the microphone element is 0.1 μ F.

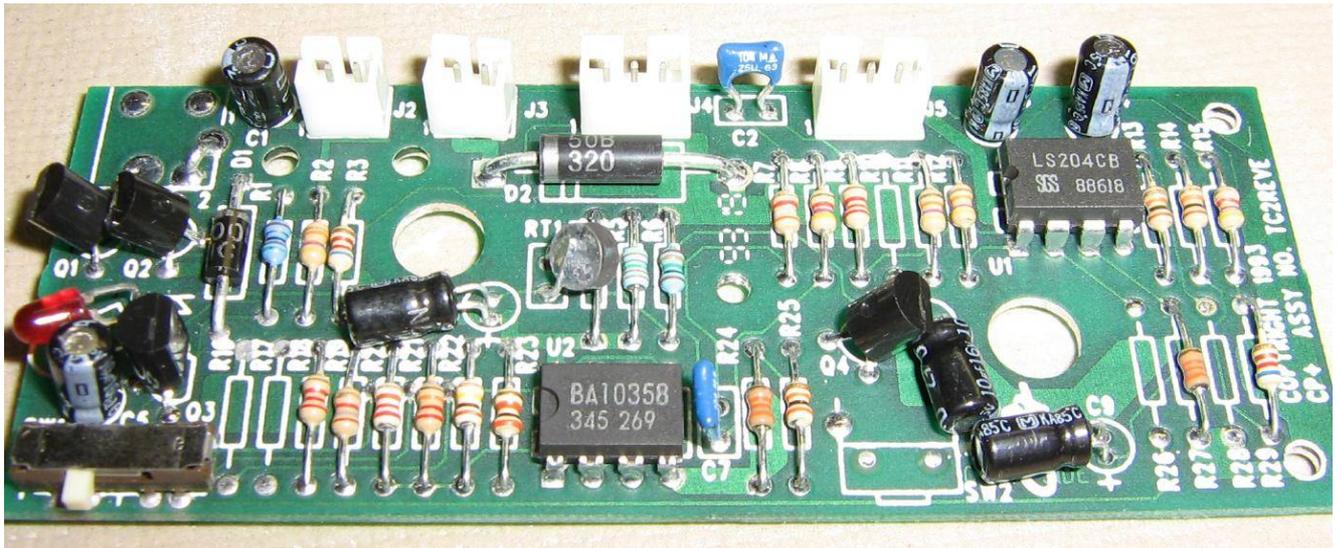
There is a 1N5350 5 watt, 13 volt Zener diode on the line input to catch and voltage spikes on the line.

The switch on the lower left adjusts the gain of the transmit op-amp. More speaker gain can be added for "noisy" phones.

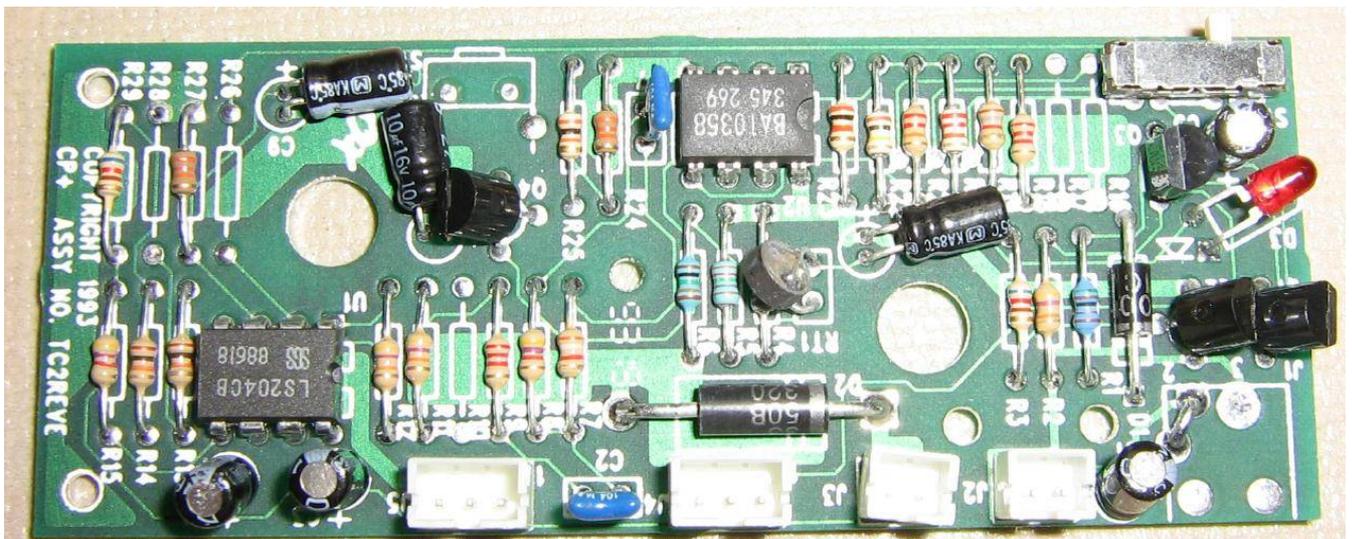
The transistors do the normal phone line interface switching.



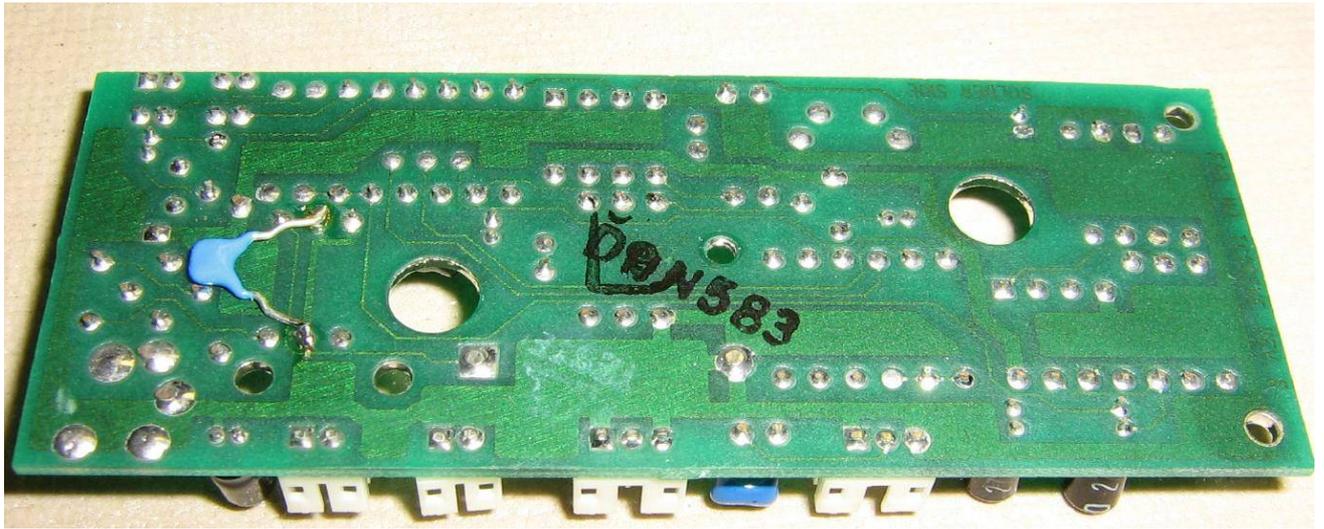
Coupler view without the internal PC board. The speaker and microphone element are mounted in very soft rubber cushions.



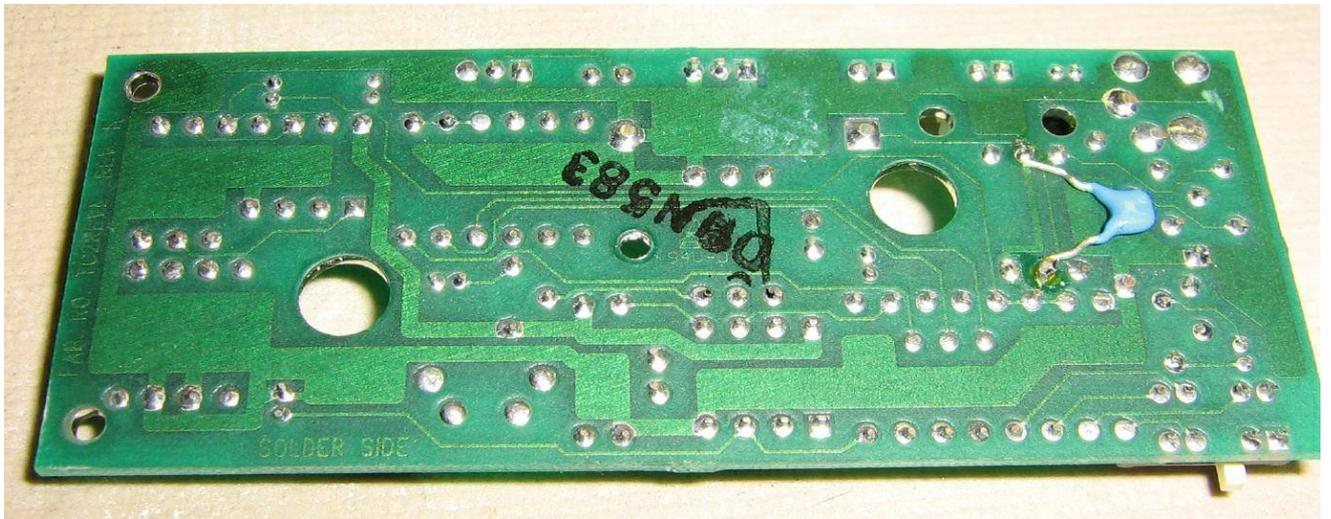
Closeup circuit board view. Speaker/DC/line conditioning section is on the left.



Closeup circuit board alternate view. Speaker section is on the right.



Bottom view of the circuit board. Speaker section is on the right.



Bottom view, now rotated. Speaker section is on the left.



We are all going to die!



USER'S REFERENCE

Telecoupler II[®]

High Speed Modem Coupler

The Road Warrior™ Telecoupler® II high-speed acoustic coupler connects your modem to virtually any telephone and lets you send and receive faxes, transmit data, check your E-mail or access on-line services with your portable or notebook computer wherever your travels may take you.

Utilizing advanced signal processing technology, the Telecoupler II can interface with the telephone system when no direct connection is available. Communicate over pay, cellular, hotel, digital/PBX and international telephones up to 14,400 bps.*

Used by major corporations, governments and traveling professionals worldwide, the Telecoupler II gives you the power to communicate the world over. For more information on additional Road Warrior products, call (714) 847-1799.

The following step-by-step instructions will explain the main features of the Telecoupler II (Fig. 1) and guide you through the operating procedures. **PLEASE READ THE INSTRUCTIONS THOROUGHLY. WE HIGHLY RECOMMEND PRACTICING WITH THE TELECOUPLER II BEFORE GOING OUT ON THE ROAD.**

* Speed may vary with telephone, modem, line conditions and communications software.

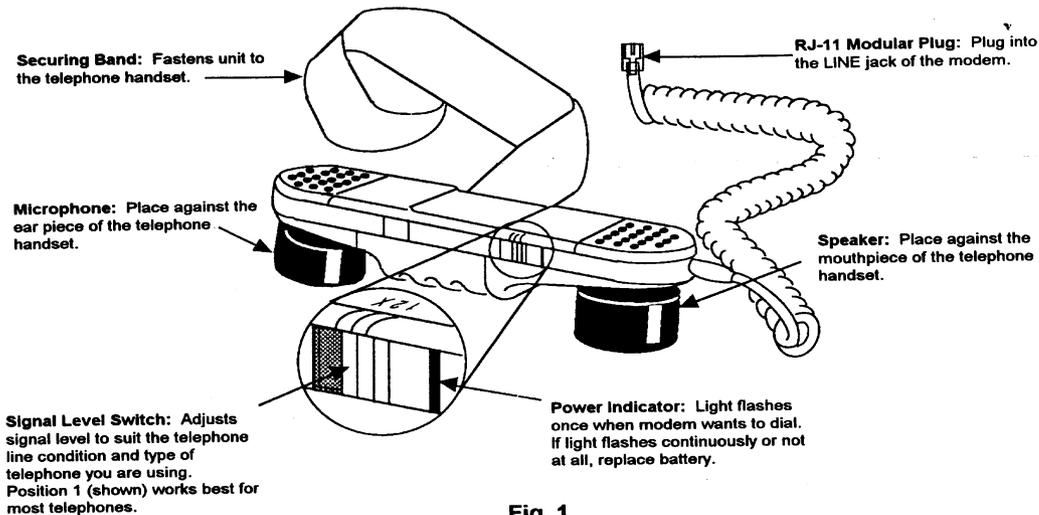


Fig. 1

Installing/Replacing the Battery

Slide battery compartment cover as shown (Fig.2). **DO NOT PRY UP.**

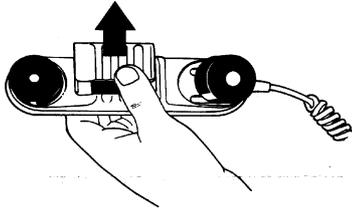


Fig. 2

Spare battery can be stored in carrying case pocket (Fig.3).

