Squirt

Bulk Call Generator

Instruction Manual

Ameritec

Squirt
Bulk Call Generator
Instruction Manual

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SAFETY STANDARDS ADDENDUM

To comply with the published safety standard, the following must be observed when using this equipment.

- The power cord protective grounding must be connected to earth ground.
- Applications of cables with exposed metal conductors such as alligator clips are not recommended at tip/ring interface due to ringing voltages that exist during normal use.
- Interface Ports must be connected directly to the switch peripherals under test. Caution should be exercised not to connect at any live network access point where line powering voltage is present.
- For continuous protection against risk of fire, replace fuse with same type and rating only.
- Servicing the equipment shall be done by a qualified technician only.
- In case of damage to the housing, this equipment must not be used further, and shall be returned immediately to Ameritec for servicing.
- When servicing, the main power cord and Tip/Ring cables must be disconnected before making any change to the equipment.
- Dispose of Internal Lithium Batteries properly, in accordance with applicable local regulations.

A fin de se conformer aux nordes de securite en vigueur, les rigles qui suivent doivant être observées lors de l'utilisation du material.

- Le fil de masse du cordon secteur doit être relié à la terre.
- L'utilisation de cordon de test avec partie métalique apparente, telles les pinces crocodiles, n'est pas recommandée en raison de la présence de tension de sonnerie pendant les séquences de test.

- Les connecteurs d'interface doivant être reliés directement au commutateur ou périphériques sous test. Une attention particulière doit être exercée pour qu'en aucun cas un accès de test soit en contact ave une ligne de tension secteur.
- Afin d'éviter tout risque d'incendie, le replacement des fusibles doit être effectué avec des fusibles de même type et de même valeur.
- La maintenance de l'équipment ne doit être réalisée que par des personnes qualifiées.
- En cas de dommage apparent sue le châssis, l'équipment ne doit pas être utilisé et devra être renvoyé chez Ameritec pour réparation.
- Toute opération de maintenance ou de démontage doit être effectuée après avoir débranché le cordon secteur et les connecteurs de test.
- Les piles au lithium doivent être entreposées et évacuées selon les procédures en vigueur.

Zur Einhaltung der allgemeinen Slcherheltsvorschriften, muss bei Benutzung des Geraetes folgendes beachtet werden.

- Das Netzkabel muss geerdet sein.
- Kabel mit offenen Kontaktlerungen, insesondere Krokodilklemmen, sollten nicht verwendet werden an unter Spannung stehenden Schnittestellan.
- Die muss direkt am zu testenden Knoten und dessen Peripherie angeschlossen sein. Der Anschluss des Messgeraetes an aktive Netze solite moeglichst im ausgeschaltetem Zustand vorgenommen werden.
- Um weltere Schaeden am Messgeraet zu vermeiden, Insbesondere Brandschaeden, darf die Netzsicherung nur mit dem original Wert ersezt werden.
- Reparaturen duerfen nur von qualifizierten Personen durchgefuehrt werden.
- Im Fall einer Gehausebeschaedigung darf das Messgeraet nicht mehr benutzt werden und muss zum naechsten Service Stuetzpunkt eingesendet werden.
- Im Servicefall muessen Netzkabel und Schnittstellankabel vom Messgeraet entfernt werden.
- Die eingebaute Lithium Batterie muss umweltgerecht entsorgt werden.

In ottemperanza alle normative pubbliche relative all sicurezza, è neccessario seguire le seguenti precauzioni durante l'uso dei dispositivi.

- Il filo di terra di protezione del cavo alimentazione deve essere collegato a terra
- Si sconsiglia l'utlizzo di cavi con conduttori metallici esposti (non protetti da protezione isolante) come le clip a coccodrillo sugli attachi telefonici a causa della presenza della corrente di chiamata.
- Le porte di interfaccia devono essere connesse direttamente alla centrale sotto test e alla sua rete di distribuzione. Particolare attenzione deve essere posta per non connettere le porte di interfaccia alla rete elettrica.
- Per ottenere una protezione continuativa contro i rischi di incendio, sostituire i fusibili solo con altri dello stesso tipo e della stessa portata.
- Gli interventi di manutenzione potranno essere eseguiti solamente da personale autorizzato e qualificato.
- In caso di danneggiamento del contentitore dello strumento, l'apparato non deve essere usato e dovrà essere immediatamente inviato alla Ameritec per la riparazione.
- In fase di intervento di riparazione, il cavo di alimentazione e tutti i cavi di connessione all'apparato sotto test devono essere rimossi prima di eseguire qualsiasi operazione.
- Lo smaltimento delle batterie al litio presenti internamente all'apparato devono essere eseguite in ottemperanza alle normative vigenti.

1. INTRODUCTION

The Squirt™ is a member of the Ameritec Niagara® family of bulk call generators. The operating principles of the Squirt are the same as other Niagara products, with the exception of the line capacity and the user interface.

The main difference between the Squirt and other Niagara product lines is that the Squirt products have no front panel display or pushbuttons, and that a Microsoft Windows based Graphical User Interface (GUI) called FeatureCall® is the primary user interface. A Squirt can also be operated by having it respond to control commands received on the RS-232/Ethernet port.

1.1 Squirt™ Call Generators

1.1.1 AM2S-A Analog Squirt

The AM2S-A Squirt Analog Bulk Call Generator is designed to originate and terminate calls on 16 to 64 lines simultaneously, depending on the configuration of available options.

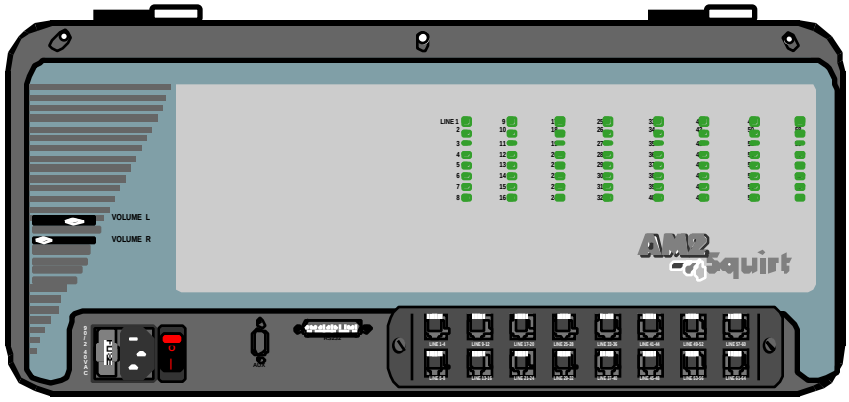


Figure 1-1. AM2S-A Squirt

The AM2S-A Squirt supports a maximum of 64 two-wire loop start lines or ground start circuits. The interface options include:

- 600Ω or 900Ω impedance
- Ground Start
- 12 or 16kHz meter pulse detection
- Analog Display Service Interface (ADSI)

Loop start is the line-side of the Central Office (CO) and the station-side of the Private Branch Exchange (PBX). Two-wire analog trunks are used between the CO and the PBX. The loop start option in the AM2S-A simulates the subscriber-line side of the CO and the station-side of the PBX. The ground start option simulates the PBX side of ground start trunks to a CO.

1.1.2 AM2S-B Basic Rate Interface (BRI) Squirt

The AM2S-B Squirt is designed to originate and terminate calls on 8 to 32 ISDN Basic Rate Interface/Access (BRI/BRA, 2B1Q) U-Interface lines. These lines contain two bearer channels at 64 kilobits per second and one D channel at 16 kilobits per second.

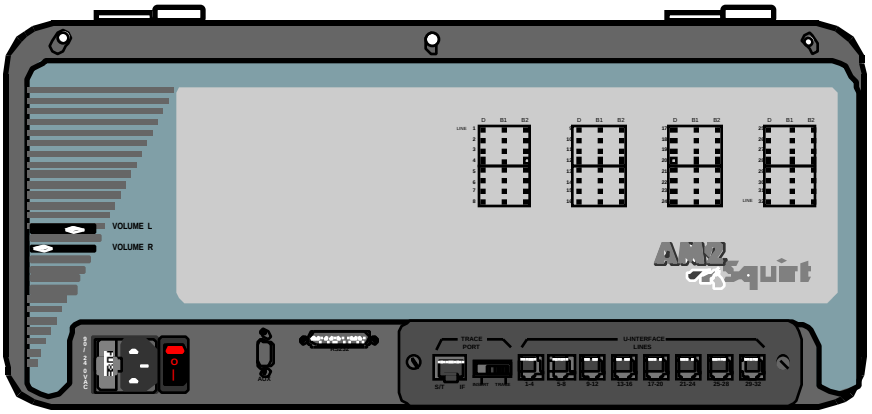


Figure 1-2. AM2S-B Squirt

The bearer B-channels are designed for PCM voice, video conferencing, etc. The data D-channel is for bringing in information about incoming calls and taking out information about outgoing calls. It is also for access to slow-speed data networks, like packet switched networks.

1.1.3 AM2S-D/De Digital (CAS) Squirt

AM2S-D: Each unit supports four 1.544Mbps T1 PCM spans.

AM2S-De: Each unit supports four 2.048Mbps E1 PCM spans.

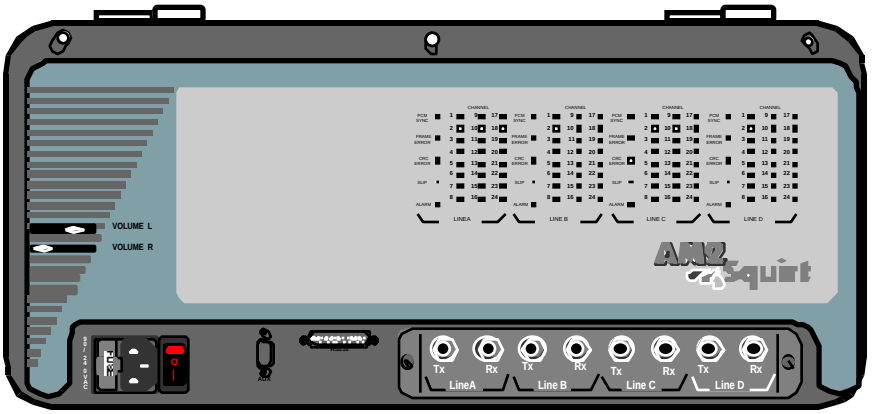


Figure 1-3. AM2S-D Squirt

The AM2S-D unit can originate or terminate up to 96 simultaneous calls. Tone senders and receivers are available for each of the 96 time-slots for maximum call volume in MFR1 environments. The AM2S-De unit can originate or terminate up to 120 simultaneous calls. Tone senders and receivers are available for each of the 120 time-slots for maximum call volume in MFC (MFR2) environments. Pulse and DTMF signaling are also available.

1.1.4 AM2S-DX/DXe Digital (PRI) Squirt

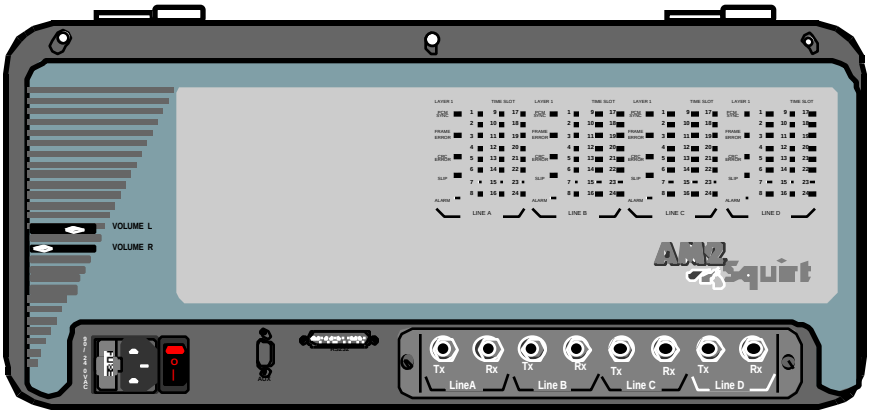


Figure 1-4. AM2S-DX Squirt

AM2S-DX: A digital trunk test device designed to interface to a PBX or Central Office through one to four T1 PCM Common Channel Signaling (CCS) trunks at 1.544 Mbps. The unit can simulate a precisely-controlled ISDN Primary Rate Interface (PRI) or Primary Rate Access (PRA) call traffic load.

Each CCS trunk can provide 24 time slots (23B + D). The B (Bearer) channel can originate or terminate circuit-switched and packet-switched calls at a rate of up to 48,000 confirmed calls per hour. The signaling D channel can be assigned to any single time slot of a CCS trunk.

AM2S-DXe: A digital trunk test device designed to interface to a PBX or Central Office through one to four E1 PCM Common Channel Signaling (CCS) trunks at 2.048 Mbps. The unit can simulate a precisely-controlled ISDN Primary Rate Interface (PRI) or Primary Rate Access (PRA) call traffic load.

Each CCS trunk can provide 31 time slots (30B + D). The B (Bearer) channel can originate or terminate circuit-switched and packet-switched calls at a rate of up to 60,000 confirmed calls per hour. The signaling D channel can be assigned to any single time slot of a CCS trunk.

1.1.5 AM2S-S7/S7e Digital Squirt

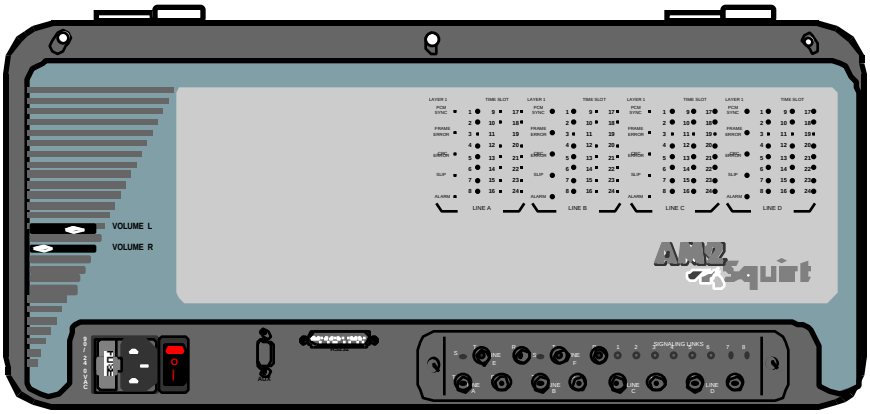


Figure 1-5. AM2S-S7 Squirt

AM2S-S7: A digital trunk test device designed to test a variety of SS7 network components, including the Service Switching Point (SSP), Signal Transfer Point (STP), and Service Control Point (SCP) applications, as well as a range of intelligent network applications.

- **SCP:** a remote database within an SS7 network that supplies translation and routing data.
- **SSP:** a switch that recognizes, routes, and connects SS7 calls under direction of an SCP.
- **STP:** a packet switch.

Up to 96 voice-data channels can be tested with voice tones or BERT patterns over four 1.544 Mbps PCM lines (or trunks). Each PCM trunk (A to D) can provide 24 time slots for voice or data channels that can originate or terminate circuit-switched and packet-switched calls at a rate of up to 48,000 confirmed calls per hour. In addition, the AM2S-S7 provides up to eight 56 or 64 kBps SS7 signal links that may be accessed through optional T1, V.35, or DS0A interfaces.

AM2S-S7e: A digital trunk test device designed to test a variety of SS7 network components, including the SSP, STP, and SCP applications, as well as a range of intelligent network applications. Up to 124 voice-data channels can be tested with voice tones or BERT patterns over four 2.048 Mbps PCM lines (or trunks).

Each PCM trunk (A to D) can provide 31 time slots for voice or data channels that can originate or terminate circuit-switched and packet-switched calls at a rate of up to 60,000 confirmed calls per hour. In addition, the AM2S-S7e provides up to eight 64 kBps SS7 signal links that may be accessed through optional E1 or V.35 interfaces.

1.2 Squirt Testing

Squirt testing consists of:

- Bulk Call Testing
- T1/E1
- Channel Associated Signaling (CAS)
- Basic Rate Interface (BRI)
- Primary Rate Interface (PRI)
- Signaling System 7 (SS7)

1.2.1 Bulk Call Testing

Bulk call testing is a method of stress testing a switch or exchange. Generally you would use bulk call testing to generate high volumes of telephone traffic while exercising many features of the switch in a 'pre-service' of 'out-of-service' environment. The purpose of the high volume is to test the ability of the switch to perform its many functions under a heavy load. Stress testing can help you discover an array of problems that might not show up under light traffic or single feature test conditions. Problems that may be uncovered include software bugs, misrouted calls, broken connections, incorrect setup messaging, and others, up to and including total switch failure.

The easiest method that you can use to stress test a switch is to connect a bulk call generator to that switch. Once connected, you can program it to generate large volumes of calls and exercise many switch features. For most applications you can use the appropriate model Ameritec bulk call generator to test switches by simulating the terminal equipment that would normally be connected to that switch when it is placed in service.

1.2.2 T1/E1

Each T1 or E1 interface tested by a particular digital Squirt has its own unique properties. The following paragraphs provide introductory information concerning these unique properties. Specifics about how a particular call generator tests these properties are also provided. Although a complete overview of testing capability is given, you need only read the paragraphs related to the areas that you are testing.

1.2.2.1 T1

T1 is a North American transmission line standard operating at 1.544 Mbps. Each T1 span is multiplexed into twenty-four 64 kBps digital timeslots (also referred to as channels). The 24 channels are combined into a serial bit stream using Time Division Multiplexing (TDM). Each channel data packet (frame) contains a sampling of one 8-bit word from each channel (192 bits), separated by a single framing bit, for a total of 193 bits per frame. The T1 sampling rate is 8000 frames per second (x 193 bit frame size = 1.544 Mbps).

T1 uses bipolar transmission techniques. In bipolar transmissions digital 'ones' are represented by a positive or negative pulse. Each pulse must be the opposite polarity of the previous pulse. When two ones in a row have the same polarity, a bit polarity violation occurs. T1 usually uses Bipolar with Eight Zeroes Substitution (B8ZS) or Alternate Mark Inversion (AMI) coding schemes.

A data detector in T1 receivers detects the leading edge of each positive or negative pulse and synchronizes an internal clock to be used by the receiving circuits. Receiver data detectors are dynamic, in that they adapt to minor timing shifts in the incoming pulses by resynchronizing the internal clock.

The Squirt supports two T1 framing strategies: Superframe (D3/D4), consisting of a group of 12 frames, followed by a bit pattern, and Extended Superframe (ESF), consisting of a group of 24 frames, followed by a bit pattern.

1.2.2.2 E1

E1 is an International transmission line standard that operates at 2.048 Mbps. Each E1 span is multiplexed into thirty-two 64 kBps digital timeslots (32 channels x 64 kBps = 2.048 Mbps). Thirty of the channels are used for digitized voice transmission. All voice channel signals occupy a single channel, (usually timeslot 16), with framing and maintenance signals occupying timeslot 0. The frame alignment signal (FAS) in timeslot 0 indicates the beginning/end of each 2.048 Mbps sequence, and is used for synchronizing the multiplexer and demultiplexer.

Like T1, E1 also uses a bipolar coding technique for signal transmission. E1 usually uses High Density Bipolar Code #3 (HDB3) or AMI. E1 also supports the same D3/D4 and ESF framing strategies as T1.

1.2.3 Channel Associated Signaling (CAS)

In the basic configuration, digital Squirt unit spans are configured for Channel Associated Signaling (CAS). With CAS, the same channel carries both the call and the setup and management signals that control the call. Such signaling begins at the originating caller and follows the same path as the call itself. Two forms of CAS are in use: inband and out-of-band.

Inband signaling uses not only the same physical path as the call it serves, it also uses the same frequency band as the voice signals that are carried.

Out-of-band signaling takes advantage of the fact that voice signals do not use the full 4 kHz bandwidth allotted to them. A separate narrow signaling band within the 4 kHz is used to send control signals, even while voice signals are being sent.

In CAS, ABCD signaling bits (bits robbed from bytes in each T1 channel and used to carry all status information) determine the signaling state (i.e., seize, dialing, count, clear forward, etc.). A control processor originates the control signals from a switch and sends them to the outgoing channel. On the receiving end, they are switched from the voice channel to the control processor.

1.2.3.1 T1 CAS

In T1 CAS, each of the twenty-four channels carries the address signaling and voice data for their respective calls, however, the ABCD signaling bits are not assigned a particular time slot. They are encoded and decoded using robbed bit signaling on the same channel that carries the digitized voice data. Framing is usually D4 or ESF.

1.2.3.2 E1 CAS

E1 CAS assigns address signaling for each call to the corresponding voice channel (time slot). The ABCD signaling bits for all channels are assigned to a common channel (usually time slot 16), while framing and maintenance signaling is carried by time slot 0. E1 CAS therefore, is a hybrid of CAS and Common Channel Signaling (CCS), in that some signaling is assigned to a common channel and some assigned to the digitized voice channel.

The signaling on the common channel is only related to actual voice channels on the same line; whereas in true CCS system the signaling channels are part of a different network and do not travel the same paths as the voice data.

1.2.4 Basic Rate Interface (BRI)

The BRI Squirt provides 8 to 32 independent ISDN BRI/BRA U-Interface lines (2B+D, 2 wire 2BIQ). Comprehensive testing provides verification of both D-channel signaling and B-channel connections. Each U-Interface port emulates one-to-eight 4-wire terminal equipment devices connected to a simulated NT-1 device. Testing of each terminal equipment device, to originate or terminate calls, may be accomplished with scripts supplied with the unit.

Ways in which the BRI Squirt may be used to test an ISDN PBX or Central Office switch are shown in Figure 1-6. The PCM outputs of the PBX or switch may be connected to an Ameritec PRI Squirt.

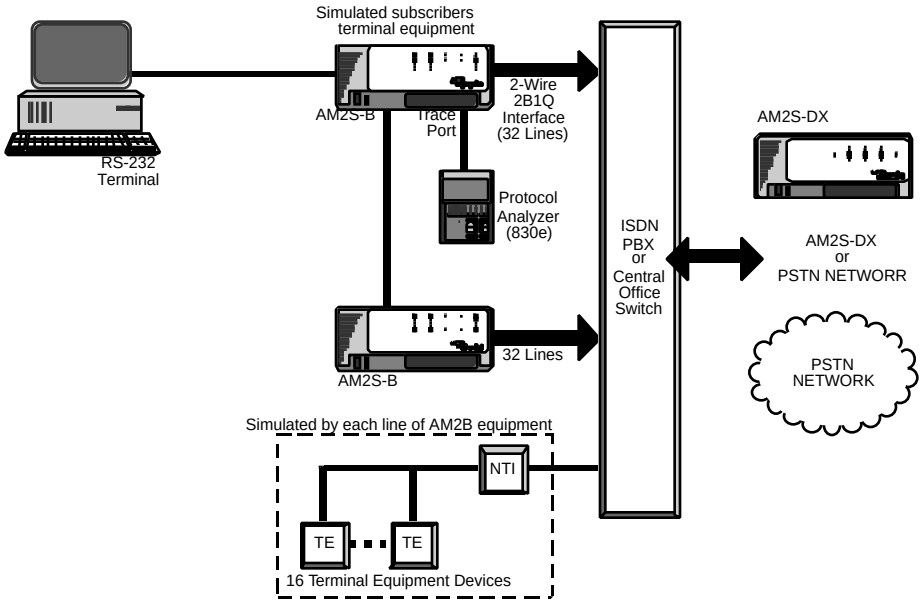


Figure 1-6. AM2S-B Application

1.2.5 ISDN Primary Rate Interface (PRI)

The Integrated Services Digital Network (ISDN) provides a user-to-network interface that emulates both user and network ports for the transmission of voice, data, images, and control signals through a single digital network rather than instituting specialized networks for each type of service.

PRI stands for Primary Rate Interface. It gives you 1,544,000 bits per second in both directions (transmit and receive). An ISDN PRI line is typically broken into "B" (voice, data, or video transmission) and "D" channels. D channels are out-of-band signaling channels that carry Network Facility Associated Signaling (NFAS) and Frame Alignment Signal (FAS) information.

1.2.5.1 T1 1.544 Mbps ISDN PRI

T1 is a digital transmission link with a capacity of 1.544 Mbps, using two pairs of normal twisted wires that connect networks across remote distances.

The T1 Primary Rate ISDN Interface (PRI) consists of 23 Bearer (B) channels and one Signaling (D) channel and is commonly abbreviated (23B + D). Time slot 24 is usually assigned as the Signaling channel.

The transfer of end-user information over B channels is based on the use of a standard DS-1 interface and CCITT recommendations. The Link Access and message-oriented signaling procedures on the D channel are based on CCITT recommendations

1.2.5.2 E1 2.048 Mbps ISDN PRI

The E1 Primary Rate ISDN Interface (PRI) consists of 30 Bearer (B) channels, one Signaling (D) channel and one Framing and Maintenance channel, and is commonly abbreviated (30B + D).

In E1 PRI ISDN, time slot 16 is typically assigned as the Signaling channel. Time slot 0 is used for Framing and Maintenance.

1.2.6 Signaling System 7

Signaling System 7 (SS7) uses Common Channel Signaling (CCS) rather than CAS. In CAS, both the voice and signaling are sent over a single trunk, resulting in longer setup and hold times. In CCS, the signaling is carried over a separate network than the voice/data trunks. Although separate networks, the voice and signaling work together as if a single network. One network, however, is strictly for signaling, while the other is for voice or circuit switched data.

A major characteristic of SS7 is its layered functional structure. Its transport functions are divided into three basic sections:

- Message Transfer Part (MTP)
- Signaling Connection Control Part (SCCP)
- User Parts

1.2.6.1 Message Transfer Part (MTP)

The **MTP** provides an internationally standardized general-purpose common channel signaling system that provides a reliable means of transfer of information in correct sequence and without loss or duplication. It also has the ability to react to system and network failures and take necessary action to ensure signaling information is reliably transported and delivered.

The system uses signaling data links for transfer of signaling messages between exchanges or other nodes in the telecommunication network served by the system. These signaling data links provide bi-directional transmission paths for signaling, comprising two data channels operating together in opposite directions at the same rate. They provide reliable transfer of signaling messages between two directly connected signaling points.

- Associated messages are conveyed over a link set, directly interconnecting the origin and destination signaling points of the message.
- Non-Associated messages are conveyed over two or more link sets in tandem, passing through one or more signaling points between the origin and destination of the message.

1.2.6.2 Signaling Connection Control Part (SCCP)

The **SCCP** provides network services to transfer information between exchanges and specialized centers in telecommunications networks (e.g. for management and maintenance purposes), routes signaling messages to signaling points, and controls subsystem availability and broadcasts subsystem status.

The **SCCP** supplements the **MTP** by providing both connectionless and connection-oriented network services for the transfer of circuit-related and non-circuit-related signaling information. It can also transfer signaling data units across the network, with or without the use of logical signaling connections.

1.2.6.3 User Parts

The User Part section defines the functions of the most commonly used user parts. A user part could, for example, be a signaling set for telephone or data users. The following user parts are described:

- Telephone User Part (TUP)
- Data User Part (DUP)
- ISDN User Part (ISUP)
- Transaction Capabilities Application Part (TCAP)

1.2.6.3.1 Telephone User Part (TUP)

The **TUP** defines the necessary telephone signaling functions for international telephone call control signaling.

1.2.6.3.2 Data User Part (DUP)

The **DUP** defines the protocol to control the inter-exchange circuits used on data calls, and data call facility registration and cancellation.

1.2.6.3.3 ISDN User Part (ISUP)

The **ISUP** defines the protocol that supports signaling functions required to provide voice and non-voice services in an ISDN network. This provides for transfer of call setup signaling information between signaling points.

1.2.6.3.4 Transaction Capabilities Application Part (TCAP)

The **TCAP** provides functions and protocols to a large variety of applications distributed over exchanges and specialized centers in telecommunication networks, and controls non-circuit-related information transfer between two or more signaling points.

1.2.6.4 T1 1.544 Mbps SS7

T1 SS7 is a combination of 4 T1 Voice and Data spans and eight signaling links, served by dedicated Common Channel Signaling processors, which are responsible for all signaling. You can use any of the 8 links to carry the signaling required to make a call. With signaling carried over a separate network, all 192 channels (less up to 8 assigned signaling links) may be used for voice or circuit switched data.

1.2.6.5 E1 2.048 Mbps SS7

E1 SS7 is a combination of 4 E1 Voice and Data trunks and eight signaling links, served by dedicated Common Channel Signaling processors, which are responsible for all signaling. You can use any of the 8 links to carry the signaling required to make a call. With signaling carried over a separate network, 248 channels (less up to 8 assigned signaling links) may be used for voice or circuit switched data. Time slot 0 of each Span is still required for framing and maintenance.

1.2.6.6 SS7 Test Application

In order to test an SS7 network and its components, a real or simulated network is required. Flexible simulation of an SSP or end-office is usually a required test component. The Squirt can be used to test a variety of SS7 network components, including SSP, STP, and SCP, as well as a wide range of intelligent network applications, as depicted in Figure 1-7. The figure details the T1, V.35, or DS0A signal interface option.

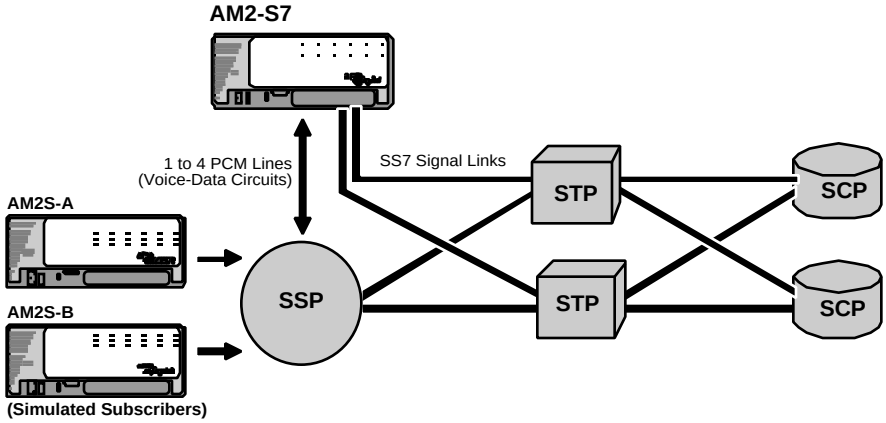


Figure 1-7. AM2S-S7 Test Application

Connection of the eight signal links to the switch under test is made through connectors on the interface module at the front of the unit. Modules for a variety of interfaces are available to allow connection of from up to four voice-data trunks or eight signal links to the switch under test.

The SS7 signal links are served by dedicated CCS processors, which are responsible for signaling. Through call program parameters, any of the eight links may be selected to make a call. The eight links can be shared by all voice-data trunks.

The SS7 T1 Squirt generates in excess of 48,000 (SS7 E1 Squirt 60,000) confirmed calls per hour, to multiple signal points in the network. The programmable Scripts provide a means to control call volume and call sequences. Factory scripts are provided with basic operations, as a starting point for Script customization.

In addition, the SS7 Squirt offers programmable Protocol State Tables (PST), referenced in Appendix A. The tables allow you to access the content of Protocol messages to change message content of SS7 Level 4 messages. The ability to program a PST provides control to test the Message Transfer Part (MTP) of network signal points, including message routing and message distribution in the STP.

The SS7 Squirt also provides the ability to simulate and test SSP functions, another essential feature. This provides the ability to verify the correct routing and connection of the call voice-data circuits by means of circuit-switched voice tones and circuit switched data BERT patterns. The SS7 Squirt is capable of generating in-band DTMF digits after voice channels are selected.

1.3 Squirt Functional Descriptions

The Squirt originates and/or terminates calls based on the directions it receives from a Call Test Set. Each Squirt can store up to four Call Test Sets. The actual encoding and decoding of the formatted instructions occurs on the unit's line cards.

All lines/time slots can simulate signaling and voice activity, with each line capable of originating and terminating calls. The Call Statistics Report is user-programmable and tracks items such as originating attempts and completions, terminating attempts and completions, and path confirmations.

The descriptions in the following paragraphs are based on Figure 1-8. Figure 1-8 is a simplified functional block diagram of the Squirt and includes the I/O Ports. Only items that are relevant to understanding the operation of the unit are shown. The block diagram does not reflect the actual internal hardware layout of the unit.

The Squirt portion of Figure 1-8 is divided into white and gray modules. The white modules with black text are the test modules that execute or translate the Call Program instructions by generating and terminating calls and measuring or tracking the results. The dark gray modules with white text are front panel components related to the user interface and chaining options.

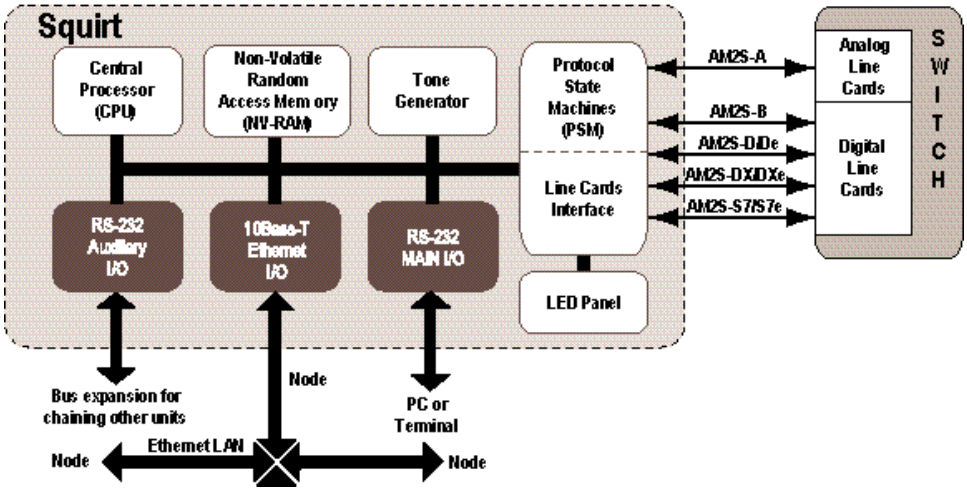


Figure 1-8. Squirt Functional Block Diagram

AM2S-A Call Generator

The AM2S-A originates and/or terminates calls on up to 64 two-wire lines. The front panel contains 64 LED indicators for line activity.

AM2S-B Call Generator

The AM2S-B originates and/or terminates calls on any U-Interface line. The U-Interface line can simulate signaling and voice activity. The front panel contains 96 LED indicators for D and B channel activity. Each B channel is capable of originating and terminating calls.

AM2S-Digital Call Generators

The AM2S-D/De, the AM2S-DX/Dxe, and the AM2S-S7/S7e all originate and/or terminate calls on any time slot. All time slots can simulate signaling and voice activity. The T1 front panels contain 96 LED indicators for time slot activity, while the E1 panels contain 120. Each time slot is capable of originating and terminating calls.

1.3.1 Test Modules

Squirt Test Modules include the CPU, Main I/O, Auxiliary I/O, NV-RAM, Protocol State Machine (PSM), Line Cards, Tone Generator, LED panel, and I/O Ports.

- The CPU contains a high-speed microprocessor, ROM, RAM, decoders, buffers, and interrupt handlers to manage the overall operation of the Squirt. In conjunction with the Main I/O card, the CPU controls the Squirt I/O interfaces.
- The NV-RAM stores the Protocols, Scripts, and Call Program files that the CPU and PSM use to execute the testing sequences. It also maintains these files when you remove power from the Squirt.
- The PSM, located in the Line Card logic, in accordance with the rules defined in a Protocol State Table (PST), responds to stimuli from the Call Programs (events) by outputting specified signal(s). PSM and Call Program activity allows the Line Interface Card to generate and react to inputs from the Line Card in the Switch Under Test. There is a separate PSM for each line.
- The Line Cards also contain the LED interface. Under program and CPU control, specific front panel LEDs light to show line activity.
- The Tone Generator generates audio range tones to test the voice band capabilities of the voice path and inband applications. The Tone Generator also contains the RS-232 receiver and driver chips for the RS-232 and Auxiliary ports. The Ethernet Interface, on the other hand, interfaces directly with the Main I/O board via the backplane.
- The Main I/O and CPU control the Ethernet Interface.

The CPU routes Call Program instructions to the proper line cards. The line cards, in turn, convert Call Program instructions to the proper format. They also translate incoming instructions from the line cards to a format that can be processed by the CPU and PSM.

1.3.2 Test Interface I/O Modules

The Squirt has three significant I/O modules: an RS-232 Main I/O Port, an Auxiliary RS-232 Port, and the line interfaces.

- The RS-232 Main I/O Port allows you to control the Squirt from a PC or RS-232 compatible terminal operating at a baud rate of 19.2K. The RS-232 Port may also be configured for Ethernet operation. You may use this port to download or backup Squirt Scripts and Protocols, or to connect a printer for printing reports. Refer to paragraph 1.9.3.1 for details related to the RS-232 port. Figures 1-41 through 1-43 contain information about optional RS-232 cables available from Ameritec.

  Note: To maintain emissions integrity on CE units, shielded cables must be used. Ameritec part numbers for shielded cable assemblies are provided in this manual.

- The Auxiliary I/O Port allows you to chain additional units to the Squirt. For detailed information related to configuring the RS-232 Port for chaining, refer to Figure 1-47. For detailed information related to configuring the RS-232 Port for Ethernet operation, refer to Figure 1-46.

1.3.2.1 AM2S-A Interface

The AM2S-A connects to the switch mode tests via 16 4-pair RJ-45 connectors, for a total of 64 physical lines..

Figure 1-9. AM2S-A I/O Connectors

Each connector contains four pairs of wires. Each pair is the equivalent of a two wire analog line with one Tip and one Ring lead. The line number corresponds to channel numbers in the Script. Each physical line handles two logical lines. Figure 1-10 contains the pinout for the eight RJ-45s.

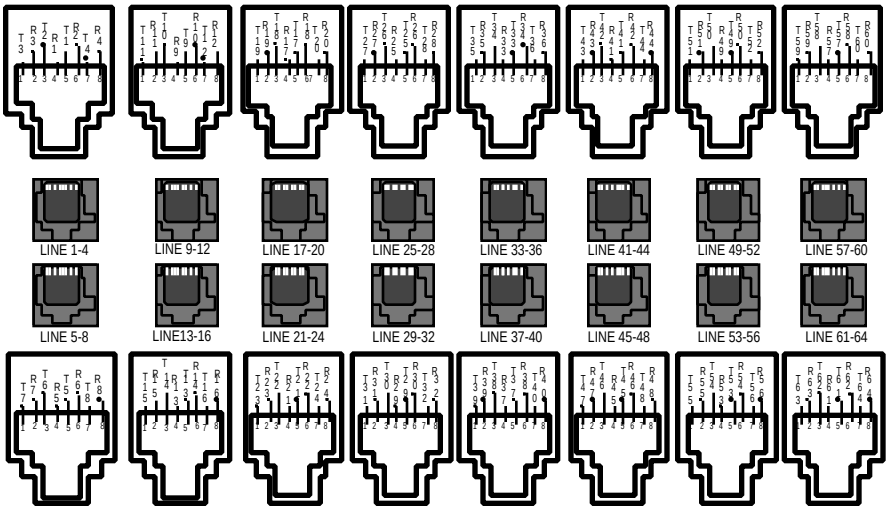


Figure 1-10. Line Interface Connector Pinout

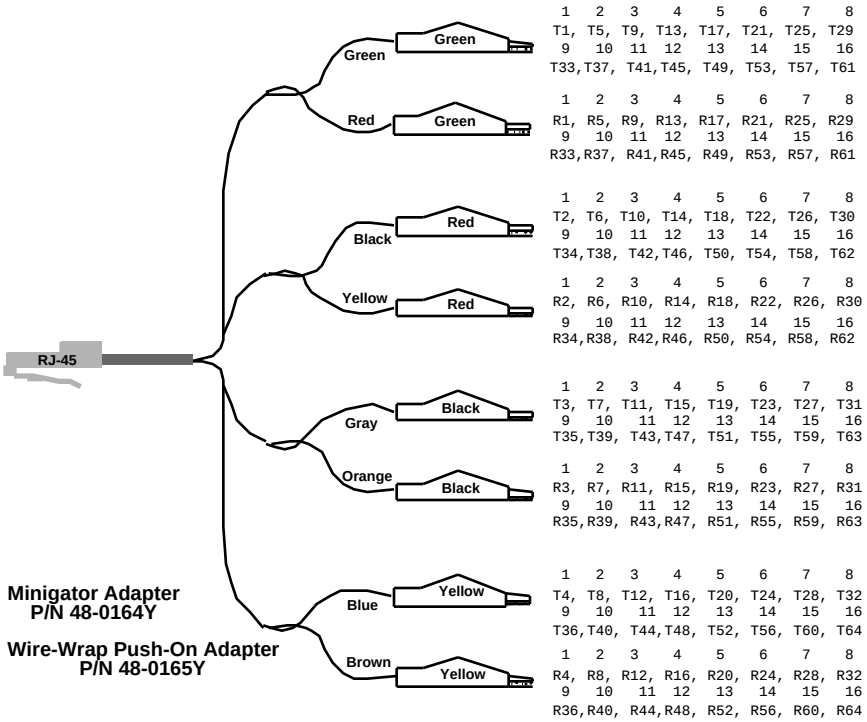


Figure 1-11. RJ-45 to Minigators or Push-On Wire-Wrap Test Cables

CAUTION: Risk of electrical shocks! Ringing voltages might exist during normal use. Avoid contact with Tip/Ring when possible.

To avoid an electrical shock hazard generated by the device under test (e.g. CO switches), when using cables with alligator clips, always:

1. disconnect the device under test from the AM2S-A unit before connecting or disconnecting Tip/Rings with alligator clips.
2. cover the exposed metal part of the clips by slipping on the metal with the plastic insulation.

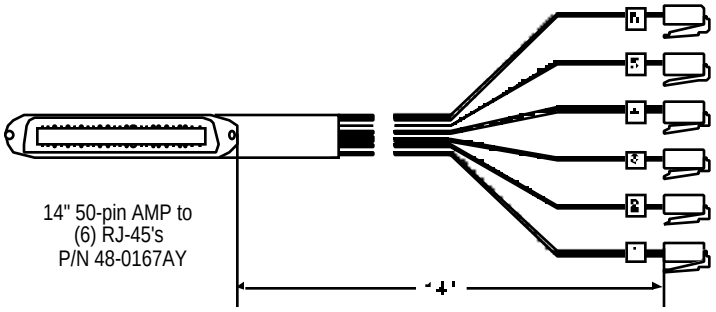


Figure 1-12. RJ-45 to 50-pin AMP Test Cable

1.3.2.2 AM2S-B Interface

The AM2S-B connects to the switch mode tests via 8 RJ-45 connectors that provide for U-Interface lines 1-32, in groups of four. A Trace Port also provides a 4-wire ISDN interface.

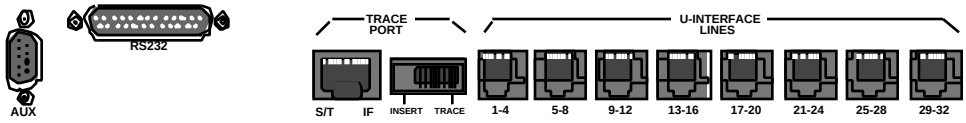


Figure 1-13. AM2S-B I/O Connectors

The U-Interface RJ-45 connectors are identically wired to provide four 2-wire line interfaces. The connection to the equipment under test may be a cable with an RJ-45 male connector at each end with the equipment end wired as suitable, see Figure 1-14. (In some test configurations, a test cable equipped with alligator or push-on clips may be used.)

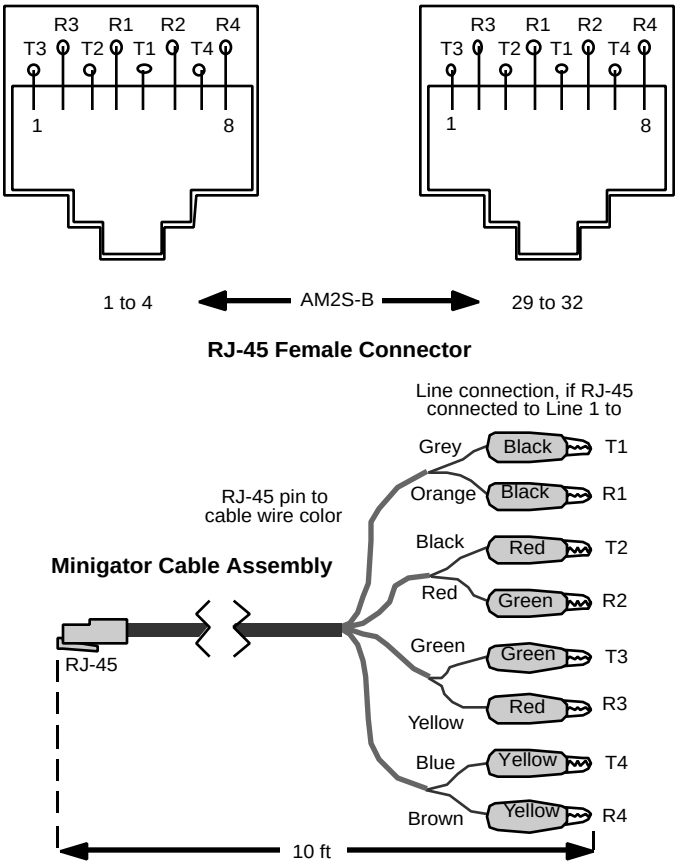


Figure 1-14. U-Interface Line Test Connections

CAUTION: Risk of electrical shocks! Ringing voltages might exist during normal use. Avoid contact with Tip/Ring when possible.

To avoid an electrical shock hazard generated by the device under test (e.g. CO switches) when using cables with alligator clips, always:

1. disconnect the device under test from the AM2S-B unit before connecting or disconnecting Tip/Rings with alligator clips.
2. cover the exposed metal part of the clips by slipping on the metal with the plastic insulation.

1.3.2.2.1 Trace Port

The Trace Port is located on the left side of the interface module and is designed to access any selected line through a 4-wire ISDN S/T interface (S/T IF). The interface module is shown in Figure 1-13. The Trace Port is intended to permit connection of a protocol analyzer for performance of protocol trace and decode.

The Trace/Insert switch is located to the right of the Trace Port.

- In the TRACE position, a Protocol Analyzer may be used to decode ISDN messages on a selected line.
- The INSERT position is not functional.

The Trace Port is assigned to the **left** audio monitor Line 1's channels via the **CM** remote command.

1.3.2.2.2 Trace Port Connections

The trace port connections are shown in Figure 1-15. These are the connector pins and respective wires used with the Ameritec test cable.