Use a standard 9-volt alkaline battery, Duracell® type MN1604 or equivalent.

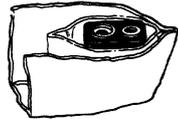


Fig. 3

Operation

1. Plug the Telecoupler II into your computer's modem jack. **NOTE:** Some modems have two jacks labeled "LINE" and "PHONE." Always use the "LINE" jack (Fig.4).

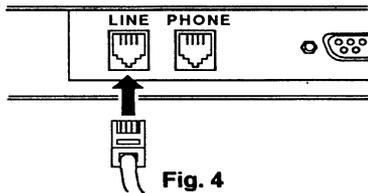


Fig. 4

2. Attach the Telecoupler II to the telephone handset as shown - note position of cords (Fig.5). Adapter disk must be used with AT&T® Merlin™ telephone handsets (Fig.6).

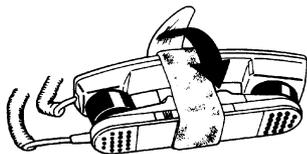


Fig. 5

Strap the two units together tightly to ensure a proper connection.

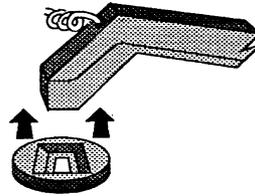


Fig. 6

3. At this point, your communications software should be loaded and ready to dial. To ensure that you get a new dial tone, depress the hook switch (hang up the phone - Fig. 7) for approximately 3 seconds and then release. Now command your computer to dial. This completes the standard dialing procedure.

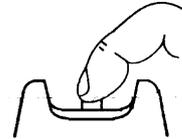


Fig. 7

If your modem fails to communicate or you receive messages such as "no dial tone" or "no carrier," then further action is required. See *Manual Dialing & Modem Configuration*.

Tips for Better Performance

Carbon Granule Microphones - Gently tap any phone handset with a carbon granule microphone against a hard surface to loosen the granules before connecting the Telecoupler II. If you are unsure of the microphone type, tap the handset anyway; this will not hurt the phone.

Avoid Noise & Vibration - When possible, isolate the Telecoupler II from noise and vibration (Fig. 8). Quiet areas provide for better communications sessions. In general, if the phone you are using is not suitable for a normal conversation due to external noise and/or poor line conditions, use a different phone.

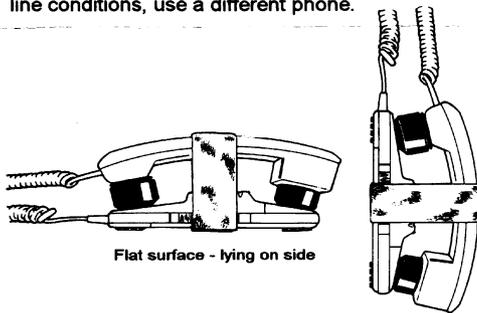


Fig. 8
(continued on back)

Dangling

Phones with Volume Controls - Pay phones with volume controls are frequently located in airports. If the volume control is set too loud, your modem can become overloaded. Simply avoid using the switch on these pay phones to avoid this problem. The volume control on any office phone should be set to normal level.

High Speed Modems - If line conditions will not support high data rates and you are having problems establishing a connection, force your modem to connect at a slower rate, such as 2400 or 1200 bps. This is normally done through your communications software.

Error Correction - Modems with error correction features will remove occasional data errors and are recommended for use with the Telecoupler II.

Manual Dialing & Modem Configuration

Cellular telephones, some pay, rotary-dial, international and digital or PBX telephone systems will not accept the dialing tones produced by your modem.

If your modem will not dial automatically or you are using one of the phone types listed above, simply follow the step-by-step procedures below:

1. Look for a manual dialing feature in your communications software. When you select the manual dialing feature your software will lead you through the dialing procedure. **REMEMBER:** Get a new dial tone before dialing!
2. If your software does not have a manual dialing feature, you can still dial for your modem, however, you must give the modem additional information:
 - Instruct your modem to ignore dial-tone detection. This feature will most likely be found in your software's modem setup menu. Proceed to step 3.
 - If your software does not have an ignore dial-tone detection feature, you must invoke the "X3" command, which will instruct the modem to ignore the dial tone.

Q: What is the X3 command? A: Modems are factory pre-programmed to listen for a dial tone before dialing. If you dial for your modem, the dial tone will not be present and your modem will not continue. The X3 command instructs your modem to ignore the absence of the dial tone.

Look for the box or command line labeled " initialization string/command" or " dialing string/command." Insert X3 immediately after AT in the command

Troubleshooting

Before proceeding, verify that your modem works properly when directly connected to the phone line (i.e., without the Telecoupler II).

Preliminary Checklist

- Check for dead or weak battery by replacing battery.
 - Make sure the Telecoupler II is correctly attached to telephone handset (Fig. 5).
 - Verify correct communications software setup.
 - Minimize external noise and vibration (Fig. 8).
1. By far, the most common connection failures are the result of improper dialing. To determine if the problem is dialing-related, listen to your modem speaker while connecting. If you can hear the telephone line ringing, the other modem answering, and tones from the other modem, then you have dialed correctly. If not, you may receive messages on your screen such as " no dial tone," " busy," " no carrier," or " voice call detected." These messages indicate a dialing problem. Please refer to *Manual Dialing & Modem Configuration* and follow the procedures carefully.
 2. If the other modem answers, but the modems fail to connect, likely causes for the problem are:
 - **Signal Level Switch Position** - Retry using a different switch position.
 - **Poor Telephone Quality or Line Conditions** - Use a different telephone or lower modem speed.
 - **External Noise** - Move to a less noisy location.
 - **Vibration** - If possible, dangle the Telecoupler II and handset by their cords (Fig. 8).
 - **Modem Incompatibility** - Use a lower modem speed.
 3. If the Telecoupler II is malfunctioning, the problem is either a transmit or receive failure. To determine if the Telecoupler II needs service:
 - a) Using a terminal emulator program (ProComm™, Windows™ Terminal accessory, etc.), type command " at" and press the Enter key. The modem should respond with " OK." If it does not, you have a communications software or modem problem. Correct the problem before proceeding.
 - b) Connect the Telecoupler II to the telephone handset, get a fresh dial tone and type: **ATM1L2X3DT 1234567890**

... See TABLE 1 for various examples. Once you've entered the necessary initialization string or command, save the configuration and restart your communications software to make the changes take effect. Now you are ready to dial manually.

Table 1

Case: If your software has:	Then change the:	To:
1. A phone number to dial which includes the characters ATD	phone number	ATX3DT1
2. A separate dialing prefix and phone number or the dialing prefix includes the characters ATD	dialing prefix phone number	ATX3DT 1 (See NOTE)
3. A field to enter a modem initialization string (and the characters AT do not appear in any dialing field described above)	modem initialization string phone number	add characters X3 to the end of the existing modem initialization string 1 (See NOTE)
4. A separate dialing prefix (without ATD) and phone number with no modem initialization string	dialing prefix phone number	X3 1 (See NOTE)
5. Only a phone number to dial with no additional prefixes or strings	phone number	X3DT1
6. Only a phone number to dial with no additional prefixes or strings and letter characters are not accepted	If only case 6 describes your software, call CP+ at (714) 847-1799 for technical support.	
NOTE: Yes, the phone number should really be set to the single digit "1." This alerts the modem to respond to an answer from the other modem.		

3. Set up your communications software so that you need to press just one more key for the modem to begin dialing.
4. Depress the hook switch (hang up the phone - Fig 7) for at least 3 seconds.
5. Release the hook switch and manually dial the phone number using the telephone keypad. REMEMBER: Dial 9 for an outside line, 1 for long-distance, etc. if required.
6. Immediately after dialing, press the key that instructs your software to begin dialing. This must be completed before the call is answered on the other end. When the other modem answers, the two computers will exchange the usual tones and establish a connection.
7. If the modems fail to connect, try again (beginning at step 3) with the Telecoupler II's signal level switch set to a different position. It may be necessary to try all three switch positions before achieving successful operation.

- **AT** means "attention to the modem."
- **M1** turns on the modem speaker.
- **L2** sets the modem speaker to medium loudness.
- **X3** tells the modem to dial without a dial tone.
- **DT** means "dial using tones."
- **1234567890** is a dummy phone number.

The Telecoupler II's power indicator should flash once after the Enter key is pressed. You should then hear a dial tone from the modem speaker followed by ten tones. If the indicator does not flash or you cannot hear a dial tone, then try another modem, preferably of a different type. If the Telecoupler II will not work with a different modem, then call (714) 847-1799 or FAX (714) 848-6850 for CP+ product support. Otherwise, see step(c).

- c) Remove the Telecoupler II from the telephone handset. Hold the Telecoupler II speaker (the rubber cup nearest the line cord) 3 or 4 inches away from your ear. Type: **AT M0 X3 DT 1234567890** and press the Enter key.

- **M0** - (M zero) - turns off the modem speaker.

If you can clearly hear the ten tones from the Telecoupler II speaker, your Telecoupler II is functioning properly and the problem is either your modem or your software.

If the tones cannot be heard, repeat this step using another modem. If the Telecoupler II still will not produce dialing tones, call (714) 847-1799 or FAX (714) 848-6850 for CP+ product support.

Glossary

Modem Initialization String or Command - a series of commands that configures your modem to work properly with your communications software. These commands are sent only once when your software is loaded.

Dialing String or Command - commands that are sent to the modem before the telephone number. They take the form "AT...DT1234..." There can be any number of special commands inserted between "AT" and "D."

Dialing Prefix - digits that are dialed before the telephone number to access special services such as disabling call waiting, long distance carriers, credit card call, etc.

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United States Patent [19]
Serrano

[11] **Patent Number:** 4,599,491
[45] **Date of Patent:** Jul. 8, 1986

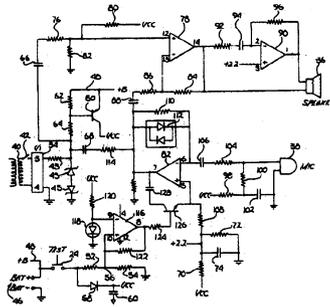
- [54] **APPARATUS FOR CONVERTING DIRECT COUPLED DATA DEVICES TO ACOUSTIC COUPLED DATA DEVICES**
- [75] **Inventor:** Arthur L. Serrano, Canoga Park, Calif.
- [73] **Assignee:** Novation, Inc., Chatsworth, Calif.
- [21] **Appl. No.:** 629,096
- [22] **Filed:** Jul. 9, 1984
- [51] **Int. Cl.⁴** H04M 11/00
- [52] **U.S. Cl.** 179/2 C
- [58] **Field of Search** 179/2 C, 2 DP

Primary Examiner—Keith E. George
Attorney, Agent, or Firm—Blakely, Sokoloff, Taylor & Zafman

[57] **ABSTRACT**
A method and apparatus for converting direct coupled data devices to acoustic coupled devices is disclosed. The apparatus consists of an acoustic coupler and associated electronics to provide acoustic coupling to a telephone handset and to connect to a direct connect modem or other data device to allow operation of the direct connect modem in most modes as if directly connected to a telephone line. The device disclosed includes circuitry for off-hook detection for automatically turning on the electronics, so that battery power is only active when required. Other features and characteristics of the device are disclosed.

- [56] **References Cited**
U.S. PATENT DOCUMENTS
4,409,437 10/1983 Horyu 179/2 DP
4,415,769 11/1983 Gray 179/2 C

7 Claims, 2 Drawing Figures



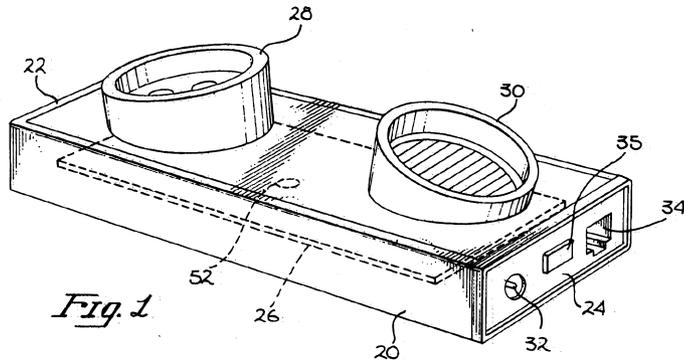


Fig. 1

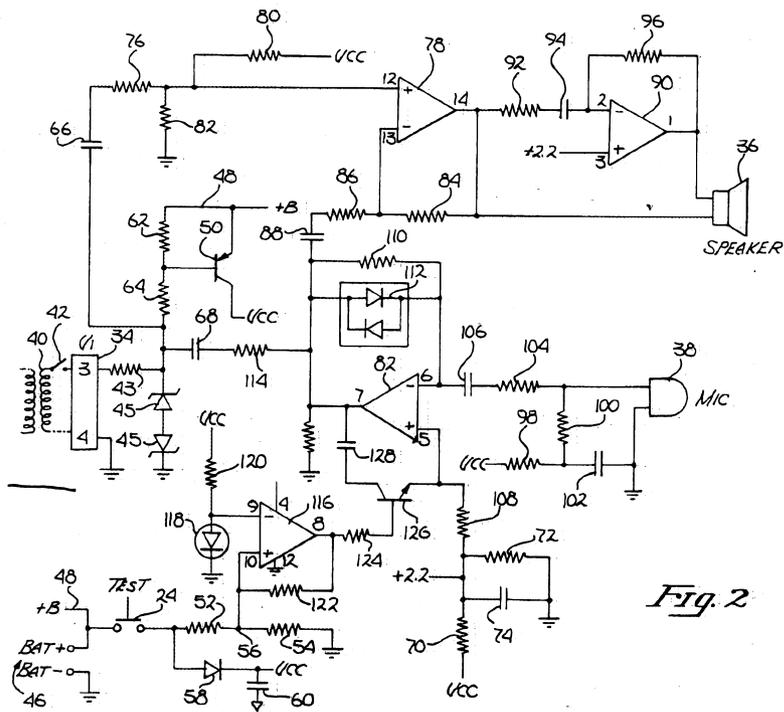


Fig. 2

APPARATUS FOR CONVERTING DIRECT COUPLED DATA DEVICES TO ACOUSTIC COUPLED DATA DEVICES

BACKGROUND OF THE INVENTION

1. Field of the Invention.

The present invention relates to the field of modulator demodulator sets and other data devices for digital communication over conventional telephone lines.

2. Prior Art.

Various types of modems, that is modulator/demodulator sets for digital communication over conventional telephone lines are well-known in the prior art. Such devices generally fall into one of two categories, specifically acoustic coupled devices and direct connect devices. Acoustic coupled devices may be characterized as having a speaker and microphone for disposition adjacent the microphone and speaker, respectively, on a conventional telephone handset, so that the digital signals being transmitted and received to and from the telephone system are coupled as audible signals. This of course works reasonably well, as a conventional telephone lines have a relatively narrow band pass which is not suitable for transmission of base band signals anyway. Acoustic coupling has the specific advantage of not requiring a direct line connection to the telephone line so as to be highly versatile, provided the coupler itself is suitable for mating with the desired range of telephone handsets. It does have the disadvantages, however, of sometimes being larger than a direct connect modem because of the requirement of the couplers and coupler spacing, of perhaps being more expensive for the same reason, and of suffering somewhat in signal-to-noise ratio because of the conversion of electronic signals to acoustic signals and back again, particularly in light of the poor frequency response of speakers and microphones in conventional handsets.

In recent years modular telephone connectors for connecting telephone lines to receivers and for connecting handsets to receivers have been mandated. These modular connectors allow the direct connection of a modem to a telephone line with the attendant reduction in cost and size of direct connect modems and improved performance over acoustic coupled modems. At the present time, a substantial percentage of telephones use the modular connectors, which percentage is steadily increasing. Accordingly, the ratio of direct connect modems to acoustic modems being sold is undoubtedly also steadily increasing because of the advantages of direct connects. However, there are many instances where direct connect modems cannot be used, such as in phone equipment already installed before the advent of the modular connection, multiline telephones, phones in phone booths, motels, etc. Thus, there will be instances encountered by traveling persons and others using portable terminals and other digital equipment where the direct connect modem commonly used therewith cannot be used with available phones. Heretofore there has been no known adapter or converter such as the present invention for providing an acoustic interface between a direct connect modem and a telephone to allow the use of a direct connect modem system on a

phone system to which a direct connection cannot be made, whether that direct connect modem be a stand-alone device or integrated into some larger piece of digital equipment.

BRIEF SUMMARY OF THE INVENTION

A method and apparatus for converting direct coupled data devices to acoustic coupled devices is disclosed. The apparatus consists of an acoustic coupler and associated electronics to provide acoustic coupling to a telephone handset and to connect to a direct connect modem or other data device to allow operation of the direct connect modem in most modes as if directly connected to a telephone line. The device disclosed includes circuitry for off-hook detection for automatically turning on the electronics, so that battery power is only active when required. Other features and characteristics of the device are disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of the present invention.

FIG. 2 is a circuit diagram for the circuit of the device shown in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

First referring to FIG. 1 a perspective view of one embodiment of the present invention may be seen. In this embodiment, an enclosure 20 having end caps 22 and 24 thereon is provided, the enclosure housing a printed circuit board 26 shown in phantom therein and supporting muffs 28 and 30 for receiving conventional telephone handset mouth and earpieces in the same manner as conventional acoustic coupled modems. In that regard, the structure of the enclosure 20, end caps 22 and 24, the support of the printed board 26 and muffs 28 and 30, etc. may be constructed in accordance with U.S. Pat. No. 4,297,530 which patent is also owned by the assignee of the present invention. The device of FIG. 1 is also characterized by a DC power connector 32 mounted to the printed circuit 26 within the enclosure and accessible through an appropriate opening in end cap 24, and may be provided with a battery power supply controlled by on/off-switch 35. Also a female connector 34 for receiving a standard RJ-11 modular connector is provided through the end cap 24 to make electrical connection between such a modular connector and associated connections on printed circuit board 26.

Now referring to FIG. 2, a circuit diagram for the device of FIG. 1 may be seen. The muffs 28 and 30 house a speaker 36 and microphone 38 respectively, which provide the acoustic coupling to and from the telephone handset. The function of the circuit is to couple the speaker 36, microphone 38 and RJ-11 connector 34 in an appropriate manner. Resistor 43 and back-to-back Zener diodes 45 provide circuit protection against line transients, the Zeners normally being inactive. Also shown in phantom is a coupling transformer 40 and switch 42, at least schematically representing the adja-

cent interface of a typical direct connect modem. In that regard, a typical direct connect modem will provide a relatively high impedance to a phone line as an on-hook signal (switch 42 open) and an approximately 100 ohm load to the phone line when off-hook (switch 42 closed) to provide the off-hook signal to the central office as a result of the loop current through the 100 ohm load. In general, the modem itself will not be dependent upon the loop current and accordingly, the circuit of FIG. 2 need not simulate the normal off-hook line current of a conventional telephone line.

The circuit of FIG. 2 in the preferred embodiment uses a battery source for power, coupled across battery terminals generally indicated by the numeral 46. In the embodiment disclosed an approximately 5 volt battery is used, though typical nine volt transistor batteries or other batteries having an output voltage of at least a few volts are suitable for this purpose. Line 48 is connected directly to the emitter of transistor 50, and is also coupled through a push to test switch 24 to a voltage divider comprised of resistors 52 and 54, coupled in series between the switch 24 and ground to provide, upon depression of the test switch 24, a voltage at the junction 56 between the two resistors which is some predetermined fraction of the battery voltage, regardless of the state of charge of the battery. Also coupled to switch 24 is a diode 58, which upon depression of the push to test switch 24 will charge capacitor 60 to the voltage VCC, the supply voltage for the remainder of the electronic circuit.

The circuit of FIG. 2 includes an automatic on feature through transistor 50. When switch 42 or its equivalent is open (direct connect modem on hook), or disconnected, resistor 62 holds the base of transistor 50 at the battery voltage on line 48, thereby holding the transistor off. In this condition the steady state current through resistor 64 is zero, as capacitors 66 and 68 isolate the adjacent portions of the circuit from the DC voltage, and of course the battery voltage on line 48 is less than the conduction voltage for the back-to-back Zeners 45. When the direct connect modem goes off hook, switch 42 or its equivalent is closed, so that the combination of resistors 43, 64 and 62 act as a voltage divider, pulling the base of transistor 50 sufficiently below the battery voltage on line 48 to turn transistor 50 on. This supplies voltage VCC to the remainder of the circuit, thereby providing power to the operational amplifiers and other points in the circuit identified with the voltage VCC. This in turn provides power to the voltage divider comprised of resistors 70 and 72, thereby providing a reference voltage at the junction therebetween, 2.2 volts in the embodiment illustrated, with capacitor 74 providing a filter for the reference voltage. In the embodiment shown, resistors 62 and 64 are relatively large resistors, so that even though resistor 43 is a relatively low resistance, only a minimal phone line loop current is provided to the direct connect modem. Obviously however, higher loop currents can be simulated, or even a full 20 milliamp loop current may be simulated by appropriate choice of resistor values, though battery life under such conditions may be

quite limited, suggesting the use of alternate power sources.

Once the direct connect modem goes off hook and power is automatically supplied to the circuit in response thereto as hereinbefore explained, signals received from the direct connect modem for communication over the phone line are coupled through resistor 43, capacitor 66 and resistor 76 to the positive input of operational amplifier 78, resistors 80 and 82 holding the average or DC level of the positive input of operational amplifier 78 at an intermediate voltage level. Assuming for the moment that the AC output of operational amplifier 82 is substantially zero, operational amplifier 78 will have a gain determined primarily by feedback resistor 84 and resistor 86, capacitor 88 being relatively large, thereby having little effect on the gain of operational amplifier 78. Because of the negative feedback and DC blocking provided by capacitor 88, the DC output of operational amplifier 78 will be equal to the positive input thereto. In that regard, resistor 80 has the same value as resistor 70, and resistor 82 has the same value as resistor 72, so that in the embodiment being described, the DC component of the positive input and thus the DC component of the output of operational amplifier 78 is approximately 2.2 volts. Of course these DC values have on top thereof the AC signal received through connector 34 coupled to the direct connect modem.

The output of operational amplifier 78 is connected directly to one of the inputs to speaker 36. It is also connected through resistor 92 and coupling capacitor 94 to the negative input of operational amplifier 90. This amplifier has a negative feedback resistor 96, and because of its positive input being connected to the 2.2 volt reference, has a quiescent or DC output component of 2.2 volts also, so that the quiescent or DC voltage on speaker 36 is zero. Further, in the preferred embodiment, resistors 92 and 96 are of equal value, so that operational amplifier 90 has a gain of one, or in essence functions as an inverter. Thus, as to AC signals, the AC output of amplifier 78 responsive to the AC signal received from the direct connect modem is applied directly to one lead of speaker 36, and inverted and applied to the other lead of speaker 36, thereby effectively operating the speaker in a push/pull mode to convert the AC signal received from the direct connect modem to a corresponding audio signal of appropriate intensity to couple through speaker 36 to the adjacent microphone in a telephone handset.