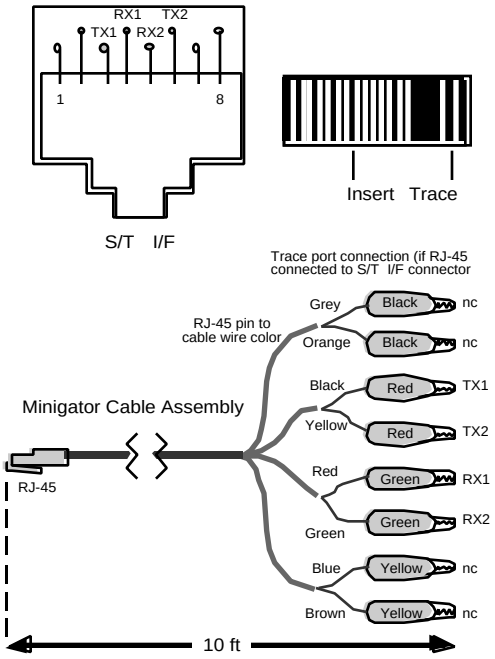


Figure 1-15. Trace Port Test Connections

1.3.2.3 AM2S-D/De and AM2S-DX/DXe Interface

The AM2S-D/De and AM2S-DX/DXe connects to the switch mode tests via several possible interface modules.

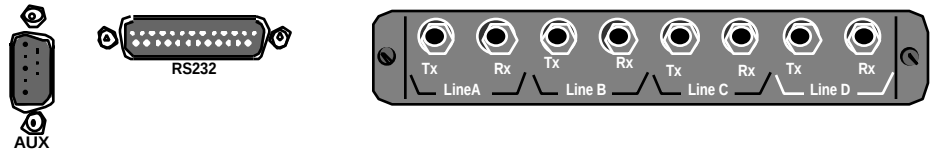


Figure 1-16. AM2S-D/De and DX/DXe I/O Connectors

CAUTION: To prevent an electrical shock hazard, during normal operation avoid connecting PCM I/O Ports or cables with exposed metal conductors to an unprotected external telephone network such as a line repeater.

The Line Interface consists of one of five connector port options.

- Bantam PCM Connector (standard)
- Tri-Banana PCM Connector (option no. 280130AY-2)
- BNC PCM Connector (option no. 280130AY-3)
- Siemens PCM Connector (option no. 280130AY-4)
- Bantam PCM Connector w/120Ω balanced impedance (option no. 280130AY-5)

PCM Line Interface Connector Options

The AM2S-D/De and AM2S-DX/DXe units come with one of five different PCM Line Interface Connectors. There are five options available for these units, and any of the options may be ordered from Ameritec to be retrofitted, or installed with the unit when ordering.

Note: Although the standard Line Connector is the Bantam PCM Connector, your unit may already be equipped with one of the other options.

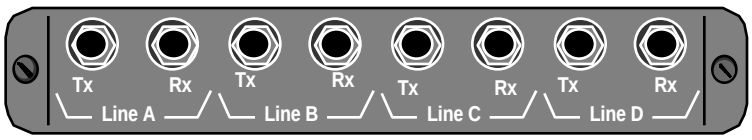


Figure 1-17. Bantam PCM Line Interface Connector (280130AY-1)

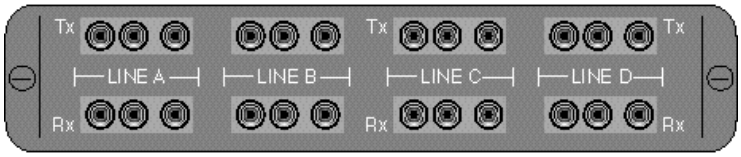


Figure 1-18. Tri-Banana PCM Line Interface Connector (280130AY-2)

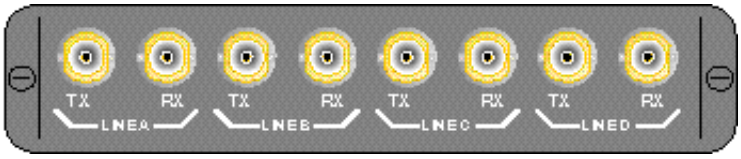


Figure 1-19. BNC PCM Line Interface Connector (280130AY-3)

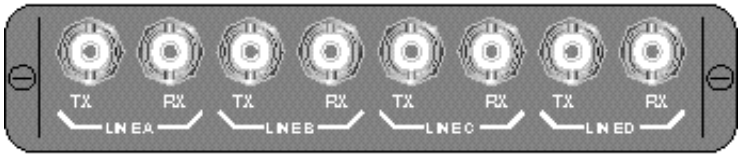


Figure 1-20. Siemens PCM Line Interface Connector (280130AY-4)

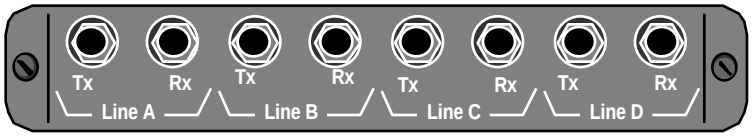


Figure 1-21. Bantam PCM Interface Connector with 120Ω balanced impedance (280130AY-5)

1.3.2.4 AM2S-S7/S7e Interface

The AM2S-S7/S7e connects to the switch mode tests via several possible interface modules.

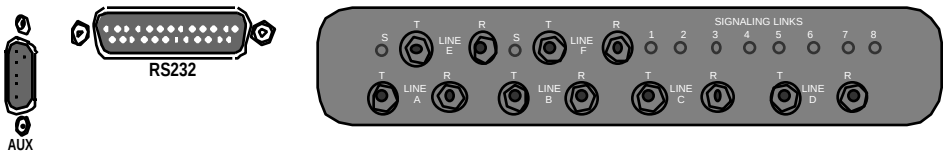


Figure 1-22. AM2S-S7/S7e I/O Connectors

1.3.2.4.1 S7 Interface

The AM2S-S7 signal interface modules provide for T1 1.544 Mbps, V.35, and DS0A signal standards. All options provide both transmit and receive, 1.544 Mbps, T1 channels for voice-data.

Table 1-1. AM2S-S7 Signal Interface Options

Part No.	Line Characteristic	Type	Voice-Data	Signal Line T and R
25-0211-1	100 ohm balanced	T1	A, B, C, D	E, F
25-0211-2	120 ohm balanced	T1	A, B, C, D	E, F
25-0213-1	100 ohm balanced	V.35	A, B, C, D	Two DB-37-P and cable adaptors (48020000)
25-0211-2	120 ohm balanced	V.35	A, B, C, D	Two DB-37-P and cable adaptors (48020000)
25-0234-1	100 ohm balanced	DS0A	A, B, C, D	Clock in R (Slave); Clock out T (Master); 8 T&R, 56 Kbps
25-0234-2	120 ohm balanced	DS0A	A, B, C, D	Clock in R (Slave); Clock out T (Master); 8 T&R, 56 Kbps

AM2S-S7 1.544 Mbps Signal Interface Option

The T1 module hosts the PCM Lines (A to D) for the voice-data channels and the two dedicated T1 signaling channels (E and F), accessed through the transmit and receive connectors.

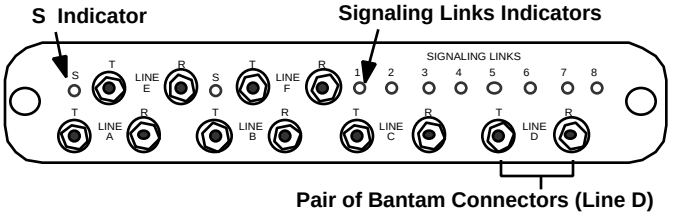


Figure 1-23. T1 Interface Module

With proper set up of the unit, simultaneous calls may be made and received over 96 voice channels, 24 for each PCM Line A to Line D. Eight out-of-band signal channels are carried through signaling Channel E and Channel F.

In addition Line A to Line D may also be used for in-band signaling, with a maximum of two signal channels per line. This reduces the number of voice channels.

- **S Indicator:** LINE E and LINE F indicators glow green when the line is in sync, and are off when the line is out of sync.
- **Signaling Links:** Signaling Links indicators glow green when the Link is in service and are off when the Link is out of service.
- **Line A to D:** The PCM LINE A to LINE D are Bantam jacks for T1 spans. The T-connector sends signals; the R-connector receives them.
- **Line E and F:** The PCM LINE E to LINE F are Bantam connectors for T1 spans for SS7 Signaling Links only. The T-connector sends signals; the R-connector receives them.

AM2S-S7 V.35 Signal Interface Option

The V.35 Signal Interface provides eight Bantam connectors for PCM lines. Two auxiliary connectors (37-pin) serve two adapter cables (48020000) that terminate with V.35 connectors.

Note: The V.35 Signaling Interface Option simulates a DCE (Data Communications Equipment) interface and is intended to be connected to the user's DTE (Data Terminal Equipment) interface.

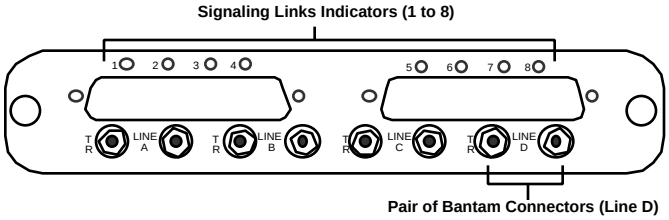


Figure 1-24. T1 V.35 Interface Module

- **Signaling Links:** Signaling Links indicators glow green when the Link is in service and are off when the Link is out of service.
- **V.35 Connectors:** Connection point for SS7 Signaling Links only.
- **Line A to D:** The PCM LINE A to LINE D are Bantam jacks for T1 spans. The T-connector sends signals; the R-connector receives them.

Table 1-2. V.35 Adapter Connections

V1/V5 and V3/V7 Links				
J1-J2	**V1/V5**	**J1-J2**	**V3/V7**	**Signal**
1 20	P S	10 29	P S	Transmitted Data Transmitted Data
2 21	AA Y	11 30	AA Y	Transmitted Timing Transmitted Timing
3 22	X V	12 31	X V	Receive Timing Receive Timing
4 23	T R	13 32	T R	Received Data Received Data
5	B	14	B	Signal Ground
V2/V6 Link, and V4/V8 Links				
J1-J2	**V1/V5**	**J1-J2**	**V3/V7**	**Signal**
1 20	P S	10 29	P S	Transmitted Data Transmitted Data
2 21	AA Y	11 30	AA Y	Transmitted Timing Transmitted Timing
3 22	X V	12 31	X V	Receive Timing Receive Timing
4 23	T R	13 32	T R	Received Data Received Data
5	B	14	B	Signal Ground

The signals jumpered in each V.35 connector are indicated as follows:

C ↔ D = Request to send/Clear to send

E ↔ F ↔ H = Data set ready/Signal line detect/Data terminal ready

A circuit diagram for the 1.544 Mbps line interface is presented in Figure 1-25, for the T1 and the V.35 options. The only distinction is that the T1 option utilizes Line E and Line F for SS7 signaling, as shown in the figure.

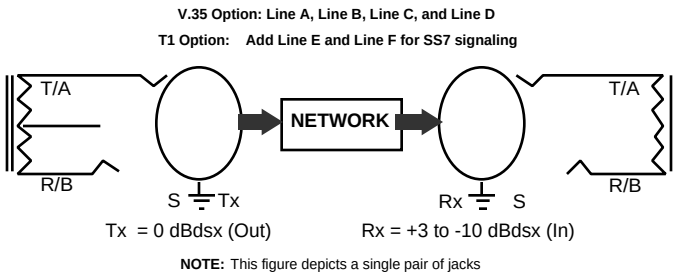


Figure 1-25. T1 and V.35 Option Circuit Diagram

AM2S-S7 DS0A Signal Interface Option

The PCM lines for the four voice-data (T&R) channels are accessed through eight Bantam jacks. For SS7 signaling, there are eighteen Bantam jacks (T&R sleeve, the sleeve is not used). The clock is accessed at the two left-most connectors, and eight 56 Kbps signaling channels (restricted mode) are accessed through the remaining 16 Bantam jacks. Indicator lights show clock sync and signal link activity.

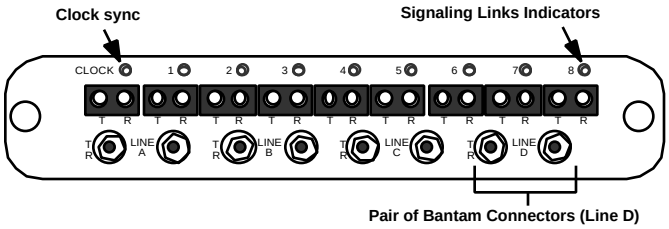


Figure 1-26. DS0A Interface Module

- **Clock:** The CLOCK indicator glows green when the clock is in sync, and is off when the clock is not in service.
- **Signaling Links:** Signaling Links indicators glow green when the Link is in service and are off when the Link is out of service.
- **Line A to D:** The PCM LINE A to LINE D are Bantam jacks for T1 spans. The T-connector sends signals; the R-connector receives them.

1.3.2.4.2 S7e Interface

Signal interface option modules are available for E1, 2.048 Mbps or V.35 signal standards. All options provide transmit (T) and receive (R), 2.048 Mbps, E1 channels for voice-data. The signal channel interface depends on the option. The available module options are listed below.

Table 1-3. AM2S-S7e Signal Interface Options

Part No.	Line Characteristic	Type	Voice-Data	Signal Line T and R
25-0212	75 ohm balanced	E1	A, B, C, D	E, F
25-0214	75 ohm balanced	V.35	A, B, C, D	Two 37-pin auxiliary connectors and adapter cables

AM2S-S7e 2.048 Mbps Signal Interface Option

The interface module of the AM2S-S7e has six pairs of BNC connectors (transmit and receive), four pairs of PCM Lines (A to D) for the voice-data channels, and two E1 Signal Channels (E and F). With proper set up of the unit, simultaneous calls may be made and received over 124 voice channels (31 per PCM Line A to Line D), while 8 out-of-band signal channels are carried through signal Line E and Line F. To reduce the number of voice channels, Line A to Line D (Channel 30 and 31) default to in-band signaling, with a maximum of two signal channels per line.

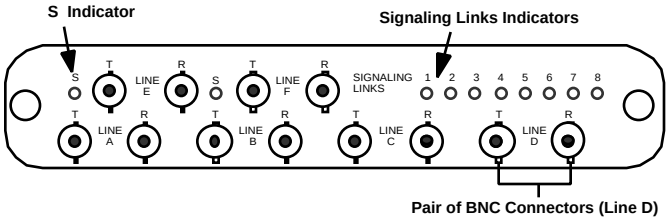


Figure 1-27. E1 Interface Module

- **S Indicator:** Line E and Line F indicators glow green when the line is in sync, and are off when the line is out of sync.
- **Signaling Links:** Signaling Links indicators glow green when the Link is in service and are off when the Link is out of service.
- **Line A to D:** The PCM LINE A to LINE D are BNC connectors for E1 spans. The T-connector sends signals; the R-connector receives them.
- **Line E and F:** The PCM LINE E to LINE F are BNC connectors for E1 spans for SS7 Signaling Links only. The T-connector sends signals; the R-connector receives them.

The T1 options may also be installed in an AM2S-S7e for special requirements. In this case, the PCM LINE E and LINE F will not be operational. For additional information, contact Ameritec Customer Service.

AM2S-S7e V.35 Signal Interface Option

The V.35 signal interface option simulates a data communications equipment interface, and is intended to be connected to the data terminal equipment interface of the user. The V.35 signal interface option provides eight BNC connectors for the PCM lines. Two auxiliary connectors (37-pin) serve two adapter cables (480200000), then terminate with the V.35 connectors. The details of the adapter cables are shown in Table 1-5.

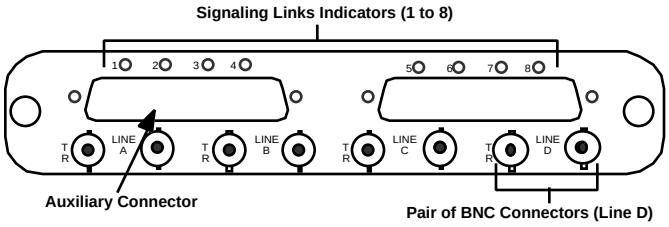
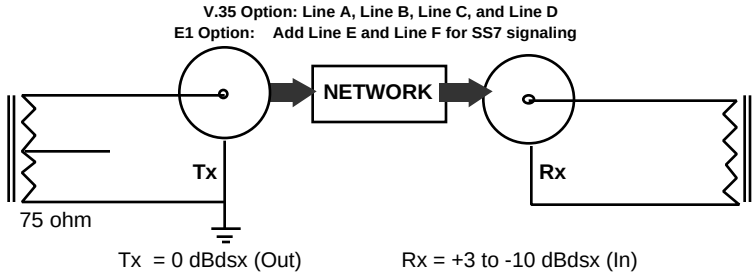


Figure 1-28. E1 V.35 Interface Module

- **Signaling Links:** Signaling Links indicators glow green when the Link is in service and are off when the Link is out of service.
- **V.35 Connectors:** Connection point for SS7 Signaling Links only.
- **Line A to D:** The PCM LINE A to LINE D are BNC connectors for E1 spans. The T-connector sends signals; the R-connector receives them.

A circuit diagram for the 2.048 Mbps line interface is presented in Figure 1-29, for the E1 and the V.35 options. The only distinction is that the E1 option utilizes LINE E and LINE F for SS7 signaling, as noted in the figure. The transmit and receive levels are 75 ohm.



NOTE: This figure depicts a single pair of jacks. The receive connector is ungrounded to prevent ground loop.

Figure 1-29. E1 and V.35 Option Circuit Diagram

1.4 Scripts, Call Programs, Call Test Sets, and Protocols

To understand how to use a Squirt unit, you need to understand four concepts: Protocols, Scripts, Call Programs, and Call Test Sets.

- A **Protocol** defines how the communications lines/channels respond to stimuli (Events). Each Protocol consists of a Protocol State Table (PST). The PST contains the rules of engagement between the Call Program, the Protocol State Machine (PSM), and the Line Interface. The rules of engagement define the signal(s) the PSM sends in response to specific events. Your unit is shipped with one or more Protocols installed.
- A **Script** is a text file with specialized syntax that forms the template for the Squirt to follow when it originates or terminates a call. Your unit is shipped with one or more Script files installed.
- A **Call Program** is a program that assigns user and default parameters such as call lines and phone numbers, to a selected Script.
- A **Call Test Set** is a collection of Call Programs that are executed as a test during run mode. Each Call Program is based on one Script, and a Call Program Set may contain many Call Programs. Call Programs within each Set may be individually enabled or disabled without removing them from the Set.

1.5 Communicating with the Squirt

You may interact with a Squirt via FeatureCall, a Microsoft Windows compatible Graphical User Interface (GUI), using either the RS-232 or Ethernet port. The GUI sends the correct Control Commands in response to your selections from menus and dialog boxes in FeatureCall.

You can also interact with a Squirt by sending control commands to the RS-232 or Ethernet port.

Section 2, Getting Started, provides detailed step-by-step procedures related to setting up the Squirt for testing, initiating testing, and interpreting test results.

Control Command Interface

The command control interface allows you to:

1. connect the RS-232 port to an Ethernet workstation using a 10Base-T adapter.
2. connect the RS-232 port directly to a Personal Computer (PC) or to a workstation using a serial cable.
3. connect the RS-232 port to the Auxiliary port of another unit that is connected via method two or three above.

You may also send control commands. Control commands fall into ten major categories and are usually one or two characters plus any applicable parameters. Command categories are listed below:

- Help Commands
- Chaining Commands
- Configuration Commands
- FeatureCall Remote Commands
- File Operation Commands
- Miscellaneous Commands
- Ethernet Commands
- Program Operation Commands
- Report Commands
- Test Control Commands

Note: ? Lists all commands with their related syntax.

α? Lists only commands of the command type α; where α is the first letter of that command type, e.g. **m?** lists only the Miscellaneous Commands.

MH ? Lists Index of Help Subjects.

MH <Topic> Lists Help for selected topic.

1.6 Inspection

The Squirt was thoroughly tested and carefully packed before shipment. Before operation, visually inspect the unit for damage. If the unit looks fine, but you suspect rough handling because of the condition of the shipping container, before applying power, remove the front panel and check for loose circuit boards or cabling.

The front panel is secured to the chassis with five screws. Remove the screws and partially pull away the front panel. Be careful not to disconnect any internal cabling, and hold the panel with one hand as the boards and cables are checked. Reinstall the front panel in the same manner in which it was removed.

Immediately contact the carrier in the event of physical damage to the unit. The carrier's name is printed on the packing slip. Notify Ameritec in the event of a shortage or malfunction. Save the container and packing material in case you need to return the unit.

1.7 Initial Test Setup

Most of your interaction with the Squirt will be during your first test setup phase. During the first test setup, you will be:

- connecting the Squirt to the lines to be tested.
- creating Call Programs. You create a Call Program by assigning a Script to a Call Program number and then assigning parameter values to that Call Program. Values are items that make that Call Program unique and include things such as line numbers, call digits, and delay times.
- assigning the Call Programs to a Call Test Set.
- assigning specific Protocols to each line pair.

Note: Appendix A contains a listing of the Call Statistic Data Register Codes and Real-Time, System, and Unit error messages pertaining to the Scripts that shipped with the unit.

Note: Once you have created Call Test Sets and assigned Protocols to each line pair, future setups can be as easy as enabling or disabling individual Call Programs within a Set.

1.8 Using the Manual

Sections 2 and 3 provide detailed operating instructions and/or related reference material. The following list provides a summary of each section:

- ***Section 2, Getting Started***, contains the detailed instructions for setting up the Squirt for the first time.
- ***Section 3, File Management of Scripts and Protocols***, contains instructions for setting up the RS-232 and Ethernet ports as well as instructions for transferring files between the Squirt and the Terminal or Terminal Emulator on the PC/Workstation.

As you become a more advanced user, you may want to create your own Scripts. Detailed instructions for Script writing can be found in the ***Ameritec Call Generator Script Writer's Guide*** (Ameritec P/N 18-0134).

You may even have the opportunity to create new or modified Protocol State Tables (PST). Instructions for creating PSTs are contained in the ***AM2 Bulk Call Generator Protocol Table Development Guide*** (Ameritec P/N 18-0038).

1.9 Physical Description

The Squirt is 16.8 inches wide, 7.2 inches deep, 11.5 inches high, and weighs approximately 16.5 lbs (7.5 kg) depending on the option(s) ordered. The chassis shell with attached cover and handle serves as a convenient carrying case.

The LED panel mounts on the rear of the front panel. The front panel is secured to the chassis with five recessed Philips screws and can be removed to access the power supply and line cards

Although they appear on the front of the unit, the communications ports are mounted on the lower-left front of the chassis. The line interface module is a separate module that plugs into the lower-right side of the chassis front. The face of the unit consists of the following interface groupings:

- line status indicators
- input power group
- communication ports
- line interface module

1.9.1 Status Indicators

The LED Panel, located on the upper half of the front panel, displays the line/channel activity. The line/channel LEDs can be in one of four states. Table 1-4 shows each state based on the LED color or lack thereof (dark).

Table 1-4 Line/Channel LED Status

Color	Status
Dark (off)	Line is Idle (On Hook)
Green	Originate Off Hook (outgoing call)
Yellow	Terminate Off Hook (incoming call)
Red	Not used for factory standard loop or ground start protocols

1.9.1.1 AM2S-A Line Status Indicators

Figure 1-30 shows the LED for each of the AM2S-A unit's 64 lines (channels). Each line number corresponds to a channel number.

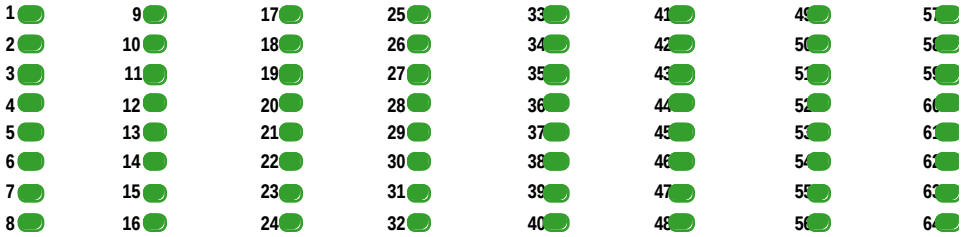


Figure 1-30. AM2S-A LED Panel

1.9.1.2 AM2S-B Line Status Indicators

Figure 1-6 shows the AM2S-B LED for each of the 32 lines.

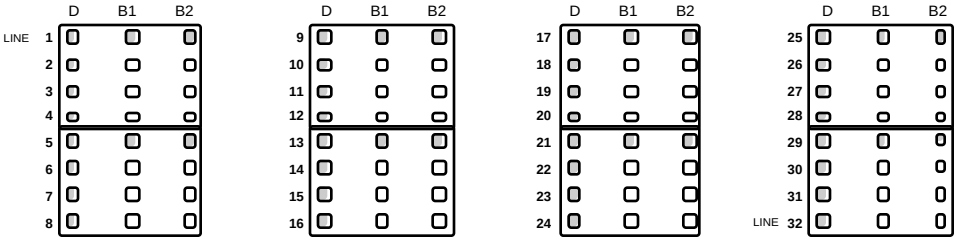


Figure 1-31. AM2S-B LED Panel

The line activity indications are three-color LED indicators that monitor the activity on the Bearer Channel (B1 and B2) and the Signaling Channel (D) for each U-Interface line.

When a simulated TE is originating or terminating a call, the D indicator will indicate the line activity. The B1 or B2 indicator will monitor circuit-switched data or voice. If a 2B1Q line loses Layer 1 sync (L1), the D indicator will be red, and the B1 and B2 indicators will be extinguished.

When power is applied to the AM2S-B, an LED diagnostic sequence is displayed. The indicators provide an indication of the line card loading status, and a positive indication that the U-Interface is synchronized with the line.

The B2 indicator will extinguish as the software begins loading to the line card. Once the loading is complete, the B1 indicator will extinguish. If the B1 and B2 indicators do not extinguish after several minutes, a line card may not be installed, or a problem with the software load may exist on that line card. If the problem is due to an improper software load, it can be cleared by cycling power to the unit. The D channel indicator will extinguish as each U-Interface synchronizes to the line.

1.9.1.3 AM2S-D/De Channel Status Indicators

Figure 1-32 shows the LED for each of the 96 channels of the AM2S-D. Figure 1-33 shows the LED for each of the 120 channels of the AM2S-De.

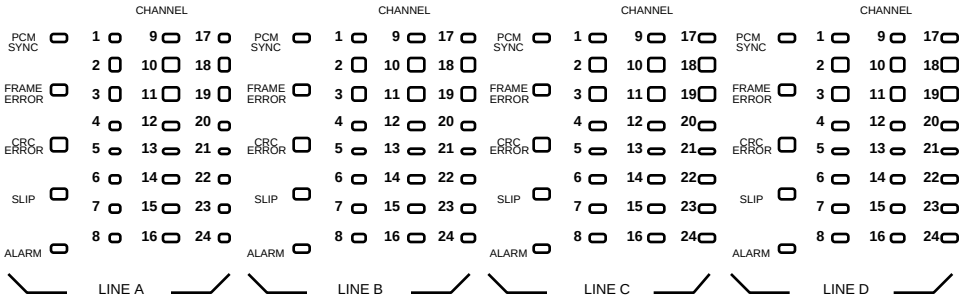


Figure 1-32. AM2S-D LED Panel

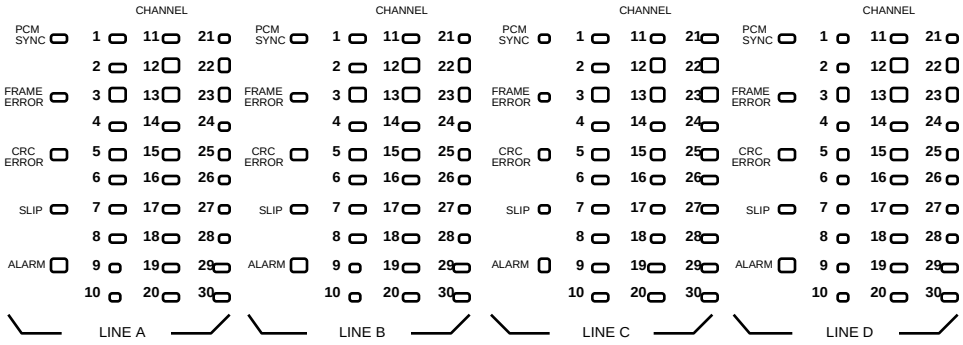


Figure 1-33. AM2S-De LED Panel

1.9.1.4 AM2S-DX/DXe Channel Status Indicators

Figure 1-34 shows the LED for each of the 96 channels of the AM2S-DX. Figure 1-35 shows the LED for each of the 120 channels of the AM2S-DXe.

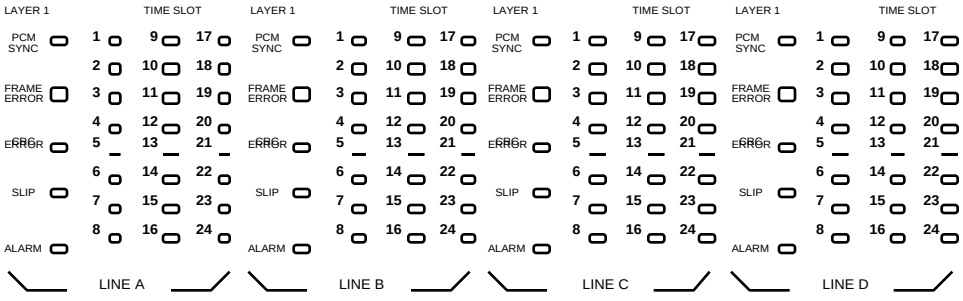


Figure 1-34. AM2S-DX LED Panel

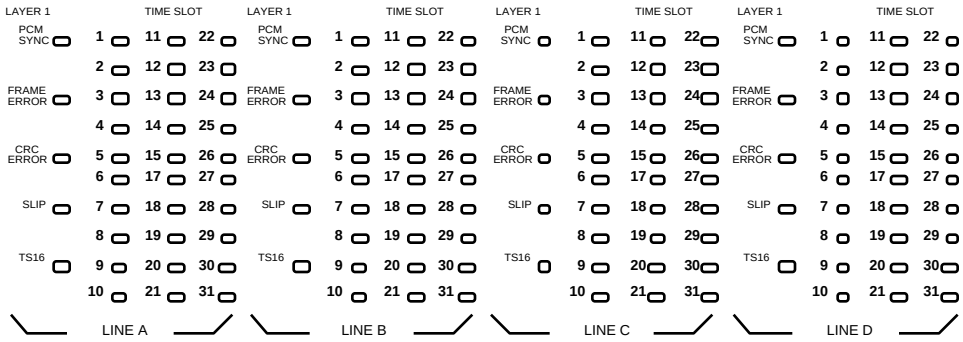


Figure 1-35. AM2S-DXe LED Panel

1.9.1.5 AM2S-S7/S7e Channel Status Indicators

Figure 1-36 shows the LED for each of the 96 channels of the AM2S-S7. Figure 1-37 shows the LED for each of the 120 channels of the AM2S-S7e.

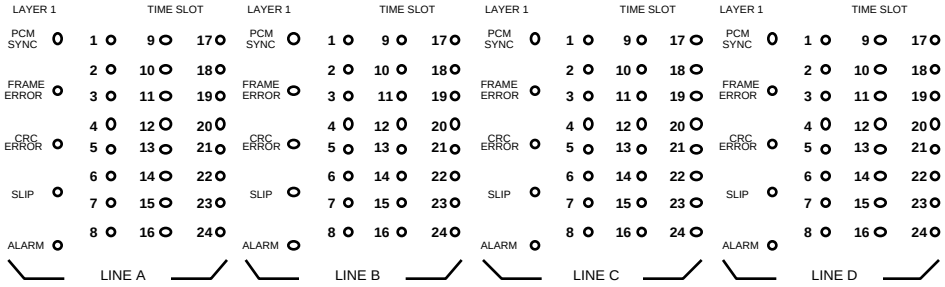


Figure 1-36. AM2S-S7 LED Panel

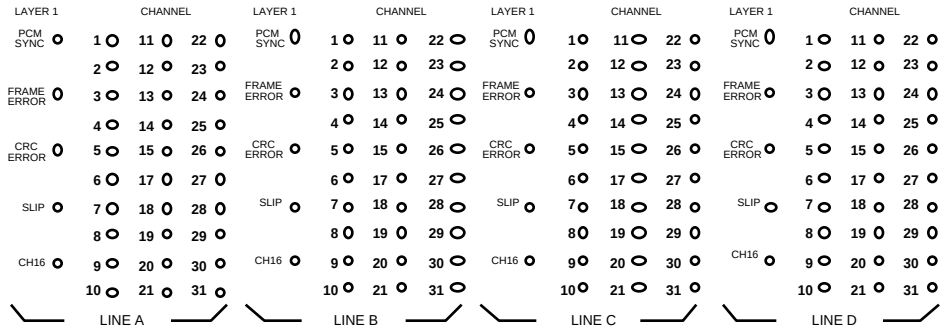


Figure 1-37. AM2S-S7e LED Panel

1.9.2 Input Power

The Squirt operates on universal power: 90 VAC to 264 VAC @ 50 Hz to 60 Hz and fused with a 250V 2A fast-blow fuse. The input power group consists of: from left-to-right, a fuse holder, a three prong modular AC input connector, and an on/off toggle switch. The fuse holder and connector are a single unit. The fuse holder contains both an active fuse and a spare fuse. The fuses are located in a drawer to the left of the AC input connector.

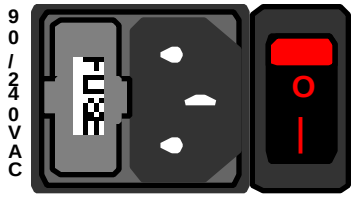


Figure 1-38. Input Power Group

To access the fuses, grip the small tabs in the center of the fuse holder and pull the drawer towards you. Two fuse compartments will be visible. The spare fuse is in the compartment nearest you.

CAUTION: For continuous protection against risk of fire, replace fuse with same type and rating only.

A Squirt power supply converts the universal AC input into +5V, -5V, +12V, and -12V for use by the plug-in modules, fan, and LEDs.

Grounding

The center pin of the three-prong connector is ground (when connected to a wall socket - earth ground). If your switch is not connected to an earth ground, then make sure that the Squirt and the switch share a common ground.

CAUTION: To prevent an electrical shock hazard, the power cord protective grounding must be connected to ground.

1.9.2.1 Chassis Grounding Kit Option Installation

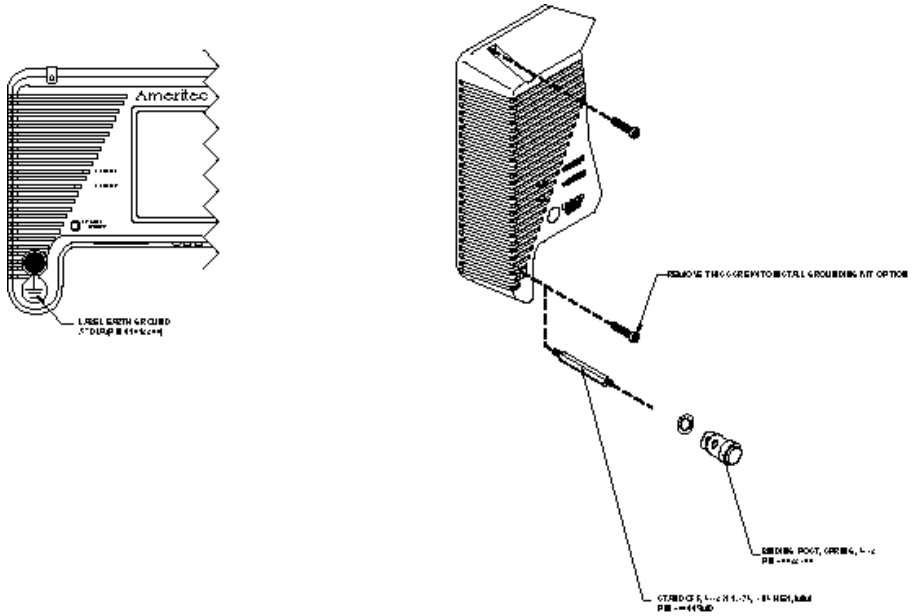


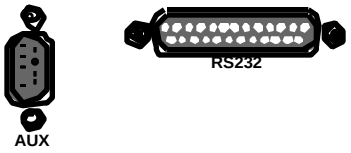
Figure 1-39. Chassis Grounding

1. Remove 1 screw (P/N 80028100) from the front panel of the Squirt assembly as indicated.
2. Insert the Standoff (P/N 800445MD) into the Front Panel as shown.

   Tighten the Standoff to its fully clockwise position.
3. Insert a Lockwasher (P/N 80043400) and Spring Binding Post (P/N 80022300) onto the Standoff.

   Tighten the Binding Post to its fully clockwise position.
4. Add the Earth Ground Label (P/N 41012200) below the Binding Post on the Front Panel.

1.9.3 Communications Interface

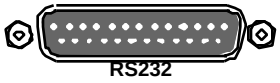


The communications interface consists of two ports, from right-to-left:

- RS-232 and Ethernet Port
- AUXiliary Port

The **RS-232** connector is a dual function port. Pins 14 through 19 are dedicated to the Ethernet Port and the remaining pins 2, 3, and 7 are dedicated to the RS-232 Port. The **AUX**iliary Port is used for chaining units.

1.9.3.1 RS-232/Ethernet Port



The 25-pin 'D' connector labeled RS-232 is a dual-function connector, with three pins dedicated to the RS-232 I/O and six pins dedicated to the Ethernet I/O.

DB25 Pin #	Ethernet Function
14	Transmit +
15	Transmit -
16	Receive +
17	Receive -
18	Clock +
19	Clock -

DB25 Pin #	RS-232 Function
2	Transmit Data
3	Receive Data
7	Signal Ground

DB-25 Male Connector on Front of AM2S

Figure 1-40. RS-232/Ethernet Port

1.9.3.1.1 RS-232 Port

The RS-232 port is used for the following:

- Downloading Scripts and Protocols
- Saving Scripts and Protocols
- Sending Control Commands (in lieu of using the Ethernet port)
- Used in conjunction with the AUX connector to chain units (Figure 1-48)
- Setting up the Ethernet address

Figures 1-41 through 1-43 list the optional Ameritec cables that are available for Chaining, connecting to a PC or connecting to a Printer.

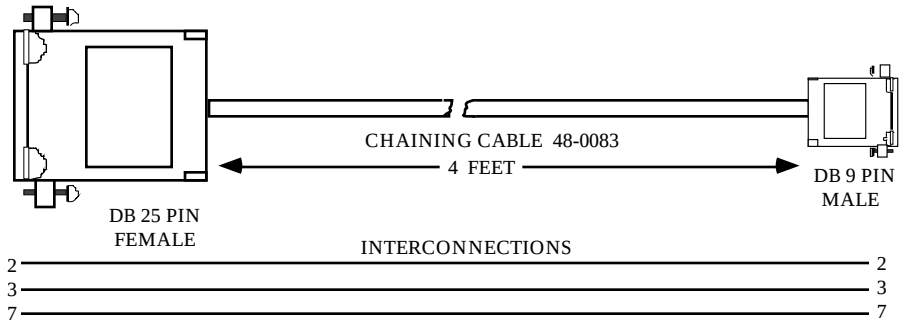


Figure 1-41. Chaining Cable [Auxiliary Port to RS-232 Port (48-0083)]

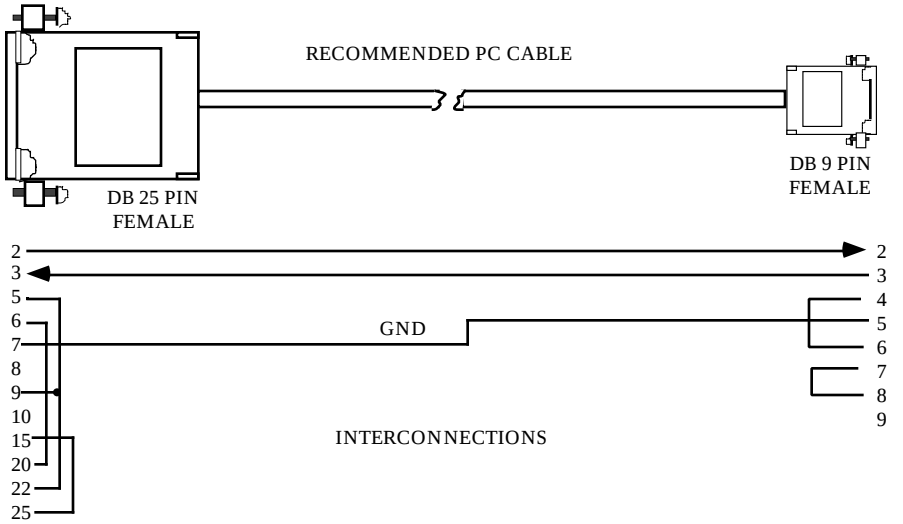


Figure 1-42. PC Cable [RS-232 Port to 9-pin Female Connector (48-0107)]

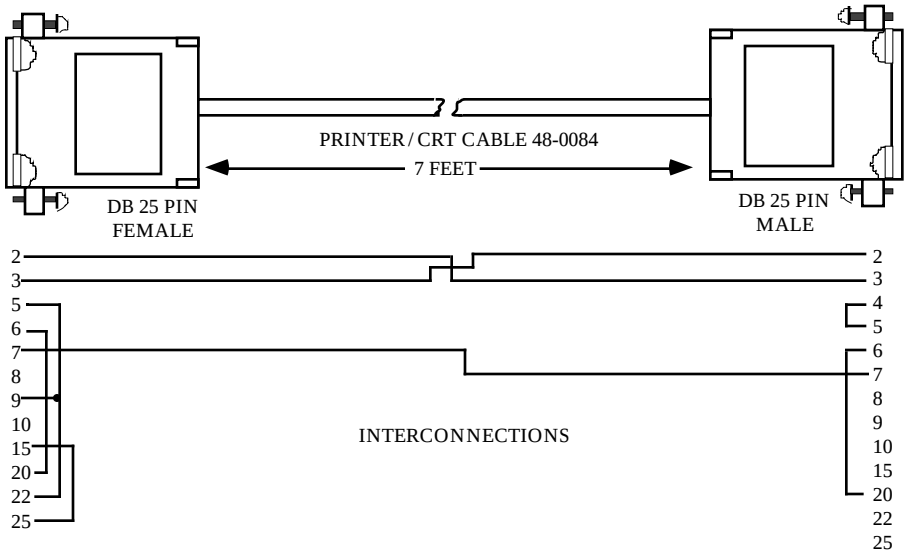


Figure 1-43. Printer Cable (48-0084)

1.9.3.2 RS-232/Ethernet Port and 10Base-T Interface

The Ethernet connections are made through the RS-232 connector on the front panel of the unit. Pins 14 through 19 are dedicated to the Ethernet port (Figure 1-40). A DB-25 to RJ-45 (P/N 480192) 10Base-T Ethernet adapter is shown in Figure 1-44. The 10Base-T interface conforms to the IEEE 802.3 specification.

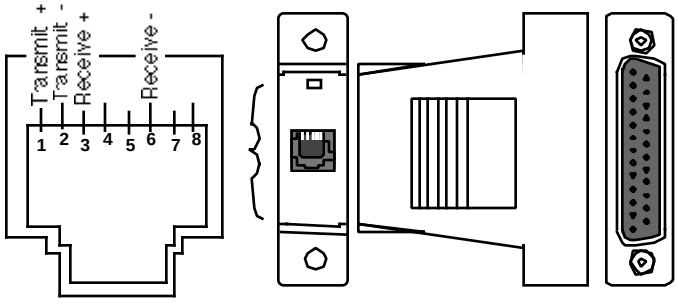


Figure 1-44. DB-25 to RJ-45 10 Base-T Ethernet Adapter (48-0192)

The dual function cable, P/N 48-0189, allows you to simultaneously connect the Ethernet and RS-232 ports. Only one port, however, can be active at a time.

The cable is a 15-inch long ribbon cable with a single DB-25 female connector on the Squirt end and two identically-wired DB-25 male connectors on the other end.

A (48-0192) 25-Pin 'D' to RJ-45 adapter can be connected to one of the male connectors on the dual-function cable to provide a 10Base-T Ethernet interface.

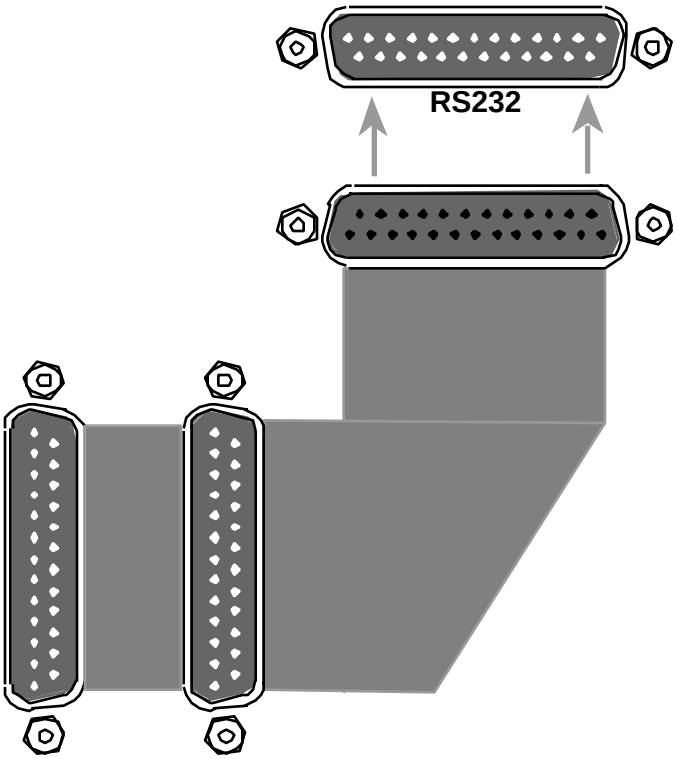


Figure 1-45. RS-232/Ethernet Dual Function Cable (48-0189)

The use of the Ethernet adapter allows you to lay out an Ethernet network as illustrated in Figure 1-46.