AC signals received over the telephone line and converted by the speaker in the telephone handset to a corresponding audio signal are picked up by microphone 38, in the preferred embodiment an Electret microphone. Power is supplied to the microphone through resistors 98 and 100, with capacitor 102 providing noise suppression for this DC power supply. The AC output of the microphone is coupled through resistor 104 and capacitor 106 to the negative input of operational amplifier 82. As shall be subsequently explained, transistor 126 is turned off during normal operation of the circuit, so that the positive input to amplifier 82 is

held to the 2.2 volt reference through resistor 108. Amplifier 82 has negative feedback provided by resistor 110 and a pair of diodes 112, the resistor 110 providing a relatively high, low signal gain for the amplifier, with diodes 112 grossly limiting the gain for higher signal amplitudes to prevent oscillation and/or saturation in the system.

The output of operational amplifier 82 is coupled through resistor 114, capacitor 68 and resistor 43 out to the direct connect modem coupled through connector 34. It is, of course, also coupled through capacitor 66 and resistor 76 to operational amplifier 78, and accordingly the AC output signal of microphone 38 will be coupled to the positive input of amplifier 78. The output of amplifier 82 is also coupled through capacitor 88 and resistor 86 to the negative input of operational amplifier 78, the coupling to both the positive input and the negative input of amplifier 78 being of the same polarity, as neither has been inverted by any active devices therebetween. By appropriate selection of the resistor ratios, etc., the coupling to the positive and negative inputs of amplifier 78 of signals originating from microphone 38 may be made equal, so that the output of amplifier 78 is substantially insensitive to such microphone signals. Obviously, in the selection of the various component values to achieve such a result, resistor 84 must also be considered. In essence, assuming first the desired result that the AC output signal of amplifier 82 does not appear on the output of amplifier 78, resistors 86 and 84 will act as a voltage divider in determining the AC input to the inverting or negative input of amplifier 78. Obviously to achieve the desired result, the output of operational amplifier 82 must similarly be divided down by the various resistors in the circuit to provide the same fraction of the output of amplifier 82 on the positive input of amplifier 78 as provided by resistors 86 and 84 to the negative input. Of particular importance are resistors 114 and 43, as these two resistors approximately match the anticipated 600 ohm line impedance representative of the typical phone line and a typical direct connect modem line load. While total elimination of the microphone signal from the output of operational amplifier 78 and thus, from the audio output of speaker 36, is only approximated because of the inability to perfectly balance the circuit, particularly in light of the unknown exact impedance of the direct modem coupled thereto, the coupling of the microphone signal to the speaker output is grossly attenuated so as to have no real effect on the operation of the system.

The battery of the system may be checked by depression of the push to test switch 24, which couples the voltage determined by resistors 52 and 54 to the positive input of operational amplifier 116. Power to the circuit, of course, is supplied through diode 58 during the test. The voltage at point 56 coupled to the positive input of operational amplifier 116 is some predetermined fraction of the battery voltage, and will be higher for a fresh battery than for a weak battery. The negative input for operational amplifier 116 is coupled to the junction between light emitting diode 118 and resistor 120, the series combination of the resistor and LED being coupled between VCC and ground. The light emitting

diode is used in the circuit not for its light emitting capability (and in fact would emit negligible light because of the relatively high value of resistor 120) but instead, effectively serves as an approximate 1.5 volt Zener diode to clamp the negative input of operational amplifier 116 at approximately 1.5 volts independent of VCC, provided of course VCC exceeds 1.5 volts.

If upon depression of switch 24, the voltage at point 56 exceeds the reference voltage provided by the LED 118, the output of operational amplifier 116 will be positive or high, resistor 122 providing some positive feedback to drive the output substantially to VCC. This positive output is coupled through resistor 124 to turn on transistor 126, coupling the output of operational amplifier 82 through capacitor 128 and transistor 126 to the positive input of the amplifier 82. The capacitive feedback to the noninverting input of amplifier 82 causes the amplifier to oscillate. The oscillation couples to the inputs of amplifier 90, causing an audible test tone through speaker 36 which may be readily detected by the operator prior to the placement of the telephone handset onto the coupler of FIG. 1.

If, on the other hand, the battery is low, the input to the positive or noninverting input of amplifier 116, upon depression of the switch 24, will be lower than the voltage on the inverting input of the amplifier, so that the output of the amplifier will be held low, again the positive feedback through resistor 122 holding the output toward ground. This condition maintains transistor 126 in the off condition, as it is during normal operation of the circuit 32, thereby not generating an audible output in speaker 36. Accordingly, it may be seen that the circuit of FIG. 2 is automatically turned on when the direct connect modem coupled thereto goes off hook, and of course, automatically turned off when the modem goes back on hook, thereby minimizing the power dissipation of the circuit. Further, while provision could readily be made to simulate the full normal phone line loop current of 20 milliamps, not doing so grossly minimizes power dissipation and assures long battery life without requiring the use of alternate power supplies such as, by way of example, separate power supply lines from a computer and/or AC/DC converters. Further, the push to test capability allows a quick and reliable battery test by a user of the device without risk of inadvertent battery discharge through the inadvertent long term operation by leaving an on/off switch on when carried in a brief case, etc.

While a specific physical configuration for the coupler is shown in FIG. 1 as exemplary, other configurations may also be utilized to provide a device of particularly small size and portability. In that regard, one of the advantages of the present invention is its ability to adapt direct connect devices to phone systems not lending themselves to direct connect applications, such as in telephone booths, motels rooms and the like as are likely encountered by traveling businessmen. Accordingly, the present invention allows the use of direct connect devices in a direct connect mode when possible and in an acoustic mode when not.

Obviously while the present invention has been disclosed and described with respect to a preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

I claim:

1. A coupling unit for acoustic coupling to a telephone line, a direct connect digital device intended to operate by the direct connection thereof to a telephone line, comprising:

- microphone means for receiving acoustic signals from a speaker in a telephone handset;
- speaker means for providing acoustic signals to a microphone in a telephone handset;
- connector means for connecting said coupling unit to the telephone line connection of a direct connect digital device;
- electronic means coupled to said microphone means, said speaker means and said connector means, said electronic means being a means for coupling an electronic signal from said microphone means to said connector means, and coupling an electronic signal from said connector means to said speaker means, said electronic means further including means for eliminating the electronic signal of said microphone means from said speaker means.

2. The coupling unit of claim 1 further comprised of means coupled to said connector means for simulating at least a minimum telephone line loop current.

3. The coupling unit of claim 2 further comprised of detection means for detecting when a direct connect digital device connected to said coupling unit goes off-hook.

4. The coupling unit of claim 3 wherein said detection means is a means for providing power to said electronic

means upon the direct connect digital device going off-hook.

5. A coupling unit for acoustic coupling to a telephone line, a direct connect digital device intended to operate by the direct connection thereof to a telephone line, comprising:

- microphone means for receiving acoustic signals from a speaker in a telephone handset and providing a microphone signal in response thereto;
- speaker means for providing acoustic signals to a microphone in a telephone handset in response to a speaker signal provided thereto;
- connector means for connecting said coupling unit to the telephone line connection of a direct connect digital device;
- means coupled to said connector means for simulating at least a minimum telephone line loop current;
- first electronic means for coupling said microphone means to said connector means to couple said microphone signal to said connector means;
- second electronic means for coupling a line signal received by said connector means to said speaker means, whereby said first and second electronic means are both coupled to said connector means;
- said first and second electronic means further including means for combining said line signal and said microphone signal to substantially eliminate a line signal originating in said microphone means from said speaker means.

6. The coupling unit of claim 5 further comprised of detection means for detecting when a direct connect digital device connected to said coupling unit goes off-hook.

7. The coupling unit of claim 6 wherein said detection means is a means for providing power to said electronic means upon the direct connect digital device going off-hook.

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Telco Vendor Phone Numbers

Wisconsin Telco Vendor & Support Phone Numbers

- ACTERNA (TTC/CENTEST): 800-638-2049
- Alcatel/DSC (Customer Technical Assistance Center): 972-519-4141
- Ameritech (General Support): 800-705-5335
- Amery Telephone: 715-268-7101
- Amherst Telephone: 715-824-5529
- AT&T/TCG (Local Trouble): 800-829-1011
- AT&T (Regional Technical Assistance Center): 800-225-7822
- Badger Telephone (TDS Telecom): 715-743-4698
- Badger Telephone (Neillsville, WI): 715-743-4601
- Baldwin Telephone: 715-684-3346
- Baldwin Telephone (Central Office): 715-684-3100
- Baldwin Telephone (On-Call Tech): 715-684-3031
- Cable & Wireless: 800-969-0029
- Central States Telephone (TDS/CSTS): 715-569-4801
- Century Telephone (Maintenance): 800-824-2877
- Century Telephone (Install): 800-948-3060
 - ◆ *Coverage:* La Crosse, Ashland, Baraboo, Bayfield, Berlin, Cornell, Green Lake, Hurley, Ladysmith, Marinette, Mazomanie, McAllister, North Freedom, Oconto, Oconto Falls, Peshtigo, Princeton, Redgranite, Saxon, Stanley, Superior, Washburn
- STP (Lorraine, OH): 216-244-8416
- Cisco Systems (Customer Service): 800-553-6387
- Cisco Systems (Technical Assistance Center): 800-553-2447
- Clintonville Telephone (Frontier Communications): 800-515-0203
 - ◆ *Coverage:* Bear Creek, Bowler, Clintonville, Gresham, Keshana, Marion, Neopit, Shawano, Tigerton
- Coon Valley Farmers Telephone: 608-452-3101
 - ◆ *Coverage:* Chaseburg, Coon Valley, Stoddard
- Crandon Telephone (Citizen's Communications): 715-478-3333
 - ◆ *Coverage:* Crandon, Argonne
- East Coast Telecom Inc. (TDS): 920-693-8121
 - ◆ *Coverage:* Cleveland, WI

- Farmer's Telephone Co.: 608-723-2181
 - ◆ *Coverage:* Lancaster, Dickeyville
- Farmer's Independent Telephone: 715-463-5322
- Hillsboro Telephone: 608-489-2100
- Indian Head Telephone: 715-353-2700
 - ◆ Exeland, Radisson
- Internet Connect (Time Warner Communications): 414-476-4266
- ITN (SS7 Network): 800-869-7225
- ITN (Lee Byers): 913-344-6279
- Link USA: 319-363-7570
- Litel (Control Center): 800-837-9966
- Litel (Cleveland Switch): 216-696-0221
- Litel (Chicago Switch): 312-565-1017
- McCloud: 800-654-3628
- MCI/Worldcom (Trouble Reporting): 800-828-4984
- MCI/Worldcom (Checking Status): 800-367-5631
- MCI/Worldcom (Checking Status): 800-922-3900
- MCI/Worldcom (Installation): 800-843-2599
- MCI Frame Relay NNI: 800-444-6600
- Metro Fiber System: 800-637-2489
- Metro Fiber System (Chicago POP): 312-803-4464
- Mid-Plaines Telephone: 608-831-5858
- Monroe County Telephone: 608-269-0820 / 800-824-2877
- Niagara Telephone: 715-251-3116
- Norlight/MRC: 800-809-4340
- Norlight/MRC (Milwaukee POP): 414-224-9407
- Norlight/MRC (Chicago POP): 312-565-2360
- Nortel Emergency Technical Assistance Service (ETAS): 800-846-9507
- Nortel ETAS (Conrad Wood): 972-685-0322
- Peoples Telephone (Century Telephone): 800-824-2877
- PTI Telecomm (Century Telephone): 800-362-2243
 - ◆ *Coverage:* Cencom, Northwest Telephone, Sullivan Telephone, Thorp Telephone, Platteville Telephone