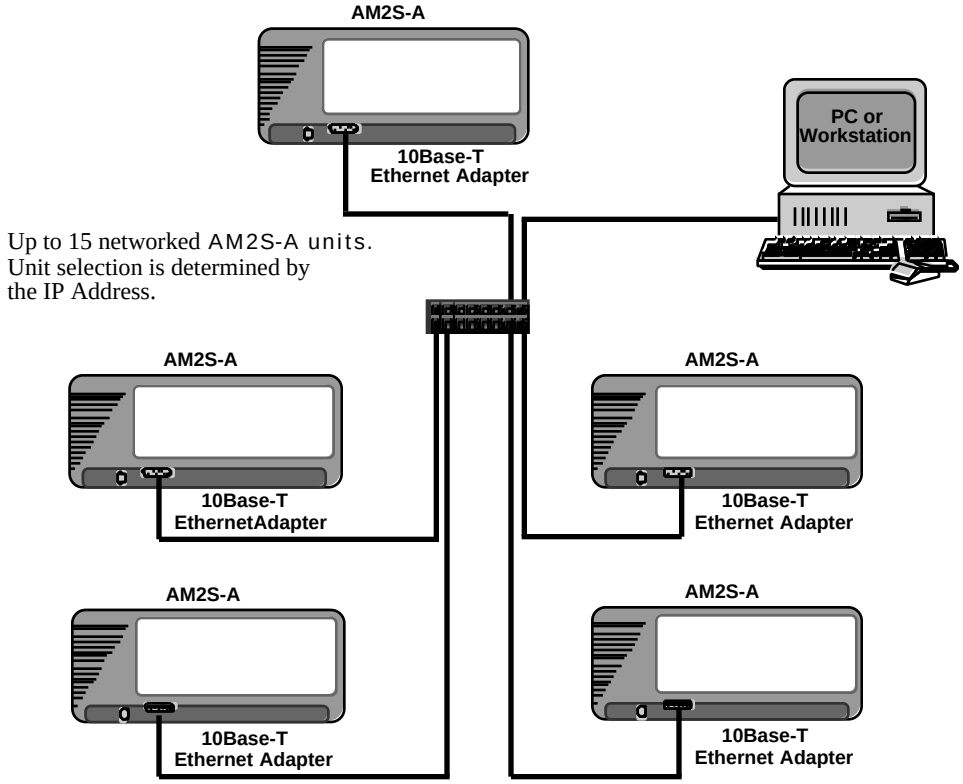
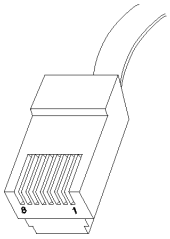


Figure 1-46. Ethernet Network Layout

Note: Ameritec Bulk Call Generators do not support Dynamic Host Control Protocol (DHCP) IP addressing. IP addressing must be entered manually via the RS-232 port.

1.9.3.3 Connecting the PC/Workstation to the Squirt



There are two methods of connecting the PC to the Squirt: standard Ethernet connection and the crossover connection. The standard method consists of connecting both the PC and the Squirt to an Ethernet Network using a 10Base-T Hub as shown in Figure 1-46. The standard method uses 8-wire twisted pair cables with RJ-45 Telco jacks. The pinouts for the standard Ethernet connection are shown in Table 1-5.

Table 1-5. Standard Ethernet RJ-45 Cable Connector Pinout

RJ-45	Signal	RJ-45
1	Transmit +	1
2	Transmit -	2
3	Receive +	3
6	Receive -	6

The second method consists of connecting the PC directly to the Squirt. It also uses the 8-wire twisted pair cables with RJ-45 Telco Jacks; however, the active transmitter and receiver wires are reversed. The crossover is symmetrical so either end can be connected to either unit. The pinouts for the crossover Ethernet connection are shown in Table 1-6.

Table 1-6. Crossover Ethernet RJ-45 Cable Connector Pinout

RJ-45	Signal	RJ-45
1	Transmit +	3
2	Transmit -	6
3	Receive +	1
6	Receive -	2

1.9.3.4 AUXiliary Port for Chaining Units

The auxiliary port allows you to chain call generators. Figure 1-47 shows how to interconnect multiple units in a chain. The AUX port of one unit connects to the RS-232 port of the next unit and so on, for up to a maximum of 15 units. Each unit is addressed based on its position in the chain. The unit directly connected to the PC or RS-232 Terminal is always Unit A and is addressed as **!A**. The second unit in line is addressed as **!B**, and so on, with the fifteenth unit addressed as **!O**. A sixteenth address, **!Z** allows you to broadcast the same command to all units simultaneously.

Broadcast mode is the default mode that the chain assumes before any other addressing commands are sent. If any unit in the chain lost power or was rebooted, try sending a **Ctrl-E** to clear the communications channel before attempting to send any further chaining commands.

Once you initiate an address command for a specific unit, all commands are sent to that unit until you send a different address command.

When chaining, you can mix Niagara (AM2), Crescendo (CRS), and Squirt (AM2S) units on the same chain. You can also mix individual models within each group such as an AM2S-D, AM2S-A, AM2S-B, etc.

CAUTION: If you do mix models, be careful not to send model specific commands in broadcast mode.

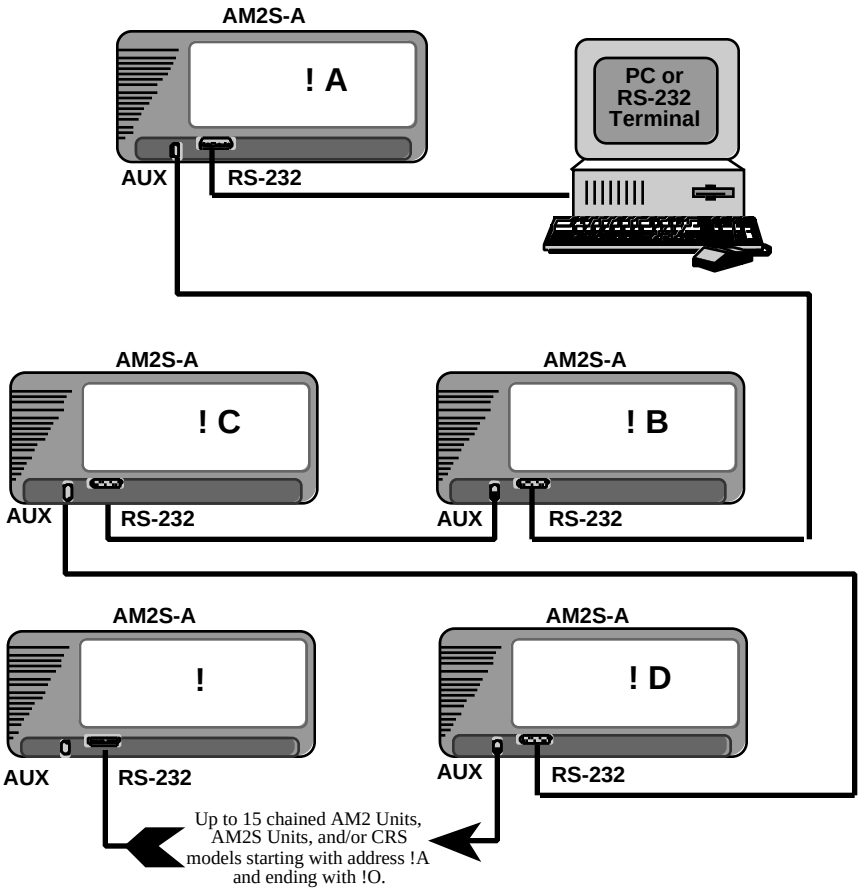


Figure 1-47. Chaining Layout

1.9.4 Non-Volatile Memory

Power loss during a test causes unit operation to cease, however, non-volatile memory maintains Scripts, Protocols, and test setups such as Call Test Sets. At restoration, the Squirt outputs real-time messages indicating the time that power was lost and when it was restored. Any tests that were in progress at the time of a power loss are automatically restarted.

Non-volatile memory is maintained by a 3.9V Lithium battery (P/N 88000100) and has a life expectancy of six years if the unit is operated continuously. Table 1-7 shows battery life expectancy based on usage. The battery is drained anytime AC power is removed from the unit. The battery will not run the unit, its sole purpose is to maintain the integrity of files stored in non-volatile memory.

Table 1-7. Battery Life Expectancy

Unit On-Time (hours per day)	Battery Life before Replacement
0	458 days (15 months)
8	687 days (23 months)
24	6 years (72 months)

CAUTION: Dispose of Lithium Batteries properly in accordance with applicable local regulations.

To avoid downtime, the battery, Ameritec P/N 88000100, should be replaced periodically, based on the usage indicated in Table 1-7. Battery replacement can be performed in the field or at Ameritec. For field replacement, contact Ameritec Customer Service and ask for a new battery.

1.9.4.1 Replacing the Lithium Battery

The lithium battery is located on the Master I/O board, P/N 280191AY-1. The CPU board, P/N 280190, is piggy-backed onto the I/O board and must first be removed to access the battery. Perform the following to replace the battery.

1. If battery is not completely dead, backup Scripts, Protocols, Call Programs, and Call Program Sets using the **Backup Unit Files** feature in FeatureCall.
2. Remove front panel.

3. Locate the piggy-backed cards in slots 13 and 14 and remove the applicable cables.
4. Slide the piggy-backed cards out of the card slot.
5. Using a #1 Philips screwdriver remove the four screws securing the CPU to the Master I/O card.
6. Gently separate the two boards.

CAUTION: To avoid bending connector pins avoid separating the boards as a clamshell. Keep the boards as close to parallel as possible during separation.

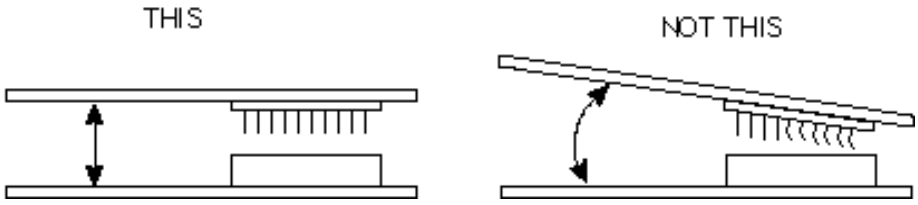


Figure 1-48. Separating CPU and Master I/O

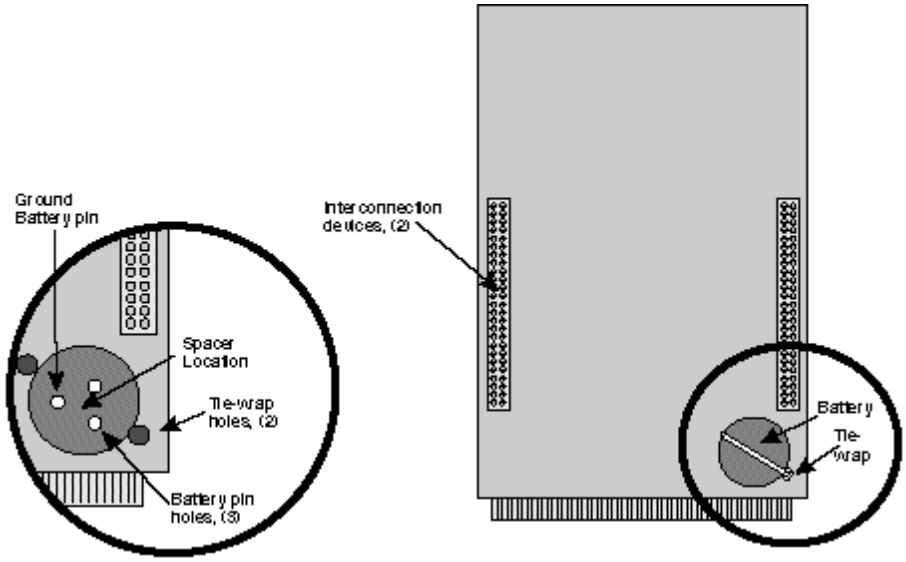


Figure 1-49. Lithium Battery Location on Master I/O Board

7. Using side-cutters, cut the tie wrap securing the battery to the Master I/O card. If it is real tight, you may use an orange stick to gently pry it out.
8. Align the pins on the new battery with the receptacles on the Master I/O card and press the new battery in place.
9. Install a new tie wrap with the knot facing the nearest corner.
10. Tighten the tie wrap as needed to secure the battery and trim the excess.
11. Align the CPU connectors with the Master I/O connectors and press the two boards together being careful not to bend any pins.
12. Reinstall the Philips screws.
13. Slide the piggy-backed card set back into the card cage and press the Master I/O connector into the back plane.
14. Reconnect the cables.
15. Re-install the front panel. Tighten each screw about a 1/4 turn at a time, alternating back and forth between the screws until the front panel is secure.
16. Reconnect power and the Network.
17. Using the FeatureCall **Restore Unit Files** feature, transfer the Scripts, Protocols, Call Programs, and Call Program Sets previously removed.

Which Files Do I Transfer to a PC?

If you have the original factory diskette that contains factory loaded Scripts and Protocols, you only need to transfer user created programs. These usually include user-written or modified factory Scripts stored in locations 11-20. If you don't have the factory diskette, transfer all the Protocol and Script files to a PC/Workstation.

1.9.4.2 Battery Back-Up Board

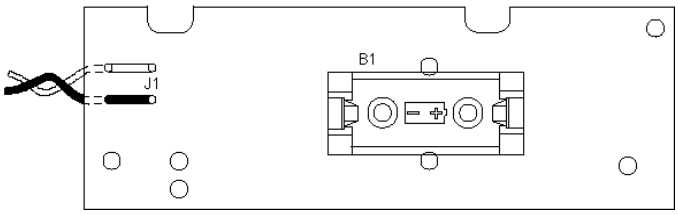


Figure 1-50. Battery Back-Up Board

The Battery Back-up Board provides 6V power at 1/2 amp to the Squirt from an internal source if there is a drop in the external voltage coming into the unit. The board is capable of supplying 6V power for up to one year if the unit is maintained in a power-off condition, or for up to three years if the unit is maintained with power on.

This provides enough power to save Customer Statistics in CMOS in case of an external power failure.

The Battery Back-up Board is attached on the LED Display board, P/N 280269AY.

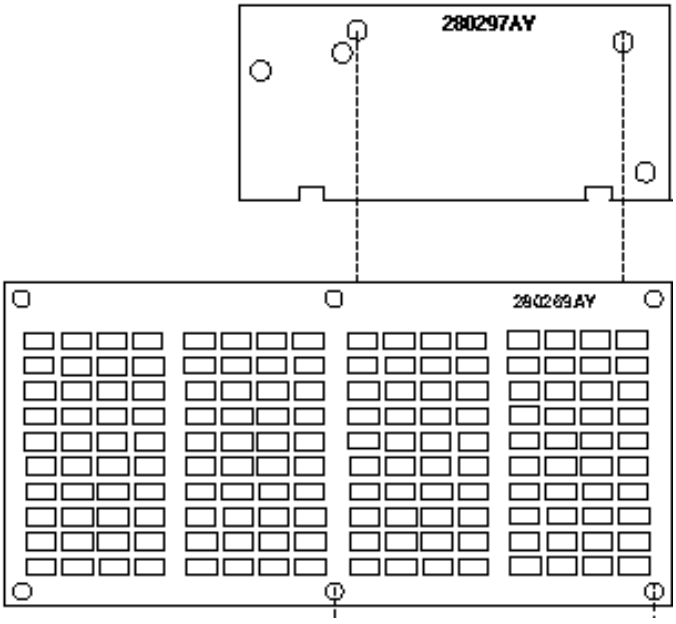


Figure 1-51. Battery Back-Up Board Location

1.9.5 Cooling

The Squirt dissipates less than 300 Watts of exchanged heat. A fan draws heated air away from the power supply, display, and plug-in modules and exhausts it out vents on the tapered left side of the front panel. For most environments, no special concern airflow clearance requirements are needed.

1.10 Meter Pulse Option

The Meter Pulse Option for the AM2S-A Bulk Call Generator adds the capability to detect metering or billing pulses on the subscriber analog loop. When the Option is installed, each of the 64 Loop Start lines has an independent pulse detector for Meter Pulses encoded as 12 kHz or 16 kHz bursts.

The Meter Pulse Option requires:

- Factory installation of an option module.
- Connection of Analog circuits carrying voice/meter pulses to LINE inputs on the module.
- Selection of the correct Meter Pulse frequency.
- Loading and Assignment of a Line Type designed for Meter Pulse Application.
- Loading and Copying the appropriate Script for Meter Pulse application to a Call Program.

1.10.1 Meter Pulse Option Modules

There are two option modules (25-0141 or 25-0142) which can be installed to match the impedance of the circuits under test and provide the connections for Loop Start lines which carry Voice-frequency and Meter Pulse signals.

Impedance selection is based on the Option Module installed in the unit:

- 900Ω 25-0141
- 600Ω 25-0142

The accuracy of the impedance selection is ±10%.

1.10.2 Line Requirements

For successful detection of meter pulses on the line:

- Meter pulses must be within ±5% of center frequency.
- Meter pulse width must be 20ms or greater (on-time).
- Meter pulse levels must be within 100mV to 10V. (The AM2S-A automatically adjusts for levels within this range).

Note: Countries with meter pulse levels below 100mV should contact Ameritec Customer Service for further consideration.

- Simultaneous Voice (or tone) level must be -6 dBm maximum.
- Meter pulses may be detected on the LINE whether the called end is on-hook or off-hook.

1.10.3 Line Type (Protocol State Table) Requirements

The LSMeterPulse Protocol (Part #: 9221003) is required for Meter Pulse operation.

Load the Line Type into the unit for proper Meter Pulse operation.

2. GETTING STARTED

The Ameritec Corp. (P/N 240034) FeatureCall® is a PC based Graphical User Interface (GUI) that provides a simplified human interface to control the Ameritec Squirt Call Generator in either a system test environment, or as the control of a single test instrument.

FeatureCall is a Microsoft® Windows® based application that runs on a personal computer with a 486 or higher microprocessor. It allows you to configure units, transfer files, control test sequences, request data, and generate reports. A test environment can be created over an Ethernet® TCP/IP LAN or an RS-232 serial system to test your equipment by running sets of scripted Call Programs controlled by Protocols.

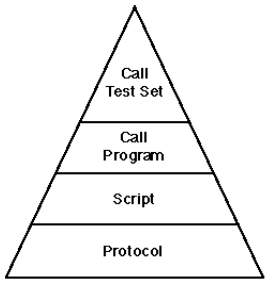
The Getting Started section is task oriented. The presentation order is generally the order in which you perform the tasks. Basic FeatureCall functions that you will be performing to set up a call are presented in this section. Some features are not needed for the basic operations and are covered elsewhere. These features, shown in Chapter 4 of the FeatureCall manual, include items such as Auto Scheduling of Tests and outputting various listings from the Report menu.

FeatureCall includes the FirstCall™ Wizard. The Wizard provides step-by-step instructions for setting up your first Call Test Set.

2.1 System Testing

There are four basic building blocks used to generate multiple calls on a Call Generator:

- A **Protocol** defines how the Squirt communications channels respond to stimuli (Events). Each Protocol consists of a Protocol State Table (PST). The PST contains the rules of engagement between the Call Program, the Squirt Protocol State Machine (PSM), and the Line Interface. The rules of engagement define the signal(s) the PSM sends in response to specific events. Your unit shipped with one or more Protocols installed.



- A **Script** is a text file with specialized syntax that forms the template for the Squirt to follow when it originates or terminates a call. Your unit shipped with one or more Script files installed.
- A **Call Program** is a program that assigns user and default parameters such as call channels and phone numbers to a selected Script.
- A **Call Test Set** is a collection of Call Programs executed as a test in run mode. Each Call Program is based on one Script, and a Call Test Set may contain many Call Programs. Call Programs within each Set may be individually enabled or disabled without removing them from the Set.

You may control the Squirt via the Command Line Interface, FeatureCall FirstCall Wizard, or the FeatureCall Configuration and Call Setup windows. Each of these interfaces require that you perform four basic steps. You must:

- assign Protocols to Lines/Channels.
- assign Scripts to Call Programs.
- assign parameter values to make each Call Program unique.
- assign Call Programs to a Test Set.

2.2 Test Setup Procedures

To run a test:

- open FeatureCall
- configure the Squirt
- access FirstCall
- assign Line Type configurations and protocols via FirstCall
- select the Call Program Script and Set via FirstCall
- create a Call Program and enter the program variables via FirstCall
- run the Call Test Set and view the results via FirstCall

2.2.1 Open FeatureCall

1. Start Microsoft Windows.
2. Double-click on the Ameritec Program Group. The system displays the FeatureCall Icon.
3. Double-click on the FeatureCall icon. The system displays the Open System menu (superimposed over the FeatureCall Main Window).

Figure 2-1. Open System Menu

2.2.2 Configure the Squirt Call Generator

A system of call generators may be connected either across the RS-232 port or by a Telnet connection. A system may be comprised of a single unit, connected via RS-232 or Ethernet, it may be multiple units chained together by serial cables, or it may be a group of Ethernet-ready units on a TCP/IP network (LAN or WAN).

The **Open System** menu lets you set up and verify the status of the Squirt. When you first load FeatureCall, the Open System menu is blank. The six fields in the Open System menu correspond to the six entry boxes located below them.

Use the entry boxes to build systems and set communication parameters for their units.

- **The System field** distinguishes units, or chains of units, from each other. The system name is required, and may contain one to eight characters.
- **The Unit Identity field** allows you to enter the title that is printed in the header of all reports generated from that unit or chain. The Unit Identity is required, and may contain one-to-eight characters.
- **The Communication field** is a drop-down list that allows you to select RS-232 or Ethernet connectivity.
- **The No. of Units (Chaining) field** defines the number of units in a chain, and is automatically incremented as units are added to the chain. From one to fifteen units may be configured in a single system's chain.
- **The System Type field** is a drop-down display, allowing you to select the call generator equipment type.
- **The Description field** is optional. It contains a 20-character field for adding a note or reminder.

1. Beginning with the left-most entry box, complete each entry to build a system.
2. When the fields are complete, click on **Add/Modify** to display the **Add New System Name** dialog box.

Figure 2-2. Add New System Name

Click on **Yes** to add the system to the Open System Window. To modify an existing system, select it and change the contents of the fields as required.

Note: You can add an Ethernet unit from the Open System menu by selecting a unit in the system you want to add to, then overwriting that unit's data. Click the **Add/Modify** button to add the new unit.

3. Click **OK** or **Communication** on the Open System menu. The system displays a Communication menu (Figure 2-3). For RS-232 equipment the Serial Communication menu is shown. For the Ethernet equipment, the Ethernet Communication menu is shown.

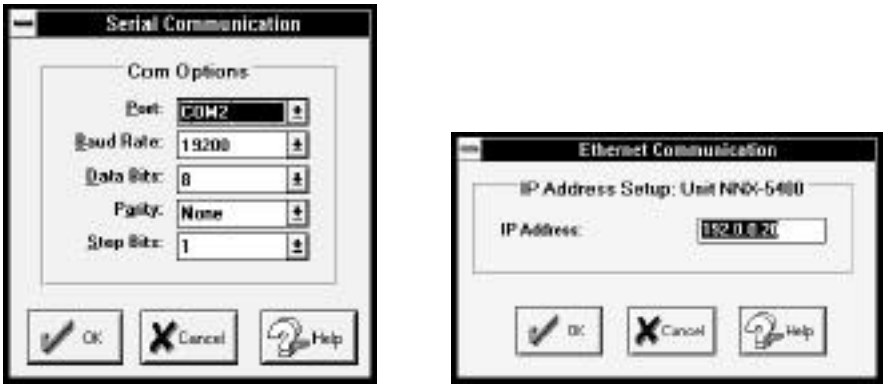


Figure 2-3. Communication Menus

Note: If you select a previously configured system to open, when you click **OK** the Main Window is displayed. To return to the Open System menu, select the **File** menu, then select **Open System**.

4. **Chaining** lets you connect up to 15 units and control them with a single RS-232 port or Ethernet LAN. When chaining, you can mix different call generators.

   If more than one unit in a system is desired, select the system, then click on **Chaining** on the Open System menu to set up a unit stack. The Chaining menu lists the units in the chain. The system only displays configured units on the Chaining menu.

   a. Add units by entering data in the Unit Identity, Unit Model, and Description boxes.

   b. Click on **Add/Modify** to add the unit to the chain.

c. Repeat steps a and b until the list of chained units is complete, then click on **OK** to save the chained configuration.

> **Note:** Multiple systems may be configured in the FeatureCall program, but only one system may be run at a time.

5. **Sync. units' clock to PC clock** sets the call generator's time to match the time/date in the PC when the connection is established. The clocks of any units chained to the selected call generator are also synchronized. This allows you to determine what was going on in all of the units during a particular test event.

6. When a connection is made to the call generator, FeatureCall displays CONNECTED in the FeatureCall Main Window.

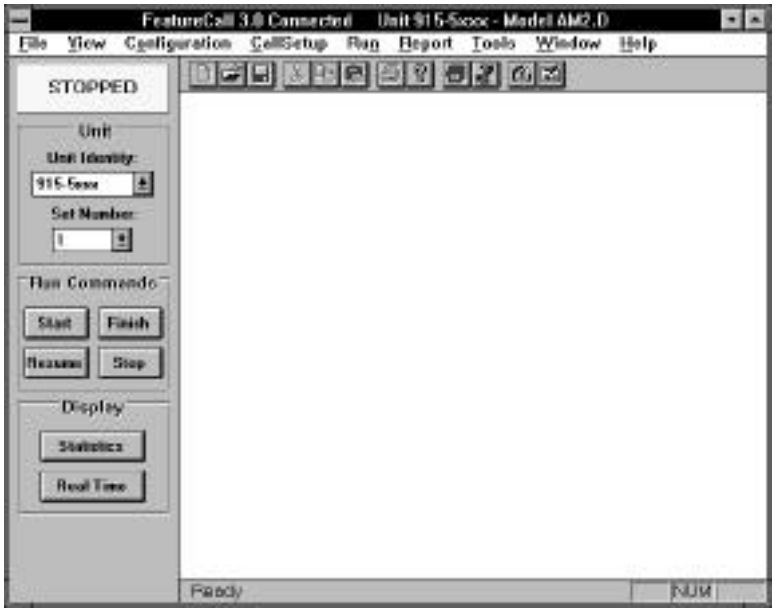


Figure 2-4. FeatureCall Main Window

2.2.2.1 PCM Mode Parameter Entry

Call generators that utilize Pulse Code Modulation (PCM) (T1 or E1) require that the PCM mode be set up properly. To set up PCM Mode:

1. From the Main Window, click on **Configuration**. The PC displays the Configuration menu.
2. Select **PCM Mode**. The system displays the PCM Mode Configuration menu.

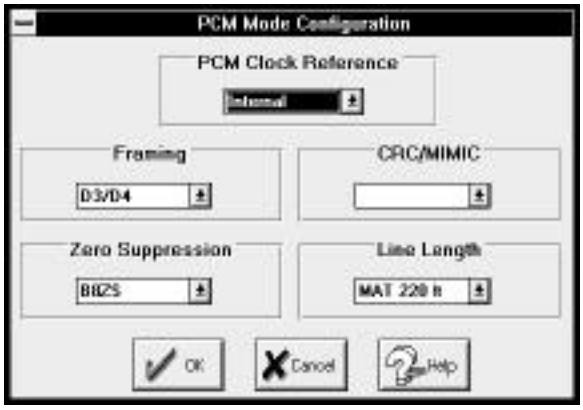


Figure 2-5. PCM Mode Configuration

The PCM Mode Configuration menu allows you to set the following T1 or E1 line parameters.

- **PCM Clock Reference** sets the source of the PCM clocking.
  - **Internal** originates within the call generator and is presented with the signal at the LINE TX connectors.
  - **Span A, B, C, or D** originates the clocking signal within the external equipment and presents it with the signal at the LINE RX connectors.
- **Framing** selects the Span framing for the tested circuit (T1 only).
  - **D3/D4** uses 12 separate frames in a "super-frame". The signaling bits are "a" and "b".
  - **ESF (Extended Super Frame)** uses 24 frames in a "super-frame". The signaling bits are "a", "b", "c" and "d".

- **CRC/MIMIC** selects whether CRC/MIMIC checking is on or off. The setting must match the CRC/MIMIC setting of the equipment under test. When on, CRC checking is performed on PCM lines with ESF framing, and MIMIC is performed on PCM lines with D3/D4 framing.
- **Zero Suppression** determines the PCM line handling of a data pattern of all "0's" during transmission (T1 only).
  - **B8ZS** (Binary Eight Zero Suppression) inserts two bipolar violations when it sees eight consecutive "0's". The receiving equipment recognizes this and removes the BPVs (Bi-Polar Violations).
  - **ZCS** (Zero Code Suppression) inserts a "1" bit to prevent the transmission of eight or more consecutive "0" bits.
  - **AMI** (Alternative Mark Inversion) alternates ones; that is, the first one is positive, the second negative, and so on. It is the basis for B8ZS and ZCS, but does not supply any zero suppression conversions.
- **Line Length** selects the Cable Type and Line Length. Several line lengths are available for the different cable types (T1 only).

2.3 Making Your First Call

FeatureCall includes the FirstCall™ Wizard. The Wizard provides step-by-step instructions for setting up your first Call Test Set. It streamlines and eases the process of creating tests, including assigning protocols or line types, creating call programs, and assigning parameter values. Six screens help in setting up a test.

- The first window is the introduction screen, which provides general information on what is required in the unit prior to starting the process.
- The second window, FirstCall Wizard Line Types and Protocols, is used to assign the desired line type configurations or protocol assignments to the lines in the Squirt.

- The third window, FirstCall Wizard Script Selection, allows the assignment of one or two scripts for use in the Test Set. It also allows selection of the Set number, which determines the range of Call Program numbers to be created by the Wizard.
- The fourth and fifth windows, FirstCall Wizard Call Programs (one for each Script selected), present an easy, intuitive way to assign all required parameters to the Call Programs. Only those parameters in the Script which have no default values are displayed, thus minimizing the amount of variable fields that need to be defined.
- The display of the sixth (and last) window, FirstCall Wizard Finish, indicates that the test creation process is complete. It also allows you to select whether or not to immediately run the new test.

To access FirstCall, click on the FirstCall Wizard icon on the toolbar, or click on **Tools** in the menu bar, then click on **FirstCall Wizard**. **FirstCall Wizard Page 1 of 6** is displayed. It gives general information on what is required of the call generator prior to starting the process.

Figure 2-6. FirstCall Wizard Introduction

FirstCall requirements include having the scripts and protocols that you want to use for testing loaded into the unit. The factory scripts and protocols typical for your application are loaded on the Squirt.

> **Note:** To check Protocols, click **Next>**. **FirstCall Wizard Page 2 of 6** shows you the Protocols loaded into the Squirt. To check Scripts, click **Next>**, use **<Back** to return. **FirstCall Wizard Page 3 of 6** shows you the Scripts loaded into the Squirt.

There are a number of command buttons at the bottom of every screen, which control navigation through FirstCall. The **Next>** and **<Back** buttons shift control through each setup screen. Use the **Next>** button to go to the next screen. Use the **<Back** button to go back to the previous screen. Use the **Cancel** button to quit the wizard without leaving any changes in the unit. The **Help** button assists you in operating the screen on which it is located.

2.3.1 Assign Line Type Configurations and Protocols

Click on **Next>**. **FirstCall Wizard Page 2 of 6** is displayed. It assigns the line type configurations and protocols to the lines/channels of the Squirt.

The **Line Types** grid displays all the assignments of the Squirt. A list of the available line types is visible in the **Available Protocol** list.

To select a line to modify, click on the cell you wish to edit. To select a group of lines to edit, click on the upper left-hand cell in the group. Then, holding the mouse button down, drag the mouse so that it highlights the desired range of cells/lines.

To select an entire column, click the top-most cell in any column, this highlights all the cells under it.

To select an entire row, click the left-most cell. Select the entire grid by clicking the upper left-hand corner cell.

1. To change or make an assignment, select the new Line Type from the Available Protocol list, then highlight the line numbers displayed the grid that require this new setting. Click **Assign** to complete the new assignment.
2. To remove an assignment, highlight the line (by clicking the cell) or group of lines (by clicking and dragging the mouse over the desired range of cells), then click **Clear**.

3. If there are no entries in the list, exit the FirstCall Wizard and use the **Download Files to Unit** command (discussed in Chapter 4 of the FeatureCall manual) to load a protocol off the ***Ameritec Factory Scripts and Protocols diskette*** or from the PC hard drive.

The AM2S-A and AM2S-B Line Type grids display a summary of current line type assignments in the unit.

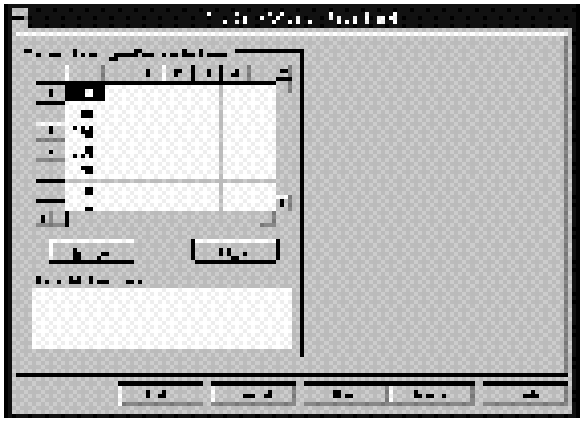


Figure 2-7. AM2S-A and AM2S-B Line Types Grid

2.3.1.1 Meter Pulse Selection

In some countries, customer billing is regulated by the amount of Meter Pulses that occur during a call. For Meter Pulse billing, click on **Line Options** in the **Configuration** menu, and set the correct Meter Pulse Frequency (12kHz or 16kHz).

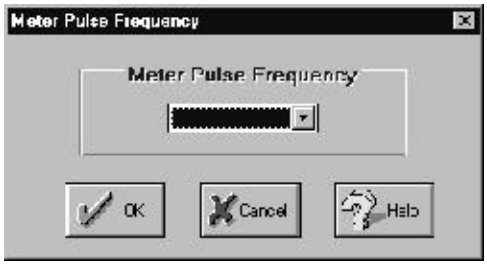


Figure 2-8. Meter Pulse Screen

AM2S-D/De Line Type grids display a summary of the current protocol assignments in the unit.

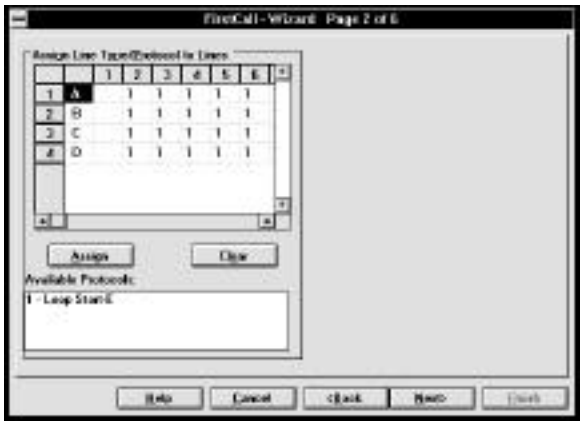


Figure 2-9. AM2S-D/De Line Types Grid

AM2S-DX/DXe call generators operate in the same manner as the Digital call generators, except that they require additional facility, simulation mode, and D-Channel timeslot and Protocol selections. Enter these selections by using the **D-Channel Assignment** field located to the right of the screen.

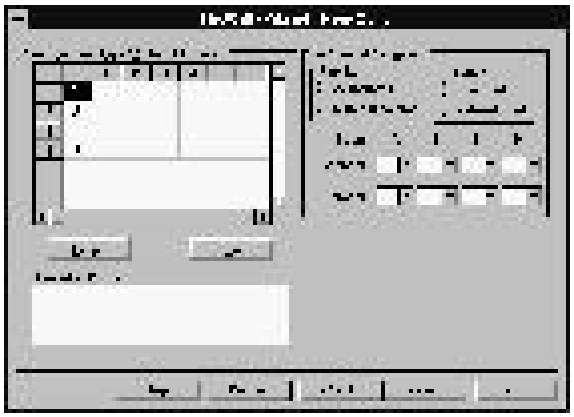


Figure 2-10. AM2S-DX/DXe Line Types Grid

- **Facility** selects whether **Associated** or **Non-Associated** signaling is used. Associated signaling indicates that each span in the AM2S-DX/DXe has one timeslot/channel dedicated to the D-channel signaling. Non-Associated signaling indicates that a single timeslot carries the D-channel messages for all the spans.
- **Simulate** indicates whether the AM2S-DX/DXe simulates a Subscriber/User or the Network.
- **D-Channel Assignments** indicate which channels/timeslots on each span are dedicated to carrying D-Channel signaling information. The Protocol list under each channel list indicates if a D-Channel Protocol is also running on that channel. Protocol 00 indicates that no Protocols are assigned.

2.3.2 Signaling System 7 (SS7) Line Types

Signaling System 7 (SS7) call generators operate in the same manner as Digital call generators. The Signaling System 7 call generators do however, require additional data rate speed and D-Channel timeslot and Protocol selections. Enter these selections by using the **SS7 Link Assignment** field at the right of the screen.

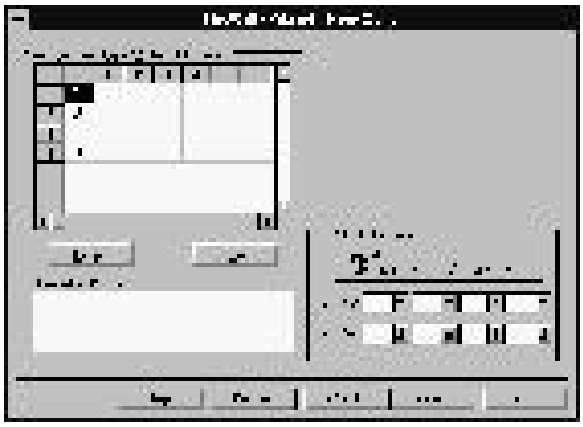


Figure 2-11. SS7 Line Types Grid

The **Speed** selection on the SS7 Line Types Grid defines the data rate at which information is transmitted over the signaling links. Select either 56kBps or 64kBps.

If using the Command Line Interface, use the **PR m** command as described under Program Operation Commands in Section 4 of the manual.

2.3.2.1 SS7 Signaling Link Assignment

The **Link 1-4 and Link 5-8** selection on the SS7 Line Types Grid selects the timeslots/channels to carry the SS7 signaling messages. These droplists show which channels/timeslots on each span are dedicated to carrying D-channel signaling information. To change an assignment, click on the down arrow on the box, then scroll down the list and select the new channel.

If using the Command Line Interface, use the **P7 <link>= ccc** command as described under Program Operation Commands in Section 4 of the manual.

Note: For S7 units equipped with the V.35 interface card, E01-E24 and F01-F24 are not valid link selections. Use *01-*08 for a unit with this interface. Conversely, for units without V.35, *01-*08 are not valid. Use E01-E24 and F01-F24 instead.

If using the DS0A module, assign signaling links in the same manner as used for the V.35 interface card.

Note: Each DCC is used to assign two signaling links. If the number of DCCs is less than the number of LGCs (i.e., one DCC and four LGCs), each span could only have Link 1 and Link 2 assigned.

The PCM Mode Configuration menu allows you to set the source of the PCM clocking via the **PCM Clock Reference** selection.

- **Span A, B, C, D, E, or F** extracts the clocking signal from the unit under test via the LINE RX connector for the selected span. Spans E and F are only available on Call Generators capable of supporting SS7 operation.

If using the Command Line Interface, use the 'Digital' **CL C=a, F=a, L=an, R=a, Z=a** command as described under Configuration Commands in Section 4 of the manual.

2.3.2.2 SS7 Interlink Configuration

The SS7 Interlink Feature allows systems to be created that can simulate a Service Switching Point (SSP) with 8, 12, or 16 voice/data trunks. This is accomplished by interconnecting multiple SS7-compatible units and configuring them to act as a single SSP (as shown in Figure 2-12). Each unit added to the group expands the number of voice trunks by four. The first unit in the group is connected to the Signal Transfer Point (STP). When the unit receives a Message Transfer Part (MTP)-3 message that it can't terminate, it forwards it to the next unit in the group. The message will propagate down the interconnecting links until a destination is found. Messages sent to the STP are automatically propagated up the interconnecting links until they reach the first unit, where they are forwarded to the STP.

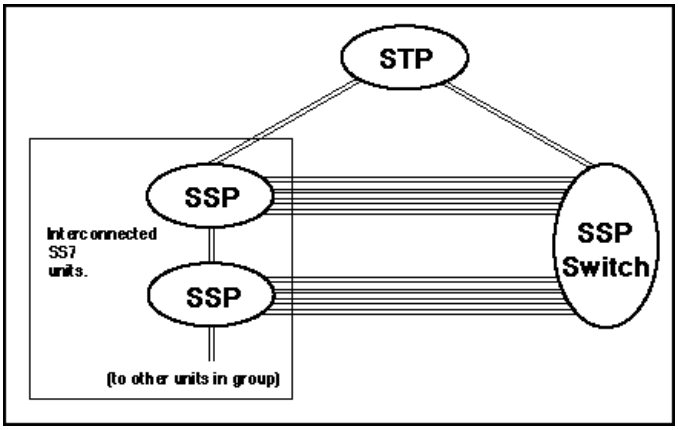


Figure 2-12. Signal Transfer Point System

2.3.2.2.1 Interlink Connection Requirements

1.544 Mb/s SS7

The physical connection used to interconnect a group of SS7 (1.544 Mb/s) units is shown in Figure 2-13.

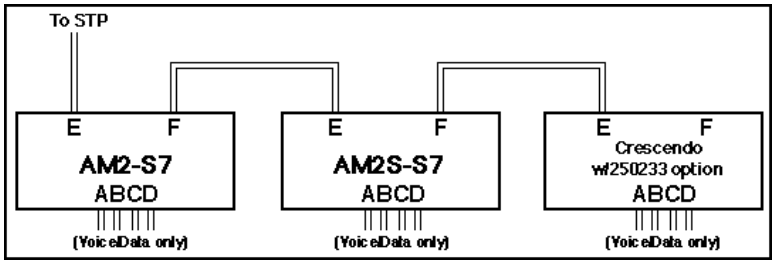


Figure 2-13. 1.544 Mb/s SS7 Physical Connection

In Figure 2-13, the first unit connects to the STP by using Span E. Span F is used as the interconnect link and is unavailable for signaling.

2.048 Mb/s SS7

The physical connection used to interconnect a group of SS7 (2.048 Mb/s) units is shown in Figure 2-14.

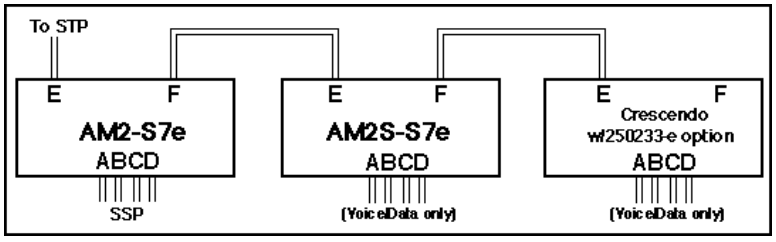


Figure 2-14. 2.048 Mb/s SS7 Physical Connection

In Figure 2-14, one signaling link can be assigned to each voice trunk on the first unit. The trunks on the other units are voice/data only because all eight links are reserved to interconnect units.

Note: The Interlink feature requires DCC SS7 firmware version 114F or higher, and is only recommended for board type 280298AY.

2.3.2.2.2 Enable Interlink Feature

The SS7 Interlink feature is only enabled when a special protocol is loaded. Units are shipped with both the standard protocol and the Interlink protocol. Interlink protocols may be identified by their name, which ends with an "I". Other protocols may be modified by inserting the statement SS7_INTERLINK, and then compiling the source file. This requires a protocol development kit.

2.3.2.2.3 Message Forwarding

When a message is forwarded, the outgoing link is determined by which link the message was received on. This relationship is fixed, and when links are assigned certain rules must be followed. Figure 2-15 illustrates how messages move between units.

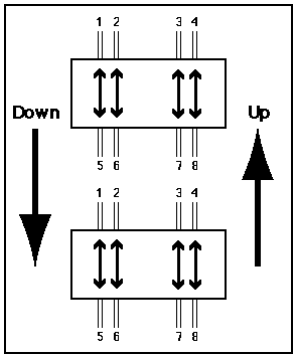


Figure 2-15. Message Movement

The 8 logical links are divided into two groups. Messages received on links 1-4 are said to move "down", and those received on links 5-8 are said to move "up".

If a message is received on Link 1, it is always forwarded to Link 5. If a message is received on Link 2 it is always forwarded to Link 6. Similarly, messages received on Link 3 are forwarded to Link 7, and those received on Link 4 are forwarded to Link 8. Messages propagated in the "up" direction use the same relationship, but in reverse. Forwarding rules are defined in Table 2-1.

Table 2-1. Forwarding Rules

Received On	Forward To	Received On	Forward To
Link 1	Link 5	Link 5	Link 1
Link 2	Link 6	Link 6	Link 2
Link 3	Link 7	Link 7	Link 3
Link 4	Link 8	Link 8	Link 4

Messages Not Forwarded

Link maintenance messages are not forwarded. This includes all Signaling Network Management Messages (SNMM) and Signaling Network Testing and Management Messages (SNTM1 and SNTM2).

ISUP Messages listed in Table 2-2 are not forwarded.

Table 2-2. ISUP Messages Not Routed

Message Type
Block
Unblock
Reset Circuit
Group Reset
Group Block
Group Unblock

TUP Messages listed in Table 2-3 are not forwarded.

Table 2-3. TUP Messages Not Routed

Message Type (CCITT, BELLCORE, CHINA)	Message Type (NUP)	Message Type (FRENCH)
Block	Block	Block
Unblock	Unblock	Unblock
Reset Circuit	Group Reset	Reset
Group Reset	Group Block	General Request
Group Block		
Group Unblock		
Group Block (hardware)		
Group Unblock (hardware)		
Group Block (software)		
Group Unblock (software)		

If the SS7 Interlink flag is set, any ISUP or TUP message not defined in Tables 2-2 and 2-3 are routed based on the Destination Point Code and CIC value contained in the message. If the Destination Point Code and CIC value does not identify one of the lines in the unit, the message is forwarded to another unit based on the Forwarding Rules defined in Table 2-1.

2.3.2.2.4 Link Channel Assignment

Each AM2/CRS maintains its normal interface and must be configured individually. The user must assign a channel to the logical links, numbered 1 to 8. An example of a correct setup is shown in Table 2-4. Other configurations are possible, but this is the recommended setup.

Table 2-4. Link Assignments

First Unit			Middle Unit(s)			Last Unit	
1 to 4	5 to 8		1 to 4	5 to 8		1 to 4	5 to 8
*	F1		E1	F1		E1	**
*	F2		E2	F2		E2	**
*	F3		E3	F3		E3	**
*	F4		E4	F4		E4	**
* Any channel on E, A, B, C, D, or leave unassigned. ** Leave unassigned.							

In addition, the call program parameter slc_val must be assigned to select the outgoing signaling link for each line. The value of slc_val for all call programs should be set to 1, 2, 3, or 4 on all units.

2.3.2.2.5 Signaling Link Script Parameters and Data Register Codes

The following tables describe the Parameters and Report Codes used in Signaling Link scripts.

Table 2-5. Signaling Link Parameters

Parameter Name	Range	Definition
slc_val	1 - 8	Selects which of eight signaling links is to be used by the call program. To determine which channel will be used, refer to SS7 Signaling Link screen.
sls_val	0 - 255	Signaling Link Selection. Part of the ISUP call-control messages. Used to identify a link in a set. Usually defaults to 0.
slt_enb	0=disable 1=enable	Signaling Link Test Message (SLTM) enable. If programmed to 1, the call program sends an SLTM before the first IAM. If programmed to 0, no SLTM is sent. Leave value at the default unless you know the terminating end will not send this message first.
orig_slc_val	DEC 1-8	Signaling link channel for the originating timeslot. This parameter selects one of the 8 links in the SS7 Link Assign screen and uses it as the signaling link for this call. For example, if Link 1 is A16 and slc_val is programmed to 1, the signaling link for this call is Link 1, A16.