- Rhinelander Telephone (Citizen's Communications): 715-369-4641
- Citizen's Communications (Repair): 715-362-1000
- Qwest/US West (Reporting Trouble): 800-239-1051
- Qwest/US West (Status/Install): 888-678-8080
- Riverside Telephone (TDS): 920-699-3411
 - ◆ *Coverage:* Johnson Creek, Reeseville
- State Long Distance (Elkhorn, WI): 414-723-5300
- State Long Distance (After Hours): 414-723-3000
- Southeast Telephone of Wisconsin (Waterford, WI): 262-534-5101
- Sprint: 800-877-5045
- Southwest Bell: 800-662-2163
- TCG/Diginet (Trouble – AT&T): 800-829-1011
- TCG/Diginet (Install): 800-374-7380
- TCG/Diginet (Milwaukee Local): 414-273-7570
- TCG/Diginet (John Birkenhier): 414-290-9820
- TCG/Diginet (IXC Group): 800-557-5836
- Time Warner Communications: 800-829-0420
- Time Warner Communications (Provisioning): 800-655-1044
- Tinney Telephone (TNNY): 608-685-3229
 - ◆ *Coverage:* Alma, WI
- Urban Telco: 800-515-0203
 - ◆ *Coverage:* Clintonville, Keshana, Shawano
- US Link: 800-642-0072
- UTELCO (TDS): 608-328-5252
 - ◆ *Coverage:* Monroe, Monticello, South Wayne, Woodford, Albany, Blachardville
- Verizon/GTE (Trouble Reporting): 800-650-4524
- Verizon/GTE (Black River Falls CO): 715-284-9898
- Verizon/GTE (Wausau CO): 715-847-1498
- Verizon/GTE (Installation Questions): 800-967-7027
- Vernon Telco Coop: 608-634-3136
- Viroqua Telephone (Frontier): 608-637-2111
- VYVX (Tulsa, OK): 800-370-7882

- Wittenberg Telephone: 715-253-2111
- Wood County Telephone: 715-421-8175
- Wood County Telephone (24 Hours): 715-421-8102

Global Crossing Communications – Support Phone Numbers

- CAM (ANI/Authcodes): 800-261-4226
- CAM (Fax): 800-783-4523
- Cross-Net Maintenance: 800-466-1267
- Cross-Net Maintenance (Larry Alexander Pager, Boston): 800-279-7580
- Data Operations Center: 800-796-5528
- GIS Help Desk: 800-757-4374 / 716-777-4374
- FIT NOC: 716-777-5564
- Federal Telephone System DMS Support: 800-536-1951
- ROC West: 888-762-9378 / 303-223-4460

Global Crossing Communications – DMS-250 Milwaukee, WI

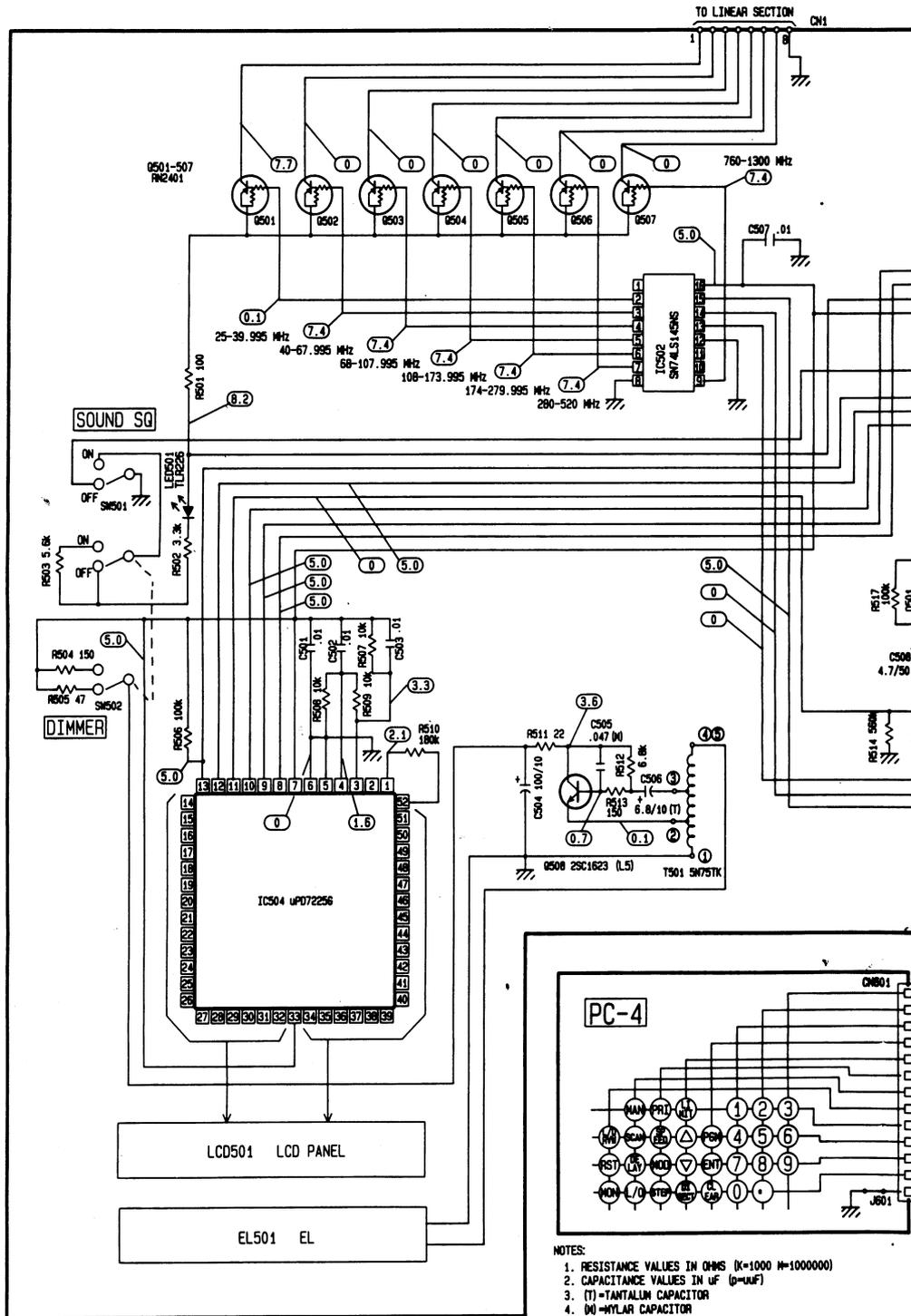
- Maintenance Dept.: 800-236-3013 / 414-224-6700
- Maintenance (On-Call Pager): 800-392-7909
- Maintenance (Cellular): 414-322-7525
- Installation Dept.: 800-261-6733 / 414-224-6700
- Appleton POP: 414-224-6705
- Appleton POP (Black Box): 920-993-0052
- Eau Claire POP: 414-224-6706
- Eau Claire POP (Black Box): 715-832-2228
- Green Bay POP: 414-224-6711 / 414-224-6712
- La Crosse POP: 414-224-6707
- Madison POP: 414-224-6713 / 414-224-6714 / 608-258-8004
- Minneapolis POP (SCI): 612-349-9924
- MKE (Old DEX400 Site): 414-276-8827
- On-Call Switch (Cellular): 414-940-8856

Global Crossing Communications – Trouble Reporting

- Network Operations Center (NOC): 800-783-4662
- NOC Fax: 810-647-1209
- Global Center NOC: 800-404-7714
- Switched Services: 800-466-4600
- Dedicated Services: 800-249-4672
- Local Services: 800-414-1973
- Strategic Accounts: 877-454-4455
- Toll Free Center: 800-800-0407

Radio Shack PRO-2006 Scanner Schematics

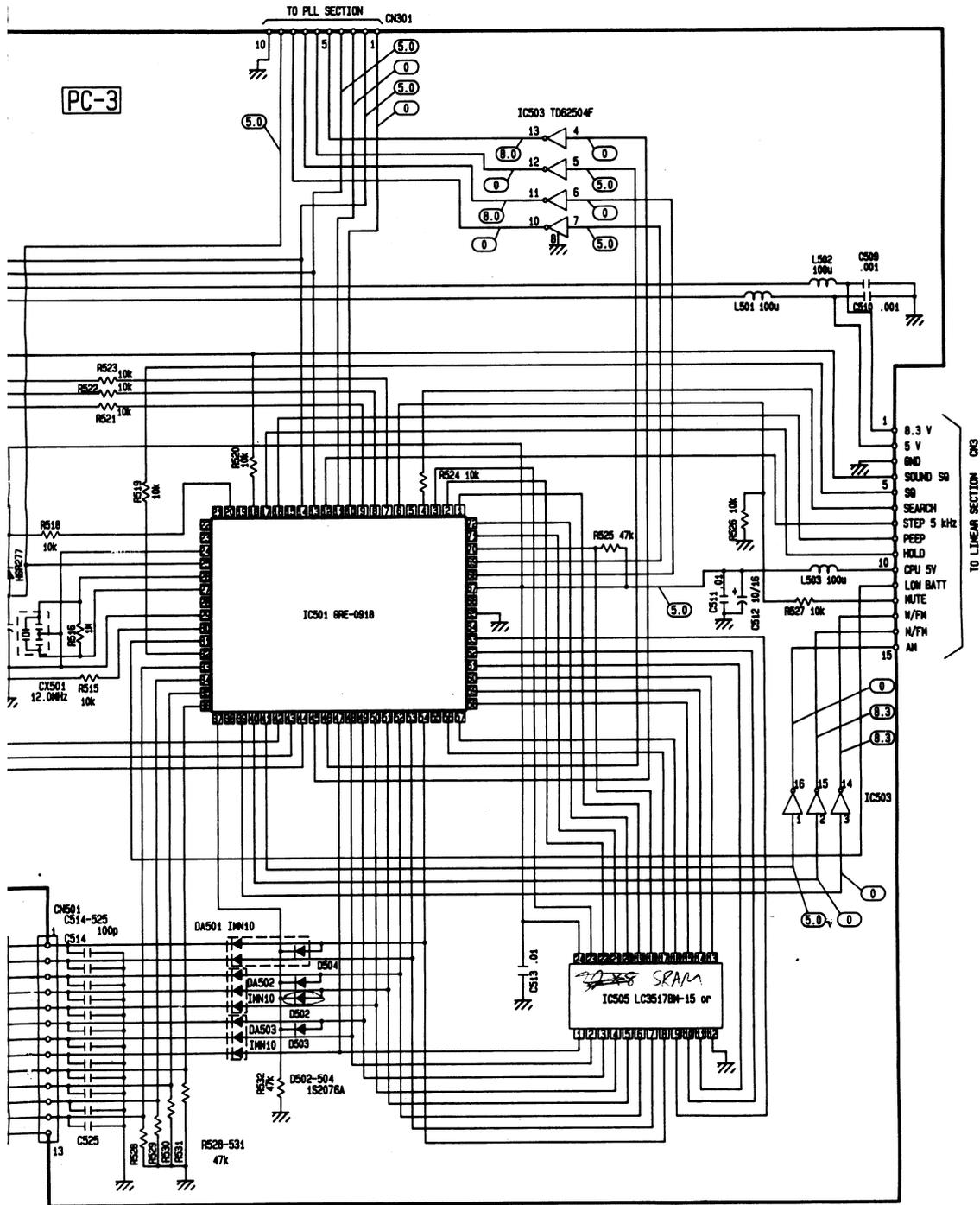
CPU Section – Part 1



- NOTES:
1. RESISTANCE VALUES IN OHMS (K=1000 M=1000000)
 2. CAPACITANCE VALUES IN uF (p=pF)
 3. (T)-TANTALUM CAPACITOR
 4. (M)-MYLAR CAPACITOR
 5. NO SUFFIXED CHIP CAPACITOR
 6. DENOTES VOLTAGE UNDER FOLLOWING CONDITION
CH1 VHF LO BAND AT 25 MHz AM MANUAL OPERATION.
VOLTAGE AT MINIMUM AND SQUELCH CCM.

Radio Shack PRO-2006 Scanner Schematics

CPU Section – Part 2

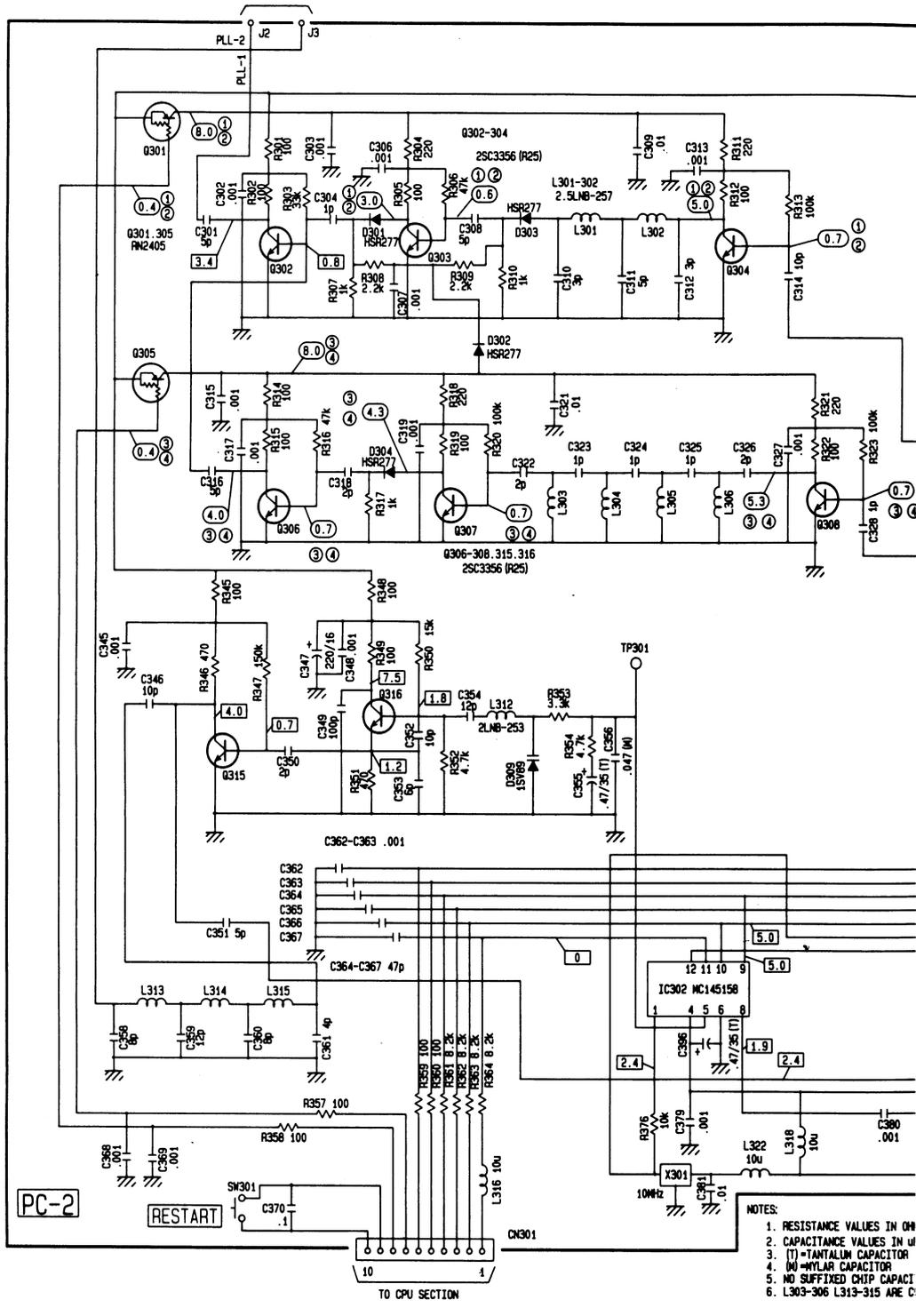


	DS02	DS04
USA CANADA MODELS	USE	NOT USE
AUSTRALIA UK	NOT USE	USE
BELGIUM FRANCE MODELS	NOT USE	USE

*DS02 controls Cellular
Cut DS02 for Cell/...*

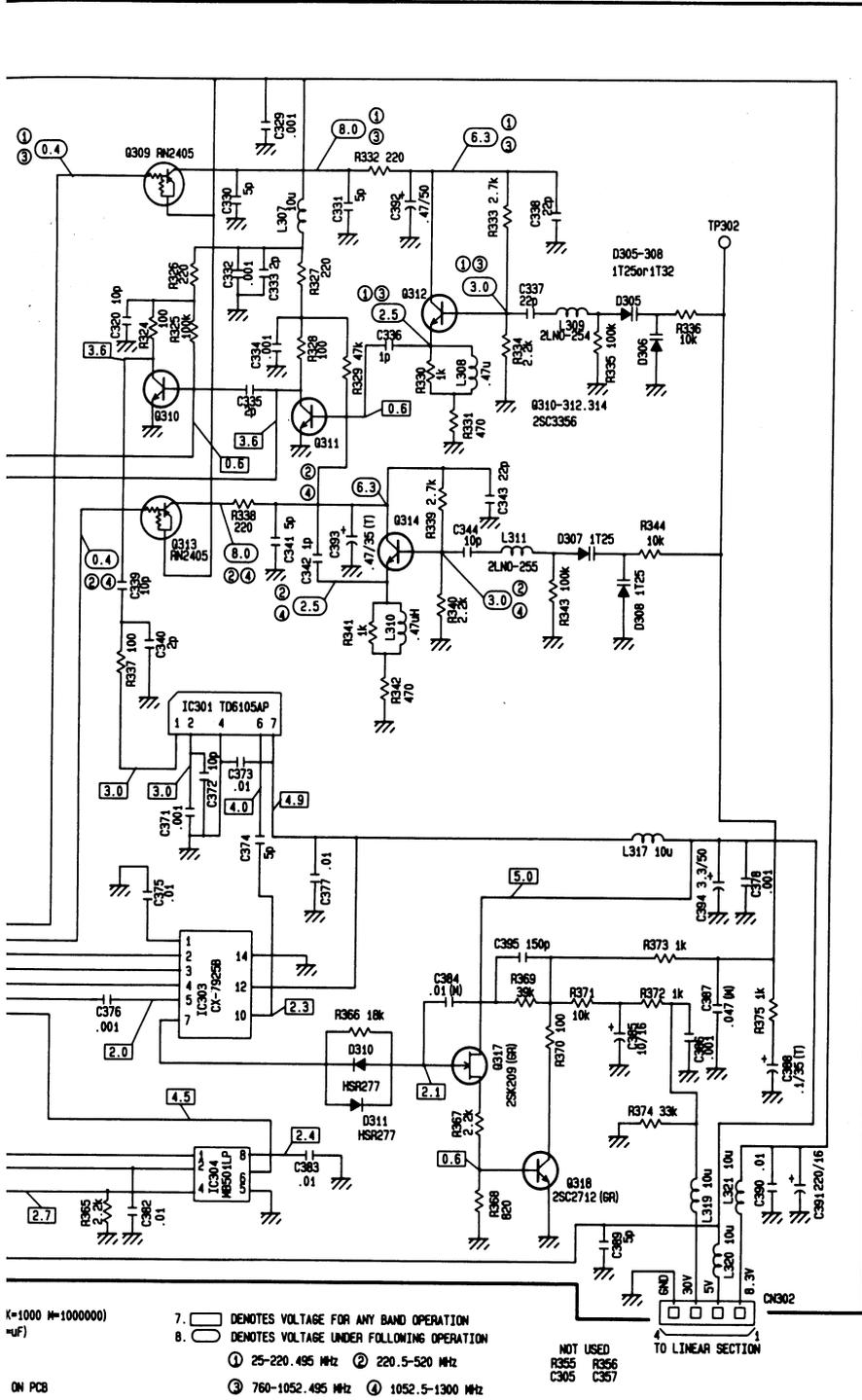
Radio Shack PRO-2006 Scanner Schematics

PLL Section - Part 1



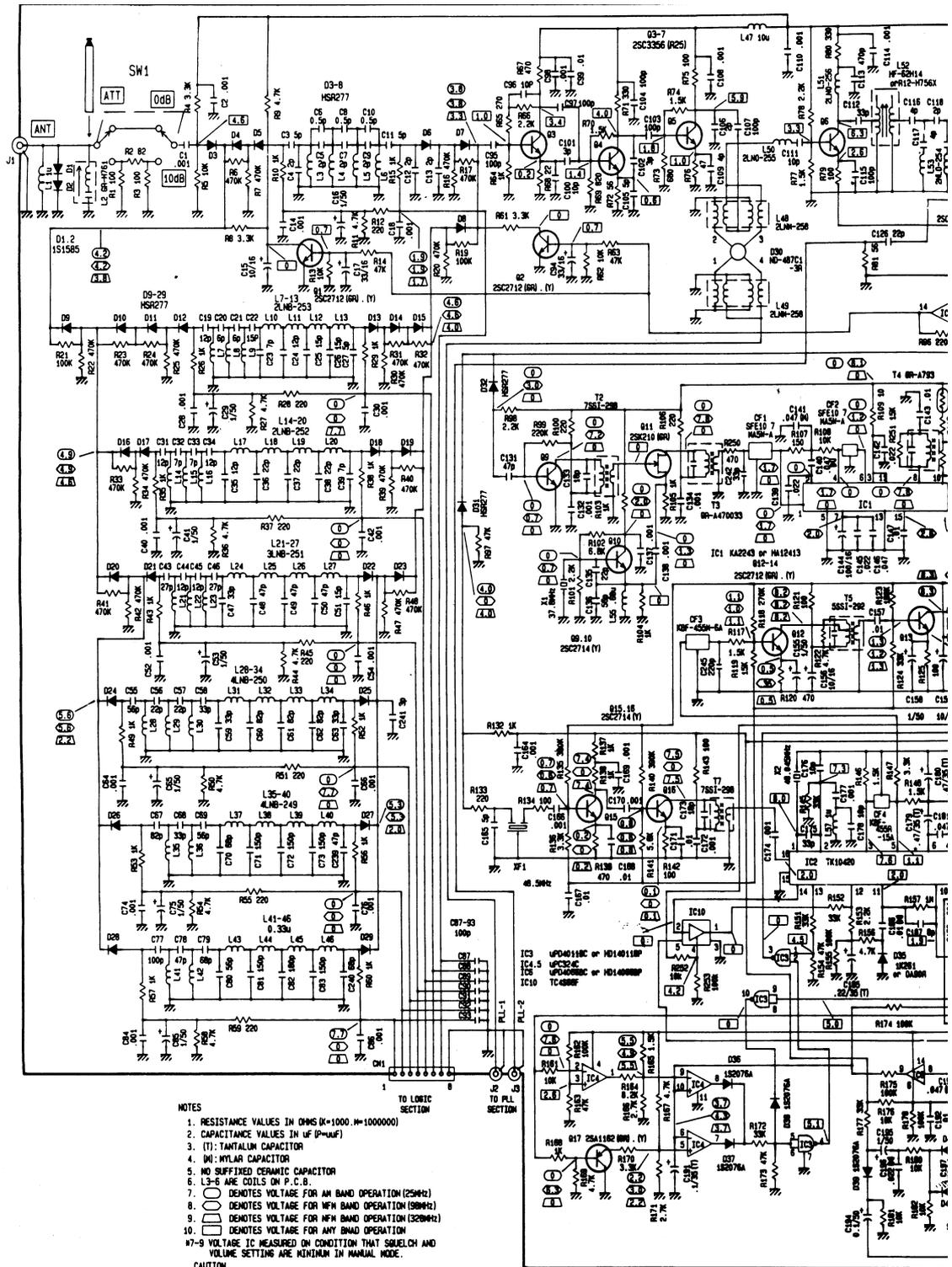
Radio Shack PRO-2006 Scanner Schematics

PLL Section – Part 2



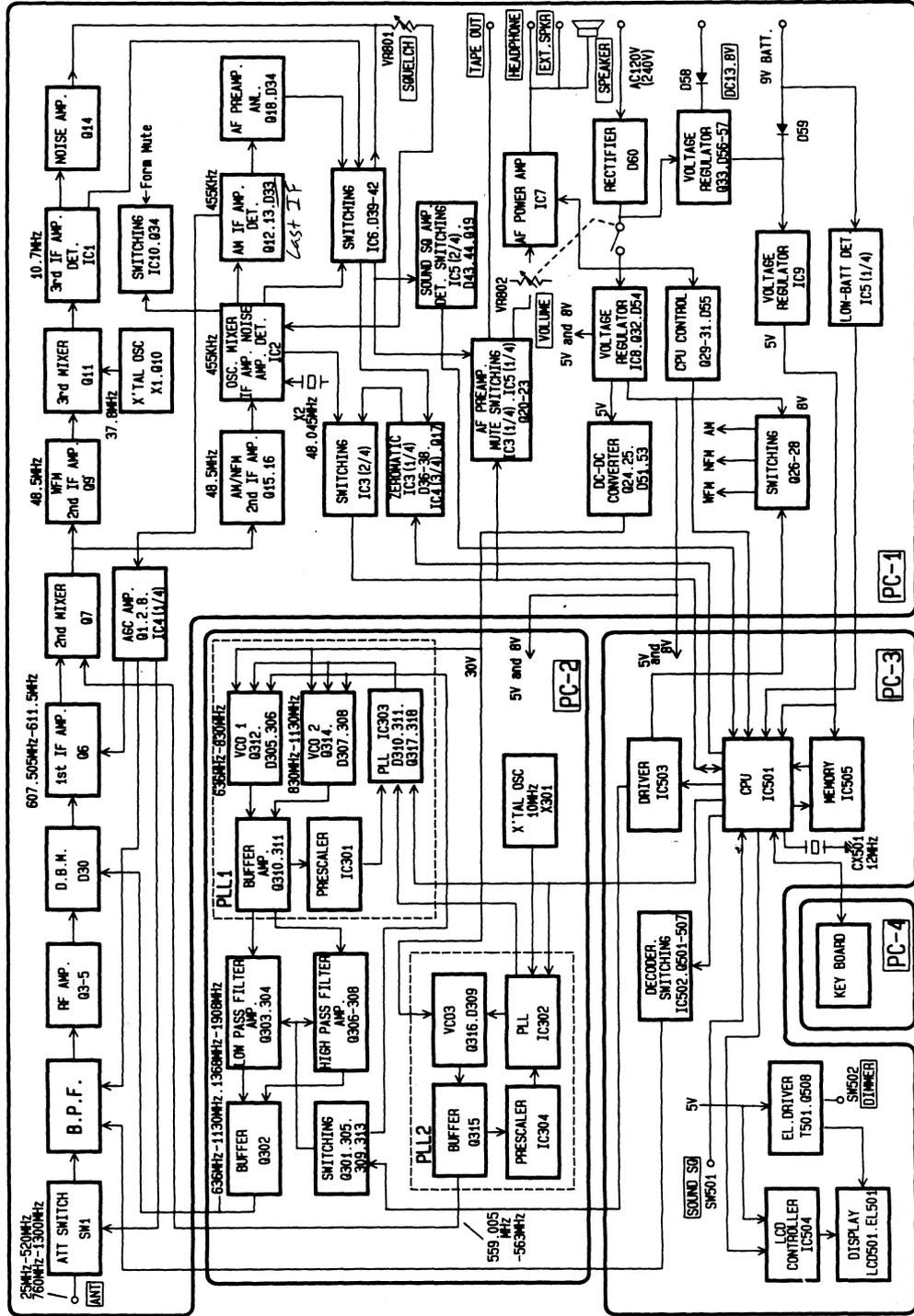
Radio Shack PRO-2006 Scanner Schematics

RF/Linear Section – Part 1



Radio Shack PRO-2006 Scanner Schematics

Block Diagram



Bonus

The screenshot shows a YouTube video player interface. At the top, the YouTube logo and navigation links like 'Sign Up', 'My Account', 'History', 'Help', 'Log In', and 'Site' are visible. Below the navigation, there are tabs for 'Videos', 'Categories', 'Channels', and 'Community', along with a search bar. The video title is 'Garage Door Opener (?) As Cell Phone Jammer'. A message states: 'Hello, you either have JavaScript turned off or an old version of Adobe's Flash Player. Get the latest Flash player.' Below this, there are social sharing options: 'Share', 'Favorite', 'Add to Playlists', and 'Flag'. The video has a rating of 4 stars (6 ratings) and 879 views. Comments are disabled, with a message: 'Adding comments has been disabled for this video.' On the right side, there is a channel information box for 'newshoundsblog', showing it was joined 8 months ago and has 726 videos. Below this is an 'About This Video' section with a description: 'During a story about people who use cell phone jammers, Fox used a photo of what looks like a garage door opener to illustrate what a jammer looks like. More at www.newshounds.us. (less)'. It also lists the date added (November 05, 2007), category (News & Politics), and tags (Fox News Neil Cavuto Cell Phone Jammers). There are fields for the video's URL and an embed code.

From: http://www.youtube.com/watch?v=MGz_w1lv-lg

The anti-science, anti-logic kooks at "Newshounds" thought this cellular phone jammer was a garage door opener!

Also note how they had to disable the comments. Don't want the truth to get out?



This is a commercial cellular phone jammer mounted to a ceiling. The acoustic tiles should be a dead giveaway to anyone with an I.Q. over 4. The DC power input is the black cable coming in from the left, and there are three antennas hanging down, probably one for each of the frequency bands being jammed. Mounting the jammer to a ceiling gives the best radio line-of-sight inside a building.

End of Issue #44



Any Questions?

Editorial and Rants

Is there anyone the Eurosavages are not in bed with?

Tough Iran Sanctions to Hit Germany Hard

November 24, 2007 – From: news.yahoo.com

By Noah Barkin

BERLIN (Reuters) – The adoption of tougher sanctions against Iran over its nuclear program could cost the German budget 2 billion euros, according to Finance Ministry estimates cited in Der Spiegel magazine on Saturday.

Germany, Britain, France and the United States called this week for the United Nations to consider more severe sanctions because they say Iran has failed to allay concerns about its atomic work.

Chancellor Angela Merkel has also vowed to press German companies to reduce trade with Iran, which the West fears is trying to build nuclear weapons.

Der Spiegel reported that if Iranian Bank Melli, which handles most of Germany's trade with Iran, were placed on a European Union embargo list, it would cost the budget 700–800 million euros (\$1–1.2 billion) next year because the government would be forced to pay damages to German firms.

Over the medium term, finance ministry experts believed tougher sanctions could cost Berlin 2 billion euros, according to the magazine.

Finance Ministry spokesman Torsten Albig declined to comment on the details of the report but said the estimates appeared to be based on data from Euler Hermes, which manages export credit guarantees for the German government.

"The logic (of the report) is correct," he said.

Germany is one of Iran's largest trading partners in the EU, although exports have fallen sharply this year amid pressure from the United States for German firms to cut their ties to the Islamic Republic.

Iran says its nuclear program is for peaceful civilian energy purposes.

More proof "open-minded liberals" are the real enemy.

Scientists Threatened for 'Climate Denial'

November 3, 2007 – From: www.discoverthenetworks.org

By Tom Harper

Scientists who questioned mankind's impact on climate change have received death threats and claim to have been shunned by the scientific community.

They say the debate on global warming has been "hijacked" by a powerful alliance of politicians, scientists and environmentalists who have stifled all questioning about the true environmental impact of carbon dioxide emissions.

Timothy Ball, a former climatology professor at the University of Winnipeg in Canada, has received five deaths threats by email since raising concerns about the degree to which man was affecting climate change.

One of the emails warned that, if he continued to speak out, he would not live to see further global warming.

"Western governments have pumped billions of dollars into careers and institutes and they feel threatened," said the professor.

"I can tolerate being called a sceptic because all scientists should be sceptics, but then they started calling us deniers, with all the connotations of the Holocaust. That is an obscenity. It has got really nasty and personal."

Last week, Professor Ball appeared in The Great Global Warming Swindle, a Channel 4 documentary in which several scientists claimed the theory of man-made global warming had become a "religion", forcing alternative explanations to be ignored.

Richard Lindzen, the professor of Atmospheric Science at Massachusetts Institute of Technology – who also appeared on the documentary – recently claimed: "Scientists who dissent from the alarmism have seen their funds disappear, their work derided, and themselves labelled as industry stooges.