Parameter Name	Range	Definition
term_slc_val	DEC 1-8	Signaling link channel for the terminating timeslot. This parameter selects one of the 8 links in the SS7 Link Assign screen and uses it as the signaling link for this call. For example, if Link 1 is A16 and slc_val is programmed to 1, the signaling link for this call is Link 1, A16.

Table 2-6. Signaling Link Extended Report Codes

Code	Title	Description
R_AVGSTARTDLY (CODE 403)	AVG Link Activation Time	Average time it took to activate the signaling link (layer 2).
R_SLOWSTART (CODE 404)	Slow Link Activation	The link was not activated within the time specified by the st_sig_dly parameter.
R_NOSTART (CODE 405)	SS7 Link Not Activated	The link was not activated within the time specified by the st_sig_fail parameter.

2.3.3 Select the Call Program Script and Set

Click on **Next>**. **FirstCall Wizard Page 3 of 6** is displayed. It selects the Scripts used to create Call Test Sets. Select either one of two Scripts and the Set. Each Set dedicates a range of Call Programs for program creation. Sets one and two each provide up to 100 Call Programs, Set three 120 programs, and Set four a full 160 programs. The range of Call Programs is defined for each Set.

Figure 2-16. FirstCall Wizard Script Selection

- **Set to Configure** selects the set number and the range of programs used by the Wizard to create the new test.

CAUTION: The Call Program range defined is created when **Finish** is clicked. This overwrites existing programs in the range. If the existing setup is important, a Set Backup should be performed first.

- **Script #1** lists the Scripts in the Squirt. The Script selected is used to create the Call Programs in the Test Set. The Call Program numbers and their associated values are selected in **FirstCall Wizard Page 4 of 6**.
- **Script #2** lists the Scripts in the Squirt. The Script selected is used to create Call Programs in the Test Set. The Call Program numbers and associated values are selected in **FirstCall Wizard Page 5 of 6**.

2.3.4 Create a Call Program and Enter the Program Variables

Click on **Next>**. **FirstCall Wizard Page 4 of 6** is displayed. It creates a Call Program based on Script #1. It has two major components; the parameter grid and the program editing buttons. Use the buttons to create a Call Program, then click the **Add Program** button. Once a program is created, you must enter all its values.

Figure 2-17. Call Parameters for Script #1

The names of all the Call Program variables in the Script that have no default values are shown in the grid. You must enter these values for each Call Program. Use the **Delete Program** button to remove Call Programs. The edit buttons **Copy**, **Paste**, and **Fill Down**, all assist in assigning parameter values.

Clicking the right mouse button allows you to move from one edit button to another quickly and easily.

- **The Call Program Parameter grid** contains the Call Programs and their parameter values. To edit the contents of a cell, click or use the arrow keys to select the cell, then type the desired values into the cell. You can also use the **Tab** key to navigate through the grid.

  A Call Program is selected by clicking on the entry number on the far left column of the grid. This highlights the parameters of a program. Use **Delete Program**, **Copy**, and **Paste** to edit the highlighted values.

  To choose a column of values, click on the column title, then use the **Copy**, **Paste**, or **Fill Down** commands to edit the values in that column. By clicking on a cell, holding down the mouse button, and dragging, you can select any number of cells for editing.

- **Program Editing** uses five buttons (**Add Program**, **Delete Program**, **Copy**, **Paste**, and **Fill Down**) to edit the Call Program's parameter values.
  - **Add Program** inserts a new Call Program. If no program is highlighted, the new program is added to the end of the list. If a range of programs is selected, an identical number of Call Programs are created. To create multiple programs, highlight the desired range of programs.
  - **Delete Program** deletes the selected Call Programs. If no program is selected, no action is taken.
  - **Copy** copies the selected cell value(s) into a buffer. The paste operation then replaces any selected cell with the copied contents.
  - **Paste** enters the data copied into the buffer into the selected cell(s).
  - **Fill Down** fills all the selected values in a column based on the first two highlighted values in the column. If the first two values are the same, the same value is entered into all the selected cells in the column. If the values differ, the numbers determine the value by which the rest of the fields are incremented. A simple difference is performed, then applied to each value entered into the grid.

Click on **Next>**. **FirstCall Wizard Page 5 of 6** is displayed. If a Script is selected for Script #2, it creates a Call Program based on Script #2 in the same manner as **FirstCall Wizard Page 4 of 6** does for Script #1. If (None) is selected for Script #2, **FirstCall Wizard Page 5 of 6** displays a message indicating that no script was selected.

Figure 2-18. Call Parameters for Script #2

2.3.5 Run the Call Program Set and View the Results

Click on **Next>**. **FirstCall Wizard Page 6 of 6** is displayed. Use this screen to choose whether to run the test immediately, or to run it at a later time.

Figure 2-19. FirstCall Wizard Finish

To create a test set that contains the values that you entered in the preceding screens, click on **Finish**. A flood bar is displayed, showing how much of the creation process is complete and giving an estimate of how much remains.

To immediately run the new set once it is created, click on **Yes**. If you select **No**, Set 1-4 does not run until it is selected from the Command Bar and receives a Start command.

If you selected **Yes**, the set begins running as soon as it is created. The Gauges and the Realtime Error Report screens open so you can observe the test as it progresses.

As you become a more advanced user, try setting up and running Call Programs using the Call Setup menu. See ***Call Setup - Creating and Running Call Programs***, near the beginning of ***Chapter 4*** in the FeatureCall Manual.

The FeatureCall manual (P/N 18-0074) accompanies the FeatureCall program that is supplied with your Squirt. Please refer to it in the event you have any questions regarding its application.

3. FILE MANAGEMENT

Call generator software is available on both a factory diskette supplied with the unit, and on an Internet Web Site. The software may be retrieved as described in ¶3.1.

The factory diskette contains Protocol **.stb** and **.hex** files, and Script **.src** and **.hex** files. The **.stb** and **.src** files are text files.

Host software in binary and hex formats as well as the latest Scripts and Protocols are available on the Internet.

The files that you download from Ameritec's *ftp* site are **self-extracting** compressed archives that contain the latest software, update instructions, and release notes for the update. Double clicking on the filename or executing it from the DOS prompt will expand this compressed file.

- The binary file (**.bin**) is required to download host software using the Ethernet port.
- The hex file (**.x**) is required to download host software using the RS-232 port.
- The hex files (**.hex**) are required to download Scripts and Protocols when you use FeatureCall or a Terminal program. Files beginning with **922xxxxx.hex** are Protocol files, while those beginning with **932xxxxx.hex** are Script files.

The host files stored on Ameritec's *ftp* site can only be used with Ameritec Call Generators that contain the high performance processors. To verify if you have the high performance processor, type **RM** at the unit prompt when connected via RS-232 or Ethernet. The high performance processor will have host revision 4.0 or higher.

Many of the file management procedures in this document use Ameritec's Graphical User Interface (GUI) FeatureCall®. FeatureCall® requires host software version 4.39 and above. SWARM™ Masters require host software version 4.43 and above. ScriptMate® generated scripts will only run on 4.50 host software and above. If you plan on using your Call Generators for any of these applications, you may need to upgrade your host software.

The following steps must be performed in order to obtain the information (host processor software, Scripts, Protocols, etc.) stored on the *ftp* site to use in upgrading your Ameritec Call Generator(s):

- Retrieving files from the *ftp* site
- Configuring the RS-232 and Ethernet ports
- Transferring the files to a call generator

3.1 Retrieving Files from the *ftp* Site

Host software in binary and hex formats as well as the latest Scripts and Protocols are available on the Internet from **ftp://ftp.ameritecftp.com**.

The files on most new browsers are accessible by simply entering **ameritecftp.com**.

From the ***ftp*** site, select the title that you require:

AM2 and CRS Factory Disk Files
AM2 and CRS Host CPU Update
AM8e Factory Disk Files
Application Notes
BRI Master and Linecard Code Updates
FeatureCall Updates
Prep Script Compile Utility Program
Previous Revision Release Documents
Read Me First.pdf
Recommended Terminal Emulation Program
ScriptMate Updates

Download the required file(s) and transfer it to an appropriate directory on the PC.

3.2 Configuring the RS-232 and Ethernet Ports

To configure the Ethernet port, you must **first** configure the RS-232 port. For RS-232 operation, only configure the RS-232 port.

A terminal emulation program is required to load files to your unit. We strongly recommend the freeware program **TeraTerm** if you are not using Ameritec's GUI FeatureCall. **TeraTerm** has been identified to work for both serial and Telnet error-free transfers to the Ameritec Squirt units.

The **TeraTerm** program can be downloaded from Ameritec's *ftp* site. **TeraTerm** will run on MS-Windows 95/98, MS-Windows NT 3.51, and MS-Windows NT 4.0 Operating Systems. Download the self-extracting archive named TeraTerm.exe from the following location:

ftp://ftp.ameritecftp.com

Go to the directory called "**Recommended Terminal Emulation Program**".

CAUTION: When connecting to Ameritec Squirt units via a serial port, **HyperTerminal** has typically been the most common terminal emulation program used to transfer files to and from the unit. When transferring files, Ameritec units require the use of **XON/XOFF** software flow control. We have found that the **HyperTerminal** program drops characters when used in this mode, which can cause code corruption requiring return of hardware to the factory for repair. Therefore, **HyperTerminal** cannot be used when transferring files to and from Ameritec units.

TeraTerm Installation Instructions

1. Once the file is located on the hard drive, extract the **TeraTerm** installation files by running the **TeraTerm.exe** program. When prompted for the unzip folder, select temporary directory (e.g., **C:\TEMP**) or an empty floppy disk.
2. The **SETUP.EXE** installation program will run automatically.
3. When prompted, select a Destination Path for **TeraTerm** (for example: **C:\PROGRAM FILES\TTERMPRO**).

4. After the installation, the extracted installation files are no longer needed. You can delete them or keep them in the directory or floppy disk.
5. Run the **TeraTerm** program.
6. Select the [**Setup**] **Serial port...** dialog box and program the following settings:

   Port: **COM1, COM2, or other appropriate COM port**
   Baud Rate: **As selected by the unit (typically 19200)**
   Data: **8 bit**
   Stop Bits: **1**
   Parity: **None**
   Flow Control: **XON/XOFF**

7. Make sure you can communicate with the Ameritec Squirt unit by pressing **<CR>**. The unit should respond with the unit prompt.
8. Once communicating, save these settings by selecting the [**Setup**] **Save setup...** dialog box. Overwrite the default **teraterm.ini** file by pressing the "**Save**" button. This will ensure that these settings will be the default every time **TeraTerm** is opened in the future.

3.2.1 Configuring the RS-232 Port

Configuring the RS-232 Port consists of:

- Connecting a PC to the Call Generator RS-232 Port.
- Setting up the Call Generator and PC serial communication parameters.

To configure the RS-232 Port, perform the following:

1. Obtain the necessary serial cable. Depending on the PC's COM port, you many need a 25-to-25 pin or a 9-to-25 pin serial cable (see Tables 3-1 and 3-2).

Table 3-1. PC Cable [RS-232 Port to 9-pin Female Connector (48-0107)]

DB 25-Pin Female Connector		DB 9-Pin Female Connector
2	connected to	2
3	connected to	3
7 (ground)	connected to	5
5, 9, and 22 jumpered		4 and 6 jumpered
6 and 20 jumpered		7 and 8 jumpered
15 and 25 jumpered		

Table 3-2. PC Cable [RS-232 Port to 25-pin Male Connector (48-0084)]

DB 25-Pin Female Connector		DB 25-Pin Male Connector
2	connected to	3
3	connected to	2
7 (ground)	connected to	7
5, 9, and 22 jumpered		4 and 5 jumpered
6 and 20 jumpered		6 and 20 jumpered
15 and 25 jumpered		

2. Power up both the Call Generator and PC/Workstation.
3. Connect the Call Generator serial port to an available communications port on the PC/Workstation; usually COM1 or COM2.

   Note: If loading Hex files, use the RS-232 port. If loading binary files, use the Ethernet port.

   Run **TeraTerm** and set the communications setup in **TeraTerm** to serial port with these parameters: **19200 baud**, **8 data bits**, **no parity**, **1 stop bit**, and **XON/OFF** software flow control. Be sure to select the correct COM Port. Select "**setup**"; then save to keep your parameters. Save as **TeraTerm.ini**.
4. Enter **RM** to verify communication. **TeraTerm** displays the Call Generator status.
5. If you have privileged access, enter **ML <password>**. The default is **ML ameritec**. The monitor displays "Privileged Login".

   Note: If you need to change the password, use the **MP** command. If the password has been changed and you need to setup the Ethernet port, contact your system administrator.
6. Proceed to "**Configuring the Ethernet Port**" if using an Ethernet connection.

3.2.2 Configuring the Ethernet Port

To configure the Ethernet port you must have privileged access. In many locations Ethernet configuration is performed by the System Administrator.

A PC may be connected to the Call Generator via a LAN, by connecting through a hub or directly via a crossover connection. Both connections use an 8-wire twisted pair cable with RJ-45 Telco Jacks. The pinouts for the hub and crossover Ethernet connection are shown in Table 3-3.

Table 3-3. Ethernet RJ-45 Cable Connector Pinout

Hub Connection			Direct Connection (Crossover)		
RJ-45	**Signal**	**RJ-45**	**RJ-45**	**Signal**	**RJ-45**
1	Transmit +	1	1	Transmit +	3
2	Transmit -	2	2	Transmit -	6
3	Receive +	3	3	Receive +	1
6	Receive -	6	6	Receive -	2

3.2.2.1 Port Configuration - General

Configuring the Ethernet Port consists of using the RS-232 port to:

- Set the Internet Protocol (IP) address
- Optionally set the subnet mask
- Optionally set the Default Gateway
- Optionally set the Transmission Frame Type

3.2.2.2 Setting Up the Frame Type, IP Addresses, and Subnet Mask

Before you start, check with your system administrator to obtain the following addresses:

- Ethernet IP address
- Default Gateway IP address (optional)
- Ethernet Subnet mask (optional)

Note: The Call Generator accepts addressing and masking in a decimal format. If your administrator provides you with addresses in hexadecimal format, you must convert them to a decimal format.

To set up the IP addresses, frame type, and subnet mask, perform the following:

1. Enter one or more of the following commands and their respective parameters:

    a. **NI nnn.nnn.nnn.nnn** to set the IP address, where **nnn** is a number between 0 and 255. The default IP address is **192.0.0.2**. Make sure the Call Generator, PC/Workstation, and any other FeatureCall PC share the same address classification. The address ranges for each class are:

Class	IP Address Range		
A	0.0.0.0	to	127.255.255.255
B	128.0.0.0	to	191.255.255.255
C	192.0.0.0	to	233.255.255.255
D	234.0.0.0	to	239.255.255.255
E	240.0.0.0	to	247.255.255.255

    b. **NG nnn.nnn.nnn.nnn** to set the Default Gateway IP address, where **nnn** is a number between 0 and 255.

    c. **NF1** or **NF2** to set the Transmission Frame Type, where **NF1** is **Ethernet II** and **NF2** is **IEEE 802.3**. The default Transmission Frame Type is **Ethernet II**.

    d. **NM nnn.nnn.nnn.nnn** to set the Subnet Mask, where **nnn** is a number between 0 and 255.

> **Note:** The addresses are stored in Non-Volatile RAM and only need to be reentered for changes or after battery replacement.

2. Turn the Call Generator off and then back on to display the unit prompt.

> **Note:** For the **NI**, **NM**, and **NG** commands to take effect, turn the Call Generator off, then on.

3. Enter **ND**. The PC displays the Ethernet address, Transmit Frame Type, IP Address, Subnet Mask, and Default Gateway. The terminal displays a message similar to the following:

```
ameritec>ND
Ethernet addr   =  00:a0:4f:00:00:39
Tx Frame type   =  Ethernet II
IP addr         =  192.0.0.2
Subnet mask     =  255.255.255.0
Def Gateway     =  192.0.0.2
ameritec>
```

Note: You can log these results to a file or print them for later reference.

4. Compare the displayed values to the values that you entered. Return to step 1 if any settings are incorrect.
5. If OK, enter **ML BYE** to log out of privileged access mode. This prevents unauthorized persons from entering privileged commands; otherwise, reenter the correct values.
6. Disconnect the PC from the Call Generator RS-232 Port.
7. Connect the Ethernet port to the Ethernet LAN. Squirt units require an adapter that connects to the RS-232 port.
8. Open a Telnet or *ftp* session and enter the Call Generator IP address. If everything is set properly the Telnet or *ftp* application will respond with a connection message.

Opening and Closing a Telnet Session

a. Open a Telnet session by selecting **Start**, **Programs**, **Accessories**, **Telnet**.

b. From the **Connect** pull down menu select **Remote System**. The Telnet window displays the Connect dialog box.

c. Enter the **<IP address>** of the unit, **telnet**, and **vt100**, followed by selecting **Connect**. The Telnet window displays a series of messages followed by the unit id prompt of the unit. The unit is now in command line mode.

d. Enter **NX** to close the session. The Telnet window responds with the following message: **Connection to host lost**.

e. Select **OK**.

Opening and Closing a File Transfer Protocol (FTP) Session

a. Open an *ftp* session by selecting **Start**, **Programs**, **Command Prompt**. Windows NT displays the MSDOS Command Prompt window.

b. Enter **ftp <IP address>** at the MSDOS prompt. If successful, the window displays: **Connected to <IP address>**.

c. Press **Return** twice and enter **bye** at the **ftp>** prompt to close the *ftp* session.

3.3 Notes about Scripts and Protocols

Scripts

A Script in a movie or a play is a document that determines the order in which the scenes will take place, what will take place within the scenes, and who will say or do what. Similarly a Script is a text file with specialized syntax that forms the template for a Call Program to follow when it originates or terminates a call.

Each call consists of an originate Call Program and a terminate Call Program. The Scripts used for the originate and terminate Call Programs are determined by the types of calls being made.

Protocol Files

A Protocol is a State Table that defines the rules of engagement between the call generator and the switch-under-test. Protocols are assigned on a channel-by-channel basis. Each of the major stages, from initiation to termination, in a phone call is represented in the call generator by a specific state. A single channel of the call generator can only be in one state at a time. Each state contains a list of events that the call generator will respond to by performing a specific action. The action may cause the call generator to remain in the same state, move on to the next state, terminate a call, etc. The action performed by the call generator in a specific state depends on which expected event it receives.

If the call generator receives an unexpected event, it generates a Protocol System Error Message #251 and continues to wait in the same state until it receives an event that it recognizes. The stages or states that a call goes through from setup through teardown varies, based on the dialing method and switch configuration.

Each Protocol is identified by a number and an acronym. Use the number to identify the **.stb** or **.hex** file on the factory diskette for viewing/editing (**.stb**) or when transferring the Protocol to the call generator (**.hex**). Use the acronym to identify a Protocol when assigning it to a specific call generator channel.

3.4 Transferring the Files to a Call Generator

You may download files to an Ameritec Call Generator using either the Ethernet or RS-232 port. The file transfer and management operations are listed below:

- Transferring Host "binary" Files using the Ethernet Port (**.bin** files)
- Transferring Host Hex Files using the RS-232 Port (**.x** files)
- Transferring Script Source Files to a Call Generator
- Transferring Protocol State Table (**.stb**) Files to a Call Generator
- Transferring Script and Protocol Hex Files to a Call Generator
- Transferring Script or Protocol Files from a Call Generator
- Archiving Call Generator Files
- Erasing Files

3.4.1 Transferring Host Files using the Ethernet Port (binary files)

Requirements: Ethernet Port, *ftp* and Telnet apps on Windows 95/98 or NT 4.0.

Time Requirements: approximately five minutes.

Note: Using the Ethernet port to download Host files only takes about 5 minutes whereas the RS-232 download typically takes about 45 minutes.

CAUTION: Transferring a new Host software release to the Call Generator may erase any resident Scripts, Protocols, Call Programs, Call Test Sets, Reports, Schedules, etc. Perform a full backup using the **Backup Unit Files** function from the **File** pull-down menu before downloading new Host software.

FeatureCall full backup doesn't save Ethernet settings. If you're not sure of the settings, use the **ND** command from a Telnet or **TeraTerm** setting, then print results. The settings need to be re-entered after battery replacement or Host Software update.

The following procedure assumes that the Host Software .**bin** file to be downloaded is resident either on the same or an accessible networked computer. The procedure also assumes that the PC that you will be using to perform the download is operating on a Windows NT or Windows 95/98 platform.

Transferring a Binary File to the Unit Using File Transfer Protocol (FTP)

1. Open up the **MSDOS** window.
2. At the DOS prompt, initiate a **File Transfer Protocol** (***ftp***) session by entering **ftp <IPaddress>**. The MSDOS window displays **Connected to <IPaddress>**.
3. Press **Return** twice. The MSDOS window displays **Guest login ok....**
4. Enter "**binary**" (**Case Sensitive - Use Lower Case Letters**).

CAUTION: The default ftp file transfer mode is ASCII. If you transfer the **.bin** file in ASCII mode, the file will be corrupted when the **MF <filename>** command is executed. When the call generator is later rebooted, the call generator will lock up and must be returned to Ameritec to have the system reloaded.

5. Enter **put c:\path\filename** where **path\filename** is the path where the host software **.bin** file is located. The MS-DOS window displays:

   PORT command successful.
   150 Opening BINARY mode data connection for <filename>.
   226 Transfer Complete.
   xxxx bytes sent in xxxx seconds (xx Kbytes/sec)

6. Verify that the MSDOS window displays **Transfer Complete**. Resend any incomplete transfers.

> **Note:** Incomplete transfers may be due to lack of available memory. Delete call programs to create the necessary available memory.

7. Enter **bye** to exit the *ftp* session.
8. Type **Exit** to close the MSDOS window.

Using a Telnet Session to Perform FLASH Download

> **Note:** For Windows 3.1, you need a 3rd party Telnet application. If you do not have a Telnet program, stop and refer to "Host Update via RS-232" instructions.

9. Open a Telnet session by clicking on **Start**, and dragging the cursor to **Run**, then type **Telnet** and finally click on **OK**. Windows NT or 95/98 displays the Telnet window.
10. From the **Connect** menu select **Remote System**. The Telnet window displays the Connect dialog box.
11. Enter the **<IP address>** of the Call Generator, **telnet**, and **vt100**, followed by selecting **Connect**. The Telnet window displays a series of messages followed by the unit id prompt of the Call Generator. The Call Generator is now in command line mode.
12. Enter **HD** and verify the binary file is present on the Call Generator.

> **Note:** If you sent the wrong file you can erase it using the **HE <filename>** command.

13. Enter **ML** (Privileged Login).

    Login > ameritec

14. Enter **MF <filename>** of the binary file to be transferred. Enter the filename exactly as it was displayed by the **HD** command.

> **Note:** The filename portion of this command is case sensitive.

The Telnet window displays:

Load FLASH Application Block? [y/n] :

15. Enter **y**. (**Caution: Do not press <enter> or <cr> after the y**. If you do, you will lose the Telnet connection and must restore it before continuing to the next step. This should take approximately three minutes). The Telnet window displays:

    FLASH Vpp ON
    Erasing FLASH ... done
    Loading FLASH ... /done
    Verifying FLASH ... /done
    Reset unit to run program in FLASH memory

16. Enter **CX** or recycle power to reset the Call Generator. Resetting the unit automatically terminates the Telnet connection.
17. Wait a couple of minutes for the Call Generator to initialize before reconnecting.

> **Note:** If unable to reconnect after the unit has completed initializing, connect serially and press the **ENTER** key. If a **pROBE** prompt appears, follow the **pROBE+ Correct Procedure**. If unable to reconnect performing the procedure, contact Ameritec Customer Support at 626-915-5441.

18. Enter **RM**. If the download was successful, the Telnet window will display the status followed by the unit ID prompt and host revision.
19. Enter **NX** to close the session. The Telnet window responds with the following message: **Connection to host lost**.
20. Select **OK**.

3.4.1.1 pROBE+ Correction Procedure

When updating Ameritec's Squirt Call Generator host to version using a Telnet connection, the unit may sometimes return with a "**pROBE+>**" prompt, instead of the unit prompt after power cycling the unit.

If nothing appears on your screen, you can recover by using the following procedure to get out of the "**pROBE+**" mode by cleaning out the RAMDISK using the **pROBE** debug command. The unit will not go back to the normal unit prompt with the "**GS**" or "**GO**" commands, which have been used in the past.

1. Reconnect to the unit via the serial connection.
2. At the **pROBE+>** prompt, enter:

   pROBE+>fm 50000000..5017ffff 00 (**enter**)
3. Power cycle the unit.
4. As the unit powers up, you will get an error message, "**file system error – unable to mount the ramdisk 0x2007**". Ignore this message and wait until the unit comes back with the "**ameritec>**" prompt.
5. Enter the following at the prompt: **ml ameritec** (**enter**) followed by **MD** (**enter**).
6. Enter "**y**" to confirm formatting.
7. After formatting, the unit will come back with the unit prompt. Type in **HD** followed by an **enter**. The following should appear:

   Ameritec>HD
   bitmap sys
   flist.sys
   fdata
   stad
8. The unit prompt will return.

Note: Please note that all battery backup information such as Ethernet parameters, date, time, etc., will be lost. The IP address has to be setup again before you can address the unit via Ethernet.

3.4.2 Transferring Host Files using the RS-232 Port (hex files)

Requirements: **TeraTerm** Terminal Emulator found on Ameritec's *ftp* Site.

Time Requirements: approximately forty-five minutes.

CAUTION: Transferring a new Host software release to the Call Generator may erase any resident Scripts, Protocols, Call Programs, Call Test Sets, Reports, Schedules, etc. Using FeatureCall, perform a full backup using the **Backup Unit Files** function from the **File** pull-down menu before downloading new Host software.

Transferring a new software release (a.k.a."host" program) into the Call Generator requires that the unit be in the 'privileged mode' of operation (**Privileged Login** from **File** pulldown menu or **ML** command). The new software release will reside in the Flash EPROM.

In order to load the new software release, the old release must first be erased. A single command, **MF**, erases the old release and initiates the Flash EPROM to receive the new release.

Use the following procedure to download a new software release:

1. Connect the Call Generator serial port to an available communications port on the PC/Workstation; usually COM1 or COM2.

   Set the communications setup in **TeraTerm** to serial port with these parameters: **19,200 baud**, **8 data bits**, **no parity**, **1 stop bit**, and **XON/OFF** flow control. Be sure to select the correct COM Port. Select "**setup**"; then save to keep your parameters. Save as **TeraTerm.ini**.

2. To verify that the PC/Workstation is communicating with the Call Generator, enter **RM**. **TeraTerm** should display the unit status following by the unit ID prompt:

   Unit id <Ameritec>, Model XX, Version X.XXx 01-Feb-97
   Status: STOPPED
   Ameritec>

3. Enter **ML <password>**. **TeraTerm** displays the message:

   Privileged Login
   Ameritec>

4. Enter **MF**. **TeraTerm** responds with the message:

   FLASH is OK, Overwrite ? [y/n] : y (**DO NOT** press **Enter**)

CAUTION: Entering **y** will erase the existing contents of Flash memory. Make sure the new software release files are accessible for download from your PC/Workstation. Immediately after erasing the Flash memory, you will be prompted to load the replacement file.

5. Enter **y**. The monitor responds with the following:

   Erasing FLASH...done
   Load Extended Hex File

Note: While you can load the hex files at this point, it is faster to now power cycle the unit and wait for the "**Load Extended Hex Files**" prompt before continuing.

6. From the **File** menu, select **Send File** to transfer the host file from the PC/Workstation to the Call Generator. In the dialog box, select the **path<filename.x>** for the "host" program, e.g., the Call Generator Software Release. Verify that the option **binary** is not checked.

   The monitor displays the following: **.....**, indicating a download is in progress. **TeraTerm** opens a window showing the bytes transferred.

Note: Depending on file length, a “host” program download will take approximately 45 minutes to complete.

   When the download is complete, the monitor displays a message:

   Reset unit to run program in FLASH memory

7. Enter **CX** to reboot the unit. The monitor responds with information similar to the following:

```
REBOOT!!!
boot $Revision: 1.6 $
not done
bsp $Revision: 1.32A $
file system passed
?<Ameritec>  0 --- 04:08:38am  10 Aug 98  Power Lost          0
?<Ameritec>  0 --- 04:08:42am  10 Aug 98  Power Restored      0
new device: 1
new device: 2
new device: 3
new device: 4
```

8. Restore the files that you previously backed up (if necessary).

3.4.3 Transferring Script Source Files to a Call Generator

Script source files such as those created by ScriptMate or a Text Editor must first be converted to hex files before they can be used by a Call Generator. If you are using FeatureCall, it will perform the conversion automatically when you download load Scripts using the Scripts window from the **Call Setup Scripts** pulldown menu. If you are not using FeatureCall, you must first convert the source file to a hex file using **Prep.exe**. Both procedures follow.

3.4.3.1 Transferring Script Source Files to a Call Generator Using FeatureCall

1. Connect the Call Generator and select it using the **Open System** window.
2. Select **Scripts** from the **Call Setup** menu.
3. Select the file under **Workstation Scripts** and click on **Download**.
4. Enter the script name (e.g. **A->B std**) and script number.
5. Click on **OK**. The Script will load and appear under **Unit Scripts**.

3.4.3.2 Converting Script Source Files to a Script.hex file using prep.exe

Prep is incorporated into FeatureCall GUI and is therefore not needed when using FeatureCall. If using FeatureCall, select Call Setup/Scripts to download the **.src** file to the unit. The **prep.exe** utility program is supplied on the factory diskette to allow users to compile their own script files into the **.hex** format, which is downloaded to the unit. To convert the files into the **.hex** format, follow these steps:

1. Copy the **prep.exe** file into the same directory as your script file. The script file must use the **.src** file extension.
2. Open a DOS window and use the **CD** command to change directories until you are in the directory where your script and **prep.exe** are located.
3. Type **prep "Unit Script Name" <filename> unit_location**.

   "**Unit Script Name**" is the script name you want to appear in your unit. This name cannot be longer than 12 characters and must be surrounded by quotes if spaces are included in the name.

   <filename> is the name of the script file without the **.src** file extension

   unit_location is an optional selection of where in the unit the script is to be loaded by default. This must be a value from 1-20.

   A **.hex** file will be created as **<filename>.hex**.

   Eg. **prep "A->B std" 9320001f 1** would use the file **9320001f.src** and convert it to **9320001f.hex**. The script would load by default into script location 1 and would appear with the name **A->B std**.
4. The **.hex** file will be created in the same directory as the **.src** file and can be downloaded to the unit by following the "**Downloading Script & Protocol .hex Files via the TeraTerm Terminal Emulator**" instructions.

3.4.4 Transferring Protocol State Table (.stb) Files to a Call Generator

Protocol State Table (**.stb**) files, created on a Text Editor, must first be converted to hex files before they can be used by a Call Generator.

3.4.4.1 Converting Protocol .stb Files to .hex Files

The factory diskette came with both a **.hex** and **.stb** version of the protocol file(s). If you just need to reload a standard factory protocol, you can transfer the existing **.hex** file to the Call Generator. If, however, you modified the state table (**.stb**) file, you must first convert it to a **.hex** file. To convert the **.stb** file to a **.hex** file, it must be assembled and linked.

The assembler and linker is available from Softools, Inc. Ameritec is licensed to sell both the Softtools Linker and Assembler. When ordering, specify the Protocol Development Kit (P/N 190002).

To convert an **.stb** file to a **.hex** file, perform the following at the MS-DOS prompt:

1. Verify that the **am2p.bat** file, include files, assembler files, linker files, and **.stb** file are loaded in an MSDOS directory.
2. At the MSDOS prompt for that directory, enter **am2p <protocolfilename> (do not include the .stb extension)**.

   The assembler creates an object file (**.obj**) and listing (**.lst**) for the protocol file. The linker then creates a hex (**.hex**) file. During the conversion, the batch file, assembler, and linker will echo the current status of the process.
3. Verify that no error or warning messages are displayed. If any occur, check the error messages in the documentation that came with the *Softools* software.
4. If no errors occur, you may transfer the **.hex** file to the Call Generator using the one of the procedures under **Transferring Script and Protocol Hex Files to a Call Generator**, which follows this procedure.
5. Once transferred, follow the procedures in the ***Ameritec Call Generator Protocol Table Development Guide (18-0038)*** for debugging a new or modified protocol.

3.4.5 Transferring Script and Protocol Hex Files to a Call Generator

3.4.5.1 Transferring .Hex Files to a Call Generator Using FeatureCall

To download .hex files to a Call Generator using FeatureCall, perform the following:

1. It is recommended that you login to privileged access when downloading factory scripts and protocols. This will allow access to the factory protected script locations in the unit. Login by selecting the **File** menu followed by **Privileged Login...**. Enter your password at the prompt and click **OK**. The default password is **ameritec**.
2. From **File** pulldown menu, select **Download Files to Unit**.
3. When the **File: Download Hex Files to Unit** window is displayed, select the file to download and click on **OK**. Only one file can be downloaded at a time. Repeat procedure for each Script/Protocol to download.

Note: Script and protocol files are both downloaded as **.hex** files. This may become confusing. Be sure to give each type of file a distinctive name so that it may be readily identified. Ameritec's convention designates scripts as **932xxxx.hex** files and protocols as **922xxxx.hex** files.

3.4.5.2 Transferring .Hex Files to a Call Generator using the Command Line Interface

To download scripts or protocols from the PC/Workstation to a Call Generator using **TeraTerm** Terminal Emulator, perform the following:

1. Start the **TeraTerm** Terminal Emulator program.
2. Set the **TeraTerm** Terminal Emulator found on the Ameritec *ftp* site to **19,200 baud**; **8 data bits**, **no parity**, **1 stop bit**, and **XON/XOFF** flow control. Be sure to connect the correct COM port. Select "**setup**"; then save to keep your settings. Save as **TeraTerm.ini**.
3. To verify that the PC/Workstation is communicating with the Call Generator, enter **RM**. The monitor should display the unit status followed by the unit ID prompt.

> **Note:** If the monitor displays the unit status but not the unit ID prompt, enter **!a**. If it still doesn't appear, enter **M>1**. The monitor returns the unit ID prompt.

4. It is recommended that you login to privileged access when downloading factory scripts and protocols. This will allow access to the factory protected script locations in the unit. Login by typing: **ML <password>** where **<password>** is the password for your unit. The default password is **ameritec**.
5. To transfer a Script or Protocol file to the Call Generator, enter **HL**. The monitor displays the message: **<unit> serial download**.
6. Under the "**file**" dropdown menu, select "**send file**". A popup window to select the file to transfer will appear. Select the filename for the Script or Protocol hex file to download.

> **Note:** Script and protocol files are both downloaded as **.hex** files. This may become confusing. Be sure to give each type of file a distinctive name so that it may be readily identified. Ameritec's convention designates scripts as **932xxxx.hex** files and protocols as **922xxxx.hex** files.

Possible Messages During Download

For Protocols:

Enter Protocol Number (1 to 8)

For Scripts in non-privileged mode (no password entered):

Enter Script Number (11 to 20)

Existing Script/Protocol message:

Script/Protocol Number # Exists; Overwrite? (y/n):

Answer **n** to Overwrite?

Enter Script Number (1 to 20) or **Enter Protocol Number (1 to 8)**

Successful Download OK:

Script Save Successful
Please wait for call programs to assemble or
Protocol Save Successful

You entered Ctrl-C (or selected Cancel) anytime during the download:

Serial Load Hex File: aborted by user

Complete the transfer by entering the correct responses.

3.4.6 Transferring Script or Protocol Files from a Call Generator

3.4.6.1 Transferring .Hex Files from a Call Generator using FeatureCall

To upload **.hex** files to a PC using FeatureCall, perform the following:

1. From **File** menu, select **Upload Files to Unit**.
2. Select **Script** or **Protocol** from the drop-down list and click on **OK** to upload the file(s) to the PC.

> **Note:** Other available choices for **Upload Files to Unit** are **Set**, **Call Program Parameters**, and **Assembled Call Programs**. **prog**, **val**, and **set** files interact with one another, and backing these files up using the **Upload Files to Unit** function is not recommended. Use the **Backup Unit Files** command instead. See *Archiving Call Generator Files.*

3.4.6.2 Transferring Script & Protocol Hex files to a PC

The **HU <filename>** command transfers HEX files from the call generator(s) to the PC.

1. At the PC: With the **TeraTerm** terminal emulation program set up to communicate with the Call Generator, press **Return** or **Enter**, and make sure that a prompt (e.g., "**Ameritec>**") is displayed.
2. Type **HU <filename>** (where **<filename>** is the Script or Protocol name from Table 3-4 that you wish to upload) but do **NOT** press **Return** or **Enter**.

3. Open File/Log to a Log file on the PC. Enter the path and name of the file. The filename should end with the extension **.hex**. Remove the check on append and binary.
4. Press **Return** or **Enter**. You should see the Script or Protocol file on the screen. A series of dots "**.....**" may precede the file.
5. Once transfer is complete, close the Log file on the PC. You may need to open the minimized screen.
6. Repeat steps 2-5 for each Script/Protocol hex file to be saved.

3.4.6.3 Transferring Script Source (.src) Files to a PC

Protocol Source (**.stb**) files cannot be recovered from the Call Generator. To upload **.src** files to a PC using FeatureCall, perform the following:

1. From the **Report** menu, select **Capture**, **Script...**.
2. Enter the number of the Script you wish to load and click on **OK** to upload the file to the PC.

3.4.6.4 Transferring .src Files from a Call Generator using the Command Line Interface

The **RT ss** command transfers Script source **.src** files from the call generator(s) to the PC. Protocol source **.stb** files cannot be reconverted from the Call Generator.

1. At the PC: With the **TeraTerm** terminal emulation program set up to communicate with the Call Generator, press **Return** or **Enter**, and make sure that a prompt (e.g., "**Ameritec>**" is displayed.
2. Type **RT ss** (where **ss** is the Script Number that you wish to upload) but do **NOT** press **Return** or **Enter**.
3. Open a File/Log to a Log file on the PC. Enter the path and name of the file. The filename should end with the extension **.src**. Remove the check on append and binary.
4. Press **Return** or **Enter**. You should see the Script file on the screen. A series of dots "**.....**" may precede the Script file.

5. After the "**# END**" close the Log file on the PC. You may need to open the minimized screen.
6. Repeat steps 2-5 for each Script file to be saved.

3.4.7 Archiving Call Generator Files

3.4.7.1 Archiving Files using FeatureCall

FeatureCall allows you to archive all the files in the unit (Full Unit Backup), or to perform selective backups, such as backing up Call Test Sets, by selecting **Backup Unit Files** from the **File** pulldown menu. The Backup Unit Files window contains a **Backup Type** subwindow with six backup selections. FeatureCall displays the file types included in backup selection grouping in the **Files Included in Backup** subwindow.

Select **OK** to back up the archive file selections to the PC's disk. The system displays a Backup Unit Files screen to show you the backup progression.

> **Note:** When a file is backed up to the PC's memory, it overwrites any files with the same name. If you are going to back up multiple Call Generators, use **File Manager** (Windows 3.1) or **My Computer** (Windows 95/98) to create Featcall subdirectories for each unit.

Backup files can be restored at any time using the File, Restore Unit Files pull down menu.

3.4.7.2 Archiving Call Generator Configuration using TeraTerm Terminal Emulator

Table 3-4 lists the individual file types that exist in a Call Generator. Backing up files other than Script or Protocol files using the Command Line Interface is not recommended. Many file types, such as **prog**, **val**, and **set** files, interact with one another. All the files, with the exception of the **scrpt** and **proto** files, are created on the Call Generator; some automatically and others in response to commands that you enter. The only safe way to archive files other than Protocols and Scripts is to use the **Backup Unit Files** and **Restore Unit Files** functions available through FeatureCall.

Table 3-4. Call Generator Internal Filenames

File Name	File Type
BITMAP.SYS	system file
Configur	initial configuration data
Cpstable	call program stats table
FLIST.SYS	system file
Passign	protocol assignments file
Prog001-prog640	call program files (one for each assigned call program)
Proto001-proto008	protocol files
Repohead	report headings assignment file
Repopars	report parameters
Rtdata	real-time data
Runsched	run schedule
Scrpt01-scrpt20	script files
Set1-set4	set content files
Spl00009	spooler file (cannot be uploaded or downloaded)
Stad	internal stats data (cannot be uploaded or downloaded)
Val001-val640	files containing the parameter values

3.4.8 Erasing Files

3.4.8.1 Erasing Files using FeatureCall

FeatureCall allows you to selectively erase Scripts, Call Test Sets, Protocols, and Call Programs from the Call Generator. You may want to erase one or more files after archiving or simply to get rid of unwanted files. To erase files from the Call Generator, perform the following:

1. Login as a privileged user by selecting **Privileged Login** from the **File** menu and enter the password.

> **Note:** The default factory password is **ameritec**. If the password has been changed and you need to erase files, see your System Administrator.

2. In privileged mode, select **Erase Files in Unit** from the **File** menu. Highlight the files in the **Erase Files in Unit** drop-down list and select **OK**.

3.4.8.2 Erasing Files using the Command Line Interface

The **HE** command erases files within a directory, and must be used with caution.

- To erase a single file, enter **HE <filename>**. The Call Generator deletes the file.
- To erase all files of a type, enter **HE <alpha...>**, where **alpha** is the alphanumeric characters in a file type, and **...** is a wild card that erases all files of that type.

For example, if you want to erase all of the Call Program files, enter **HE prog...**. The Call Generator erases all the Call Program files. See Table 3-4 for the list of internal filenames.

3.5 Master Linecard and Linecard Code Update using TeraTerm

The Master Linecard and Linecard code update are for use with the Basic Rate Interface unit (AM2S-B).

1. Run **TeraTerm** and verify serial communication with the unit. You should receive the unit prompt back every time a **<CR>** is pressed.
2. Locate the following files from the BRI unit update downloaded from the Ameritec *ftp* site:
   - **Mlc_XXXX.btf**
     Master Linecard Update File (**XXXX** = current firmware revision). E.g., **Mlc_108a.btf**
   - **Lc_YYYY.btf**
     Linecard Update File (**YYYY** = current firmware revision). E.g., **Lc_108d.btf**
   - **Master_Linecard Load.ttl**
     TeraTerm macro file for loading Ameritec Master Linecard and Linecard code which is to be installed in the directory where **TeraTerm** is installed.
3. Copy the **Mlc_XXXX.btf** and **Lc_YYYY.btf** files into a known directory (e.g., **C:\AMERITEC**).

4. Copy the **Master_Linecard Load.ttl** file into the directory in which **TeraTerm** was installed. Typically this would be in **C:\Program Files\Ttermpro**.
5. Start the **TeraTerm** program.
6. Select the [**Control**] **Macro** dialog box, and if it is not already in the **Ttermpro** directory, move it there.
7. Select the "**Master_Linecard Load.ttl**" file and press "**Open**".

> **Note:** Once the macro is running, a MACRO icon will be minimized. Do not pause or end the macro. It will close once the update is completed.

8. A dialog box will be displayed to allow you to check your **Serial Port Setup** information. Verify that your **TeraTerm** settings are correct in **TeraTerm**, [**Setup**] **Serial Ports**, and press "**OK**" after you have verified that they are correct and no one has changed them.
9. A dialog box will be displayed prompting you to enter the path and filename of the Master Linecard update file. Enter the full path and filename and press "**OK**". E.g., **c:\ameritec\mlc_108a.btf**.
10. A dialog box will be displayed prompting you to enter the path and filename of the Linecard update file. Enter the full path and filename and press "**OK**". E.g., **c:\ameritec\lc_108d.btf**.
11. Once entered correctly, **TeraTerm** will start loading the update to the unit.

> **Note:** **Do not** close or pause the **send file** dialog box while it is transferring files to the unit. The dialog box will close when the transfer is complete. Do not disconnect cables from the unit when a transfer is in progress, because you can damage the unit.

12. After the first load is complete, you will be notified of the successful load and prompted to cycle power to the unit. Do so, then immediately press "**OK**".
13. As soon as the unit is initialized, **TeraTerm** will begin loading a second update to the unit.

14. After the second load is complete, you will again be notified of the successful load and prompted to cycle power to the unit. Do so, then immediately press "**OK**".
15. As soon as the unit is initialized, **TeraTerm** will begin loading the final update to the unit.
16. After the final load is complete, you will again be notified of the successful load and prompted to cycle power to the unit. Do so, then immediately press "**OK**".
17. When the unit is initialized, **TeraTerm** will indicate that the unit is ready for normal use and the update is complete.

4. COMMAND REFERENCE

This section is arranged alphabetically by commands.

Help Commands

?	
List All Commands and Syntax	Returns a complete list of the remote commands. It displays the command, its syntax, and a brief description of the command.

∝**?** where ∝ is the first letter of a command type.		
List Commands and Syntax by a Command Type	**Command Types by First Letter:**	
	C = Configuration Commands	**N** = Ethernet Commands
	F = FeatureCall Remote Commands	**P** = Program Operation Commands
	H = File Operation Commands	**R** = Report Commands
	M = Miscellaneous Commands	**T** = Test Control Commands

Chaining Commands

!A	
Address Unit A (also called echo prompt)	Communicates with first unit/group in chain. When not chained, if AM2S is not echoing an enabled prompt (**M>1**), entering **!A** should cause the unit to echo the prompt.

! ∝ where ∝ is a letter in the range of **B** to **O**.	
Address Chained Units 2 through 15	**!** ∝ allows you to send commands to individual chained units/groups 2 through 15, while excluding other units.

!Z	
Broadcast to All Units	**!Z** allows you to send commands to all chained units/groups simultaneously.

Configuration Commands

CC nnn where **n** is a line width of from 40 characters to 132 characters wide. The default setting is 80 characters wide.	
Report Column Width	Allows you to adjust the width of your listing for a Call Statistics report.

CD	
Erases Current Configuration	**CD** is a privileged command that returns the AM2S to the factory default settings. It destroys all user settings. After entering the command, the monitor prompts you with the following caution: **Current Configuration will be lost - Continue? [y/n]**

CF	
Configure Image Data Capturing Mode	**CF** allows the configuration of the Multimedia Image Data Capture mode selections. Entering the command without the parameters displays the current mode configuration. Each MMP line group has 4 image capture buffers. Any channel on the line group or span can be set to have images captured into any of the 4 image buffers. **Format 1** - Request Image Data Capture Mode Selections **CF** Format 2 - Change Image Data Capture Mode Selection **CF s b cc pp m** where: s = Line Group Number/Span (1-4) b = Image Capture Buffer Number (1-8) cc = Channel Number on the Line Group/Span (1-32, 0 to unassigned buffer) pp = Image Page Number (1-200) m = Capture Mode (0 = No capture, 1 = Capture Always, 2 = Capture Once then stop capturing) Images can only be retrieved using the MultiMedia Windows application.