"Consequently, lies about climate change gain credence even when they fly in the face of the science."

Dr Myles Allen, from Oxford University, agreed. He said: "The Green movement has hijacked the issue of climate change. It is ludicrous to suggest the only way to deal with the problem is to start micro managing everyone, which is what environmentalists seem to want to do."

Nigel Calder, a former editor of New Scientist, said: "Governments are trying to achieve unanimity by stifling any scientist who disagrees. Einstein could not have got funding under the present system."

Canadians are bat–shit crazy insane.

Father Killed Daughter for Not Wearing Hijab

December 11, 2007 – From: www.breitbart.com

Friends and classmates of a 16–year–old girl who police say was murdered by her devout Muslim father in a Toronto suburb told local media Tuesday she was killed for not wearing a hijab.

Police said in a statement they received an emergency call at 7:55 am local time Monday from "a man who indicated that he had just killed his daughter."

The victim, Aqsa Parvez, was "rushed to hospital with life–threatening injuries, but tragically passed away late last night."

Her father, Muhammad Parvez, 57, was arrested at the scene and will be formally charged with murder when he appears in court Wednesday, said police.

The girl's friends, meanwhile, told local media she was having trouble at home because she did not conform to the family's religious beliefs and refused to wear a traditional Islamic head scarf, or hijab.

"She wanted to go different ways than her family wanted to go, and she wanted to make her own path, but he (her father) wouldn't let her," one of her classmates told public broadcaster CBC.

"She loved clothes," another of her friends, Dominiquia Holmes–Thompson, told the daily Toronto Star. "She just wanted to show her beauty... She just wanted to dress like us, just like a normal person."

According to her friends, Aqsa had worn the hijab at school last year, but rebelled in recent months.

They said she would leave home wearing a hijab and loose–fitting clothes, but would take off her head scarf and change into tighter garments at school, then change back before going home at the end of the day.

The victim's 26 year–old brother was also charged with obstructing police in the investigation.

Eurosavages are bat–shit crazy insane.

Dutch Woman Joins Guerrillas in Colombia

November 25, 2007 – From: ap.google.com

By Toby Sterling

BOGOTA, Colombia (AP) — The army stumbled on the handwritten diary during a raid on a guerrilla camp. It lay near the embers of a communal kitchen where fleeing rebels left their breakfast untouched.

"I'm tired, tired of the FARC, tired of the people, tired of communal living. Tired of never having anything for myself," wrote the author, a 29-year-old Dutch woman.

Colombia's government couldn't have hoped for better propaganda against the Revolutionary Armed Forces of Colombia, or FARC. It leaked excerpts from the diary found last June to the media, even making available an English translation of the Dutch entries.

The first known person from outside Latin America to join the region's largest rebel army wasn't just disillusioned. Like most FARC foot soldiers, Tanja Nijmeijer apparently wasn't permitted to leave.

"This would be worth it if I knew I was fighting for something. But I don't really believe that anymore," she wrote on Nov. 24, 2006, according to the excerpts released by the government.

What exactly impelled Nijmeijer, a child of Europe's bourgeoisie, to take a journey from peace activist to guerrilla fighter with the nom-de-guerre "Eillen" remains largely a mystery — even to people who knew her well before she joined the FARC in early 2003.

More than a dozen friends, former colleagues and fellow peace activists interviewed by The Associated Press described a young woman deeply disturbed by social inequalities and guilt-ridden over her privileged life. Nijmeijer's family refused to discuss her plight, saying doing so could endanger her life.

Defense Minister Juan Manuel Santos, meanwhile, was happy to use the case to counter "guerrilla chic" in Europe, where the FARC — classified a terrorist group by both the United States and the European Union — has a small but determined group of supporters who run pro-rebel Web sites.

In the diary, Nijmeijer abhors the strict discipline imposed by FARC's male commanders — no smoking, no phone calls, no romantic relationships without their consent. She says the rank and file are hungry and bored, and describes FARC leaders as both materialistic and corrupt.

"How will it be when we take power? The wives of the commanders in Ferrari Testa Rossas with breast implants eating caviar?" she writes.

Santos told AP that the Nijmeijer case should help dispel foreign leftists of the notion that the FARC is heroic.

"In certain circles in Europe, there still exists the romantic image of the guerrillas as Robin Hood, or Che Guevara, fighting the bad guys for the benefit of the poor," he said. "Nijmeijer fell into this trap."

Nijmeijer wrote her thesis on the FARC at the University of Groningen in her homeland, then traveled to Colombia in 2000 on a work-exchange program.

She taught English to well-heeled children at a private school in the western city of Pereira, winning praise from fellow teachers for professionalism and a gentle classroom demeanor.

But Nijmeijer socialized little, and worried colleagues at the Liceo Pino Verde with her weekend excursions on Colombia's perilous highways, where rebel roadblocks and banditry were then frequent.

"I remember arguing with her that it was unsafe to travel by bus at night, but she was very independent and didn't listen," said Diana Angel, head of the school's English program.

One destination, Angel and other colleagues said, was the southern town of San Vicente de Caguan, at the center of a Switzerland-sized safe haven ceded to the FARC to facilitate peace talks that collapsed in 2002.