CI n where **n** is a number from 0 to 5	
Re-initializes Unit	**CI** re-initializes some, or all of the files and tables in a unit.
	n=0 Re-initialize all files
	n=1 Re-initialize set, protocol, and protocol assignment files
	n=2 Re-initialize set and call program files
	n=3 Re-initialize script dependent tables
	n=4 Re-initialize protocol and protocol dependent tables
	n=5 Re-initialize unit configuration files

CL M=an	
Sets Up Unit Configuration **(Analog)**	**M** (Meter Pulse) = 12 or 16 MHz

CL C=a, F=a, L=an, R=a, Z=a	
Sets Up PCM Configuration. **(Digital)**	**C** (CRC or MIMIC) =Y/N. The setting must match the unit being tested.
	F (Framing) =D/E - D for D3/D4 or E for ESF
	L (Line length & type) =M2 (MAT 220), M4 (MAT 440), M6 (MAT 655), A1 (ABAM 133), A2 (ABAM 266), A3 (ABAM 399), A5 (ABAM 533), A6 (ABAM 655)
	R (PCM Clock Ref) =I, A, B, C, D - Internal, Line A, Line B, Line C, Line D
	Z (Zero Suppression) =A, B, Z - AMI, B8ZS, ZCS
	C, F, L, R, Z T1 only (no Z with PRI ISDN)
	C, R E1 only

CM mm ccc t where **mm** is an audio monitoring channel in the range of **1-24**, **cc** is an Analog0r P-Phone line in the range of **1-32**, and **t** is the type of line to be monitored and may be **T**, **R**, or **P** for transmit, receive, or paired, respectively.	
Assign Audio Access Port Channels (Requires T1 or E1 Audio Access Port option) **(Analog)**	Assigns 1 of 24 T1 or 1 of 30 E1 slots to an Analog line. The T1/E1 slot number corresponds to the number entered as **mm**, and carries a PCM translation of the audio for line. You can monitor the time-slot by dialing a preassigned number in the switch. **Note 1:** To execute, the T1 or E1 Audio Access Port option must be installed. **Note 2:** The first four audio channels from a Call Generator's Audio Out will be used by the AMSG for audio.

CM mm uuc t where **mm** is an audio monitoring channel in the range of **1-24**, **uuc** is a CRS-ADB(e) line and channel assignment to be monitored (**uu =** U-Interface or S/T-Interface Line Number **01-64**, **c=** Call Number **1-8**), and **t** is the type of line to be monitored and may be **T**, **R**, or **P** for transmit, receive, or paired, respectively.	
Assign Audio Access Port Channels **(BRI)**	Assigns Audio Access Port channels to the lines that are being tested, and sets up the T1 or E1 Audio Monitor option. The monitor channel (mm) entry defines which T1 or E1 Monitor channel will be assigned to a U- or S/T-Interface line and a channel that sends voice/data over that line (uuc). The PCM signal containing the encoded audio appears at the AUDIO OUT connector on the rear panel. The audio encoding corresponds to the option generating the audio. **Note 1:** An S/T-Interface will not operate with even-numbered CRS-ADB(e) channels. Real Time Error 248 is reported if a Call Program or Audio Assignment containing an even-numbered channel is downloaded to an S/T-Interface Card. **Note 2:** To execute, the T1 or E1 Audio Access Port option must be installed. **Note 3:** The first four audio channels from a Call Generator's Audio Out will be used by the AMSG for audio.

CM mm ccc t where **mm** is an audio monitoring channel in the range of **1-24**, **ccc** is an AM2S channel in the range of **A01-D24** (AM2S-D), or **A01-D30** (AM2S-De, and **t** is the type of channel to be monitored and may be **T**, **R**, or **P** for transmit, receive, or paired, respectively.	
Assign Audio Monitor Channels (Requires T1 or E1 Audio Monitor option) **(Digital)**	Assigns 1 of 24 T1 or 1 of 30 E1 slots to an AM2S line. The T1/E1 slot number corresponds to the number entered as **mm**. The T1/E1 slot carries an audio PCM translation for the assigned time-slot. Monitor the time-slot by dialing a preassigned number in the switch. **Note:** To execute, the T1 or E1 Audio Monitor option must be installed

CS nnnnn where **nnnnn** is one of the following baud rates: 300, 1200, 2400, 4800, 9600, or 19200. No leading zeroes.	
Set Baud Rate	**CS** allows you to set the baud rate of the AM2S unit. The factory default baud rate is 19.2.

CT - The Set Trouble Mode command allows you to set the fault tolerance threshold of the AM2-De as well as the action the AM2-De initiates once the threshold is exceeded.	
Set Trouble Mode	**Format 1 - CT** <**U/C**> **nn.n%** <**min attempts**> <**action**> where: **Format 2 - CT** <**U/C**> **nn.n%** <**min attempts**> <**unit action**> <**call action**>where: **U** errors are calculated on all the calls received by the unit **C** errors are calculated on the total errors by a single call program **nn.n** is a percentage between **00.0** and **99.9** of calls that failed The percentage of failed calls at run-time is calculated by: Current Error Percentage = Errored Calls/Call Attempts where: Call Attempts is total of CODE 1 and CODE 11 Reports (CODE 18 and CODE 20 (DXe Only) Errored Calls is total of every STOP executed by the Script <**minimum attempts**> minimum number of attempts allowed before the calculation is valid enough to take an action <**action**> is (Format 1 only) **O**, **U**, or **C** where: **O** Ignore all errors and continue test **U** Stop unit when threshold conditions are reached, usually calculated on all calls. **C** Stop call for which error threshold was reached. All other calls continue, usually used for errors calculated on single calls. <**unit action**> is (Format 2 only) **O**, **Z**, **F**, or **S** where: **O** Ignore all errors and continue test **Z** Freeze all call programs in unit when threshold conditions are reached. **F** Finish all call programs in unit when threshold conditions are reached. **S** Stop all call programs in unit when threshold conditions are reached. <**call action**> is (Format 2 only) **O**, **Z**, **F**, or **S** where: **O** Ignore all errors and continue test **D** Disable call program whose threshold conditions are reached. **Z** Freeze call program whose threshold conditions are reached. **F** Finish call program whose threshold conditions are reached. **S** Stop call program whose threshold conditions are reached.

CU	
Configure Trace Data Capturing Mode	**CU** allows the configuration of the MultiMedia Trace Data Capture mode selections. Entering the command without the parameters displays the current capture mode configuration. Each MMP line group has 8 trace capture buffers. Any channel on the line group or span can be set to trace into any of the 8 trace buffers. **Format 1 -** Request Trace Data Capture Mode Selections **CU** **Format 2 –** Change Trace Data Capture Mode Selection **CU s b cc m** where: s = Line Group Number/Span (1-4) b = Trace Capture Buffer Number (1-8) cc = Channel Number on the Line Group/Span (1-32, 0 to unassign buffer) m = Capture Mode (0 = No capture, 1 = Capture Always, 2 = Capture Once then stop capturing) After a test run, the trace data buffer can be retrieved using **TX**, **TT**, and **HU**.

CV	
Display/Add License Keys	**CV** adds a license key to an Ameritec Call Generator. Entering **CV** without parameters displays license key information already loaded in the unit. A list of licensed host types is displayed on Digital units, and a list of features and their supported channel limits on all models. **Format 1 -** Request Key List **CV** **Format 2 –** Add New Key **CV ABCD-1234-EFGH-5678** **CV ABCD1234EFGH5678**

CX	
Reboot and Initialize CRS	**CX** is a privileged command. CX allows a reboot and reinitialize of the AM2S. Equivalent to turning power OFF and then ON. During initialization, the AM2S performs a self test.

FeatureCall Remote Commands

FeatureCall commands are used primarily for programming functions. In the normal course of events, you, as the operator, will never need to use them.

FA	
Prints assigned protocols	**FA** allows you to print assigned protocols.

FE	
Print call program info with script number	**FE** lists all Call Programs with their Script number, whether or not assigned to a Set. If Call Test Set assignments are needed, use the **RE 0** command.

FF ss where **ss** is script/report page number (1-20)	
Retrieve Script Report Page Format	**FF ss** where **ss** is script/report page number (1-20) Ex. FF 2; FF 20

FG **FG ss** where **ss** is the script/report page number.	
Print Abbreviated Statistics Totals Report (**Standard Page Only**)	**Request Abbreviated Statistics** Ex. FG (Prints abbreviated statistics totals report for standard page) Ex. FG 0 (Prints abbreviated statistics totals report for standard page) Ex. FS 5 (Prints abbreviated statistics totals report for script page 5) Ex. FS 15 (Prints abbreviated statistics totals report for script page 15)

FH n1, n2, ... n32 where **01-32** are statistical report codes for columns 1-32.	
Set Statistic Totals Report Column Assignment	**Set Standard Page Format** FH n1, n2, … n32 where nX is report code number (1-32) Ex. FH 1; FH 1,2,5; FH 1.3.11.32 **Set Page Format** FH #ss, n1, n2, … n32 where ss is script/report page number where ss is script/page number (0-20) where nX is report code number (1-65535), up to 32 codes Ex. FH #3, 1; FH #20, 1000, 23293, 50; FH #0, 1, 3, 11, 32 **Display Selected Codes** FH #ss where ss is script/page number (0-20) Ex. FH (display selected codes for standard page) Ex. FH #0 (display selected codes for standard page) Ex. FH #5 (display selected codes for script 5 page) Ex. FH #16 (display selected codes for script 16 page)

FL ccc[-ccc]ALL where **ccc** is a line number and **ALL** is all lines.	
Defines lines to be used in print stats. **(Analog)**	**FL** defines the lines to be included in the **FS** command output. Sample syntax: **FL ccc[-ccc], [ccc[-ccc]]** where **ccc** is a line or range of lines.

FL uuc[-uuc]ALL where **uuc** is a line number in the range of **011-168** and **ALL** is all 16 lines.	
Defines lines/channels to be used in print stats. **(BRI)**	**FL** defines the lines or channels to be included in the **FS** command output. Sample syntax: **FL uuc[-uuc]** , **[uuc[-uuc]]** where **uuc** is a line or channel or range of lines or channels.

FL ccc [-ccc]ALL where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels.	
Defines channels to be used in print stats **(Digital)**	**FL** defines the channels to be included in the **FS** command output. Sample syntax: **FL ccc[-ccc], [ccc[-ccc]]** where **ccc** is a channel or range of channels.

FM n1, n2, … n32 where **01-32** are statistical report codes for columns 1-32.	
Set Abbreviated Report Column Assignment	**Set Standard Page Format** FM n1, n2, … n32 where nX is report code number (1-32) Ex. FM 1; FM 1, 2, 5; FM 1, 3, 11, 32 **Set Page Format** FM #ss, n1, n2, … n32 where ss is script/report page number where ss is script/page number (0-20) where nX is report code number (1-65535), up to 32 codes Ex. FM #3, 1; FM #20, 1000, 23293, 50; FM #0, 1, 3, 11, 32 **Display Selected Codes** FM #ss where ss is script/page number (0-20) Ex. FM (display selected codes for standard page) Ex. FM #0 (display selected codes for standard page) Ex. FM #5 (display selected codes for script 5 page) Ex. FM #16 (display selected codes for script 16 page)

FP n where **n** is the Set number.	
Preload Set	**FP** allows you to preload a set. This tells the units to load up the linecards with the Set to be run, but to not run it. It is used to synchronize multiple-unit starts. Sample syntax: **FP n** where **n** is the set number.

FS standard page only request **FS ss** where **ss** is script/report page number or "all" for all page codes selected.		
Print Abbreviated Statistics Report	**FS** **FS ss** Ex. FS Ex. FS 0 Ex. FS 5 Ex. FS 15 Ex. FS all	standard page only request where **ss** is script/report page number or "all" for all page codes selected. (Prints abbreviated report for standard page) (Prints abbreviated report for standard page) (Prints abbreviated report for script page 5) (Prints abbreviated report for script page 15) (Prints abbreviated report for codes selected on pages 0-20, starting with standard page codes up to page 20 codes)

FV ppp where **ppp** is the Call Program number in the range of 1 to 480	
Output Call Program Parameters	**FV** allows you to output call program parameters. Sample syntax: **FV ppp** where **ppp** is the Call Program number.

File Operation Commands

HD <filename>|<filetype> where **filename** is the filename of a single file that you wish to delete and **filetype** is the letters in a filetype, e.g., to list all Call Programs loaded in the AM2S, enter **HD prog**.	
List Directory	Produce a directory listing of the files in a unit.

HE <filename>|<alpha...> where **filename** is the filename of a single file that you wish to delete and **alpha...** is the letters in a filetype and the three period symbol (**...**) is a wildcard requesting that the AM2S delete all files of that type, e.g., to delete all the Call Program files, you would enter **HE prog...**.	
Erase File	**HE** is a privileged command.

HL readies the unit for loading of (.HEX) files in ASCII format. Transmission of the file must be initiated at a PC.	
Transfer File to AM2S	**HL** is a privileged command for Script numbers 1 - 10. Only Call Program, Script, RUNMODE, and Protocol Table files can be transferred with the **HL** command. To transfer a Host program, refer to the **MF** command.

HU <filename>	
Transfer Hex File From AM2S to PC/Workstation	Used to transfer Hex files from the AM2S to a PC/Workstation. Seldom used because transferred files are coded totally in hex. Files may or may not transfer back properly, because if one or more lines of hex were corrupted during the transfer, the corrupted code would be in hex and difficult to read/detect.

HW <filename> <text> <Ctrl Z>	
Write Text File to AM2S	**HW** is a privileged command. Creates a text file. To enter a text file, type **HW** plus the filename, followed by a carriage return. Then enter the text, followed by Ctrl Z to terminate the file. A typical application is to download new help screens.

Filenames

File Name	File Type
BITMAP.SYS	system file
configur	inital configuration data
cpstable	call program stats table
FLIST.SYS	system file
passign	protocol assignments file
prog001-prog480	call program files (one for each assigned call program)
proto001-proto004	protocol files
repohead	report headings assignment file
repopars	report parameters
rtdata	real-time data
runsched	run schedule
set1-set4	set content files
spl00009	spooler file (cannot be uploaded or downloaded)
stad	internal stats data (cannot be uploaded or downloaded)
val001-val999	files containing the parameter values

Miscellaneous Commands

M> 0|1 where **0** = unit id prompt off and **1** = unit id prompt on	
Enable/Disable Unit ID Prompt	This command allows you to turn the unit id prompt on or off.

MC 0|1 where **0** = chain tag off and **1** = chain tag on	
Enable/Disable Chain Tagging	This command allows you to add a unit id to a command response. **!Z MC 1** for example, turns on tagging for all the units in a chain.

MD	
Reformat File System	**MD** is a privileged command. This will **DELETE ALL** unit files, disconnect any Telnet session, and restart the unit. A prompt ***Do you wish to do this? [y/n]*** is displayed.

ME c	
Set Escape key for remote key mode	**ME** sets the character that is identified as the ESCAPE key in the remote keystroke sequences. The default key is ESC.

MF	
Force FLASH Transfer to AM2S	**MF** is a privileged command. A new software release resides in the Flash EPROM. **MF** erases the old release and prepares the flash EPROM to accept the new release.

MH <?>	
Lists Help Index Subjects	Lists the valid entry items for the **MH <subject>** command

MH <subject> where **<subject>** is an item from the listing obtained by entering **MH ?**.	
Lists Subject Description	

ML <password>	
Login to Privileged Mode	The **ML** command allows you access to privileged mode commands. On a new unit **ameritec** is the default password.

ML BYE	
Logout of Privileged Mode	**ML BYE** allows you to exit privileged mode. Logging out prevents unauthorized users from using commands that could adversely effect the performance of the unit.

MP <new password> where **<new password>** can be from 1 to 8 printable characters.	
Change Password	**MP** is a privileged mode command. **MP** allows you to change the password.

MR	
Enter Remote Keystroke Mode 	Allows you to enter remote keystrokes from a keyboard that's part of a Ethernet workstation or PC connected via the RS-232 port. **Note1:** On a Crescendo, the **MR** command may be used in conjunction with specific keystrokes to change the baud rate. Before attempting to change the baud rate, contact Ameritec Customer Service. **Note 3:** Entering **MR** places the Crescendo in " Remote Keystroke Mode" and takes it out of "Command Entry Mode". **Caution:** Remote Keystroke Mode allows the terminal keyboard to simulate keys normally found on an AM2 front panel. In this mode, user feedback is limited. And, since feedback is limited, you might accidentally change a setting without knowing it. If you accidentally enter **MR**, simultaneously press ESC and Q to return to "Command Entry Mode".

MT	
Display Time and Date	Displays time and date in the form of **yyMMDDdhhmmssp** where **yy**= year (**00-99**), **MM** = month (**01-12**), **DD** = day (**01-31**), **d**= the day of the week (**0**= Saturday), **hh**= the hour (**01-12**), **mm** = minutes (**00-59**), **ss**= seconds (**00-59**), and **p**= am/pm (am= **0**, pm= **1**).

MT yyMMDDdhhmmssp where **yy**= year (**00-99**), **MM**= the month (**01-12**), **DD**= the day (**01-31**), **d**= the day of the week (enter **0**), **hh**= the hour (**01-12**), **mm**= minutes (**00-59**), **ss**= seconds (**00-59**), and **p**= am/pm (am= **0**, pm= **1**).	
Set Time and Date	**Note:** In this format, the days of the week start with Saturday as **0**, Sunday as **1**, Monday as **2**, etc. If you enter a number from **1** through **6**, the AM2S will hard code the day of the week. If you enter **0**, the AM2S will adjust the day of the week to match the entered calendar date.

MU <Unit ID> where the **Unit ID** is an alpha-numeric sequence up to eight characters long.	
Set Unit Identification	**MU** allows you to set the unit ID. The unit ID appears on call statistics reports, error listings, and the screen prompt. **Hint:** If you are chaining units, you may want to have part of the ID coincide with the ! (bang) command address, e.g., if you have an AM2S in position d and an AM2-D in position e, you may want to set the unit ids as d-AM2S and e-AM2-D respectively. In this way the prompt will tell you what model is at each **!** address.

MV m where m=1 for the long format and M=0 is the short format. Current setting listed if no parameters entered.	
Set Error Message Format	**MV** selects between a terse (single number) and a verbose (descriptive text) command error identification. The verbose message is the default.

Ethernet Commands

ND	
Display Ethernet Address Information	**ND** is a privileged mode command. **ND** displays the Ethernet address, Transmit Frame Type, IP Address, Subnet Mask, and Default Gateway.

NF where **NF1** = Ethernet II and **NF2** = IEEE 802.3	
Set Transmission Frame Type	**NF** is a privileged mode command. **NF** allows you to set the Ethernet Transmission Frame Type. The default Frame Type is Ethernet II.

NG nnn.nnn.nnn.nnn where **nnn** = a number between **0** and **255**.	
Set Gateway IP Address	**NG** is a privileged mode command. **NG** allows you to set the Ethernet Gateway IP Address. The Default Gateway IP Address is 192.0.0.1.

NI nnn.nnn.nnn.nnn where **nnn** = a number between **0** and **255**.	
Set IP Address	**NI** is a privileged mode command. **NI** allows you to set the Ethernet IP Address. The default IP address is 192.0.0.2.

NK n where **n** = a number between **0** and **538216** minutes. **0** maintains the Telnet session even if no commands are received for an infinite length of time.	
Set Telnet Session Keep Alive Time	**NK** is a privileged mode command. **NK** allows you to set the amount of time that the AM2S will rest between receipt of commands before it queries whether the workstation that started the session is still online. If the workstation is still online, the Telnet session will continue. If the workstation is off line, the AM2S will disconnect the Telnet session. The AM2S is then free to receive commands from any workstation on the network.

NM nnn.nnn.nnn.nnn where **nnn** = a number between **0** and **255**.	
Set Subnet Mask Address	**NM** is a privileged mode command. **NM** allows you to set the Ethernet Submask. The default Subnet Mask address is 255.255.255.0.

NX	
Exit from Telnet Session	**NX** allows you to exit the Telnet Session.

Program Operation Commands

P7 <link>= ccc	
Assign SS7 Signaling Link **(Digital)**	**P7** provides you with the means to assign signaling links to T1 or E1 spans. Up to 8 commands may be entered. Signaling assignments may be printed through the use of the **RA** command.
· <link> = 1 - 8	One of the signaling links. (It takes 8 commands to assign all 8 links.)
· ccc is omitted	Deletes the link specified.
· c (first) = A, B, C, D	Span letter for B-channels and limited signaling link assignment.
· c (first) = E, F	Span letter for signaling-only spans for units with T1/E1 Option.
· cc = 1 - 31	One of the voice/data channels with E1 Signaling Option.

PA ccc|ccc-ccc=n where **ccc**= line number **1-128** and **n**= protocol number (**1-4**).	
Assign protocol to a Line or Range of Lines **(Analog)**	**PA** assigns protocols to the lines in a unit. To determine available protocols, enter the **RA** command.

PA uu [-uu]=n where **uu**=2B1Q U-Interface or S/T-Interface line assignment **01-32**, **-uu**= optional line range ≥uu and **n**= protocol number (**1-8**).	
Assign a Protocol to a channel **(BRI)**	**PA** makes assignments of Voice/Data protocols to the U-Interface or S/T-Interface lines and channels in a CRS-ADB(e) unit. To determine available protocols, enter the **RA** command.

PA ccc|ccc-ccc=n where **ccc**=time-slot number **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **n**= protocol number (**1-4**).	
Assign Protocol to a Time-slot or Range of Time-slots **(Digital)**	**PA** assigns Voice/Data protocols to the Bearer Channels in the unit. To determine available protocols, enter the **RA** command.

PC ppp|ppp-ppp, <**name**>=<**value**> where **ppp** is a call program number in the range of **1-480**, **name** is the name of the parameter that you want to change, and **value** is the new value for the parameter.	
Assign Value to Parameter	Use the **PC** command to change the value of a single parameter in one or more call programs. Use a leading dot (.) to blank values.

PD ccc=n	
Assign D-channel and Protocol to Channel **(Digital)**	**c (first) = A, B, C, D** (Span letter for Facility Associated Signaling) **c (first) = A (only)** (Span letter for Non-Facility Associated Signaling)
	cc = 1 - 24 (CRS-DX channel - 24 is the default)
	cc = 1 - 31 (CRS-DXe channel - 16 is the default)
	n = 0 (No assignment; signaling only)
	n = 1 - 8 (Protocol number for provisions or unprovisioned D-channel packet protocols). To list protocols, use the **RA** command.

PF m where **m**=**1** for selecting Facility Associated Signaling, **m**=**0** for selecting Non-Facility Associated Signaling. **M=Omit** displays the current m-value.	
(Digital)	Select the Facility Associated Signaling mode

PL ppp|ppp-ppp,ss where **ppp** = a Call Program Number in the range (**1-480**) and **ss**= Script number (**1-20**).	
Assign Script to Call Program(s)	

PR m	
(Digital) Select transfer mode	**PR** provides the means to select (or display the setting of) a restricted (56 kBps) or unrestricted (64 kBps) transfer mode for an SS7 link. **m = 1** Select unrestricted transfer mode (64 kBps) - default **m = 0** Select restricted transfer mode (56 kBps) **m = omit** displays current transfer mode setting

PU m	
(Digital) Select User Mode Simulation	**m = 1** (Select User-side [terminal] Simulation) **m = 0** (Select Network-side [switch] Simulation) **m = omit** (displays the current m-value)

PV ss (where ss is a script number 1 - 20). Use a leading dot (.) to blank values.	
Open Copy Dialog for Entering Parameter Values	Entering PV causes the AM2S to generate a COPY>> prompt, initiating an interactive session. At COPY>> prompt enter **M**, **I**, **C,** or **X** where:
	M <**name**> <**value**> where **M** is the command to mark a parameter; **name** is the name of the parameter; and **value** is the new value to assign to the parameter.
	I <**name**> <**init_value**> <**min_value**> <**max_value**> <**step_value**> where: · **name** is the name of the parameter to change · **init_value** is the value from which the AM2S increments · **min_value** is the smallest value that the AM2S will enter. The **min_value** is the value that immediately follows the **max_value**. The unit starts incrementing from the **min_value** until it reaches the **max_value** or runs out of call programs to which to assign values. · **max_value** is the highest value that stepping is allowed to reach before the AM2S changes to the **min_value**. · **step_value** is the incremental value that the AM2S adds to the next call program in line until the max-value is reached, at which time rollover to the **min_value** occurs and incrementing begins again.
	C ppp-ppp where **ppp** is a line number in the range of **1-480**.
	L to list script parameters.
	X to close the interactive session.

Report Commands

RA	
List Protocol Line Assignments	Lists all PCM Protocols in the AM2S. It also shows default assignments, assignments generated by the **PA** command, or Signaling Link assignments generated by the **P7** command.

RB ccc|ccc-ccc|ALL where **ccc** is a line number in the range of **1-128**, and **ALL** is all 128 lines. **RB ccc|ccc-ccc|ALL, ss** where **ccc** is a line number in the range of **1-128**, and **ALL** is all 128 lines. **ss** is the script/report page number.	
List stats totals for lines/channels **(Analog)**	Standard report – RS ccc[-ccc] where ccc is line number or "all" Ex. RS all; RS 1; RS 1-30 Extended report – RS ccc[-ccc], ss where ccc is line number or "all" where ss is script/report page number Ex. RS all, 5; RS 1, 15; RS 1-30, 1; RS 1-2, 0 (prints stats for standard non-script specific report page)

RB ccc|ccc-ccc|ALL where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels in the group. **RB ccc|ccc-ccc|ALL, ss** where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels in the group. **ss** is the script/report page number.	
List stats totals for lines/channels **(Digital)**	Standard report – RS ccc[-ccc] where ccc is channel number or "all" Ex. RS all; RS A01; RS B01-B30 Extended report – RS ccc[-ccc], ss where ccc is channel number or "all" where ss is script/report page number Ex. RS all, 5; RS A01, 15; RS B01-B30, 1; RS C01-C02, 0 (prints stats for standard non-script specific report page)

RC ccc|ccc-ccc|ALL where **ccc** is a line number in the range of **1-128**, and **ALL** is all 128 lines.	
Reset Call Statistics Register **(Analog)**	RC ccc[-ccc] where ccc is line number or "all" Ex. RC all; RC 1; RC 1-30 **Note:** Resetting even a single Call Statistics Line Register resets the Real Time Error Messages Buffer. **Note:** Resetting Call Statistics for a line clears both Standard and Extended pages.

RC uuc [-uuc]|ALL where **uuc** is a line assignment in the CRS-ADB(e) in the range of **011-168** and **ALL** clears all statistics.	
Reset Call Statistics **(BRI)**	**uu = 01-32** for a U-Interface or S/T-Interface Line Number on an CRS-ADB(e) **c = 1-8** for a Call number **-uuc =** optional channel range ≥uuc **Note:** Resetting even a single Call Statistics Line Register resets the Real Time Error Messages Buffer. **Note:** Resetting Call Statistics for a line clears both Standard and Extended pages.

RC ccc|ccc-ccc|ALL where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels in the group..	
Reset Call Statistics Register **(Digital)**	RC ccc[-ccc] where ccc is channel number or "all" Ex. RC all; RC A01; RC B01-B30 **Note:** Resetting even a single Call Statistics Line Register resets the Real Time Error Messages Buffer. **Note:** Resetting Call Statistics for a channel clears both Standard and Extended pages.

RD	
Remote Diagnostics Dump	**RD** is a privileged mode command. **RD** lists the Host Error Register contents, memory utilized, active line groups, Ethernet information, and Network Debug Register contents.

RE n where **n** is a number in the range of **0** to **4**. If **n**= **0**, the AM2S lists the contents of each set. If **n**= a number between **1** and **4,** the CRS lists only the contents of the specific set.	
List Call Program Set Assignments	

RF <col #> <cause code> where **<col #>** is a column number in the range of **1-32** and **<cause code>** is the number of the cause code. Current setting listed if no parameters entered.	
Set Call Statistics Report Format	**RF** sets up one column of the Statistical report each time it is used.

RG ccc|ccc-ccc|ALL where **ccc** is a line number in the range of **1-128**, and **ALL** is all 128 lines.	
Set Realtime Reporting Range **(Analog)**	**RG** sets the range of lines required for realtime reporting information.

RG ccc|ccc-ccc|ALL where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels in the group.	
Set Realtime Reporting Range **(Digital)**	**RG** sets the range of channels required for realtime reporting information.

RH ss, rrrr[-rrrr][,rrrr][,rrrr-rrrr] (up to 32 codes) where **ss** is script/report page number (0-20) and **rrrr** is report code (1-65535)	
Set Report Column Assignment/Display Selected Codes	**Set Report Column Assignment** RH ss, rrrr[-rrrr][,rrrr][,rrrr-rrrr] where ss is script/report page number (0-20) Up to 32 codes where rrrr is report code (1-65535) Ex. RH 0, 1, 2, 11, 12 (standard page, 4 columns w/Orig Attempts, Orig Completes, Term Attempts, Term Completes) Ex. RH 2, 1, 2, 501-504 (script 2 page, 6 columns w/Orig Attempts, Orig Completes, Code 501, Code 502, Code 503, Code 504) **Display Selected Codes** RH ss where ss is script/report page number Ex. RH (display selected codes for standard page) Ex. RH 0 (display selected codes for standard page) Ex. RH 5 (display selected codes for script 5 page) Ex. RH 16 (display selected codes for script 16 page)

RL	
List Real Time Error Log	**RL** prints a list of all error messages that have accumulated since the last reset of the Call Statistics.

RL 1|0 where **1** lists errors as they happen and **0** turns off automatic error listing.	
Set Real Time Error Printing	**RL 1** automatic printing ON **RL 0** automatic printing OFF

RM	
Display Unit Status.	Status includes Unit ID, Model #, Software Release Version, Date, and Operating Status (e.g. Stopped, Running Set #, etc.)

RN	
Print Revision	Prints the hardware and software revisions of the unit.

RP m, ccc|ccc-ccc|ALL where **m**= a number in the range of **0** to **3** and **ccc** is a line number in the range of **1-128** and **ALL** is all 128 lines. When: **m=0**.....the unit scheduling off **m=1**.....the unit lists the call statistics every 15 minutes. **m=2**.....the unit lists the call statistics every 30 minutes. **m=3**.....the unit lists the call statistics every hour.	
Schedule Listing of Call Statistics **(Analog)**	

RP m, uuc [-uuc]|ALL where **m**= a number in the range of **0** to **3** and **uuc** is a line assignment in the CRS-ADB in the range of **011-168** and **ALL** is all span voice/data channels. When: **m=0**.....the unit scheduling off **m=1**.....the unit lists the call statistics every 15 minutes. **m=2**.....the unit lists the call statistics every 30 minutes. **m=3**.....the unit lists the call statistics every hour.	
Schedule Listing of Call Statistics **(BRI)**	**uu = 01-16** for a U-Interface or 01-08 for an S/T-Interface Line Number on a CRS-ADB(e) **c = 1-8** for a Call number **-uuc =** optional channel range ≥uuc

RP m, ccc|ccc-ccc|ALL where **m**= a number in the range of **0** to **3** and **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De) and **ALL** is all channels in the group. When: **m=0**.....the AM2S scheduling off **m=1**.....the AM2S lists the call statistics every 15 minutes. **m=2**.....the AM2S lists the call statistics every 30 minutes. **m=3**.....the AM2S lists the call statistics every hour.	
Schedule Listing of Call Statistics **(Digital)**	Current setting listed if no parameters entered.

RR	
List Run Mode, Trouble Mode, Start Schedule, & Run Sequence Settings	

RS ccc|ccc-ccc|ALL where **ccc** is a line number in the range of **1-128**, and **ALL** is all 128 lines. **RS ccc|ccc-ccc|ALL, ss** where **ccc** is a line number in the range of **1-128**, and **ALL** is all 128 lines. **ss** is the script/report page number.	
List Call Statistics **(Analog)**	Standard report – RS ccc[-ccc] where ccc is line number or "all" Ex. RS all; RS 1; RS 1-30 Extended report – RS ccc[-ccc], ss where ccc is line number or "all" where ss is script/report page number Ex. RS all, 5; RS 1, 15; RS 1-30, 1; RS 1-2, 0 (prints stats for standard non-script specific report page)

RS uuc [-uuc]|ALL where **uuc** is a line assignment in the CRS-ADB(e) in the range of **011-168** and **ALL** is all lines and channels.	
List Call Statistics **(BRI)**	**uu = 01-16** for a U-Interface or 01-08 for an S/T-Interface Line Number on an CRS-ADB(e) **c = 1-8** for a Call number **-uuc =** optional channel range ≥uuc

RS ccc|ccc-ccc|ALL where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels in the group. **RS ccc|ccc-ccc|ALL, ss** where **ccc** is a channel number in the range of **A01-D24** (AM2S-D) or **A01-D30** (AM2S-De), and **ALL** is all channels in the group. **ss** is the script/report page number.	
List Call Statistics **(Digital)**	Standard report – RS ccc[-ccc] where ccc is channel number or "all" Ex. RS all; RS A01; RS B01-B30 Extended report – RS ccc[-ccc], ss where ccc is channel number or "all" where ss is script/report page number Ex. RS all, 5; RS A01, 15; RS B01-B30, 1; RS C01-C02, 0 (prints stats for standard non-script specific report page)

RT 0	
List Loaded Scripts	**RT 0** prints a listing of Scripts in the unit, by number and name.

RT ss where **ss** is a script number in the range of 1-20.	
Display a Script Listing in ASCII Format	**RT ss** prints the list of instructions (including parameters and variables in a selected Script.

RV ppp where **ppp** is a single call program number from **1** to **480**.	
List Call Program Parameters/Values	**RV** prints the name and number of the Script used by the specified Call Program, along with its parameters and assigned values.

Test Control Commands

TA 1|2 where **1** arms the test schedule and **2** disarms the schedule. Current setting listed if no parameters entered.	
Arm/Disarm Test Schedule	**TA** arms the Start Schedule. When armed, the RUN SEQUENCE is performed at the future dates and times specified in the Start Schedule.

TC n s mmmm aaaaaa cccccc tttt where: **n** is the row/sequence number in the range of **1-4** **s** is the set number in the range of **1-4** or enter **0** if you want the sequence to pause for a set period. **mmmm** is the number of minutes that you want the program to run in the range of **1-9999**. **aaaaaa** is the number of call attempts in the range of **1-999999**. **cccccc** is the number of completed calls that will be made in the range of **1-999999.** **tttt** is an optional entry in the range of **1-9999** that instructs the CRS to run the sequence **tttt** times. If you do not enter a number in this field, the program will run the sequence once before **moving to the next line number**. If a 0 is entered, the sequence will run indefinitely.	
Set Run Sequence	Current setting listed if no parameters entered. Will not execute changes if error in parameters.

TD s, ppp-ppp where **s** is the set number in the range of **1-4** and **ppp** is the call program number in the range of **1-480**.	
Disable Call Program	**TD** disables any Call Programs in a Program Set. The disabled Call Program remains in the Set.

TE s, ppp-ppp where **s** is the set number in the range of **1-4** and **ppp** is the call program number in the range of **1-480**.	
Enable Call Program	**TE** enables Call Programs within a Set that have been disabled by the **TD** command.

TF	
Halt Test	Halts any tests in progress as soon as the individual line tests are completed. LEDs will continue to blink until line tests complete. May be restarted using the **TR** (Resume) command.

TG	
Start Run Sequence Manually	**TG** immediately starts a Run Sequence.

TK ppp|ppp-ppp (Delete a Range of Call Program Files) where **ppp** is a call program in the range of 1-480.	
Delete Call Programs	**Caution:** The **TK** command deletes the actual prog file from the AM2S. If the Call Program is assigned to more than one set, it will be removed from those sets. If you only want to remove a Call Program from a single set, use the **TU** command, or disable the Call Program using the **TD** command.

TL s, ppp|ppp-ppp where **s** is a set number in the range of **1-4**, and **ppp-ppp** are Call Program numbers in the range of **1-480**.	
Add Call Programs to Set	

TM m where **m= 0** places the unit in random mode and **m= 1** places the unit in synchronous mode.	
Set Run Mode	Current setting listed if no parameters entered.

TP n MM DD hh mm A/P where **n** is the row number in the range of **1-4**, **MM** is the month in the range of **01-12**, **DD** is the day in the range of **1-31**, **hh** is the hour in the range of **01-12**, **mm** is the minutes in the range of **00-59**, and **A/P** is either **A** for **AM** or **P** for **PM**. Current setting listed if no parameters entered.	
Schedule Tests	Will not execute changes if error in parameters.

TQ	
Stop Test Immediately	Stops all line activity. LEDs stop blinking on receipt of command.

TR	
Resume a Halted Test	

TS s where **s** is the set number in the range of **1-4**.	
Start Testing	

TT	
Retrieve Trace Buffer Data	**TT** transfers the contents of an MMP Trace Capture Buffer into a temporary file called "trace000". Once the data is in the file, its contents can be displayed and captured on a workstation using the **HU**, file upload, command. The file is displayed in HEX format. The files can then be viewed using the Ameritec TraceViewer program (P/N 942270102A). This application is an open source and can be requested through Ameritec Sales Support. Note that the Trace Buffer Retrieval process can also be easily handled by the MultiMedia Windows Application. Any buffer that has data can be retrieved using the **TT** remote command. Note that all trace buffers are cleared whenever a test set is started.

TU s, ppp|ppp-ppp where **s** is a set in the range of **1-4** and **ppp** is a call program in the range of **1-480**.	
Remove Call Program(s) from Set	**TU** removes the Call Program from the set. It does not delete the actual program (**prog**) file. To delete a Call Program use the **TK** command.

TV	
Display Call Program running state	**TV** displays the Call Program's running status. R = Running F = Finished D = Disabled S = Stopped

TX	
Trace Buffer Status List	**TX** displays a list of the status of the trace buffers on all line groups. Each line group is listed, followed by a list of the trace buffer numbers that currently have captured data in them. If a buffer is empty, it is not listed. Any buffer that has data can be retrieved using the **TT** remote command. Note that all trace buffers are cleared whenever a test set is started.

TY	
Print Test Run Time	**TY** prints the elapsed running time of the current set. If a set isn't running, the duration of the last test set run is displayed. Test duration is displayed as HH:MM:SS where HH is hours, MM is minutes, and SS is seconds. Ex: "Test's time is 0:23:02" or "Test's time is 324:23:02".

5 SPECIFICATIONS

5.1 Call Programs and Scripts

Call Test Sets

Up to four sets; resides in non-volatile memory

Call Programs

Up to 480 (analog/digital), 640 (BRI); resides in non-volatile memory

Scripts

- Up to ten factory scripts; resides in non-volatile memory
- Room for up to ten user generated scripts

5.2 Reports and Listings

Call Statistics Registers

Generates Call Statistics for each originate line/channel, including activity counters for the following:

- Calls Attempted
- Calls Completed
- Delayed Start Signal
- No Start Signal
- No Alert Signal
- No Voice Path
- Busy Signal Encountered
- No Answer Signal
- Ring Time Out
- Custom Code Report Count

The Call Statistics Registers can also average the times on the originate lines/channels for the following:

- Dial Tone Delay
- Post Dial Delay

Generates Call Statistics for each terminate line/channel, including activity counters for the following:

- Calls Attempted
- Custom Code Report Count
- Calls Completed

BRI generates Call Statistics for each Packet-Switched originate line including activity counters for the following:

- Calls Attempted
- Calls Completed
- Average Connect Acknowledge
- Average Connect Delay
- Slow Connect Acknowledge
- Slow Connect Delay
- Number of Packets Sent
- Number of Packets Resent
- Average Packets Delay
- No Connect Acknowledge
- Custom Code Report Count

BRI generates Call Statistics for each Packet-Switched terminate line, including activity counters for the following:

- Calls Attempted
- Custom Code Report Count
- Calls Completed

Real-Time Error Reporting

- Listed as they occur
- Lists of to 100 most recent error reports on demand
- Listing reports the error type, line/channel(s) involved, and time of occurrence
- Error types reported:
  - Slow Start
  - No Start
  - No Alert Tone
  - Path Confirmation Failure
  - No Answer Signal
  - Ring Time-Outs
  - Busy
  - Custom Code Report Count
  - Protocol Cause Values (PRI/SS7)

B-Channel Path Confirmation (BRI/PRI/SS7)

Circuit-Switched Voice (CSV)

CSV consists of 10 user-selectable single tone signals to send unique channel IDs. 64 user-selectable single tones are available for programming

Circuit-Switched Data (CSD)

CSD consists of 56k or 64k High Level Data Link Control (HDLC) packets containing channel identification or a Bit Error Rate Test (BERT) pattern

Packet-Switched Data

Packet-switched data consists of user-programmable X.25 packets for up to 8 B-Channels per trunk for path confirmation

5.3 User Interface

- Command Driven via RS-232 or Ethernet
- Windows 3.1, Windows NT, and Windows 95 compatible, FeatureCall GUI

5.3.1 Front Panel Controls and Indicators

Line Status

AM2S-A - 64 LEDs, two LEDs per each physical line

AM2S-B - 96 LEDs, three LEDs per each physical line (one D-channel and 2 B-channel)

AM2S-Digital - 96 LEDs, one for each T1 channel
120 LEDs, one for each E1 channel

Line Status LED Colors:

Dark: Idle; **Green:** Originate Line Off-Hook
Red: Line Error **Yellow:** Terminate Line Off-Hook

Audio Monitor

Volume controls for adjusting left and right volume of speaker.

5.3.2 RS-232/Ethernet Ports

RS-232

DB-25P, 25-pin male connector

RS-232 Auxiliary Ports for Chaining

DB-9P, 9-pin female connector

Ethernet

- DB-25 to RJ-45 10 Base-T adapter (48-0192)
- Serial 1-to-2 extension cable to simultaneously connect the 10Base-T adapter and RS-232 ports (48-0189)
- 10Base-T Interface (10Mbps)
- IEEE 802.3 Compliance

5.4 Test Interface

Test Ports (Analog)

Eight RJ-45 connectors wired per EIA/TIA standards (4 line pairs each)

Test Ports (BRI)

- Eight RJ-45 connectors that provide for U-Interface lines, 1 to 32 in groups of four
- Trace Port that provides a 4-wire ISDN interface

Test Ports (Digital)

The Line Interface consists of one of five connector port options.

- Bantam PCM Connector (standard)
- Tri-Banana PCM Connector (option no. 280130AY-2)
- BNC PCM Connector (option no. 280130AY-3)
- Siemens PCM Connector (option no. 280130AY-4)
- Bantam PCM Connector w/120Ω balanced impedance (option no. 280130AY-5)

5.5 Physical Characteristics

Power: 90-264 VAC @ 47-65 Hz and 50 watts

Dimensions

Width: 16.8 inches (43 cm)
Height: 11 inches (29.5 cm)
Depth: 7.2 inches (18.5 cm)
Weight: 16.5 lbs. (7.5 kgms)

Environment

Operating Temperature: 0ºC to 40ºC
Humidity: 10% to 90% non-condensing

5.6 System

Capacity

- **Analog:** 64 lines.
- **BRI:** All channels originate or terminate calls. PCM timing may be sourced internally or from any of the 32 trunk lines
- **Digital CAS:** All channels originate or terminate calls. PCM timing may be sourced internally or from any of the trunk lines
  - 1.544 Mbps PCM, 24 channel, T1 CAS trunks, menu selectable D3/D4 or ESF framing
  - 2.048 Mbps PCM, 30 channel, E1 CAS trunks, menu selectable CRC4
- **Digital PRI:** All channels originate or terminate calls. PCM timing may be sourced internally or from any of the trunk lines
  - 1.544 Mbps PCM, T1 CCS (23B+D) AM1 or B8ZS line coding, menu selectable D3/D4 or ESF
  - 2.048 Mbps PCM, E1 CCS (30B+D), HDB3 line coding, menu selectable CRC4
- **Digital SS7:** All channels originate or terminate calls. PCM timing may be sourced internally or from any of the trunk lines
  - One to four 1.544 Mbps PCM, T1 CCS trunks (PCM24) AM1 or B8ZS line coding, menu selectable D3/D4 or ESF
  - One to four 2.048 Mbps PCM, E1 CCS trunks (PCM30/PCM31), HDB3 line coding, menu selectable CRC4

Clock

INPUT: Capture range is ±30ppm. Signal frequency within this range is guaranteed to be captured.

OUTPUT: Frequency accuracy is ±100ppm. Output signal frequency is guaranteed to be within 100ppm.

Line Types

- **Analog:** Lines compatible with NIS S106-1, DTMF in-band Dialing, Simulated Sets are not Loop Powered
- **BRI:** 8 to 32 (2B1Q encoded) U-Interface lines (2B+D)
- **Digital CAS:** supports all CAS using ABCD signaling bits and MFR1 or MFR2 in-band tones. DTMF can also be generated. T1 uses standard protocols. E1 uses generic CCITT R2 Q.420/Q.441 protocols.

Signaling Systems (BRI)

- **LAYER 1**: 2B1Q, ANSI TI.201-1992 ISDN Basic Access Interface for use on metallic loops for application on the network side of the Network Termination (NT). Data transmission is full duplex at 160 kBps
- **LAYER 2**: Q.921/Link Access Procedure D-Channel (LAPD) and Link Access Procedure B-Channel (LAPB) (X.25)
- **LAYER 3**: Q.931 and equivalent standards. Up to 8 different Layer 3 Protocols may be downloaded to the unit. L3 Protocols for each U-Interface are menu-selectable.

Signaling Systems (PRI)

- **LAYER 1**: Per CCITT 1.412, 1.431, and ANSI T1.408
- **LAYER 2**: Q.921/Link Access Procedure D-Channel (LAPD) and Link Access Procedure B-Channel (LAPB) (X.25). Up to 4 different Layer 2 Protocols (one per trunk) may be downloaded into the unit
- **LAYER 3**: Q.931 and equivalent standards. X.25 Packet Data on the D-Channel and B-Channel. Up to 8 different Layer 3 Protocols may be downloaded to the unit. Protocols for each B- or D-Channel are menu selectable. The D-Channel (signaling channel) may be assigned to any physical time slot.

Signaling Protocols (SS7)

- **T1**
  - Bellcore Q.702 at Level 1
  - Bellcore Q.703 at Level 2
  - Bellcore Q.704 at Level 3
  - Bellcore Q.761 to Q.766 ISUP signaling
  - Regional TUP varieties
- **E1**
  - CCITT Q.702 at Level 1
  - CCITT Q.703 at Level 2
  - CCITT Q.704 at Level 3
  - CCITT Q.761 to Q.766 ISUP signaling
  - BTNR 167
  - Regional TUP varieties

Eight signal Protocol State Tables: T1 and E1, X.25 LAPB on voice-data circuits

Signaling Links (SS7)

- **T1:** Fully associated links using time slots in the voice-data circuits are supported
  - Two x T1, 1.544 Mbps spans
  - Eight x V.35, 56/64 Kbps
  - Eight x DS0A, 56 Kbps
- **E1:** Fully associated links using time slots in the voice-data circuits are supported
  - Two x E1, 2.048 Mbps spans
  - Eight x V.35, 64 Kbps

Voltage Ring Detect Options (Analog)

There are two options provided for detection of a lower voltage limit for ringing:

- **250457 Voltage Ring Detect Option, 900Ω**
- **250458 Voltage Ring Detect Option, 600Ω**

The specification is unchanged from the normal Analog line card except for the lower limit of ring detection. **Ring Voltage Detection:** Minimum guaranteed detection voltage: **25V RMS**.

This specification allows the card to detect ringing in all European countries (lowest specified voltage is **25V RMS**).

Table 5-1. Minimum Voltages for Ringing Signal

COUNTRY	MINIMUM VOLTAGE	COUNTRY	MINIMUM VOLTAGE
Austria	26	Ireland	80
Belgium	75	Italy	26
Bulgaria	30	Luxembourg	55
Cyprus	25	Netherlands	35
Czech Republic	35	Norway	28
Denmark	40	Poland	40
Finland	35	Portugal	30
France	25 V/2 kΩ	Slovakia	70
Germany	40	Spain	65
Greece	25	Sweden	64
Hungary	44	Switzerland	25
Iceland	30	United Kingdom	63

System Start Modes

- Manual
- Random
- Synchronous
- Stagger (BRI, CAS, PRI, SS7)
- Sequential (BRI, CAS, PRI)

Trouble Encounter Response

- Continue
- Stop on Error
- Stop on Programmed Error Thresholds

5.7 Tone Detectors

Call Progress Detectors (Analog)

- One detector per line/channel
- Detects dial tone, busy, reorder, ring supervision, and wink tones

Call Progress Detectors (Digital)

- One detector per channel based on Digital Signal Processors (DSP)
- Detects dial tone, busy, reorder, and ring-back

Path Confirmation Receiver - One receiver per line/channel

Frequency Range: 10 to 2500 Hz

Accuracy: 1%; ± 10 Hz

Sensitivity: 0 to -24 dBm

Response Time: 12.5 msec

Signaling Tone Decoders (Digital) - One decoder per channel, measuring frequency of MFR1 and MFR2

Digit Receivers (PRI, SS7) - One receiver per channel, measuring frequency of MFR1 and MFR2

DTMF Receiver (Analog, Digital, PRI, SS7) - Decodes received DTMF digits

Response time: Under 40 msec

Dynamic Range: 35 dB

Digit Receiver (BRI) - One receiver per B-channel to decode MFR1, MFR2, and DTMF digits

5.8 Digit Generators

One digit generator per line/channel/timeslot.

Dialing Codes (Analog): MFR1, DTMF

Dialing Codes (Digital): MFR1, MFR2, DTMF

Dial Speed (PRI, SS7): 1 - 99 pps

Dial Break (PRI, SS7): 1 – 99%

Interdigit Time (PRI, SS7): 1 - 99 pps

Default Level: -9 dBm

Default Frequencies: Nominal = 0.005%

Programmability: Each line individually for Level and Frequency.

Level: 0 to -50 dBm in 1 dB steps for each frequency component.

Frequency: Up to 12.5% above or below nominal in 0.1% steps for each frequency component.

5.9 Confirmation Tone Generators

Produces 64 selectable tones, including ten preprogrammed single tone signals, used to send the line ID from each side encoded as a three tone sequence.

Encoding Scheme

0 ..... 1025 Hz	4..... 1525 Hz	7.....1900 Hz
1 ..... 1150 Hz	5..... 1650 Hz	8.....2025 Hz
2 ..... 1275 Hz	6..... 1775 Hz	9.....2150 Hz
3 ..... 1400 Hz		

6. WARRANTY, CALIBRATION, AND SERVICE

6.1 Warranty

Ameritec Corporation warrants that its electronic instrument products are manufactured to the highest commercial standards and are free from any defects in material or workmanship. For a period of one (1) year from shipment, Ameritec will repair without charge to the original purchaser any unit, which upon inspection by Ameritec proves to be defective.

This warranty is the sole warranty offered by Ameritec and is in lieu of all other obligations or liabilities, including claims of consequential damage; however, an EXTENDED WARRANTY PLAN may be purchased. For information contact an Ameritec Sales Representative.

6.2 Service Policy

Ameritec products are designed with plug-in printed circuit boards and modular assemblies. Once a problem is localized, service is accomplished by PC board (or module) replacement.

6.3 Calibration Policy

All Ameritec products are manufactured to commercial standards and are calibrated with equipment traceable to NIST (National Institute of Standards and Technology). With the exception of component failures or abuse, Ameritec instruments are designed to maintain compliance with their published specifications throughout their service life.

While periodic calibration verification is normally not required, in critical applications it is recommended that verification be accomplished annually.

Calibration verification is most efficiently accomplished by return of the equipment to the Ameritec factory where specialized test equipment is used. Field calibration verification is not supported by Ameritec.

6.4 FeatureCall License & Warranty

Be advised: By opening the sealed FeatureCall software package(s) or by using the *Software*, you agree to be bound by the terms and conditions of the FeatureCall Agreement. If you do not agree to the terms of the FeatureCall Agreement, promptly return the complete product, with a copy of the purchase order, to AMERITEC, or its authorized dealer, for a full refund or for a credit against future purchases.

For further Warranty and Licensing information, please refer to the User's Manual accompanying your FeatureCall software.

6.5 Return of Unit

In the event of a malfunction call or write to the Ameritec factory and obtain a return authorization number. Return the unit to Ameritec freight prepaid with a note in-warranty repair) or a Purchase Order for the repair (out-of-warranty repair) listing the following information:

- Return authorization number from Ameritec.
- Return shipment address of purchaser.
- Name and telephone number of person at purchaser's location familiar with the problem.
- Brief description of problem (include any printouts that may have a bearing on the problem, if possible).
- Terms of payment for repair costs (out-of-warranty unit).

The unit will be repaired and returned freight-prepaid for units in warranty and freight-collect for units out-of-warranty. As stated above, a Purchase Order to cover the cost of repair must accompany any out-of-warranty return of the unit to Ameritec.

Ameritec
760 Arrow Grand Circle
Covina, CA 91722 USA
TEL 626.915.5441
FAX 626.915.7181
www.ameritec.com

7. GLOSSARY

ACRONYM	COMPLETE TERM or DEFINITION
AC	Alternating Current
ACM	Address Complete Message
ADSI	Analog Display Services Interface
AMI	Alternate Mark Inversion
ANSI	American National Standards Institute
ASK	Amplitude Shift Keying
B-Channel	Digitized Voice/Data (Bearer) Channel BRI [B1-B2(2B+D)]
B8ZS	Bipolar with 8-Zeros Substitution
BC	Bellcore
BCI	Backward Call Indicator
BERT	Bit Error Rate Testing
BPV	Bit Polarity Violation
BRI	Basic Rate Interface
BT	British Telecommunications
CAS	Channel Associated Signaling
CCITT	Consultative Committee on International Telegraphy and Telephony
CCS	Common Channel Signaling
CDS	Calling Display Service
CIC	Circuit Identification Code
CLIP	Calling Line Identification Presentation
CNAM	Calling Name Delivery
CND	Calling Number Delivery
CNIC	Calling Number Identification Circuit
CPE	Customer Premises Equipment
CPN	Called Party Number
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSD	Circuit Switched Data
CSV	Circuit Switched Voice
CTA	Cable Television Authority
D-Channel	Signaling Channel
D4 (SF)	Superframe
dB	decibels
dBdsx	3V Peak-to-Peak
dBm	decibels relative to 1 mw

ACRONYM	COMPLETE TERM or DEFINITION
dBr n	decibels of relative noise (0 dBrn = -90 dBm)
DC	Direct Current
Downstream	The direction of signals from Network to TE
DPC	Destination Point Code
DS0A	Digital Signal Zero Octet Format A
DSP	Digital Signal Processor
DTMF	Dual Tone Multi-Frequency
DUP	Data User Part
E1	2048 Kbit telephone line containing thirty-two 64Kbit channels.
ERL.	Erlangs
ESF	Extended Superframe
FAS	Frame Alignment Signal
FCI	Forward Call Indicator
FSK	Frequency Shift Keying
GUI	Graphical User Interface
HDB3	High-Density Bipolar code of order 3
HDLC	High Level Data Link Control
Hz	Hertz (cycles per seconds)
IAM	Initial Address Message
Idle State	An electrical condition into which the TE, when connected to the Network, is placed such that it draws minimum current and does not activate the exchange
IP	Internet Protocol
ISDN	Integrated Service Digital Network
ISUP	ISDN User Part
ITR	Tip and Ring Current a.k.a. Loop Current
kB	kilobytes
Kbps	kilobits per second
LAN	Local Area Network
LAPB	Link Access Procedure B-Channel
LAPD	Link Access Procedure D-Channel
Loop Start	An electrical condition into which the TE, when connected to the Network, is placed such that it draws enough current to be capable of activating the exchange
Mbps	Megabits per second
MFR1	Multi-Frequency R1
MFR2	Multi-Frequency R2
MINOAS	Message Indicator and Number of Address Signal
MTP	Message Transfer Part
NC	Network Cluster

ACRONYM	COMPLETE TERM or DEFINITION
NCM	Network Cluster Member
NCS	Network Call Simulation
NFAS	Network Facility Associated Signaling
NI	Network Identifier
NIST	National Institute of Standards and Technology
NOCI	Nature of Connection Indicator
NV-RAM	Non-Volatile Random Access Memory
OPC	Origination Point Code
P/N	Part Number
PBX	Private Branch Exchange
PCM	Pulse Code Modulation
POTS	Plain Old Telephone Service
ppm	pulses per minute
PRA	Primary Rate Access
PRI	Primary Rate Interface
PSM	Protocol State Machine
PST	Protocol State Table
RAM	Random Access Memory
ROM	Read Only Memory
Rx	Receive/Receiver
SAM	Subsequent Address Message
SAO	Subsequent Address Message with One Signal
SCCP	Signaling Connection Control Part
SCP	Service Control Point
SIN	Suppliers Information Note
SIO	Service Information Octet
SLS	Signaling Link Selection
SLTM	Signaling Link Test Message
SP	Signaling Point
SPC	Signaling Point Code
SS7	Signaling System #7
SSP	Service Switching Point
STP	Signal Transfer Point
T1	1544 Kbit line containing twenty-four 64Kbit channels
TCAP	Transaction Capabilities Application Part
TCP/IP	Transport Control Protocol/Internet Protocol
TDM	Time Division Multiplexing

ACRONYM	COMPLETE TERM or DEFINITION
TDMA	Time Division Multiplexing Access
TE	Terminal Equipment
TMR	Transmission Medium Requirement
TS	Time Slot or Channel
TUP	Telephone User Part
Tx	Transmit
Upstream	The direction of signals from TE to Network
USI	User Service Information
VAC	Volts Alternating Current
VDC	Volts Direct Current

A.1 APPENDIX A: Cause Codes

A.1.1 Real Time Error Message Codes

Table A-1 provides codes and message text for errors that occur as the unit is operating. Table A-10 provides the 'y' register code definitions for System Error messages. Table A-11 defines Call Statistic Data Register Codes.

An example of a Real Time Error Message with descriptions of each section is shown below. The underlines do not appear in the actual listing.

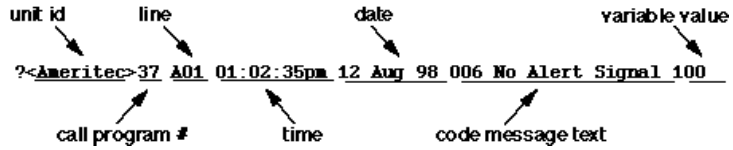


Table A-1. Real Time Error Report Messages

Report Name	Code	Message Text	Report
R_SLOWSTART	4	004 Slow Start Signal x	SLOW START
R_NOSTART	5	005 No Start Signal x	NO START
R_NOALERT	6	006 No Alert Signal x	NO ALERT
R_NOCONF	8	008 Confirming Failure x	NO CONFRM
R_BUSY	9	009 Called Subs Busy x	CALLED BUSY
—	10	010 No Answer Signal x	NO ANS SIGNAL
—	13	013 Ring Timeout x	RING TIMOUT
R_A1 • • • • R_A15	33 • • • 47	033 R2 A1 Received 0 047 R2 A15 Received 0	(first and last of series shown)
R_B1 • • • • R_B15	48 • • • 62	048 R2 B1 Received 0 062 R2 B15 Received 0	(first and last of series shown)
NOSZAK	63	063 No Seize Ack	Internal error
	239	File System Fault	
—	240	Power Lost 0	Internal error
—	241	Power Restored 0	Internal error
—	242	Start Sets s	Internal error. s=1-4
—	243	Finished Set s	Internal error. s=1-4
—	244	Stopped Set s	Internal error. s=1-4

Report Name	Code	Message Text	Report
—	245	Stopped on Trouble s	Internal error. s=1-4
—	246	Lost Real Time Reports r	Internal error. r = number lost
—	247	Code is unassigned	Internal error
—	248	Invalid Ch Assgn*	x=1-Call Program Assignment Err x=2-Audio Monitor Assignment Err
—	249	Code is unassigned	Internal error
R_GDSPERR	250	Global DSP error	
R_PSTERR	251	Protocol Error*	x=state number/unexpected event number. See ¶A.1.2, Table A-2, A-3, A-4, A-5, and A-6.
R_INTRERR	252	Cause Code*	x=cause code. See ¶A.1.3, Table A-7, A-8, and A-9.
R_RMError	253	Layer 1 ACT Error*	(BRI Only)
R_CPError	254	Call Prog Error	x=the offset into the Call Program where an error has occurred **or** -1 if out of memory on LGC when trying to download a new Call Program.
R_SYSERR	255	255 System Error y	See Table A-10 for y values

Any code over 32 automatically generates a Real Time Error message.
Any codes up to 32 may also be specified for Statistics Display/Statistical Report.
The register ("y") follows the message text for System Error. The meaning of these values are listed in Table A-10.
Names in Report column are default report-column headings for all units.
* Units with older versions of Host Software will have "Code is Unassigned" as the text.

A.1.2 Error Code 251 - Protocol Error Messages

Use the following tables to decode real time error code 251. Code 251 lists both the number assigned to the protocol state and the number assigned to the event.

Ameritec protocols are State Tables. Each State in the table has a list of events that it responds to, and each event has a related action. If an unexpected event is received, the Call Generator remains in the same state and generates a real time error 251 listing the state number in which the unexpected event was received and the number of the unexpected event.

Protocol errors are always reported in pairs. These pairs may be identified by identical Call Program numbers, channel numbers, and time stamp. The first listing in the pair provides the state number and the second listing provides the unexpected event number.

In the example below, the state number is 11 and the unexpected event is 176. Table A-2 lists the State number and name for each of the BRI Protocols, Table A-3 lists the State number and name for each of the PRI Protocols, while Table A-5 lists the possible BRI/PRI event numbers and names. Table A-4 lists the State number and name for each of the SS7 Protocols, while Table A-6 lists the possible SS7 event numbers and names. In our PRI example, during the DIS_RQST state (11) the Call Program received an unexpected EV_OFFHOOK (176).

```
Call
Prog     Chan     Time                    Cause               Value
092      A01      10:37:47am 12 Dec 99    251 Protocol Error  11
092      A01      10:37:43am 12 Dec 99    251 Protocol Error  176
093      B02      10:37:43am 12 Dec 99    251 Protocol Error  11
093      B02      10:37:43am 12 Dec 99    251 Protocol Error  176
```

If you want to explore an unexpected event further, open up the respective protocol source (.stb) file. The last event for each State is EV_ANY. The associated action AC_DIAG has a number listed in the Action Data column that corresponds to the State number listed in the Real Time Error listing.

Unexpected Events typically occur after new state tables are created either for a switch or for the Call Generator. The Protocol Real Time listing can assist in the debugging of new state tables.

Table A-2. Code 251 BRI Protocol State Numbers

9228001	**WQ931T_CVD**	U.S. En Bloc Dialing for CSV, CSD, or D-Pkt			(SPID)
9228003	**WA931TOCVD**	Int'l En Bloc Dialing for CSV, CSD, or D-Pkt			(No SPID)
9228004	**WQ931T_COV**	U.S. Overlap Dialing for CSV, CSD, or D-Pkt			(SPID)
9228007	**WA931TOCOV**	Int'l Overlap Dialing for CSV, CSD, or D-Pkt			(No SPID)
1	INITIALIZE	5	CALL_RECVX25	11	CALL_DLVR
2	ORIG_L2_ESTB	6	CALL_RECV	12	ACTIVE
13	O_RESP	7	CONN_RQST	15	ACTIVEX25
3	TERM_L2_ESTB	8	CONN_RQSTX25	16	DIS_RQST
14	T_RESP	9	CALL_INIT	17	DIS_RQSTX25
4	NULL	10	OUT_CALLPROC	18	REL_RQST

9228003 **WEKTST_CVD** U.S. Basic EKTS En Bloc Dialing for CSV, CSD, or D-Pkt (SPID) **9228006** **WEKTST_COV** U.S. Basic EKTS Overlap Dialing for CSV, CSD, or D-Pkt (SPID)					
1	INITIALIZE	5	CALL_RECVX25	11	CALL_DLVR
2	ORIG_L2_ESTB	6	CALL_RECV	12	ACTIVE
13	O_RESP	7	CONN_RQST	15	ACTIVEX25
3	TERM_L2_ESTB	8	CONN_RQSTX25	16	DIS_RQST
14	T_RESP	9	CALL_INIT	17	DIS_RQSTX25
19	KEYT_L2_ESTB	10	OUT_CALLPROC	18	REL_RQST
4	NULL				

9228008 **WACUSTOPOV** U.S. Lucent Custom Point-to-Point Overlap Dialing (No SPID)					
1	INITIALIZE	5	CALL_RECV	9	CALL_DLVR
2	ORIG_L2_ESTB	6	CONN_RQST	10	ACTIVE
3	TERM_L2_ESTB	7	CALL_INIT	11	DIS_RQST
4	NULL	8	OUT_CALLPROC	12	REL_RQST

Table A-3. Code 251 PRI Protocol State Numbers

9225003 **WQ931NACVD** Simulating Network Side, Facility Associated Signaling **9225004** **WA931NACVD** Simulating Network Side, Facility Associated Signaling & Service Message **9225005** **WQ931NNCVD** Simulating Network Side, Non-Facility Associated Signaling) **9225006** **WA931NNCVD** Simulating Network Side, Non-Facility Associated Signaling & Svc Message **9225007** **WQ931NACHD** HO (384 kBps) Simulating Network Side, Facility Associated Signaling **9225008** **WA931NACHD** HO (384 kBps) Simulating Network Side, Facility Associated Sig & Svc Msg					
1	INITIALIZE	5	OCALL_PROC	10	ACTIVE
2	ORIG_L2_ESTB	7	CALL_PRES	11	DIS_RQST
3	TERM_L2_ESTB	8	ICALL_PROC	12	REL_RQST
4	NULL	9	CALL_RECV		

9225009 **WQ931TACVD** Simulating User Side, Facility Associated Signaling **9225010** **WQ931TNCVD** Simulating User Side, Non-Facility Associated Signaling **9225011** **WQ931TACHD** HO (384 kBps) Simulating User Side, Facility Associated Signaling					
1	INITIALIZE	5	CALL_RECV	9	CALL_DLVR
2	ORIG_L2_ESTB	6	CONN_RQST	10	ACTIVE
3	TERM_L2_ESTB	7	CALL_INIT	11	DIS_RQST
4	NULL	8	OUT_CALLPROC	12	REL_RQST

9225019 WX.25_APP_01 Unprovisioned X.25 Packet Switched Call Simulating Terminal (User) or Network Side Facility Associated Signaling for both D- and B-Channel					
1	INITIALIZE	4	NULL	7	ACTIVE
2	ORIG_L2_ESTB	5	CALL_RECV	8	DIS_RQST
3	TERM_L2_ESTB	6	CONN_RQST		

Table A-4. Code 251 SS7 Protocol State Numbers

Bellcore SS7 ISDN User Part **CCITT SS7 ISDN User Part** **CCITT SS7 Telephone User Part** **Itatel SS7 Telephone User Part** **China Telephone User Part** **Spain Telephone User Part** **CCITT SS7 ISDN User Part** with Overlap **CCITT SS7 ISDN User Part** with Collect Call Reject & Call Drop Back					
2	ORIG_L2_ESTB	3	TERM_L2_ESTB	4	NULL
5	CALL_RECV	6	CONN_RQST	7	CALL_INIT
8	OUT_CALLPROC	10	ACTIVE	12	REL_RQST
British Telecom National User Part					
2	ORIG_L2_ESTB	3	TERM_L2_ESTB	4	NULL
5	CALL_RECV	6	CONN_RQST	7	CALL_INIT
8	OUT_CALLPROC	10	ACTIVE	12	REL_RQST
19	CFR_RQST				

Table A-5. Code 251 PRI/BRI Event Numbers

Event #	Event Name	Description
65	EV_ALERT	Received alert message
66	EV_CALLPRO	Received call proceeding
67	EV_CONFREJ	Received conference reject message
68	EV_CONFREQ	Received conference request message
69	EV_CONGCTL	Received congestion control
70	EV_CONNECT	Received connect message
71	EV_CONNACK	Received connect acknowledge message
72	EV_DISC	Received disconnect message
73	EV_DRPACK	Received drop acknowledge message
74	EV_DRPREJ	Received drop reject message
75	EV_FAC	Received facility message

Event #	Event Name	Description
76	EV_HOLD	Received hold message
77	EV_HOLDACK	Received hold acknowledge message
78	EV_HOLDREJ	Received hold reject message
81	EV_INFO	Received information message
82	EV_KEYHOLD	Received key hold message
83	EV_KEYREL	Received key release message
84	EV_KEYSU	Received key setup
85	EV_KEYSUACK	Received keypad setup acknowledge
86	EV_NOTIFY	Received notify message
87	EV_PROG	Received progress message
88	EV_RECONACK	Received reconnect acknowledge msg
89	EV_RECONREJ	Received reconnect reject message
90	EV_REG	Received register message
91	EV_RELEASE	Received release message
92	EV_RELCOMP	Received release complete message
93	EV_RESUME	Received resume message
94	EV_RESACK	Received resume acknowledge message
95	EV_RESREJ	Received resume reject message
98	EV_RESTART	Received restart message
99	EV_RESTACK	Received restart acknowledge message
100	EV_RETRIEV	Received retrieve message
101	EV_RTRVACK	Received retrieve acknowledge message
102	EV_RTRVREJ	Received retrieve reject message
103	EV_SETUP	Received setup message
104	EV_SUACK	Received setup acknowledge message
105	EV_STATUS	Received status message
106	EV_STATENQ	Received status enquiry message
107	EV_LONGMSG	Generated in CCS units when L3/L4 message is too long
109	EV_BADMSG	Generated in CCS units when invalid L3/L4 message is received
110	EV_SEGMENT	Segment message received
114	EV_SUSPEND	Received suspend message
115	EV_SUSACK	Received suspend acknowledge message
116	EV_SUSREJ	Received suspend reject message
117	EV_USRINFO	Received user information message

Event #	Event Name	Description
118	EV_ESTL2	Received established L2 status from L2
119	EV_LOSTL2	Received L2 lost message from L2 PST
120	EV_L1ON	Layer 1 is activated
121	EV_L1OFF	Layer 1 is deactivated
125	EV_UA0	Received UA for circuit switched link F=0
132	EV_PrInit	Initialize the simple call progress detection state machine
150	EV_UA1	Received UA for circuit switched link F=1
152	EV_DISCPSL2	Received L2 packet DISC request
155	EV_ESTPSL2REQ	Force L2 established X.25 (use w/AC_ESTPSL2REQ)
156	EV_ESTL2REQ	Force establish L2 (use w/AC-ESTL2REQ)
164	EV_OFFHKX25	Received packet event offhook
165	EV_ONHKX25	Received packet event onhook
166	EV_DIALX25	Received event dial digit
167	EV_ESTL2X25	Received packet Establish request
168	EV_L2X25LST	Received packet L2 lost
170	EV_CALLREQ	Received Call Request
172	EV_CLRCONF	Received Clear Confirm
173	EV_CLRREQ	Received Clear Request
175	EV_RESCONF	Received Reset Confirmation
176	EV_OFFHOOK	Call Program Channel OFFHOOK command
177	EV_ONHOOK	Call Program Channel ONHOOK command
178	EV_TONHOOK	Terminate ONHOOK
179	EV_DIALDP	Call Program Dial using dial pulses command
180	EV_DIALTT	Call Program Dial using Touch Tones (DTMF) command
181	EV_DIALMFR1	Call Program Dial using CCITT MFR1 tones command
183	EV_FLASH	Momentary onhook generated by the Call Program
185	EV_SENDID	Call Program Channel SENDID command
186	EV_RECVID	Call Program Channel RECVID command
187	EV_STOPID	EVENT 187 command sent by Call Program
196	EV_DONE	General DONE event, e.g. done dialing
197	EV_FAIL	General FAIL event, e.g. SENDID fails to receive an acknowledge
198	EV_COUNT0	General Purpose down counter reached 0
202	EV_GETDSP	Allows Call Program to change DSP assignment

Event #	Event Name	Description
203	EV_NODIGITS	No Dial Digits available to send
204	EV_FC_NAK	No control frequency (FC = 1700Hz or 1900Hz) received for SOCOTEL digit
205	EV_FC_STUCK	SOCOTEL control frequency (FC =1700Hz or 1900Hz) stuck on
206	EV_LASTDIGIT	Last Dial digit was just sent
207	EV_MFR1_STUCK	CCITT MFR1 (R2S) digit stuck on (no response to control frequency)
208	EV_SENDTONE	SENDTONE, SENDVOX, or SENDBERT command sent by Call Program. **Units shipped before 1/19/94 may not be equipped with SENDVOX and SENDBERT.**
209	EV_SZACK	EVENT 209 command sent by Call Program
210	EV_ENDSEL	EVENT 210 command sent by Call Program
211	EV_ORIGINATE	Select originate protocol (by call program)
212	EV_TERMINATE	Select terminate protocol (by call program)
213	EV_RECVTONE	RECVTONE command sent by Call Program
214	EV_RECVDIGITS	Receive digits (receiver type is set by script) **Units shipped before 6/18/93 may not be equipped with this feature.**
214	EV_RESIND	Received Reset Indication **X.25 Packet Only.**
215	EV_RECVDP	Start the reception and storage of Dial Pulse digits. **Units shipped before 6/18/93 may not be equipped with this feature.**
215	EV_RSTCONF	Received Restart Confirmation **X.25 Packet Only.**
216	EV_RECVDTMF	Start the reception and storage of CCITT Touch Tone (DTMF) digits. **Units shipped before 6/18/93 may not be equipped with this feature.**
216	EV_RSTIND	Received Restart Indication **X.25 Packet Only.**
217	EV_RECVMFR1	Start the reception and storage of CCITT MFR1 digits. **Units shipped before 6/18/93 may not be equipped with this feature.**
217	EV_ERR1	Protocol discrimination error
218	EV_ERR2	Message too short
219	EV_ERR3	Call reference error
220	EV_ERR4	Invalid call reference format
221	EV_ERR5	Invalid call reference value
222	EV_RECVBERT	RECVBERT command sent by the Call Program. **Units shipped before 1/19/94 may not be equipped with this feature.**
222	EV_ERR6	Unexpected message, incompatible w/ call state
223	EV_ERR7	Message type non existent/not implemented
224	EV_ERR8	Information element out of sequence

Event #	Event Name	Description
225	EV_ERR9	Duplicated information elements
226	EV_ERR10	Mandatory info element missing
227	EV_ERR11	Mandatory info element content error
228	EV_ERR12	Unrecognized info element
229	EV_SNDCGQ	Send circuit group query
229	EV_ERR13	Non-mandatory info element content
230	EV_SNDSLT	Send signaling link test
230	EV_ERR14	Data link reset
231	EV_SNDCONT	Send continuity request
231	EV_ERR15	Data link failure
232	EV_ABNORMAL	Front end ISDN detected an abnormal ISDN cause
233	EV_TIME2	User timer timed out
234	EV_DIALINFO	An OFFHOOK instruction was executed in an originating Call Program. This Event is generated to layer 3 Protocol State Table and will start building an outgoing SETUP message.
241	EV_SNDCALLPRO	Send CALLPRO message from PST
242	EV_SNDCALLPRO_CHID	Send CALLPRO message with CHID from PST
243	EV_SNDALERT	Send alert message from PST
244	EV_SNDALERT_CHD	Send alert message with CHD from PST
247	EV_ANSWER	Generated by script to make PST answer a call
248	EV_ESTS7L2	Signaling link established
249	EV_STOP	Stop the protocol (jumps back to INIT state)
250	EV_RLSDSP	Release of DSP assignment
251	EV_PTIME	Call Progress Timer Time Out Event
252	EV_INIT	Initialize State Machine for this line
253	EV_TIME	User Timer Time Out Event
253	EV_TIMER	User Timer Time Out Event
254	EV_ANY	Matches any event
255	EV_NULL	Null event

Table A-6. Code 251 SS7 Event Numbers

Event #	Event Name	Description
	ISUP Events	
1	EV_IACM	Address complete
1	EV_IMDC	Spanish acm

Event #	Event Name	Description
2	EV_IANM	Answer
2	EV_IRST	Spanish anm
3	EV_IBLK	Blocking
4	EV_IBLKACK	Blocking acknowledgment
5	EV_ICMCOMP	Call modification completed
6	EV_ICMREQ	Call modification request
7	EV_ICMREJ	Call modification reject
8	EV_ICPROG	Call progress
9	EV_ICGBLK	Circuit group blocking
10	EV_ICGBLKACK	Circuit group blocking acknowledgment
11	EV_ICGQ	Circuit group query
12	EV_ICGQRSP	Circuit group query response
13	EV_ICGRST	Circuit group reset
14	EV_ICGRSTACK	Circuit group reset acknowledgment
15	EV_ICGUB	Circuit group unblocking
16	EV_ICGUBACK	Circuit group unblocking acknowledgment
17	EV_ICHARGE	Charge information
18	EV_ICONFUSION	Confusion
19	EV_ICONNECT	Connect
20	EV_ICOT	Continuity
21	EV_ICCREQ	Continuity check request
22	EV_IDLYREL	Delayed release
23	EV_IFACACC	Facility accepted
24	EV_IFACREJ	Facility reject
26	EV_IFACREQ	Facility request
27	EV_IFWDTRSF	Forward transfer
28	EV_IINFO	Information
29	EV_IINFOREQ	Information request
30	EV_IIAM	Initial address
30	EV_IMID	Spanish iam
31	EV_ILPBKACK	Loop back acknowledgment
32	EV_IOVRLD	Overload
33	EV_IPASSALONG	Pass along
34	EV_IREL	Release

Event #	Event Name	Description
34	EV_ILIB	Spanish release
35	EV_IRLC	Release complete
35	EV_ILIC	Spanish release complete
36	EV_IRSTCKT	Reset circuit
37	EV_IRESUME	Resume
38	EV_ISAM	Subsequent address
39	EV_ISUSP	Suspend
40	EV_IUNBLK	Unblocking
41	EV_IUNBLKACK	Unblocking acknowledgment
42	EV_IUNCIC	Unequipped CICc
43	EV_IUTUI	User to user information
44	EV_ICRV	Circuit reservation
45	EV_ICRVACK	Circuit reservation acknowledgment
46	EV_ICVT	Circuit validation test
47	EV_ICVR	Circuit validation response
48	EV_IEHL	
49	EV_IEHA	
50	EV_IUBM	Unsuccessful BWD Set-Up Info (1TR7)
51	EV_IREL7	Release (1TR7)
52	EV_IRLSD	Released (1TR7)
53	EV_IFDE	Facility Deactivated (1TR7)
54	EV_IFIN	Facility Information (1TR7)
55	EV_ICON7	Connect (1TR7)
56	EV_INANA	National Nachricht (1TR7)
57	EV_IFAC	Facility
58	EV_IEXM	Exit
59	EV_IIDREQ	Identification Request
60	EV_IIDRSP	Identification Response
61	EV_INRSMGMT	Network Resource Management
62	EV_ISEG	Segment
63	EV_IUSRPAVAIL	User Part Available
64	EV_IUSRPTST	User Part Test
TUP Events		
50	EV_TACB	Access barred

Event #	Event Name	Description
51	EV_TACC	Automatic congestion control
52	EV_TACM	Address complete
53	EV_TADI	Address incomplete
54	EV_TANC	Answer, charge
55	EV_TANN	Answer, no charge
55	EV_TRST	Spanish anm
56	EV_TANU	Answer, unqualified
57	EV_TBLO	Blocking
58	EV_TBLA	Blocking acknowledgment
59	EV_TCBK	Clear back
60	EV_TCCF	Continuity failure
61	EV_TCCL	Calling party clear
62	EV_TCCR	Continuity check request
63	EV_TCFL	Call failure
64	EV_TCGC	Circuit group congestion
65	EV_TCHG	Charging
66	EV_TCLF	Clear forward
66	EV_TFIN	Spanish disconnection
67	EV_TCOT	Continuity
68	EV_TDPN	Digital path not provided
69	EV_TEUM	Extended unsuccessful backward setup info.
70	EV_TFOT	Forward transfer
71	EV_TGRA	Circuit group reset acknowledgment
72	EV_TGRQ	General request
73	EV_TGRS	Circuit group reset
74	EV_TGSM	General forward setup information
75	EV_THBA	Hardware failure group blocking ACK.
76	EV_THGB	Hardware failure group blocking
77	EV_THGU	Hardware failure group unblocking
78	EV_THUA	Hardware failure group unblocking ACK.
79	EV_TIAI	Initial address with additional information
80	EV_TIAM	Initial address
80	EV_TMID	Spanish IAM
81	EV_TLOS	Line out of service

Event #	Event Name	Description
82	EV_TMBA	Maintenance group blocking ACK.
83	EV_TMGB	Maintenance group blocking
84	EV_TMGU	Maintenance group unblocking
85	EV_TMPR	Misdialled trunk prefix
86	EV_TMUA	Maintenance group unblocking ACK.
87	EV_TNNC	National network congestion
88	EV_TRAN	Reanswer
89	EV_TRLG	Release guard
89	EV_TLGU	Spanish release guard
90	EV_TRSC	Reset circuit
91	EV_TSAM	Subsequent address
92	EV_TSAO	Subsequent address with one signal
93	EV_TSBA	Software group blocking ACK.
94	EV_TSEC	Successful backward setup information
95	EV_TSGB	Software generated group blocking
96	EV_TSGU	Software generated group unblocking
97	EV_TSSB	Subscriber busy
98	EV_TSST	Send special information tone
99	EV_TSUA	Software generated group unblocking ACK.
100	EV_TUBA	Unblocking acknowledgment
101	EV_TUBL	Unblocking
102	EV_TUNN	Unallocated number
103	EV_TDCN	Spanish address complete
BT NUP Events		
50	EV_BIAM	Initial address
51	EV_BACM	Address complete
52	EV_BANS	Answer
53	EV_BCFR	Circuit free
54	EV_BCOF	Confusion
55	EV_BIFAM	Initial and final address
56	EV_BCLR	Clear
57	EV_BBLK	Blocking
58	EV_BCSI	Isdn composite service information
59	EV_BSAM	Subsequent address

Event #	Event Name	Description
60	EV_BSND	Send 'n' digits
61	EV_BCGT	Congestion
62	EV_BRAN	Reanswerr
63	EV_BUBLK	Unblocking
64	EV_BSSR	Send service
65	EV_BFAM	Final address
66	EV_BSAD	Send all digits
67	EV_BTCG	Terminal congestion
68	EV_BREL	Release
69	EV_BBLKA	Block ack
70	EV_BSRV	Service
71	EV_BASI	Additional setup information
72	EV_BSASI	Send additional setup information
73	EV_BCNA	Connection not admitted
74	EV_BCFC	Coin and fee check
75	EV_BUBA	Unblocking ACK.
76	EV_BACI	Additional call information
77	EV_BRAT	Repeat attempt
78	EV_BTKO	Operator override
79	EV_BOVD	Overload
80	EV_BOPC	Operator condition
81	EV_BSEG	Sub engaged
82	EV_BHWR	Howler
83	EV_BUTU	User to user data
84	EV_BOFO	SUB out of order
85	EV_BEXC	Extend call
86	EV_BSWP	Swap
87	EV_BSTR	Subscriber transferred
88	EV_BDAC	Diversion activated
89	EV_BEAC	End to end address complete
90	EV_BCDB	Call drop back
91	EV_BCGB	CCT group blocking
92	EV_BNED	NODAL end to end data
93	EV_BCGU	CCT group unblocking

Event #	Event Name	Description
94	EV_BCGBA	CCT group blocking ACK.
95	EV_BCGUA	Circuit group unblocking ACK.
96	EV_BCGR	Circuit group reset
97	EV_BCGRA	Circuit group reset ACK.
	LSSU Events	
111	EV_SIO	Signaling indication "O", out of alignment
112	EV_SIN	Signaling indication "N", normal alignment
113	EV_SIE	Signaling indication "E", emergency alignment
114	EV_SIOS	Signaling indication "OS", out of service
115	EV_SIPO	Signaling indication "PO", processor outage
116	EV_SIB	Signaling indication "B", busy
118	EV_COO	Changeover order signal
119	EV_COA	Changeover order acknowledgment
120	EV_CBD	Changeback declaration
121	EV_CBA	Changeback acknowledgment
122	EV_ECO	Emergency changeover order
123	EV_ECA	Emergency changeover acknowledgment
124	EV_RCT	Signaling route set congestion test signal
125	EV_TFC	Transfer controlled
126	EV_TFP	Transfer prohibited
127	EV_TCP	Transfer cluster prohibited
128	EV_TFR	Transfer restricted
129	EV_TCR	Transfer cluster restricted
130	EV_TFA	Transfer allowed
131	EV_TCA	Transfer cluster allowed
132	EV_RSP	Signaling-route-set-test prohibited
133	EV_RSR	Signaling-route-set-test for restricted dest.
134	EV_RCP	Signaling-route-set-test cluster prohibited
135	EV_RCR	Signaling-route-set-test cluster restricted
136	EV_LIN	Link inhibit
137	EV_LUN	Link uninhibit
138	EV_LIA	Link inhibit acknowledgment
139	EV_LUA	Link uninhibit acknowledgment
140	EV_LID	Link inhibit denied

Event #	Event Name	Description
141	EV_LFU	Link forced uninhibit
142	EV_LLI	Link local inhibit
143	EV_LRI	Link remote inhibit
144	EV_TRA	Traffic restart allowed
145	EV_TRM	Traffic restart messages
146	EV_DLC	Signaling data link connection order signal
147	EV_CSS	Connection successful
148	EV_CNS	Connection not successful
149	EV_CNP	Connection not possible
150	EV_UPU	User part unavailable
General Events		
107	EV_LONGMSG	Generated in CCS units when L3/L4 message is too long
109	EV_BADMSG	Generated in CCS units when invalid L3/L4 message is received
132	EV_PrInit	Initialize the simple call progress detection state machine
176	EV_OFFHOOK	Call Program Channel OFFHOOK command
177	EV_ONHOOK	Call Program Channel ONHOOK command
178	EV_TONHOOK	Terminate ONHOOK
179	EV_DIALDP	Call Program Dial using dial pulses command
180	EV_DIALTT	Call Program Dial using Touch Tones (DTMF) command
181	EV_DIALMFR1	Call Program Dial using CCITT MFR1 tones command
182	EV_DIALMFR2	Call Program Dial using CCITT MFR2 tones command
183	EV_FLASH	Momentary onhook generated by the Call Program
185	EV_SENDID	Call Program Channel SENDID command
186	EV_RECVID	Call Program Channel RECVID command
187	EV_STOPID	EVENT 187 command sent by Call Program
196	EV_DONE	General DONE event, e.g. done dialing
197	EV_FAIL	General FAIL event, e.g. SENDID fails to receive an acknowledge
198	EV_COUNT0	General Purpose down counter reached 0
202	EV_GETDSP	Allows Call Program to change DSP assignment
203	EV_NODIGITS	No Dial Digits available to send
204	EV_FC_NAK	No control frequency (FC = 1700Hz or 1900Hz) received for SOCOTEL digit
204	EV_MFR2_FWD_NAK	No handshake received for MFR2 Forward digit
205	EV_FC_STUCK	SOCOTEL control frequency (FC =1700Hz or 1900Hz) stuck on

Event #	Event Name	Description
205	EV_MFR2_FWD_ STUCK	MFR2 Forward handshake stuck on
206	EV_LASTDIGIT	Last Dial digit was just sent
207	EV_MFR1_STUCK	CCITT MFR1 (R2S) digit stuck on (no response to control frequency)
208	EV_SENDTONE	SENDTONE, SENDVOX, or SENDBERT command sent by Call Program. **Units shipped before 1/19/94 may not be equipped with SENDVOX and SENDBERT.**
209	EV_SZACK	EVENT 209 command sent by Call Program
210	EV_ENDSEL	EVENT 210 command sent by Call Program
211	EV_ORIGINATE	Select originate protocol (by call program)
212	EV_TERMINATE	Select terminate protocol (by call program)
213	EV_RECVTONE	RECVTONE command sent by Call Program
214	EV_RECVDIGITS	Receive digits (receiver type is set by script) **Units shipped before 6/18/93 may not be equipped with this feature.**
215	EV_RECVDP	Start the reception and storage of Dial Pulse digits. **Units shipped before 6/18/93 may not be equipped with this feature.**
216	EV_RECVDTMF	Start the reception and storage of CCITT Touch Tone (DTMF) digits. **Units shipped before 6/18/93 may not be equipped with this feature.**
217	EV_RECVMFR1	Start the reception and storage of CCITT MFR1 digits. **Units shipped before 6/18/93 may not be equipped with this feature.**
218	EV_RECVMFR2F	Start the reception and storage of CCITT MFR2 forward digits. Units shipped before 6/18/93 may not be equipped with this feature.
219	EV_RECVMFR2B	Start the reception and storage of CCITT MFR2 backward digits**. Units shipped before 6/18/93 may not be equipped with this feature.**
222	EV_RECVBERT	RECVBERT command sent by the Call Program. **Units shipped before 1/19/94 may not be equipped with this feature.**
229	EV_SNDCGQ	Send circuit group query
230	EV_SNDSLT	Send signaling link test
231	EV_SNDCONT	Send continuity request
232	EV_ABNORMAL	Abnormal cause in L3
233	EV_TIME2	Second timer expired.
234	EV_DIALINFO	Receive event dial digit
247	EV_ANSWER	Generated by script to make PST answer a call
248	EV_ESTS7L2	Signaling link established
249	EV_STOP	Stop the protocol (jumps back to INIT state)
250	EV_RLSDSP	Release of DSP assignment

Event #	Event Name	Description
251	EV_PTIME	Call Progress Timer Time Out Event
252	EV_INIT	Initialize State Machine for this line
253	EV_TIME	User Timer Time Out Event
253	EV_TIMER	User Timer Time Out Event
254	EV_ANY	Matches any event
255	EV_NULL	Null event

A.1.3 Error Code 252 - ISDN Cause Codes

Refer to Table A-7 for ISDN Cause Codes generated on channels/terminals originating or terminating Voice or Data calls. Use Table A-8 for X.25 Cause Codes generated by channels/terminals originating or terminating D-channel Packet calls.

Table A-7. ISDN Cause Codes

ISDN CAUSE CODES			
1	Unallocated (Unassigned Number)	**18**	No User Responding
2	No Route to Specified Transit Network	**19**	No Answer from User (User Alerted)
3	No Route to Destination	**21**	Call Rejected
6	Channel Unacceptable	**22**	Number Changed
7	Call Awarded and Being Delivered in an Established Channel	**26**	Non-selected User Clearing
8	Prefix 0 Dialed in Error (CCITT National Specific)	**27**	Destination out of Order
8	Call is Proceeding (CCITT Network Specific)	**28**	Invalid Number Format
9	Prefix 1 Dialed in Error	**28**	Special Interrupt Announcement (CCITT Network Specific)
10	Prefix 1 Not Dialed	**29**	Facility Rejected
11	Excessive Digits Received, Call is Proceeding	**29**	Special Interrupt Announcement Undefined Code (CCITT Network Specific)
13	Service Denied	**30**	Response to STATUS ENQUIRY
16	Normal Call Clearing	**30**	Special Interrupt Announcement Number Assigned (CCITT Network Specific)
17	User Busy	**31**	Normal, Unspecified

ISDN CAUSE CODES			
31	Special Interrupt Announcement Call Blocked Due to Group Restriction (CCITT Network Specific)	**79**	Service or Option Not Implemented, Unspecified
34	No Circuit/Channel Available	**81**	Invalid Call Reference Value
38	Network Out of Order	**82**	Identified Channel Does Not Exist
41	Temporary Failure	**83**	A Suspended Call Exists, But This Call Identity Does Not
42	Switching Equipment Congestion	**84**	Call Identity in Use
43	Access Information Discarded	**85**	No Call Suspended
44	Requested Circuit/Channel Not Available	**86**	Call Having the Requested Call Identity Has Been Cleared
47	Resource Unavailable, Unspecified	**88**	Incompatible Destination
49	Quality of Service Unavailable	**90**	Destination Address Missing, and Direct Call Not Subscribed
50	Requested Facility Not Subscribed	**91**	Invalid Transit Network Selection
51	Call Type Incompatible with Service Request	**95**	Invalid Message, Unspecified
52	Outgoing Calls Barred	**96**	Mandatory Information Element is Missing
53	Service Operation Violated	**97**	Message Type Non-existent or Not Implemented
54	Incoming Calls Barred	**98**	Message Not Compatible with Call State or Message Type Non-existent or Not Implemented
57	Bearer Capability Not Authorized	**99**	Information Element Non-existent or Not Implemented
58	Bearer Capability Not Presently Available	**100**	Invalid Information Element Contents
63	Service or Option Not Available, Unspecified	**101**	Message Not Compatible with Call State
65	Bearer Capability Not Implemented	**101**	Protocol Error Threshold Exceeded (CCITT Network Specific)
66	Channel Type Not Implemented	**102**	Recovery on Time Expiry
69	Requested Facility Not Implemented	**111**	Protocol Error, Unspecified
70	Only Restricted Digital Information Bearer Capability is Available	**127**	Interworking, Unspecified

Table A-8. X-25 Packet Cause Codes

X-25 PACKET CAUSE CODES			
1	Number Busy	**19**	Local Procedure Error
3	Invalid Facility Request	**21**	RPOA Out of Order
5	Network Congestion	**25**	Reverse Charging Acceptance Not Subscribed
9	Out of Order	**33**	Incompatible Destination
11	Access Barred	**41**	Fast Select Acceptance Not Subscribed
13	Not Obtainable	**57**	Ship Absent
17	Remote Procedure Error		

A.1.4 Error Code 252 - SS7 Cause Codes

The SS7 Cause Codes (ITU-T Recommendation Q.931) that comprise a portion of the '252' error code are listed for your convenience in Table A-9.