Nijmeijer's political education was also shaped by her experience volunteering almost daily in a poor shantytown near Pereira.

"Colombia was the turning point," said a college friend from Holland who worked with Nijmeijer in Colombia. "She was so shocked by the gap between the rich and poor and was determined to do something about it."

In August 2001, she got her chance, joining a humanitarian mission organized by leftist European groups to one of Colombia's most conflicted regions, southern Bolivar state.

The monthlong "International Caravan for Life" sought to deliver three tons of humanitarian aid on a barge to peasants caught in the crossfire between right-wing paramilitaries and leftist rebels.

At the steamy port of San Pablo, on the Magdalena River, the aid workers encountered resistance from local authorities. For two days, people believed to be acting on orders of paramilitaries detained the barge.

"We were all frightened," said Jacqueline Downing of Oakland, Calif., then an undergraduate at Oberlin College in Ohio. "But Tanja was very composed and helped others overcome their fear."

To ease the tension, Nijmeijer picked up her guitar and led 60 fellow activists in a sing-along of "One Love" by U2. The group later advanced into rebel-controlled territory, where their arrival was celebrated by guerrillas, and delivered the cargo.

What subsequently prompted Nijmeijer to join the FARC remains unclear.

"In February 2003 she sent an e-mail saying she was going to the jungle to teach indigenous people and couldn't be reached by phone or e-mail. I had my doubts, but no firm evidence she ran off to join the rebels," said the friend from Holland, who spoke on condition of anonymity to avoid causing problems with Nijmeijer's family by violating their wish for privacy.

Nijmeijer's parents, in a brief statement to Dutch media, said a faxed letter arrived in 2003 that "made it clear" their daughter had joined the FARC. They said the mother visited her daughter in a jungle camp but couldn't woo her back home: "Tanja's mind was not to be changed."

"By joining the FARC, she has gone extremely far in her idealism," the parents said. "The family has the strong impression that she has been influenced badly by certain contacts."

Dutch diplomats in Bogota would not discuss the case, citing the family's desire for privacy. Snapshots of Nijmeijer's family vacationing in Turkey — without her — were found stored in a laptop found by soldiers during the June 18 raid that yielded her diary.

Also on the computer, shown to AP by military intelligence officers, Nijmeijer appears in a photo holding what appears to be a rifle. Other files contain instructions on how to build bomb detonators with cell phones.

Nijmeijer has not been heard from since the diaries were found, which would not be unusual given the FARC's status as a clandestine rebel army. Former FARC members say they believe that whatever privileges Nijmeijer had, such as e-mail, have certainly now been rescinded.

Felipe Salazar, who quit the rebels last year, said Nijmeijer likely was severely punished for indirectly aiding the enemy — forced to build trenches or demoted to cooking duty — but not killed. He said Nijmeijer's only hope of being reunited with her family probably would be to embark on a risky escape.

But FARC spokesman Raul Reyes disputed that view during a recent interview with the Dutch network TV Nova, although he gave no details about Nijmeijer's location or health.

He said Nijmeijer was more than welcome to go on holiday with her family. "If she needs a month, then fine."

But... There is no bias in the media!

BBC 'Took Terrorist Trainers Paintballing'

December 5, 2007 – From: www.timesonline.co.uk

By Nasreen Suleaman & Adam Sherwin

The BBC funded a paintballing trip for men later accused of Islamic terrorism and failed to pass on information about the 21/7 bombers to police, a court was told yesterday.

Mohammed Hamid, who is charged with overseeing a two-year radicalisation programme to prepare London-based Muslim youths for jihad, was described as a "cockney comic" by a BBC producer.

The BBC paid for Mr Hamid and fellow defendants Muhammad al-Figari and Mousa Brown to go on a paintballing trip at the Delta Force centre in Tonbridge, Kent, in February 2005. The men, accused of terrorism training, were filmed for a BBC programme called Don't Panic, I'm Islamic, screened in June 2005.

The BBC paid Mr Hamid, an Islamic preacher who denies recruiting and grooming the men behind the failed July 2005 attack, a £300 fee to take part in the programme, Woolwich Crown Court was told.

It was alleged that Mr Hamid told a BBC reporter that he would use the corporation's money to pay a fine imposed by magistrates for a public order offence.

Nasreen Suleaman, a researcher on the programme, told the court that Mr Hamid, 50, contacted her after the July 2005 attack and told her of his association with the bombers. But she said that she felt no obligation to contact the police with this information. Ms Suleaman said that she informed senior BBC managers but was not told to contact the police.

Ms Suleaman told the court that Mr Hamid was keen to appear in the programme. She said: "He was so up for it. We took the decision that paintballing would be a fun way of introducing him.

"There are many, many British Muslims that I know who for the past 15 or 20 years have been going paintballing. It's a harmless enough activity. I don't think there is any suggestion, or ever has been, that it's a terrorist training activity."

The court was told previously that Mr Hamid taunted police on his return from an alleged terror training camp in the New Forest where exercises included somersaults, pole-vaulting and paintballing.

Ms Suleaman said she was not aware that Ramzi Mohammed and Hussein Osman, two of the July bombers, had joined Mr Hamid at the Tonbridge paintball centre on July 3, 2005.

Ms Suleaman said that Mr Hamid was agitated after the July attack. She said: "I think he was worried that perhaps the men might call him because they were on the run at the time. I think he was very, very shocked about the fact that the men he knew were accused of this."

Duncan Penny, for the prosecution, asked Ms Suleaman if she had told Mr Hamid to go to the police or contacted the police herself. Mr Penny asked: "Here was a man who told you that he knew those individuals who, as I understand it, were still at large for what on the face of it was the attempted bombings of the transport network a fortnight after it happened, and he was telling you he had some knowledge of them? There was a worldwide manhunt going on, wasn't there?"

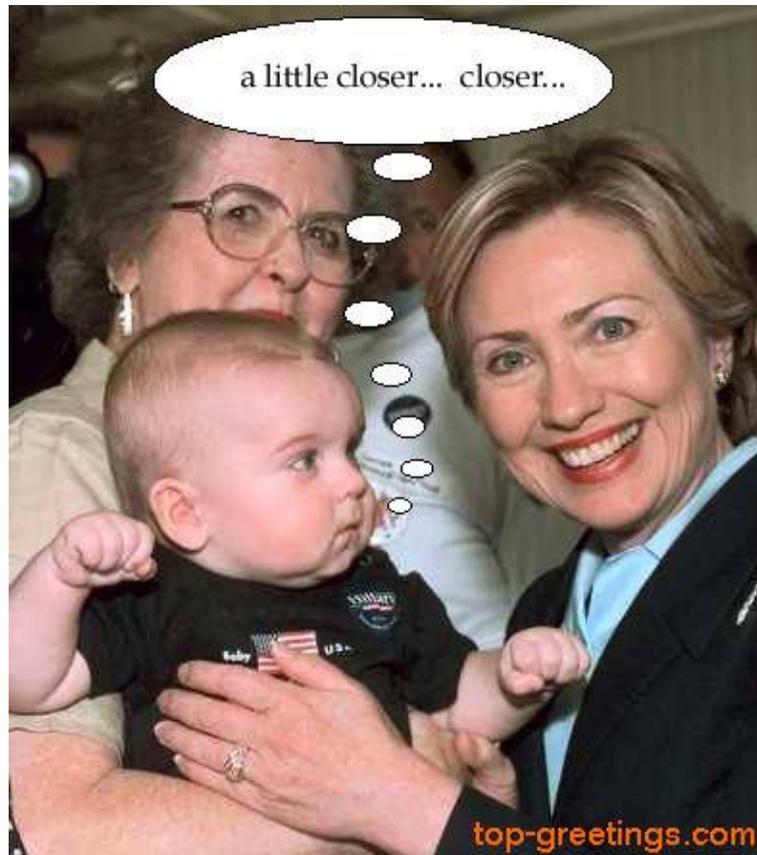
She replied: "I got the sense that he was already talking to the police. I referred it to my immediate boss at the BBC. I wasn't told that there was an obligation. In fact it was referred above her as well. It was such a big story." She added: "I don't think it's my obligation to tell another adult that he should go to the police."

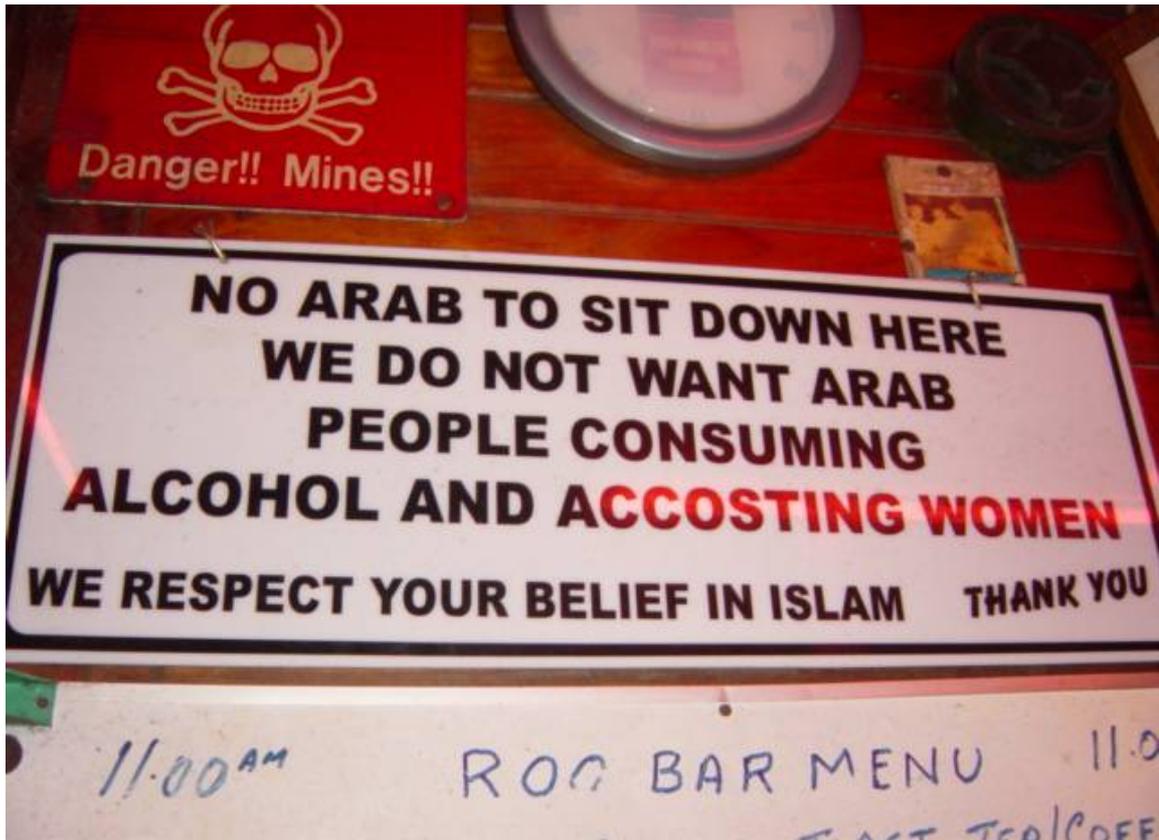
Mr Hamid had told her he had not spoken to Muktar Said Ibrahim, the ringleader of the 21/7 plot, since October 2004 and there was no suggestion that Mr Hamid knew anything about the attempted attack.

Phil Rees, who produced the show, told the court that he was impressed by Mr Hamid's sense of humour while looking for someone to appear in the documentary. He said: "I think he had a comic touch and he represented a strand within British Muslims. I took it as more like a rather Steptoe and Son figure rather than seriously persuasive. I saw him as a kind of Cockney comic." Mr Rees, who now works for the Arabic TV station al-Jazeera, gave Mr Hamid a signed copy of his book Dining With Terrorists.

Mr Hamid is charged with Mr al-Figari, 42, Mr Brown, 41, Kader Ahmed, 20, and Kibley Da Costa, 24. Atilla Ahmet, 43, has admitted soliciting murder.

Mr Hamid denies providing weapons training, five charges of soliciting murder and three of providing training for terrorism. The other men deny a series of charges related to training.





In Australia