Table A-9. SS7 Cause Codes

SS7 CAUSE CODES			
1	Unallocated (Unassigned Number)	**29**	Facility Rejected
2	No Route To Specified Transit Network	**30**	Response To STATUS ENQUIRY
3	No Route To Destination	**31**	Normal, Unspecified
4	Send Special Information Tone	**34**	No Circuit Channel Available
5	Misdialled Trunk Prefix	**38**	Network Out Of Order
6	Channel Unacceptable	**41**	Temporary Failure
7	Call Awarded And Being Delivered In An Established channel	**42**	Switching Equipment Congestion
16	Normal Call Clearing	**43**	Access Information Discarded
17	User Busy	**44**	Requested Circuit/Channel Not Available
18	No User Responding	**47**	Resources Unavailable, Unspecified
19	No Answer From User (User Alerted)	**49**	Quality Of Service Unavailable
21	Call Rejected	**50**	Requested Facility Not Subscribed
22	Number Changed	**53**	Outgoing Calls Barred Within CUG
26	Non-Selected User Clearing	**55**	Incoming Calls Barred Within CUG
27	Destination Out Of Order	**57**	Bearer Capability Not Authorized
28	Invalid Number Format	**58**	Bearer Capability Not Presently Available

SS7 CAUSE CODES			
62	Inconsistency In Designated Outgoing Access Information And Subscriber Class	**88**	Incompatible Destination
63	Service Or Option Not Available, Unspecified	**90**	Non-existent CUG
65	Bearer Capability Not Implemented	**91**	Invalid Transit Network Selection
66	Channel Type Not Implemented	**95**	Invalid Message, Unspecified
69	Requested Facility Not Implemented	**96**	Mandatory Information Element Is Missing
70	Only Restricted Digital Information Bearer Capability Is Available	**97**	Message Type Non-Existent Or Not Implemented
79	Service Or Option Not Implemented, Unspecified	**98**	Message Type Not Compatible With Call State Or Message Type Non-Existent Or Not Implemented
81	Invalid Call Reference Value	**99**	Information Element Non-Existent Or Not Implemented
82	Identified Channel Does Not Exist	**100**	Invalid Information Element Contents
83	A Suspended Call Exists, But This Call Identity Does Not	**101**	Message Not Compatible With Call State
84	Call Identity In Use	**102**	Recovery On Timer Expiry
85	No Call Suspended	**103**	Parameter Non-Existent Or Not Implemented
86	Call Having The Requested Call Identity Has Been Cleared	**110**	Inconsistency In Data
87	Called User Not Member of CUG	**111**	Protocol Error, Unspecified

A.2.7 Error Code 255 - System Error Message

The System Error message has the same format as any other Real Time error message. However, the register value represents conditions detected at the system level. Refer to Table A-10 for the recommended factory values.

Table A-10. System Error 255 'y' Value Messages

'y' Value	Definition
1	Dial timeout
2	Send ID timeout
3	Receive ID timeout
4	DSP acknowledge timeout
5	Request DSP timeout

'y' Value	Definition
6	Request global DSP slot timeout
7	DSP not available
8	Bad received message type
9	Call Program download buffer busy
10	State Table reject (running)
11	Reserved for future factory use
12	No response (DONE or FAIL response to GETDSP (internal)
13	Timeout waiting for MEASURE result
14	DSP manager was busy for STATE
15	DSP manager was busy for CP
16 - 31	Reserved for future factory use
32-255	User-defined

A typical example of a system error message follows:

?<Ameritec> 37 A01 04:25:35pm 12 Aug 98 255 System Error 1

This message indicates that while program 37 was testing simulated TE #1 on Channel A01, a Dial Timeout (register value = 1) was detected.

A.2.8 Call Statistics

Call Statistics are generated by the unit to allow you to track specific events that occur during the course of a call. While these statistics are not an error in and of themselves, they may indicate that an error has occurred.

The Squirt Script Source Files are listed below. Each Source File (Script) has a Table associated with it that lists its Call Statistic Data Register Codes.

9320000	A Calls B std	Analog, CAS
9320001	A Calls B ; B Calls A std	Analog, CAS
9320002	UNPR ORG std	Analog, CAS
9320003	UNPR TRM std	Analog, CAS
9320004	R2 T UNPR	CAS
9320005	R2C/TT ORIG	CAS
9320006	AM1 ORG	Analog
9320007	AM1 TERM	Analog
9320008	ISDN PRI UNPR ORG	PRI

9320009	ISDN PRI UNPR TERM	PRI
9320012	UNPR ORG MP	Analog
9320013	A Calls B MP	Analog
9320014	A Calls B ; B Calls A MP	Analog
9320015	UNPR TERM WK	CAS
9320016	BERT ORIG	CAS
9320017	BERT TERM	CAS
9320018	BERT R2 T	CAS
9320019	ISDN PRI UNPR ORG with BERT Test	PRI
9320020	ISDN PRI UNPR TERM with BERT Test	PRI
9320021	ISDN PRI UNPR ORG with Hyper-Channel	PRI
9320022	Voice Demo	Analog, CAS
9320038	Unpaired Originate, Provisioned Packet Switch Call on B or D	PRI
9320039	Unpaired Terminate, Provisioned Packet Switch Call on B or D	PRI
9320053	NCS_ORG	CAS
9320054	NCS_TRM	CAS
9320062	UNPR_ORIG	BRI
9320063	UNPR_TERM	BRI
9320064	ORIG_PKT	BRI
9320065	TERM_PKT	BRI
9320070	ORIG BERT	BRI
9320071	TERM BERT	BRI
9320074	ORIG_OV	BRI
9320078	BT ADSI UNPR TRM	Analog
9320079	US ADSI UNPR TRM	Analog
9320084	TERM EKTS	BRI
9320085	ORIG_OVB	BRI
9320087	Switching (In -> Out)	CAS
9320089	Switch R2	CAS

9320097	SS7 Unpaired Originate w/Overlap Dialing	SS7
9320098	SS7 Unpaired Terminate w/Overlap Dialing	SS7
9320099	SS7 Unpaired Originate w/Call Drop Back	SS7
9320100	SS7 Unpaired Originate w/Collect Call Reject	SS7
9320120	PRI Originate w/SLOTMAP ScriptMate	PRI
9320121	PRI Terminate w/SLOTMAP ScriptMate	PRI
9320127	Unpaired Originate NCS	CAS
9320128	US ADSI A Calls B	Analog
9320130	Unpaired Originate w/o Dialing Commands	PRI
9320131	Unpaired Terminate with Verification of Incoming Digits	PRI
9320132	Generic VRS/VRU Origination	Analog, CAS
9320139	Unpaired Terminate NCS, Dial Tone First, Coin First, and Semi-Post Pay	CAS
9323001	UNPR ORG 1TR6	PRI
9327001	A Calls B Std ScriptMate	Analog, CAS
9327002	A Calls B ; B Calls A ScriptMate	Analog, CAS
9327003	Unpaired Originate ScriptMate	Analog, CAS
9327004	Unpaired Terminate ScriptMate	Analog, CAS
9327005	Originate BERT ScriptMate	CAS
9327006	Terminate BERT ScriptMate	CAS
9327007	Analog and CAS Orig Tone	Analog, CAS
9327008	Analog and CAS Term Tone	Analog, CAS
9327009	BERT Originate Std ScriptMate	BRI
9327010	BERT Terminate Std ScriptMate	BRI
9327011	BRI Overlap Originate ScriptMate	BRI
9327013	BRI Originate BERT ScriptMate	BRI
9327014	Terminate BERT ScriptMate	BRI
9327015	PRI Originate Standard ScriptMate	PRI
9327016	PRI Terminate Standard ScriptMate	PRI
9327017	PRI Originate Provisioned Packet ScriptMate	PRI

9327018	PRI Terminate Provisioned Packet ScriptMate	PRI
9327021	SS7 Originate Standard ScriptMate	SS7
9327022	SS7 Terminate Standard ScriptMate	SS7
9327023	SS7 Originate BERT ScriptMate	SS7
9327024	SS7 Terminate BERT ScriptMate	SS7
9327025	R2 Terminate Standard ScriptMate	CAS
9327027	PRI Terminate BERT ScriptMate	PRI
9327028	A Calls B Std QwikScript	Analog, CAS
9327029	A Calls B ; B Calls A QwikScript	Analog, CAS
9327030	Unpaired Originate QwikScript	Analog, CAS
9327031	Unpaired Terminate QwikScript	Analog, CAS
9327032	BRI Originate Voice QwikScript	BRI
9327033	BRI Terminate Voice QwikScript	BRI
9327034	BRI Originate BERT QwikScript	BRI
9327035	Terminate BERT QwikScript	BRI
9327038	PRI Originate VoP Trip Delay	PRI
9327041	A Calls B VoP Trip Delay	Analog, CAS
9327043	A Calls B; B Calls A VoP Trip Delay	Analog, CAS
9327046	Analog and CAS Origination VoP Trip Delay	Analog, CAS
9327047	Analog and CAS Termination VoP Trip Delay	Analog, CAS
9327050	SS7 Originate VOP Trip Delay	SS7
9327052	NCS Originate Std	CAS
9327053	NCS Terminate Std	CAS
9327056	NCS Originate VOP Trip Delay	CAS
9327062	SS7 A Calls B Paired	SS7
9327063	Analog and CAS Originate then Terminate	Analog, CAS
9327064	Analog and CAS Terminate then Originate	Analog, CAS
9327065	NCS Originate then Terminate	CAS
9327066	NCS Terminate then Originate	CAS
9327067	Analog Originate Dial Tone First	Analog
9327068	Coin Analog Terminate with Overtime	Analog

9327069	Analog Originate Coin First	Analog
9327070	Analog Originate Semi-post Pay	Analog
9327075	PRI Originate VoP 1-Way Delay	PRI
9327076	PRI Terminate VoP 1-Way Delay	PRI
9327077	PRI Originate VoP Signal Analysis	PRI
9327078	PRI Terminate VoP Signal Analysis	PRI
9327079	Analog and CAS Originate VoP 1-Way Delay	Analog, CAS
9327080	Analog and CAS Terminate VoP 1-Way Delay	Analog, CAS
9327081	Analog and CAS Originate VoP Signal Analysis	Analog, CAS
9327082	Analog and CAS Terminate VoP Signal Analysis	Analog, CAS
9327083	A Calls B VoP Signal Analysis	Analog, CAS
9327084	A Calls B; B Calls A VoP Signal Analysis	Analog, CAS
9327085	A Calls B VoP 1-Way Delay	Analog, CAS
9327086	A Calls B; B Calls A VoP 1-Way Delay	Analog, CAS
9327088	Analog and CAS Terminate VoP Trip Delay	Analog, CAS
9327090	PRI Terminate VOP Trip Delay	PRI
9327093	A Calls B VoP Trip Delay	Analog, CAS
9327094	A Calls B; B Calls A VoP Trip Delay	Analog, CAS
9327095	SS7 Unpaired Originate VoP Call with Signal Analysis	SS7
9327096	SS7 Unpaired Terminate VoP Call with Signal Analysis	SS7
9327097	SS7 Unpaired Originate VoP Call with 1-Way Delay Test	SS7
9327098	SS7 Unpaired Terminate VoP Call with 1-Way Delay Test	SS7
9327100	SS7 Unpaired Terminate VoP Call w/Trip Delay	SS7
9327103	Unpaired R2 CAS Terminate Call with Round Trip Delay Test	CAS
9327104	Unpaired R2 CAS Terminate Call with 1-Way Delay Test	CAS

9327105	Unpaired R2 CAS Terminate Call with VoP Signal Analysis	CAS
9327106	NCS Unpaired Terminate VoP Call w/Trip Delay	CAS
9327107	NCS Unpaired Originate VoP Call w/1-Way Delay	CAS
9327108	NCS Unpaired Terminate VoP Call w/1-Way Delay	CAS
9327109	NCS Unpaired Originate VoP Call with Signal Analysis	CAS
9327110	NCS Unpaired Terminate VoP Call with Signal Analysis	CAS
9327114	CAS Unpaired Terminate Match	CAS
9327115	CAS A Calls B Match Std	CAS
9327116	CAS A Calls B; B Calls A Match Std	CAS
9327125	Analog & CAS Voice Replay Terminate	Analog, CAS
9327129	SS7 Originate with COT	SS7
9327130	SS7 Terminate with COT	SS7
9327131	Analog/CAS for Unpaired Originate Dropout	Analog, CAS
9327132	Analog/CAS for Unpaired Terminate Dropout	Analog, CAS
9327133	Unpaired R2 Terminate VOP II Dropout	CAS
9327134	Unpaired Originate PRI VoP II Dropout	PRI
9327135	Unpaired Terminate PRI VoP II Dropout	PRI
9327136	Unpaired Originate SS7 VoP II Dropout	SS7
9327137	Unpaired Terminate SS7 VoP II Dropout	SS7
9327144	PRI Terminate VoP Detection Script	PRI
9327145	PRI Originate VoP Detection Script	PRI
9327154	Analog & CAS Originate VoP Detection	Analog, CAS
9327155	Analog & CAS Terminate VoP Detection	Analog, CAS
9327156	SS7 Originate VoP Detection	SS7
9327157	SS7 Terminate VoP Detection	SS7
9327158	Analog & CAS A Calls B	Analog, CAS
9327159	Analog & CAS A Calls B; B Calls A	Analog, CAS
9327172	SS7 Originate BERT with COT	SS7

9327173	SS7 Terminate BERT with COT	SS7
9329007	Calling Card Script	CAS

Table A-11. Call Statistic Data Register Codes

Code	Statistic	Script	Definition
1	ORIG ATTEMPT	9320000, 9320001, 9320002, 9320005, 9320006, 9320008, 9320012, 9320013, 9320014, 9320016, 9320019, 9320021, 9320022, 9320053, 9320062, 9320067, 9320070, 9320074, 9320085, 9320087, 9320089, 9320097, 9320099, 9320100, 9320120, 9320127, 9320128, 9320130, 9320132, 9323001, 9327001, 9327002, 9327003, 9327005, 9327007, 9327009, 9327011, 9327013, 9327015, 9327028, 9327029, 9327030, 9327032, 9327034, 9327038, 9327041, 9327043, 9327046, 9327052, 9327056, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327075, 9327077, 9327079, 9327081, 9327083, 9327084, 9327085, 9327086, 9327093, 9327094, 9327107, 9327109, 9327115, 9327116, 9327131, 9327134, 9327145, 9327154, 9327156, 9327158, 9327159, 9329007	Counts each call attempt that a specific terminal attempts to initiate, regardless of the success of the call.
1	ORIG ATTEMPT	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327129, 9327136, 9327172	Counts each occurrence of an OFFHOOK condition regardless of the success of the call.
2	ORIG COMPL	9320000, 9320001, 9320002, 9320005, 9320006, 9320008, 9320012, 9320013, 9320014, 9320016, 9320019, 9320021, 9320022, 9320053, 9320062, 9320067, 9320070, 9320074, 9320085, 9320087, 9320089, 9320097, 9320099, 9320100, 9320120, 9320128, 9320130, 9320132, 9323001, 9327001, 9327002, 9327003, 9327005, 9327007, 9327009, 9327011, 9327013, 9327015, 9327028, 9327029, 9327030, 9327032, 9327034, 9327041, 9327043, 9327046, 9327052, 9327056, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327075, 9327077, 9327079, 9327081, 9327083, 9327084, 9327085, 9327086, 9327093, 9327094, 9327107, 9327109, 9327115, 9327116, 9327131, 9327134, 9327145, 9327154, 9327156, 9327158, 9327159, 9329007	Counts each successful completion of a call for each terminal listed.
2	ORIG COMPL	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327129, 9327136, 9327172	Counts the number of times the programmed sequence was successful in running through its complete test.

Code	Statistic	Script	Definition
3	AVG START DELAY	9320000, 9320001, 9320002, 9320005, 9320006, 9320008, 9320012, 9320013, 9320014, 9320016, 9320019, 9320021, 9320038, 9320053, 9320054, 9320062, 9320064, 9320067, 9320070, 9320074, 9320085, 9320087, 9320089, 9320097, 9320099, 9320100, 9320120, 9320128, 9320132, 9320139, 9323001, 9327001, 9327002, 9327003, 9327005, 9327007, 9327009, 9327011, 9327013, 9327015, 9327017, 9327028, 9327029, 9327030, 9327032, 9327034, 9327038, 9327041, 9327043, 9327046, 9327050, 9327052, 9327053, 9327056, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327075, 9327077. 9327079, 9327081, 9327083, 9327084, 9327085, 9327086, 9327093, 9327094, 9327095, 9327097, 9327106, 9327107, 9327108, 9327109, 9327110, 9327115, 9327116, 9327134, 9327136, 9327145, 9327154, 9327156, 9329007	The average time from an off hook or start signal to detection, for completed calls only.
3	AVG START DELAY	9327021, 9327023, 9327062, 9327129, 9327172	Average time it took to activate Layer 2.
4	SLOW START	9320000, 9320001, 9320002, 9320005, 9320006, 9320008, 9320012, 9320013, 9320014, 9320016, 9320019, 9320021, 9320038, 9320054, 9320062, 9320064, 9320067, 9320070, 9320074, 9320085, 9320087, 9320089, 9320097, 9320099, 9320100, 9320120, 9320128, 9320130, 9320132, 9320139, 9323001, 9327001, 9327002, 9327003, 9327005, 9327007, 9327009, 9327011, 9327013, 9327015, 9327017, 9327028, 9327029, 9327030, 9327032, 9327034, 9327038, 9327041, 9327043, 9327046, 9327053, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327075, 9327077. 9327079, 9327081, 9327083, 9327084, 9327085, 9327086, 9327093, 9327094, 9327106, 9327108, 9327110, 9327115, 9327116, 9327134, 9327145, 9327154, 9327156, 9329007	The SLOW START register increments each time an originating call doesn't receive a Layer 2 acknowledgment within the time set in the st_sig_delay parameter. The register only increments when the time received is before the time set in the st_sig_fail parameter.

Code	Statistic	Script	Definition
5	NO START	9320000, 9320001, 9320002, 9320005, 9320008, 9320016, 9320019, 9320021, 9320038, 9320054, 9320062, 9320064, 9320067, 9320070, 9320074, 9320085, 9320087, 9320097, 9320099, 9320100, 9320120, 9320130, 9320132, 9323001, 9327001, 9327002, 9327003, 9327005, 9327009, 9327011, 9327013, 9327015, 9327017, 9327028, 9327029, 9327030, 9327032, 9327034, 9327041, 9327043, 9327046, 9327053, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327075, 9327077. 9327079, 9327081, 9327082, 9327083, 9327084, 9327085, 9327086, 9327093, 9327094, 9327106, 9327108, 9327110, 9327115, 9327116, 9327134, 9327145, 9327154, 9327156, 9329007	The number of times that an originating call doesn't receive a start signal within the st_sig_fail time.
6	NO ALERT	9320000, 9320001, 9320003, 9320015, 9320017, 9320054, 9320066, 9327001, 9327002, 9327004, 9327006, 9327028, 9327029, 9327031, 9327041, 9327043, 9327047, 9327053, 9327063, 9327064, 9327065, 9327066, 9327068, 9327080, 9327083, 9327084, 9327085, 9327086, 9327088, 9327093, 9327094, 9327106, 9327108, 9327110, 9327125, 9327132, 9327133, 9327158, 9327159	The number of times that a call progresses to the point that the called line expects a connection and doesn't get it.
7	AVG PD DELAY	9320000, 9320001, 9320002, 9320005, 9320008, 9320016, 9320019, 9320021, 9320062, 9320067, 9320070, 9320074, 9320085, 9320087, 9320097, 9320099, 9320100, 9320120, 9320130, 9323001, 9327001, 9327002, 9327003, 9327005, 9327009, 9327011, 9327013, 9327015, 9327028, 9327029, 9327030, 9327032, 9327034, 9327052, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327115, 9327116, 9327145, 9327156, 9327158, 9327159, 9329007	The average time from end of dialing until the CONNECT message is detected.
7	AVG PD DELAY	9327021, 9327023, 9327062, 9327129, 9327172	Average time from outgoing IAM to incoming ANM message.

Code	Statistic	Script	Definition
8	NO CONFRM	9320000, 9320001, 9320002, 9320003, 9320004, 9320005, 9320008, 9320009, 9320015, 9320016, 9320019, 9320021, 9320038, 9320039, 9320053, 9320054, 9320062, 9320063, 9320064, 9320065, 9320066, 9320067, 9320070, 9320074, 9320084, 9320085, 9320087, 9320097, 9320098, 9320099, 9320100, 9320120, 9320121, 9320130, 9320131, 9323001, 9327001, 9327002, 9327003, 9327004, 9327005, 9327009, 9327010, 9327011, 9327013, 9327015, 9327016, 9327017, 9327018, 9327028, 9327029, 9327030, 9327031, 9327032, 9327033, 9327034, 9327041, 9327043, 9327046, 9327047, 9327052, 9327053, 9327056, 9327063, 9327064, 9327065, 9327066, 9327067, 9327068, 9327069, 9327070, 9327075, 9327076, 9327077, 9327079, 9327080, 9327081, 9327083, 9327084, 9327085, 9327086, 9327088, 9327090, 9327093, 9327094, 9327103, 9327104, 9327107, 9327109, 9327114, 9327115, 9327116, 9327144, 9327145, 9327154, 9327155, 9327156, 9327157, 9329007	Increments each time the voice path verification check fails. For SENDID or RECVID token counts when the tone was not received or not received within the time set in the confirm_time parameter.
8	NO CONFRM 0	9327022, 9327130	The voice path verification test failed. If the error also occurs on the originating side, voice path was never established.
8	NO CONFRM 0	9327100	The 100ms tone pulse was not detected back before the strip_timeout expired.
8	NO CONFRM 1	9327050	The expected 100ms tone required for the round trip measurement was not detected.
8	NO CONFRM 1, 2	9327097, 9327098	The 100ms tone pulse was not detected before the rpulse_timer expired.
8	NO CONFRM x	9327021, 9327062, 9327129	The voice path verification test failed. The value of x represents the time (in 10th of seconds) voice path verification was attempted. If the error also occurs on the terminating side, voice path was never established, otherwise voice path was initially established then lost.

Code	Statistic	Script	Definition
8	NO CONFRM x	9327023, 9327172	The BERT voice path verification test failed. The value of x why the test failed. **X=1-65532** indicates the number of bit errors (only reported when the errors exceed the max_ber parameter). **X=65533** the BERT test could not be performed. **X=65534** the BERT Pattern was lost before the test_time expired. **X=65535** the BERT Pattern was not found within 500ms.
8	NO CONFRM x	9327095	The voice path verification test failed. The value of x represents the reason for the failure. **X=1** signal analysis tone was not detected. **X=2** unit could not synchronize to the tone cadence. **X=4** signal analysis tone was lost (see det_lost_dig).
9	CALLED BUSY	9320000, 9320001, 9320002, 9320005, 9320066, 9320067, 9320087, 9327001, 9327002, 9327003, 9327028, 9327029, 9327030, 9327041, 9327043, 9327063, 9327067, 9327069, 9327070, 9327079, 9327081, 9327083, 9327084, 9327085, 9327086, 9327093, 9327094	The number of calls that busy signal was detected by the calling line after dialing all digits and waiting the "timeout" period.
10	NO ANS SIGNAL	9320000, 9320001, 9320002, 9320005, 9320016, 9320053, 9320054, 9320130, 9327001, 9327002, 9327003, 9327005, 9327025, 9327028, 9327029, 9327030	Increments each time a calling line/channel does not receive an answer signal.
10	NO ANS SIGNAL	9320074, 9320085, 9327011	Increments each time an overlap dial call does not receive a SETUP ACKNOWLEDGE message.

Code	Statistic	Script	Definition
10	NO ANS SIGNAL	9320067, 9320139, 9327007, 9327052, 9327056, 9327063, 9327064, 9327065, 9327066, 9327067, 9327069, 9327070, 9327107, 9327109, 9327115, 9327116, 9329007	The number of calls that reverse battery was not detected at the end of the voice path confirmation check with detection enabled.
11	TERM ATTMPT	9320000, 9320001, 9320003, 9320004, 9320007, 9320009, 9320013, 9320014, 9320015, 9320017, 9320018, 9320020, 9320053, 9320054, 9320063, 9320066, 9320071, 9320078, 9320079, 9320084, 9320087, 9320089, 9320098, 9320121, 9320128, 9320131, 9320139, 9327001, 9327002, 9327004, 9327006, 9327008, 9327010, 9327014, 9327016, 9327025, 9327027, 9327028, 9327029, 9327031, 9327033, 9327035, 9327041, 9327043, 9327047, 9327053, 9327063, 9327064, 9327065, 9327066, 9327068, 9327076, 9327078, 9327080, 9327082, 9327083, 9327084, 9327085, 9327086, 9327088, 9327090, 9327093, 9327094, 9327103, 9327104, 9327105, 9327106, 9327108, 9327110, 9327114, 9327115, 9327116, 9327125, 9327132, 9327133, 9327135, 9327144, 9327155, 9327157, 9327158, 9327159	Increments each time a terminate line acknowledges that it is receiving a setup message. Will count even if the call attempt is not completed.
11	TERM ATTMPT	9327022, 9327024, 9327062, 9327096, 9327098, 9327100, 9327130, 9327137, 9327173	Counts each occurrence of an incoming IAM message with matching point codes, cic, and sio values regardless of the success of the call.
12	TERM COMPL	9320000, 9320001, 9320003, 9320004, 9320007, 9320009, 9320013, 9320014, 9320015, 9320017, 9320018, 9320020, 9320053, 9320054, 9320063, 9320066, 9320071, 9320078, 9320079, 9320084, 9320087, 9320089, 9320098, 9320121, 9320128, 9320131, 9320139, 9327001, 9327002, 9327004, 9327006, 9327008, 9327010, 9327014, 9327016, 9327025, 9327027, 9327028, 9327029, 9327031, 9327033, 9327035, 9327041, 9327043, 9327047, 9327053, 9327063, 9327064, 9327065, 9327066, 9327068, 9327076, 9327078, 9327080, 9327082, 9327083, 9327084, 9327085, 9327086, 9327088, 9327090, 9327093, 9327094, 9327103, 9327104, 9327105, 9327106, 9327108, 9327110, 9327114, 9327115, 9327116, 9327125, 9327132, 9327133, 9327135, 9327144, 9327155, 9327157, 9327158, 9327159	Increments each time the called line answers an incoming call and verifies the voice path.

Code	Statistic	Script	Definition
12	TERM COMPL	9327022, 9327024, 9327062, 9327096, 9327098, 9327100, 9327130, 9327137, 9327173	Counts the number of times the programmed sequence was successful in running through its complete test.
13	RING TIMOUT	9320012, 9320013, 9320014	Number of abnormal Meter Pulses.
13	RING TIMOUT	9320053, 9327107, 9327109	Code 13 has a header of RING TIME-OUT and will generate a Real Time Error report each time it is reported.
13	CODE 13	9320078, 9320079, 9320128, 9327052, 9327056, 9327065, 9327066, 9327067, 9327069, 9327070	This alert indicates a data packet comparison failure. While comparing the Offhook data packets, a comparison failed on a particular data string. n indicates the particular string.
14	NO CONNECT	9320008, 9320019, 9320021, 9320038, 9320054, 9320062, 9320064, 9320070, 9320074, 9320085, 9320089, 9320097, 9320098, 9320099, 9320100, 9320120, 9320139, 9323001, 9327009, 9327011, 9327013, 9327015, 9327017, 9327022, 9327024, 9327032, 9327034, 9327038, 9327053, 9327065, 9327066, 9327075, 9327077, 9327096, 9327098, 9327100, 9327108, 9327110, 9327134, 9327137, 9327145, 9327156	Increments when no CONNECT message is received for Voice or Data calls.
14	CODE 14	9320078, 9320079, 9320128	This alert indicates the number of data packets that were received while Onhook.
15	CODE 15	9320054, 9320062, 9320064, 9320070, 9320074, 9320085, 9320097, 9320098, 9320099, 9320100, 9320120, 9327009, 9327011, 9327013, 9327032, 9327034, 9327038, 9327050, 9327053, 9327066, 9327075. 9327077, 9327096, 9327098, 9327100, 9327108, 9327110, 9327134, 9327137, 9327145, 9327156	Increments each time a RELEASE COMPLETE message was not received. Statistics will still show a call completion.
15	CODE 15	9320078, 9320079, 9320128	This alert indicates the number of data packets that had an satisfactory comparison, while Onhook.

Code	Statistic	Script	Definition
15	CODE 15	9320139	Increments each time an Originate terminal fails to clear. Statistics will still show a call completion.
16	NO CONNACK	9320009, 9320020, 9320039, 9320063, 9320065, 9320071, 9320084, 9320121, 9327010, 9327014, 9327016, 9327018, 9327027, 9327033, 9327035, 9327076, 9327078, 9327090, 9327135, 9327144, 9327157	Increments each time the originate terminal fails to receive a Connect Acknowledgment message on voice or data Calls.
16	CODE 16	9320078, 9320079, 9320128	This alert indicates the number of data packets that were received while Offhook.
17	CODE 17	9320053, 9320063, 9320071, 9320084, 9320121, 9327010, 9327014, 9327022, 9327024, 9327033, 9327035, 9327052, 9327056, 9327065, 9327076, 9327078, 9327090, 9327107, 9327109, 9327135, 9327137, 9327144, 9327157	Reports an error in clearing the call. Statistics will still show a call completion.
17	CODE 17	9320078, 9320079, 9320128	This alert indicates the number of data packets that had an satisfactory comparison, while Onhook.
18	CODE 18	9320038, 9320063, 9320064, 9320071, 9320084, 9327010, 9327014, 9327017, 9327033, 9327035	Increments each time the originate terminal makes a No Answer Attempt on Voice or Data Calls.
19	CODE 19	9320038, 9320063, 9320064, 9320071, 9320084, 9327010, 9327014, 9327017, 9327033, 9327035	Increments each time an originate terminal makes a No Answer Complete for Voice or Data Calls.
20	CODE 20	9320039, 9320065, 9320084, 9327018	Increments each time an originate terminal receives a No Answer Error.
20	CODE 20	9327067, 9327069, 9327070	The number of times a Coin Disposal A signal is received.
20	CODE 20	9327114, 9327115, 9327116	The number of calls that did not meet expected digit criteria.

Code	Statistic	Script	Definition
21	CODE 21	9320039, 9320062, 9320064, 9320065, 9320070, 9320074, 9320085, 9327009, 9327011, 9327013, 9327018, 9327032, 9327034	Counts when the time set in the l2_rdy_dly parameter is exceeded. This time measured is the time between the Call Program initializing the respective channel and the time it takes for the Call Program to receive the SIG_READY4L2 signal, indicating that the switch is ready to establish Layer 2.
21	CODE 21	9327067, 9327069, 9327070	The number of times a Coin Disposal B signal is received.
22	CODE 22	9320062, 9320064, 9320070, 9320074, 9320085, 9327009, 9327011, 9327013, 9327032, 9327034	Counts when the time set in the l2_rdy_fail parameter is exceeded. This time measured is the time between the Call Program initializing the respective channel and the time it takes for the Call Program to receive the SIG_READY4L2 signal, indicating that the switch is ready to establish Layer 2.
22	BIN_1_ CODE	9327041, 9327043, 9327047	Round Trip range 1 - max value 20 [100ms].
22	R_NO_CN DISP	9327067, 9327069, 9327070	Report Code, register 22 counts the number of times a Coin Disposal signal is not received.
23	BIN_2_ CODE	9327041, 9327043, 9327047	Round Trip range 2 - max value 40 [200ms].
24	BIN_3_ CODE	9327041, 9327043, 9327047	Round Trip range 3 - max value 60 [300ms].
25	BIN_4_ CODE	9327041, 9327043, 9327047	Round Trip range 4 - max value 80 [400ms].
26	BIN_5_ CODE	9327041, 9327043, 9327047	Round Trip range 5 - max value greater than 81 [405ms].
27	CODE 27	9320038, 9320039, 9320064, 9320065, 9327017, 9327018	Counts once each time an originate or terminate terminal sends an X.25 Packet.
28	CODE 28	9320038, 9320039, 9320064, 9320065, 9327017, 9327018	Counts once each time an originate or terminate terminal receives an X.25 Packet.

Code	Statistic	Script	Definition
29	CODE 29	9320038, 9320039, 9320064, 9320065, 9327017, 9327018	Counts once each time an originate or terminate terminal retransmits an X.25 Packet.
31	CODE 31	9320012, 9320013, 9320014	Number of Meter Pulses reported.
32	TRIP_ AVER	9327041, 9327043, 9327047	A running average of the number of 5ms delay timer ticks for all calls on a specific channel. To convert this value to a number of milliseconds, multiply by 50. [Multiply by 10 to remove the decimal point, then multiply by 5 to convert to milliseconds.]
251	Protocol Error	9327021, 9327022, 9327023, 9327024, 9327050, 9327062, 9327095, 9327096, 9327097, 9327098, 9327100, 9327129, 9327130, 9327136, 9327137, 9327172, 9327173	A message/event that was unexpected or undefined occurred in the specified call state. This error occurs in pairs: 251 Protocol Error x 251 Protocol Error y (x=call state, y=message/event) Refer to the Script Writer's Guide for interpretation of specific x and y values.
252	ISDN Cause Code	9327021, 9327022, 9327023, 9327024, 9327050, 9327062, 9327095, 9327096, 9327097, 9327098, 9327100, 9327129, 9327130, 9327136, 9327137, 9327172, 9327173	Displays the ISDN Cause Code value received from the system under test. Refer to the Script Writer's Guide for a list of standard definitions per CCITT. However, cause code interpretations are as defined in the system under test.
255	System Error 1	9327098	The call program failed to transmit the 100ms tone pulse
255	System Error 2	9327021, 9327022, 9327062, 9327097, 9327129, 9327130	The call program failed to initiate a SENDID command.
255	System Error 3	9327021, 9327022, 9327062, 9327095, 9327129, 9327130	The call program failed to initiate a RECVID command.
255	System Error 3	9327136	An error occurred during the data collection of the VOP signal analysis results.

Code	Statistic	Script	Definition
403	AVG START DELAY	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327129, 9327136, 9327172	Average time it took to activate the Signaling Link (Layer 2).
404	SLOW START	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327129, 9327136, 9327172	The link was not activated within the time specified by the st_sig_dly parameter.
405	NO START	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327129, 9327136, 9327172	The link was not activated within the time specified by the st_sig_fail parameter.
406	NO ALERT	9327062	The incoming call was not detected on the terminating time slot.
407	AVG PD DELAY	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327129, 9327136, 9327172	Average time from outgoing Initial Address (IAM) to incoming Answer (ANM) message.
414	NO ANM	9327021, 9327022, 9327023, 9327024, 9327050, 9327062, 9327095, 9327096, 9327097, 9327098, 9327100, 9327129, 9327130, 9327136, 9327137, 9327172, 9327173	The Answer (ANM) message was expected but not received within the time specified by the answer_time parameter.
415	NO ACM	9327022, 9327024, 9327062, 9327096, 9327098, 9327100, 9327130, 9327137, 9327173	The call program failed to transmit an Address Complete (ACM) message. Possibly due to errors in the line signaling.
421	NO REL RLC	9327021, 9327022, 9327023, 9327024, 9327050, 9327062, 9327095, 9327096, 9327097, 9327098, 9327100, 9327129, 9327130, 9327136, 9327137, 9327172, 9327173	A Release Complete (RLC) message was not received within the time specified by the rel_wait_time parameter. The RLC was required in response to the transmitted Release (REL) message(s).
423	NO RSC RLC	9327021, 9327022, 9327023, 9327024, 9327050, 9327062, 9327095, 9327096, 9327097, 9327098, 9327100, 9327129, 9327130, 9327136, 9327137, 9327172, 9327173	A Release Complete (RLC) was not received within the time specified by the rsc_wait_time parameter. The RLC was required in response to the transmitted Reset Circuit (RSC) message.
455	DIAL ERR	9327021, 9327023, 9327050, 9327062, 9327095, 9327097, 9327136	The call program failed to transmit an Initial Address (IAM) message.

Code	Statistic	Script	Definition
2000	AVER_ DROP_ DUR	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Average Dropout Duration. A running average of the dropout duration in milliseconds.
2001	MAX_ DROP_ DUR	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Maximum Dropout Duration. Reports the maximum dropout duration in milliseconds.
2002	DROPOUT _BIN1	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Dropout Bin 1 Counts. 10 - counts the number of calls that had between 0 and 10 dropouts.
2003	DROPOUT _BIN2	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Dropout Bin 2 Counts. 20 - counts the number of calls that had between 11 and 20 dropouts.
2004	DROPOUT _BIN3	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Dropout Bin 3 Counts. 50 - counts the number of calls that had between 21 and 50 dropouts.
2005	DROPOUT _BIN4	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Dropout Bin 4 Counts. 100 - counts the number of calls that had between 51 and 100 dropouts.
2006	DROPOUT _BIN5	9327081, 9327083, 9327084, 9327095, 9327109, 9327131, 9327134, 9327136, 9327158, 9327159	Dropout Bin 5 Counts. Counts the number of calls that had over 100 dropouts.
2010	AVER_ FCLIP_ DUR	9327081, 9327083, 9327084, 9327095, 9327109	Average Leading-Edge Clip Duration. A running average of the leading-edge clipping duration in milliseconds.
2011	MAX_ FCLIP_ DUR	9327081, 9327083, 9327084, 9327095, 9327109	Maximum Leading-Edge Clip Duration. Reports the maximum leading-edge clipping duration in milliseconds.
2012	FCLIP_ BIN1	9327081, 9327083, 9327084, 9327095, 9327109	Leading-Edge Clip Bin 1 Counts. 10 - counts the number of calls that had between 0 and 10 leading-edge clips.
2013	FCLIP_ BIN2	9327081, 9327083, 9327084, 9327095, 9327109	Leading-Edge Clip Bin 2 Counts. 20 - counts the number of calls that had between 11 and 20 leading-edge clips.

Code	Statistic	Script	Definition
2014	FCLIP_ BIN3	9327081, 9327083, 9327084, 9327095, 9327109	Leading-Edge Clip Bin 3 Counts. 50 - counts the number of calls that had between 21 and 50 leading-edge clips.
2015	FCLIP_ BIN4	9327081, 9327083, 9327084, 9327095, 9327109	Leading-Edge Clip Bin 4 Counts. 100 - counts the number of calls that had between 51 and 100 leading-edge clips.
2016	FCLIP_ BIN5	9327081, 9327083, 9327084, 9327095, 9327109	Leading-Edge Clip Bin 5 Counts. Counts the number of calls that had over 100 leading-edge clips.
2020	AVER_ BCLIP_ DUR	9327081, 9327083, 9327084, 9327095, 9327109	Average Trailing-Edge Clip Duration. A running average of the trailing-edge clipping duration in milliseconds.
2021	MAX_ BCLIP_ DUR	9327081, 9327083, 9327084, 9327095, 9327109	Maximum Trailing-Edge Clip Duration. Reports the maximum trailing-edge clipping duration in milliseconds.
2022	BCLIP_ BIN1	9327081, 9327083, 9327084, 9327095, 9327109	Trailing-Edge Clip Bin 1 Counts. 10 - counts the number of calls that had between 0 and 10 trailing-edge clips.
2023	BCLIP_ BIN2	9327081, 9327083, 9327084, 9327095, 9327109	Trailing-Edge Clip Bin 2 Counts. 20 - counts the number of calls that had between 11 and 20 trailing-edge clips.
2024	BCLIP_ BIN3	9327081, 9327083, 9327084, 9327095, 9327109	Trailing-Edge Clip Bin 3 Counts. 50 - counts the number of calls that had between 21 and 50 trailing-edge clips.
2025	BCLIP_ BIN4	9327081, 9327083, 9327084, 9327095, 9327109	Trailing-Edge Clip Bin 4 Counts. 100 - counts the number of calls that had between 51 and 100 trailing-edge clips.
2026	BCLIP_ BIN5	9327081, 9327083, 9327084, 9327095, 9327109	Trailing-Edge Clip Bin 5 Counts. Counts the number of calls that had over 100 trailing-edge clips.

Code	Statistic	Script	Definition
2030	AVER_ JITTER	9327081, 9327083, 9327084, 9327095, 9327109	Average Jitter Duration. Records the average jitter duration in milliseconds.
2031	MAX_ JITTER	9327081, 9327083, 9327084, 9327095, 9327109	Maximum Jitter Duration. Records the maximum jitter duration in milliseconds.
2100	AVER_ DELAY	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	The number of calls that the calling line goes off hook to initiate a call and was allowed to go back on hook without manual intervention (unit placed in stop mode).
2101	MIN_ DELAY	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	Will increment its count, up to 50000, each time the call between the two lines is complete, including voice path verification and answer supervision check, if enabled.
2102	MAX_ DELAY	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	The average time from off hook to detection of dial tone on the calling line.
2103	DELAY_ BIN_1	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	1-Way Delay Bin 1 Counts. 100 - counts the number of calls where the one-way delay is less than 100 milliseconds.
2104	DELAY_ BIN_2	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	1-Way Delay Bin 2 Counts. 200 - counts the number of calls where the one-way delay is between 101 and 200 milliseconds.
2105	DELAY_ BIN_3	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	1-Way Delay Bin 3 Counts. 300 - counts the number of calls where the one-way delay is between 201 and 300 milliseconds.
2106	DELAY_ BIN_4	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	1-Way Delay Bin 4 Counts. 400 - counts the number of calls where the one-way delay is between 301 and 400 milliseconds.

Code	Statistic	Script	Definition
2107	DELAY_ BIN_5	9327079, 9327080, 9327085, 9327086, 9327097, 9327098, 9327104, 9327107, 9327108	1-Way Delay Bin 5 Counts. Counts the number of calls where the one-way delay is greater than 401 milliseconds.
2110	TRIP_ AVER	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	Average Round Trip Delay. Reports the average Round-Trip delay in milliseconds.
2111	MIN_TRIP_ DELAY	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	Minimum Round Trip Delay. Reports the minimum Round-Trip delay in milliseconds.
2112	MAX_TRIP _DELAY	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	Maximum Round Trip Delay. Reports the maximum Round-Trip delay in milliseconds.
2113	TRIP_ BIN_1	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	1-Way Delay Bin 1 Counts. 100 - counts the number of calls where the Round-Trip delay is less than 100 milliseconds.
2114	TRIP_ BIN_2	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	1-Way Delay Bin 2 Counts. 200 - counts the number of calls where the Round-Trip delay is between 101 and 200 milliseconds.
2115	TRIP_ BIN_3	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	1-Way Delay Bin 3 Counts. 300 - counts the number of calls where the Round-Trip delay is between 201 and 300 milliseconds.
2116	TRIP_ BIN_4	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	1-Way Delay Bin 4 Counts. 400 - counts the number of calls where the Round-Trip delay is between 301 and 400 milliseconds.
2117	TRIP_ BIN_5	9327088, 9327093, 9327094, 9327100, 9327103, 9327106	1-Way Delay Bin 5 Counts. Counts the number of calls where the Round-Trip delay is greater than 401 milliseconds.
3001	COT FAIL	9327129, 9327172	A continuity test was required and failed.
3002	COT PASS	9327129, 9327172	A continuity test was required and passed.

Code	Statistic	Script	Definition
3003	COT PREV	9327129, 9327172	A continuity test was specified as performed on the previous circuit.
4001	COT REQD	9327130, 9327173	Counts the number of times the Continuity test is required on this circuit.
4002	COT NOTN	9327130, 9327173	Counts the number of times the Continuity test failed because the 2000Hz tone was not detected.
4003	COT REQ FAIL	9327130, 9327173	Counts the number of times the Continuity test was required but failed. Failure indicated by the Continuity Indicator in the COT message.
4004	COT REQ PASS	9327130, 9327173	Counts the number of times the Continuity test was required and passed. Indicated by the Continuity Indicator in the COT message.
4005	COT PREV	9327130, 9327173	Counts the number of times the Continuity test was performed on the previous circuit. Indicated by the nature of connection parameter in the incoming SETUP message.
4006	COT PREV FAIL	9327130, 9327173	Counts the number of times the Continuity test was performed on the previous circuit but failed. Failure indicated by the Continuity Indicator in the COT message.
4007	COT PRV PASS	9327130, 9327173	Counts the number of times the Continuity test was performed on the previous circuit and passed. Indicated by the Continuity Indicator in the COT message.
8001	No Tone Detected	9327131, 9327134, 9327136, 9327158, 9327159	Counts the number of times the call failed due to the incoming tone not being detected by the vop_timeout.

Code	Statistic	Script	Definition
8001	No Tone Detected	9327136	The voice path verification test failed because the tone was not detected.
8004	Tone Lost	9327131, 9327134, 9327136, 9327158, 9327159	Counts the number of times the call failed due to losing the incoming tone before the test_time parameter expires.
8004	Tone Lost	9327136	The voice path verification test failed because the signal analysis tone was lost (see det_lost_dig).

A.2.8.1 Supplemental Report Statistic Information

This section provides additional information on the use and meanings of Call Statistics Report (and error message data) which may be programmed into a Script.

A.1.8.1.1 ORIG ATTEMPT

The number of calls that the calling line goes off hook to initiate a call and was allowed to go back on hook without manual intervention (unit placed in stop mode). It counts each occurrence of an OFFHOOK instruction by the originating line regardless of the success of the call.

A.1.8.1.1 ORIG COMPL (Analog)

Will increment its count, up to 50000, each time the call between the two lines is complete, including voice path verification and answer supervision check, if enabled. It counts the number of times the programmed sequence was successful in running through its complete test.

If this does not increment once per ORIG ATTEMPT, you may see any of the following codes. The code received will help you identify the fault.

A.1.8.1.1 ORIG COMPL (CAS T1, E1, PRI, SS7)

Will increment its count, up to 50000, each time the call between the two lines is complete, including voice path verification, if enabled. It counts the number of times the programmed sequence was successful in running through its complete test. If this does not increment once per ORIG ATTEMPT, you may see any of the following codes. The code received will help you identify the fault.

A.1.8.1.1 ORIG COMPL (BRI)

Will increment its count, up to 50000, each time the call between the two lines is complete, including voice path verification, if enabled. It counts the number of times the programmed sequence was successful in running through its complete test. If this does not increment once per ORIG ATTEMPT, you may see any of the following codes. The code received will help you identify the fault.

A.1.8.1.1 AVG START DELAY (Analog)

The average time from off hook to detection of dial tone on the calling line for calls that complete, only. This code displays the average start dial delay for the assigned line. Each factory script will get a time stamp at offhook then another at the time the start dial signal arrives (or the line times out) and writes the difference to a register, which is then divided by the number of times the line reported the code, for an average delay.

A.1.8.1.1 AVG START DELAY (CAS T1, E1)

The average time from off hook to detection of dial tone on the calling line for calls that complete, only. This code displays the average start dial delay for the assigned line. Each factory script will get a time stamp at offhook then another at the time the start dial signal arrives (or the line times out) and writes the difference to a register, which is then divided by the number of times the line reported the code, for an average delay.

A.1.8.1.1 AVG START DELAY (PRI, SS7)

The average time from off hook to detection of Layer 2 on the calling line for calls that complete, only. This code displays the average start dial delay for the assigned line. Each factory script will get a time stamp at offhook then another at the time Layer 2 is established (or the line times out) and writes the difference to a register, which is then divided by the number of times the line reported the code, for an average delay.

A.1.8.1.1 AVG START DELAY (BRI)

The average time from off hook to detection of Layer 2 on the calling line for calls that complete, only. This code displays the average start dial delay for the assigned line. Each factory script will get a time stamp at offhook then another at the time Layer 2 is established (or the line times out) and writes the difference to a register, which is then divided by the number of times the line reported the code, for an average delay.

A.1.8.1.1 SLOW START (Analog)

The number of calls that an originating call doesn't receive dial tone within the st_sig_dly time. This will only count if dial tone is eventually received within the st_sig_fail time. This code represents a slow start signal on an originate line. The protocol has not detected dial-tone (or seize acknowledge) in the delay time-out set by the st_sig_dly parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal was received.

A.1.8.1.1 SLOW START (CAS T1, E1)

The number of calls that an originating call doesn't receive dial tone within the st_sig_dly time. This will only count if dial tone is eventually received within the st_sig_fail time. This code represents a slow start signal on an originate line. The protocol has not detected dial-tone (or seize acknowledge) in the delay time-out set by the st_sig_dly parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal was received.

A.1.8.1.1 SLOW START (PRI, SS7)

The number of calls that an originating call doesn't establish Layer 2 within the st_sig_dly time. This will only count if Layer 2 is eventually established within the st_sig_fail time. This code represents a slow start signal on an originate line. The protocol has not detected Layer 2 in the delay time-out set by the st_sig_dly parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal was received.

A.1.8.1.1 SLOW START (BRI)

The number of calls that an originating call doesn't establish Layer 2 within the st_sig_dly time. This will only count if Layer 2 is eventually established within the st_sig_fail time. This code represents a slow start signal on an originate line. The protocol has not detected Layer 2 in the delay time-out set by the st_sig_dly parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal was received.

A.1.8.1.1 NO START (Analog)

The number of times that an originating call doesn't receive dial tone within the st_sig_fail time. This code represents no start signal on an originate line. The protocol has not detected dial-tone (or seize acknowledge) in the fail time-out set by the st_sig_fail parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal timed out.

A.1.8.1.1 NO START (CAS T1, E1)

The number of times that an originating call doesn't receive dial tone within the st_sig_fail time. This code represents no start signal on an originate line. The protocol has not detected dial-tone (or seize acknowledge) in the fail time-out set by the st_sig_fail parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal timed out.

A.1.8.1.1 NO START (PRI, SS7)

The number of times that an originating call doesn't establish Layer 2 within the st_sig_fail time. This code represents no start signal on an originate line. The protocol has not detected Layer 2 in the fail time-out set by the st_sig_fail parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal timed out.

A.1.8.1.1 NO START (BRI)

The number of times that an originating call doesn't establish Layer 2 within the st_sig_fail time. This code represents no start signal on an originate line. The protocol has not detected Layer 2 in the fail time-out set by the st_sig_fail parameter. The number within the real time error reports represents (in 100ms increments) the time from offhook until the start signal timed out.

A.1.8.1.1 NO ALERT (Analog)

The number of times that a call progresses to the point that the called line expects ringing and doesn't get it. This code represents no alert on a terminate line. The protocol has not detected a ring (or seize) within the fail time-out set by the timeout parameter for the first ring (paired operation only) or, subsequent ring signals were not present before the ring_cycle parameter time-out. The number within the real time error reports represents the number of rings that were detected before the time-out occurred.

This code is normally used on paired operations such as A Calls B and A Calls B ; B Calls A Scripts. It is reported from the Call Program when the terminating line which is expecting a call from the originating line did not receive an ALERT signal (signal code 101) from the protocol.

This condition indicates that there is a problem in the line signaling system.

The LOOP START Line Type sends the ALERT signal when it receives ring bursts from the originating line (Analog only).

A.1.8.1.1 NO ALERT (CAS T1, E1)

The number of times that a call progresses to the point that the called line expects ringing and doesn't get it. This code represents no alert on a terminate line. The protocol has not detected a ring (or seize) within the fail time-out set by the timeout parameter for the first ring (paired operation only) or, subsequent ring signals were not present before the ring_cycle parameter time-out. The number within the real time error reports represents the number of rings that were detected before the time-out occurred.

This code is normally used on paired operations such as A Calls B and A Calls B ; B Calls A Scripts. It is reported from the Call Program when the terminating line which is expecting a call from the originating line did not receive an ALERT signal (signal code 101) from the protocol.

This condition indicates that there is a problem in the line signaling system.

A.1.8.1.1 AVG PD DELAY (Analog)

The average time from end of dialing until the first ring is detected on the called line for completed calls only. This code provides an average time (100ms resolution) from the last digit sent until ring (or seize) is detected on the terminate port (paired only) or SENDID is detected (unpaired only). Like Code 3, time stamps are used to determine the elapsed time, and then averaged.

A.1.8.1.1 AVG PD DELAY (CAS T1, E1)

The average time from end of dialing until the first ring is detected on the called line for completed calls only. This code provides an average time (100ms resolution) from the last digit sent until ring (or seize) is detected on the terminate port (paired only) or SENDID is detected (unpaired only). Like Code 3, time stamps are used to determine the elapsed time, and then averaged.

A.1.8.1.1 AVG PD DELAY (PRI)

The average time from end of dialing until the CONNECT message is detected on the called line for completed calls only. This code provides an average time (100ms resolution) from the last digit sent until a CONNECT is detected. Like Code 3, time stamps are used to determine the elapsed time, and then averaged.

A.1.8.1.1 AVG PD DELAY (SS7)

The average time from end of dialing until an answer is detected on the called line for completed calls only. This code provides an average time (100ms resolution) from the last digit sent until answer is detected. Like Code 3, time stamps are used to determine the elapsed time, and then averaged.

A.1.8.1.1 AVG PD DELAY (BRI)

The average time from end of dialing until the CONNECT message is detected on the called line for completed calls only. This code provides an average time (100ms resolution) from the last digit sent until a CONNECT is detected. Like Code 3, time stamps are used to determine the elapsed time, and then averaged.

A.1.8.1.1 NO CONFRM

The number of calls that the voice path verification check failed. This code represents a failure in the confirming path check between lines. Path confirmation is done by the sequences initiated by the SENDID/RECVID instructions in the Call Program. In this sequence, one party sends a tone sequence and the other party sends an acknowledge tone after it has received and checked the ID. The sequence continues through a programmed conversation time.

If the failure is from a RECVID (usually the originate line) instruction, the ID sent either did not match what it was told it would receive in the ID parameter, or it passed the fail time-out set in the confirm_time parameter. If the failure is from a SENDID (usually the terminate line) instruction, either the 900Hz confirmation from the RECVID was not received, or it passed the fail time-out set in the confirm_time parameter. The number within the real time error reports represents (in 100ms increments) the elapsed time of the conversation before the failure occurred.

A.1.8.1.1 CALLED BUSY (Analog)

The number of calls that busy signal was detected by the calling line after dialing all digits and waiting the timeout period. This code represents a busy signal (either fast busy or slow busy) detected on the line. The number within the real time error reports represents the type of busy signal detected (60 for slow or called subscriber busy and 120 for fast busy or congestion).

This code is usually reported from the originating Call Program to indicate that the called party is busy. Usually the protocol detects the busy conditions on the line, and sends a busy signal (signal code 113) to the Call Program.

A.1.8.1.1 CALLED BUSY (CAS T1, E1)

The number of calls that busy signal was detected by the calling line after dialing all digits and waiting the timeout period. This code represents a busy signal (either fast busy or slow busy) detected on the line. The number within the real time error reports represents the type of busy signal detected (60 for slow or called subscriber busy and 120 for fast busy or congestion).

This code is usually reported from the originating Call Program to indicate that the called party is busy. Usually the protocol detects the busy conditions on the line, and sends a busy signal (signal code 113) to the Call Program.

A.1.8.1.1 NO ANS SIGNAL (Analog)

The number of calls that reverse battery was not detected at the end of the voice path confirmation check. The number within the real time error reports represents (in 100ms increments) the elapsed time of the conversation before the failure occurred. This code is usually reported from the originating Call Program to indicate that the called party did not answer the call.

Usually the protocol detects a "far-end-answer" condition on the line and sends an answer signal (signal code 103) to the Call Program. The Call Program reports NO ANS SIGNAL if the signal code 103 is not received within a certain time limit.

The LOOP START Line Type sends the answer signal when it detects a polarity reversal (supervision).

A.1.8.1.1 NO ANS SIGNAL (CAS T1, E1)

The number of calls that an answer signal was not detected at the end of the voice path confirmation check. The number within the real time error reports represents (in 100ms increments) the elapsed time of the conversation before the failure occurred.

This code is usually reported from the originating Call Program to indicate that the called party did not answer the call. Usually the protocol detects a "far-end-answer" condition on the line and sends an answer signal (signal code 103) to the Call Program.

The Call Program reports NO ANS SIGNAL if the signal code 103 is not received within a certain time limit.

A.1.8.1.1 NO ANS SIGNAL (BRI)

The number of calls that a SETUP ACKNOWLEDGE message was not detected after dialing.

This code is usually reported from the originating Call Program to indicate that the switch did not acknowledge the SETUP message.

The Call Program reports NO ANS SIGNAL if the signal code 103 is not received within a certain time limit.

A.1.8.1.1 TERM ATTMPT (Analog)

The number of calls that the called line goes off hook as a result of receiving the appropriate number of rings. This code will count the number of times the specified line has detected an incoming call and the programmed number of expected rings, then gone offhook regardless of the success of the call.

A.1.8.1.1 TERM ATTMPT (CAS T1, E1)

The number of calls that the called line goes off hook as a result of receiving the appropriate number of rings. This code will count the number of times the specified line has detected an incoming call and the programmed number of expected rings, then gone offhook regardless of the success of the call.

A.1.8.1.1 TERM ATTMPT (PRI, SS7)

The number of calls that the called line goes off hook as a result of receiving an incoming call. This code will count the number of times the specified line has detected an incoming call, then gone offhook regardless of the success of the call.

A.1.8.1.1 TERM ATTMPT (BRI)

The number of calls that the called line goes off hook as a result of receiving an incoming call. This code will count the number of times the specified line has detected an incoming call, then gone offhook regardless of the success of the call.

A.1.8.1.1 TERM COMPL

The number of calls that the called line answered an incoming call and verified the voice path. This code counts the number of calls successfully answered by the specified terminate line. When operating in a paired mode, it is possible to have a TERM COMPLete and not an ORIG COMPLete if the originate line is expecting answer supervision and it is not present. In this case, Code 10 will count.

When running unpaired, it is possible to have a TERM COMPLete and not an ORIG COMPLete if the specified terminate line is successful in completing its SENDID function. It does not require the originating line to send a SENDID.

A.1.8.1.1 CODE 14 (PRI/BRI)

Increments when a Connect message is not received for Voice or Data calls.

A.1.8.1.1 CODE 14 (SS7)

Increments when number of expected digits is not received for Voice or Data calls.

A.1.8.1.1 CODE 15 (BRI)

Increments each time an Originate call fails to clear. Statistics still show a call completion.

A.1.8.1.1 CODE 16 (PRI/BRI)

Increments each time the terminate line fails to receive a CONNECT ACK message on Voice or Data calls.

A.1.8.1.1 CODE 17 (SS7)

Reports an error in clearing the call. Statistics still show a call completion.

A.1.8.1.1 CODE 17 (BRI)

Reports an error on the terminate side in clearing the call. Statistics still show a call completion.

A.1.8.1.1 CODE X (14 - 32)

These codes have been provided so you may customize your scripts to allow reporting of required events. Code 14 thru 32 will have the header of Codexx and do not produce real time error reports. Codes 27 thru 30 are accumulators, and Codes 31 and 32 are average registers.

Table A-12. Call Statistic Report Codes

Report Name	Code	Report Heading	RT Msg	Count	Accum.	Avg.
-	0	none		X	-	-
R_ATTEMPT	1	ORIG ATTEMPT		X	-	-
R_COMPLETE	2	ORIG COMPL		X	-	-
R_START	3	AVG ST DELAY		-	-	X
R_SLOWSTART	4	SLOW START	X	X	-	-
R_NOSTART	5	NO START	X	X	-	-
R_NOALERT	6	NO ALERT	X	X	-	-
R_PDTIME	7	AVG PD DELAY		-	-	X
R_NOCONF	8	NO CONFRM	X	X	-	-
R_BUSY	9	CALLED BUSY	X	X	-	-
-	10	NO ANS SIGNAL	X	X	-	-
-	11	TERM ATTMPT		X	-	-
-	12	TERM COMPL		X	-	-
-	13	RING TIMOUT	X	X	-	-
-	14	CODE 14		X	-	-
	• • •	(first and last of series shown)		X		
-	26	CODE 26		X	-	-
-	27	CODE 27		-	X	-
-	28	CODE 28		-	X	-
-	29	CODE 29		-	X	-
-	30	CODE 30		-	X	-
-	31	CODE 31		-	-	X
-	32	CODE 32		-	-	X

Text in **Report Heading** column appears (on two 6-character lines) in the displayed/printed header of the Statistical Report. An "X" in the RT MSG column means that a Real Time Error Message is also generated by default. In writing CODE instructions, use the Code number unless the Report Name has been defined as a constant in the # VARIABLES section of the script. The X's are default assignments.

X in the **Count** column indicates current number of code occurrences of the event is placed in the field (max. = 50000).

X in the **Accum** column indicates Accumulated-value in the variable is placed in the field (max. value = 9999999).

X in the **Avg.** column indicates that the Accum-value of the variable is divided by the count-value of the event divided by 10 (to convert the counts/100ms to counts/sec.). This result is placed in the field (max. value = 65535.0).

The maximum field width, including decimal point and leading blanks = 8 characters

If a maximum value is exceeded, the field is filled with stars "********"

A.2.7 Signal Names and Codes

Table A-13 lists the Signal Names and Codes. Signals are seen by the WAIT and IF.SIG instructions as simple "yes/no" indications that are passed out of the instructions that use the signals.

WAIT and/or IF.SIG instructions are provided to test for a returned code:

- The WAIT instruction tests for a signal code from a channel within periods set by delay or fail time parameters. A DELAY Flag or FAIL Flag is set if delay or fail time is exceeded. These flags may then be tested by IF.DELAY and/or IF.FAIL instructions.
- The IF.SIG instruction tests only for the return of a signal code from a channel, either as a result of a previous instruction, or from an external event detected by the channel.

Up to eight different signals can be stored at any time during Call Program execution. If a signal that is already present occurs again, it replaces the previous occurrence of the signal.

All signals can be cleared (set to NO) by the CLRSIGS instruction, or automatically after being detected by a WAIT or IF.SIG instruction.

Table A-13. Signal Value Names and Codes

Signal Name	Code	Meaning
SIG_ALERT	101	Alert (incoming call)
SIG_STARTDIAL	102	Start Dial (Dial tone, wink, etc.)
SIG_ANSWER	103	Far-end answer detected (offhook)
SIG_ABANDON	104	Ringing abandoned
SIG_DISCONNECT	105	Caller disconnected
SIG_SEIZE	106	Seize from network
SIG_STARTDIALb	107	Not used on AM2/CRS
SIG_ENDSEL	108	End of selection received from network
SIG_FAIL	109	Fail (sometimes due to timeout)
SIG_DONE	110	General done
SIG_BADACK	111	Bad (unexpected) backward digit

Signal Name	Code	Meaning
SIG_RELEASE	112	Line has been released (onhook)
SIG_BUSY	113	Called subscriber (B-3)
SIG_SZAK	114	Seize (ACK) from R2 originate channel
SIG_BUSY1	115	Fast Busy
SIG_BUSY2	116	Slow Busy
SIG_DSPLUPD	117	Display Updated (-P units only)
SIG_BERT_NOS	117	BERT pattern not received (D/De/DX/DXe/S7/S7e only)
SIG_BERT_LOS	118	BERT pattern lost (D/De/DX/DXe/S7/S7e only)
SIG_OFFHK	119	Offhook completed (-P units only)
SIG_RCVDGT	119	Enough incoming digits received to answer call. (S7/S7e only)
SIG_RESTART	119	Restart/Restart Ack received (ISDN only)
SIG_ONHK	120	Onhook completed (-P units only)
SIG_CLRREQ	120	X.25 Clear Request received (ISDN only)
SIG_DISCX25	121	X.25 L2 disconnected (ISDN only)
SIG_CLRCONF	122	X.25 Clear Confirm received (ISDN only)
SIG_RINGBACK	123	Ringback received
SIG_KEYSU	124	Key Setup received (-B units only)
SIG_KEYHOLD	125	Key Hold received (-B units only)
SIG_RTRVACK	126	Retrieve Ack received (-B units only)
SIG_READY4L2	127	Layer 1 is active and Switch is ready for Layer 2 (-B units only)
SIG_BUZZON	127	EV_BUZZON received (-P units only)
SIG_BUZZOFF	128	EV_BUZZOFF received (-P units only)
SIG_MTRPULSE	179	Meterpulse detected
SIG_USR1	231	User defined signal
SIG_CONNECT	232	Connect Message received (ISDN only)
SIG_CONNACK	233	Connect Ack Message received (ISDN only)
SIG_ACM	232	Address Complete Message received (S7/S7e only)
SIG_ANM	233	Answer Message received (S7/S7e only)

Note: Signal Names may not apply to all scripts. Use the Code as a numeric argument value in WAIT or IF.SIG instructions or use a Signal Name that has been defined in the # VARIABLES section (e.g., SIG_FAIL & 109).

A.2.8 Unit Error Messages

Unit error messages are rare. They are displayed when a Call Generator system-level software problem occurs. The system may stop responding after the occurrence of a unit level message. Recycling unit power usually corrects the problem. Table A-14 lists each message.

Table A-14. Unit Error Messages

MESSAGE	Meaning of message
FATAL INTERNAL ERROR 10	Unit has stopped due to a list processing error. This error and FATAL INTERNAL ERROR 31 indicate a corrupt program.
FATAL INTERNAL ERROR 31	Unit has stopped due to a message-queue posting error.
INTERNAL DIAGNOSTIC 11	This error indicates an unexpected condition in the software. Its meaning varies with the operations being performed and the version of software running. If this message is displayed, please contact Customer Service.
INTERNAL DIAGNOSTIC 12	This error indicates that a file with an illegal file type was loaded into the AM2S via the RS-232 serial port. The file was not saved, since the AM2S could not interpret the file.
INTERNAL DIAGNOSTIC 28	An unrecognized message between processors inside the AM2S produces this message. The possible cause is incompatible software in different processors in the unit.

A.2.9 Remote Error Messages

Remote Error Messages are displayed on a remote workstation. Table A-15 lists the messages and their descriptions for the Multimedia Application.

Table A-15. Remote Error Messages

MESSAGE	DESCRIPTION
“Key is 16 characters”	User inputs key string shorter than 16 characters @ command line.
“No License”	Licensing has not been configured yet.
“Invalid License”	User entered an invalid key code.
“Unknown Message”	Host received unknown message from message port.
“No Room for Channel”	All 8 buffers have configured for trace capturing mode (use ‘CU’ remote command to view configured channels).

A.2 EXTENDED REPORTING

The Extended Report Code Feature enables the user to create his or her own report headings as well as generate User-Defined Real Time Codes. This allows users to define their own report codes.

The following code types are available with Extended Reporting:

1. Average
2. Aver100Ms
3. Accumulator
4. Counter
5. Maximum
6. Minimum
7. Real Time Code

This appendix covers:

3. Minimum Host and Firmware Requirements for Extended Report Codes
4. Overview of Standard Reporting
5. Overview of Extended Reporting
6. Modifying Scripts to Include Extended Reporting using ScriptMate®
7. Modifying Scripts to Include Extended Reporting using a Text Editor
8. Once the Script is Downloaded

A.2.1 Minimum Host and Firmware Requirements for Extended Report Codes

The Extended Report Code Feature was implemented through a combination of FeatureCall, Host, LGC, and DCC firmware. All new units shipped support this feature, since they have the most current version of firmware. Older units that have been updated to support VoP II also include support for Extended Reporting. Contact customer support and supply the serial number to find out the current revision of the unit's firmware.

Note: Extended Reporting is available to Analog, CAS, PRI, and S7 bulk call generators. Extended Reporting is not available on any other bulk call generator models.

FeatureCall

The minimum FeatureCall version for extended codes is 3.60 for all models.

Host

The minimum host requirement for extended codes is 4.77A for all models.

Analog LGC

The minimum Line Group Controller (LGC) requirement for the analog unit is 912201014A.

Note: The LGC hardware must be set up for 64K.

T1 CAS LGC

The minimum Line Group Controller (LGC) requirement for the T1 CAS unit with hardware revision G or earlier is 912313113B.

The minimum Line Group Controller (LGC) requirement for the T1 CAS unit with hardware revision H or current is 912312113B.

Note: The LGC hardware must be set up for 64K.

E1 CAS LGC

The minimum Line Group Controller (LGC) requirement for the E1 CAS unit is 912322113B.

Note: The LGC hardware must be set up for 64K.

T1 and E1 PRI DCC

The minimum D-Channel Controller (DCC) requirement for the T1 and E1 PRI unit with 280137AY DCC boards is 912280128D.

The minimum D-Channel Controller (DCC) requirement for the T1 and E1 PRI unit with 280298AY DCC boards is 912282128D.

T1 and E1 SS7 DCC

The minimum D-Channel Controller (DCC) requirement for the T1 and E1 SS7 unit with 280137AY DCC boards is 912620114G.

The minimum D-Channel Controller (DCC) requirement for the T1 and E1 SS7 unit with 280298AY DCC boards is 912622114G.

A.2.2 Overview of Standard Reporting

The following script code block causes a Standard Report to be generated on the specified channel.

```
REPORT channel
  CODE code# register
END
```

code#

The code# parameter defines which code will be reported. The code can be defined within the report block or in the #VARIABLES section of the script. The following report blocks will report an "ORIG ATTEMPT" and an "ORIG COMPL".

```
SET #z 0
  REPORT channel
    CODE R_ATTEMPT #z
    CODE R_COMPLETE #z
  END

#VARIABLES
R_ATTEMPT & 1
R_COMPLETE & 2
```

```
SET #z 0
  REPORT channel
    CODE 1 #z
    CODE 2 #z
  END

There is no need to define the codes in the
#VARIABLES section if they are already defined
within the report block as shown above.
```

Once the Report block has been included in the script, it must be defined in the #VARIABLES section of the script. The #VARIABLES section is located at the bottom of the script.

There are two steps to add Standard reporting:

3. Add a Report Block in the script.
4. Define the codes in the variable section or within the Report Block.

The Standard Report Codes must be in the range of 1-255. See Table E-1 for the code names.

Registers

The register can be used to contain data significant to the reported code (e.g., elapsed time, number of BERT errors, etc.). The register value is meaningful for any codes that generate Minimum, Maximum, Average, Accumulator, and/or Real Time codes. Even if a value is not meaningful, it still must be specified. Note in the script example that the register "z" is set to zero. Code 1 and 2 are counters; therefore, the register value is not used.

Tables A-1 and A-12 list the Standard Report Codes. Note that there are 255 codes available for the Standard Reports. Some of the 255 codes are pre-defined, and some will generate a generic code (e.g., Code 26).

A.2.3 Overview of Extended Reporting

The following instruction causes an Extended Report to be generated on the specified channel.

```
EXREPORT channel
  EXCODE code# register
END
```

code#

The code# parameter specifies what will be reported. The code can be defined within the report block or in the #VARIABLES section of the script.

The following Extended Report block will report a user defined code.

SET #z 0
EXREPORT channel
  EXCODE R_CODE #z
END
	SET #z 0
	EXREPORT channel
	  EXCODE 1001 #z
	END

If the code is defined within the report block, it does not need to be defined in the #VARIABLES section. #VARIABLES R_CODE & 1001 #REPORT TITLE “Report User Code” CODE R_CODE COUNTER REALTIME “User Defined Report Heading” #END	

Once the EXREPORT block has been included in the script, the parameter name must be defined in the #VARIABLES section. The range of Extended Codes must be from 256-65535. Once the code has been defined in the #VARIABLES section, the report title, code value, and code heading must be defined. If using ScriptMate, this is done by selecting Define Report Format under the Tools drop down menu. If using a text editor, you must manually define it in the #REPORT section..

There are three steps to add Extended Reporting:

3. Add a Report Block in the script.
4. Define the codes in the VARIABLES section or within the Report Block.
5. Define the code type as a COUNTER, AVERAGE, AVER100MS, ACCUMULATOR, MAXIMUM, MINIMUM, and REALTIME in the column heading. This is defined in the REPORT section or via Define Report Format if using ScriptMate.

Registers

The register can be used to contain data significant to the reported code (e.g., elapsed time, number of BERT errors, etc.). The register value is meaningful for any codes that generate Minimum, Maximum, Average, Accumulator, and/or Real Time codes. Even if a value is not meaningful, it still must be specified. Note in the script example that Code 1001 has been defined as a realtime error. Therefore, the error will use the value entered for #z in the realtime error display.

A.2.4 Modifying Scripts to Include Extended Reporting using ScriptMate®

In this exercise, an SS7 Originate script is modified to report a real time error when an SS7 ANSWER message is not received. Though you may have a different interface type, the process to include Extended Reporting is the same.

3. Open ScriptMate and select Signaling System 7 (1.5 Mb/s) from the target interface window.
4. Select the File pull down menu and select Open. Select SS7 Orig Std 9327021b from the Script Files directory within the ScriptMate directory. The default installation path is C:\Program Files\ScriptMate\Script Files. ScriptMate displays SS7 Originate Standard Call Flow Diagram.
5. Click on the connection between the Wait for Answer (ANM) icon and the Initialize SS7 Originate Line icon. Press the Del key to delete the connection.
6. Open the General Palette. To open the General Palette, select Open under the File pull down menu. Go to the Palettes directory (C:\Program Files\ScriptMate\Palettes) and select the Primitive directory. Open the General Palette. Make sure the "files of type" field is set for Palettes (*.plt).

7. From the General Palette, click and drag the Report 1 Extended Code icon on the Call flow diagram. (The icon names will appear when you hold the mouse pointer over each icon.) Double-click on the icon and select the Parameters Tab. Change the code name to R_NoANMRecvd and select Apply. Select OK to exit.
8. Select the No ANSWER Msg node on the Wait for Answer (ANM) icon. Next, click on the Report 1 Extended Code icon to make the connection. Select and highlight the output node (square) located on the right side of the Report 1 Extended Code icon. Click on the Initialize SS7 Originate Line icon to make the connection.
9. Select the View pull down menu and select Dictionary. Scroll down and locate the R_NoANMRecvd and enter a value of 1001. (The values used for the Extended Reports are in the range of 256 to 65535.) Change the type from variable to constant. Close the dictionary.
10. Select the Tools pull down menu and select Define Report Format. Type "No Answer Report" under the Report Title field at the top of the window. Under the value column, select the drop down arrow and select the R_NoANMRecvd value. Under the type column, there are seven selections:

ACCUMULATOR	Adds current register value to the previous total.
AVER100MS	Adds each new time to the total time and averages that time based upon the report count. This report type is typically used when reporting average time, because it multiplies the result by 10 to convert the data from tenths of seconds to seconds.
AVERAGE	Adds the new value to the total and generates a new average based on the report count.
COUNTER	Increments the existing value by one.
MAXIMUM	Compares the new value to the existing maximum value and displays the larger of the two values.
MINIMUM	Compares the new value to the existing minimum value and displays the smaller of the two values.
REALTIME	Each time the code is received, the call generator generates a Real Time message, using the title defined in the Title field.

For this exercise, keep the code type COUNTER. Check the Realtime box to generate a Real Time message every time this report is generated. Change the title column from CODE 1001 to No ANSWER Message Received. Select Apply. Select OK to exit.

3. Select the File pull down menu. Select Save As, and enter the filename origSS7.
4. Select the File pull down menu. Select Create Script to convert the Call Flow Diagram (.CFD) file to a Source Code (.SRC) file.
5. The script is now ready to be downloaded.
6. To download the source code (.SRC) file, open FeatureCall, select the Call Setup pull down menu, and select Scripts. Locate and highlight the script under the Workstation Scripts, and select the download button. Enter a Script Name and a Script Number. The Script Name will be whatever you want to have displayed under the unit scripts field.

A.2.5 Modifying Scripts to Include Extended Reporting using a Text Editor

In this exercise, an SS7 Originate script is modified to report a real time error when an SS7 ANSWER message is not received. Though you may have a different interface type, the process to include Extended Reporting is the same.

1. From FeatureCall, select the Call Setup pull down menu, then select Scripts. Under the Unit Scripts, select ORIG SS7 for the unpaired originate script. Select edit/view to open a notepad window of the script.
2. Select the Search pull down menu, then select find. Type SIG_CONNACK in the field and select find next. Two lines below, after the SET #z 0, type:

```
EXREPORT channel
  EXCODE R_NoANMRecvd
END
```

3. Next, the code name (R_NoANMRecvd) must be defined in the #VARIABLES section of the script. The variable section is the last section of the script. Once the code name is defined, a #REPORT section must be added before the #END.

```
#VARIABLES
.
.
.
R_NoANMRecvd & 1001
#REPORT
TITLE "No Answer Report"
CODE R_NoANMRecvd COUNTER REALTIME "No ANSWER Message Received"
#END
```

Note: There are seven report codes to choose from. In this example we are defining this code to be a counter as well as a realtime report.

ACCUMULATOR	Adds current register value to the previous total.
AVER100MS	Adds each new time to the total time and averages that time based upon the report count. This report type is typically used when reporting average time, because it multiplies the result by 10 to convert the data from tenths of seconds to seconds.
AVERAGE	Adds the new value to the total and generates a new average based on the report count.
COUNTER	Increments the existing value by one.
MAXIMUM	Compares the new value to the existing maximum value and displays the larger of the two values.
MINIMUM	Compares the new value to the existing minimum value and displays the smaller of the two values.
REALTIME	Each time the code is received, the call generator generates a Real Time message, using the title defined in parenthesis.

4. Select Save As from the File pull down menu and enter the filename "origSS7.SRC".
5. Select the File pull down menu, and select Create Script to convert the Call Flow Diagram (.CFD) file to a Source Code (.SRC) file.
6. The script is now ready to be downloaded.

To download the source code (.SRC) file, open FeatureCall, select the Call Setup pull down menu, and select Scripts. Locate and highlight the script under the Workstation Scripts, and select the download button. Enter a Script Name and a Script Number. The Script Name will be whatever you want to have displayed under the unit scripts field.

A.2.6 Once the Script is Downloaded

Once a script with Extended Reporting has been downloaded to a unit, a Report Page is created, using the script name. To access the report codes, simply select that Report Page from the main FeatureCall window and press the Statistics button to update the statistics.

You can also add the Standard Reports to your Report Page by selecting the Report pull down menu and selecting Report Format. Select the Report Page for your script and check the add standard codes box. This will allow you to add the standard codes to your Report Page.

B. APPENDIX B: ANALOG DISPLAY SERVICES INTERFACE

Analog Display Services Interface (ADSI) Documentation. Applications for Calling Line Identification Service CDS for:

- British Telecommunications (BT) Calling Line Identity Presentation (CLIP)
- Cable Television Authority (CTA) Calling Line Identity Presentation (CLIP)
- United States, Bellcore (BC) Calling Identity Delivery (CID) systems

This documentation provides technical information for Caller Display Services in the BT (British Telecommunications), CTA (Cable Television Authority), and BC (Bellcore) networks.

The Calling Number Identification Circuit (CNIC) is compatible with BT, CTA and BC specifications. CNIC can provide two modes of operation - a mode whereby data transfer is initiated by the device and a mode whereby data transfer is initiated by an external microcontroller. CNIC also provides line reversal detection, ring detection, and dual tone alert signal detection capability.

The hardware for ADSI is designed especially to run for BT, BC, and CTA. In order to run the ADSI properly for each system, the Protocol State Table (PST) that is downloaded must be downloaded for that specific system.

Section B.2 details the Signaling Specifications for ADSI operation. Section B.3 details the Installation Instructions for your ADSI upgrade.

B.1 Signaling Specification

Signaling mechanism between a network and a Terminal Equipment (TE) providing Caller Display Service (CDS). CDS provides Calling Line Identity Presentation (CLIP), that is, delivery of the identity of the caller when a telephone call arrives, before the start of ringing (in the Idle State). Signaling may occur in either the onhook or the offhook state.

B.1.1 British Telecommunications (BT) State Signaling Sequence of Events

An incoming CDS call is indicated by a polarity reversal on the A and B wires (line reversal), followed by an Idle State Tone Alert Signal. CNIC has the capability to detect both the reversal and alert signal as well as to receive and demodulate the incoming CCITT V.23 FSK signals.

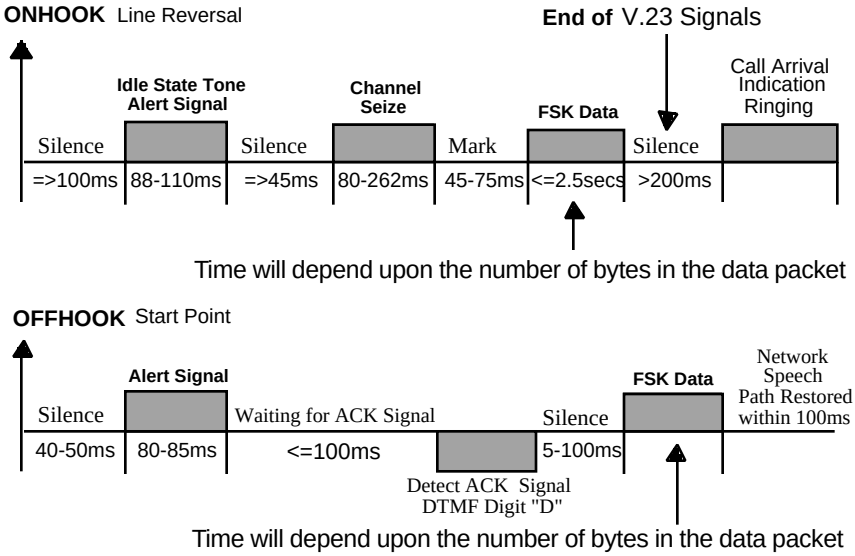


Figure B-1. British Telecommunications (BT) State Signaling

B.1.2 United States Bellcore (BC) State Signaling Sequence of Events

In Calling Number Delivery (CND) and Calling Name Delivery (CNAM) service, information about a calling party is embedded in the silent interval between the first and second ring. CNIC detects the first ring and can then be setup to receive and demodulate the incoming Bell-202 FSK data. The device will output the demodulated data onto a 3-wire serial interface.

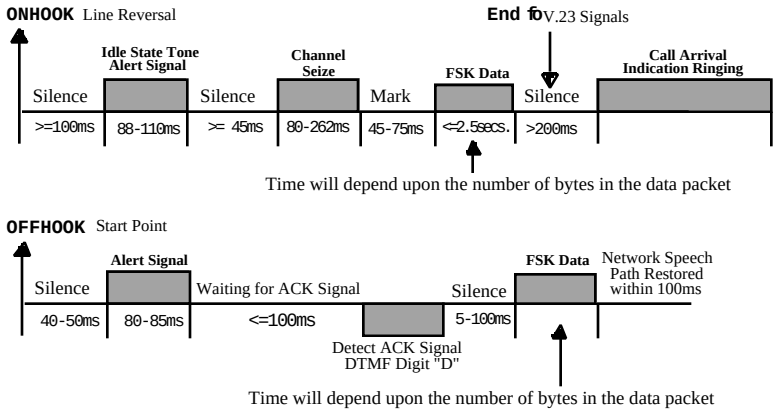


Figure B-2. United States Bellcore (BC) State Signaling

B.1.3 Cable Television Authority (CTA) State Signaling Sequence of Events

Data is transmitted after a single burst of ringing rather than before the first ringing cycle (as specified in SIN227). The Idle State Tone Alert Signal is not required as it is replaced with a single ring burst. CNIC has the capability to detect the ring burst. It is also able to demodulate either Bell-202 or CCITT V.23 FSK data following the ring burst, as specified by the CTA.

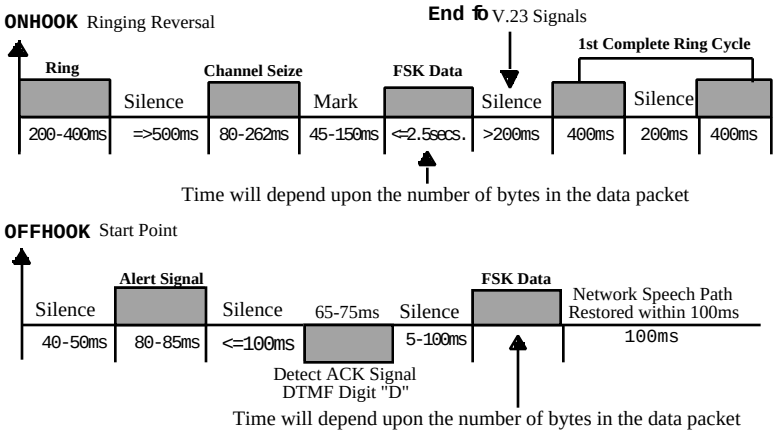


Figure B-3. Cable Television Authority (CTA) State Signaling

B.2 ADSI Upgrade Instructions

B.2.1 ADSI Requirements

The following are the requirements for ADSI. New modules will have all of the ADSI options detailed below. If existing unit(s) is upgraded to the ADSI features it must have the following components installed to the listed minimum revision level.

Hardware Requirements

"Terminate"

a. ADSI Module - 250247
b. PCM Line Interface - Rev. G - 280277
c. High Speed Processor - 25-0195 or 25-0223

Software Requirements

"Terminate"

a. Host Software - Rev. 4.29B- 912440429B
b. Line Group Control (LGC)- 912200008A
c. Local Digital Signal Processor (DSP)- 912140004A
d. ADSI DSP software - 912890101C

Script Requirements

Terminate Standard

a. 9320078C.SRC BT_ADSI Trm Std
b. 9320083B.SRC CTA_ADSI Trm Std
c. 9320079B.SRC BC_ADSI Trm Std

Protocol Requirements

Terminate Loopstart

a. 9221009B.STB BTADSILPST13
b. 9221013A.STB CTADSILPST13
c. 9221010A.STB BCADSILPST1

The Ameritec AM2S-A Analog Call Generator can be upgraded to include the ADSI option by replacing the interface module, LGC EPROM's, host flash software, and loading the ADSI scripts and protocols.

Note: In order to upgrade to the ADSI option, the AM2S-A must already have the high speed processor.

The Ameritec part number for the **INTERFACE MODULE** upgrade is 25-0247.

The Ameritec part number for the **LGC EPROMs** upgrade is 912200008A.

The Ameritec part number for the **Host Flash Software** upgrade is 912440429B.

The installation package includes a 3.5 inch Factory diskette loaded with ADSI scripts and protocols

To complete the upgrade instructions, a small Philips screwdriver will be required, as well as a PC capable of reading a 3.5 inch disk, with RS-232 serial port with communications software.

CAUTION: Electro-static discharge (ESD) precautions must be observed at all times during the procedure. Failure to comply may result in damage to the equipment.

B.2.2 Interface Module Installation Instructions

1. Remove power from the AM2S-A unit, and disconnect the power cord.
2. Stand the unit on its back so that the panel is up, then remove the five recessed screws holding the front panel. It is not necessary to remove the front panel or disconnect any of the ribbon cables. Simple remove the screws and push the front panel back, away from the interface board, to provide more room for removal of the interface board.
3. The interface module is secured by the two thumbscrews at each end, see Figure B-4. Loosen these thumbscrews evenly, one turn each at a time. The figure shows the unit.

CAUTION: It is recommended to remove and replace the two thumbscrews by hand, but it is important that the screws be loosened or tightened evenly, to prevent uneven pressure at the opposite side. Failure to comply may result in damage to the equipment.

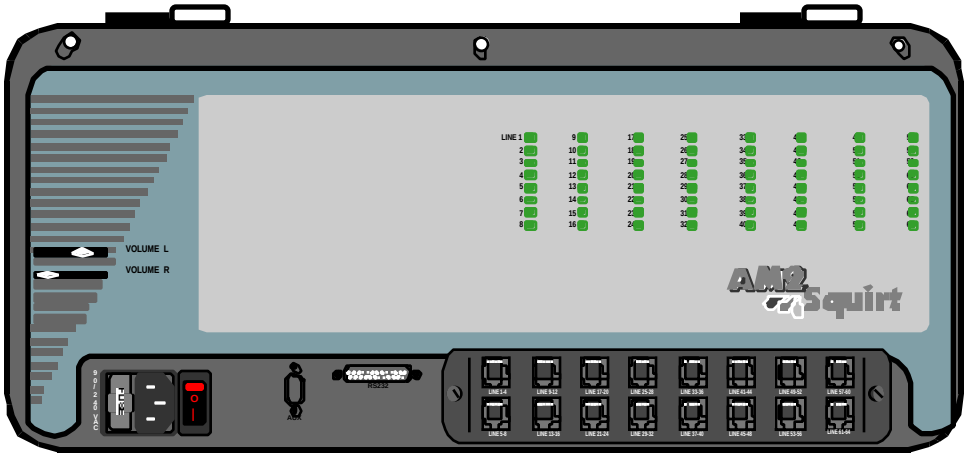


Figure B-4. AM2S-A Squirt Front Panel

4. When both of the thumb-screws are completely loose of the chassis, the module will pull freely from the chassis. Remove the old module and set it aside.
5. Take the new module and place it into the chassis. Be sure that the module fits into the chassis properly, so that the interface board slides easily into the side slots. Also make sure that the module is not upside down in the chassis. Then slowly lower the module into place.
6. It may be necessary to push down on the module to engage the two thumbscrews. After the screws are engaged, tighten them evenly, one turn each at a time. If the screws bind, push down on the module and tighten further, until the module is snug and the screws are hand-tightened.

B.2.3 LGC EPROM Installation Instructions

1. Carefully remove the two 280277AY boards from card slots ten and sixteen as shown in Figure B-5.

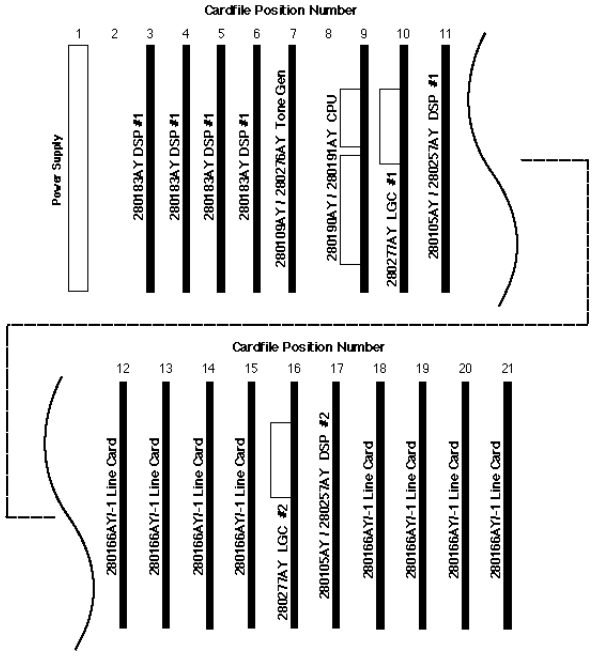


Figure B-5. LGC EPROM Locations

2. Place the boards on a flat surface with the component side facing up as shown in Figure B-6.
3. On each board carefully remove the EPROM identified as "LGC" with an IC puller. Set the EPROM's aside.

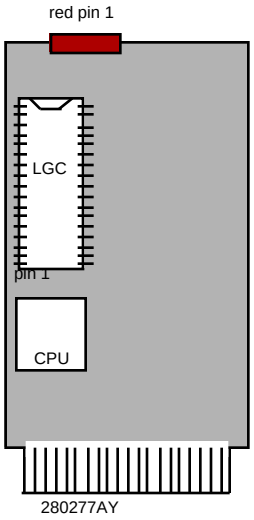


Figure B-6. LGC Card

4. Install the replacement EPROM's labeled "LGC" on each board. Observe that notch pin 1 on the EPROM are facing toward the top edge of each board.
5. Re-install the two 280277AY boards into the chassis. Be sure the components are facing the power supply.
6. Reconnect the power cable and apply power to the unit.
7. Carefully place the front panel onto the chassis. Check to see that the cables have not gotten stuck between the panel and the chassis, and align the five-screw hole.
8. Insert each of the five original screws in place, without tightening. After they have all been made snug, tighten each screw.

B.2.4 Host Flash Update Procedures

1. Set baud rate on the unit and the computer to 19200.
2. Type a Carriage Return or Enter to get the unit prompt (e.g. "**Ameritec>**").
3. Type "**ml ameritec**" followed by Carriage Return or Enter. The unit will respond "**Privileged Login**".
4. Type the flash load command "**MF**" followed by a Carriage Return or Enter.
5. Power-cycle the unit when prompted "**Reset unit to load program to FLASH memory**". Note that when power is returned the unit screen will appear blank.
6. When unit is powered back on, type a "**y**" after you are prompted "**Flash is OK, Overwrite [y/n]:**".
7. The unit will respond "**Erasing FLASH...done; Load Extended HEX File**" when it is ready to be downloaded to.

8. Insert Disk One of the provided floppy disks into the computer disk drive.
9. Initiate the transfer of the file provided on the floppy disk to the AM2S-A. Use ASCII file transfer from your file transfer program.

> **Note:** Be sure that your communicating package is setup for XON/XOFF software flow control and no character or line spacing.

10. Dots will be echoed to the computer screen as the file is transferred.
11. When the dots stop echoing, insert Disk Two into the computer disk drive.
12. Initiate the transfer of the file provided on the floppy disk to the AM2S-A. Use ASCII file transfer from your file transfer program.
13. The dots will be echoed to the computer screen as the second file is transferred.
14. When the transfer ends, the unit will echo "**done**" and the unit is ready for use.

B.2.5 Download Scripts and Protocols (line types)

1. Insert the provided floppy disk into the computer disk drive.
2. Type "**ml ameritec**", followed by carriage return or enter. The unit will respond "**Privileged Login**".
3. Start and configure your file transfer/terminal emulation program to control the AM2S-A (see instruction manual section 3).
4. Type a carriage return or enter to get the AM2S-A prompt (e.g. "**Ameritec>**").
5. Follow the instructions in Section 2 of the instruction manual that describe downloading scripts and line types (or protocols) to the AM2S-A unit. The required files on the floppy disk have names "922?????.hex".
6. The unit is ready for use.

B.3 Technical Support

If you need any assistance on the above procedures contact the Ameritec Customer Service Department.

Ameritec
760 Arrow Grand Circle
Covina, CA 91722 USA
TEL 626.915.5441
FAX 626.915.7181
www.ameritec.com

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