



The IBM 3725 Communication Controller

Presentation Guide

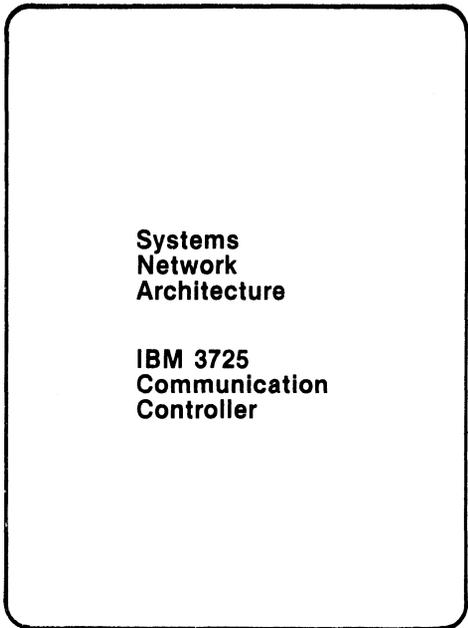
Second Edition (November 1983)

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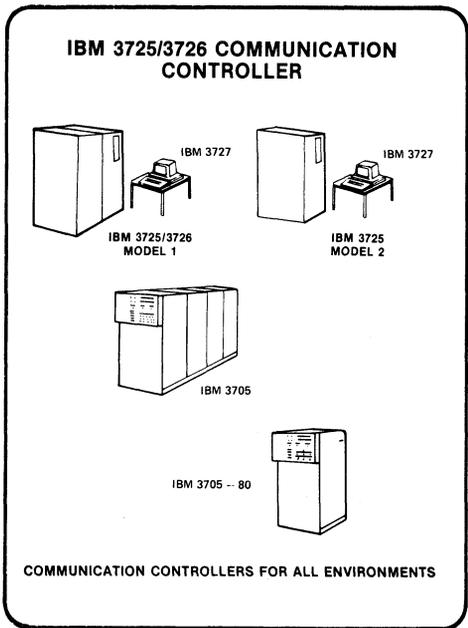
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**Foil 1 Systems Network Architecture/IBM 3725
Communication Controller**



Foil 2 IBM 3725 Communication Controller



This new communication controller enhances IBM's communication controller offering. The communication controllers for all environments are the IBM 3705-80, the IBM 3705, and the IBM 3725. The IBM 3705-80 can attach up to 16 lines; the IBM 3705 will attach up to 352 lines or up to 176 duplex lines; the IBM 3725 can attach up to 256 lines, all of which can be duplex lines. The IBM 3705-80 price/performance makes it an ideal entry-level communication controller, while the IBM 3725 price/performance is designed to meet user requirements for medium and large communication networks.

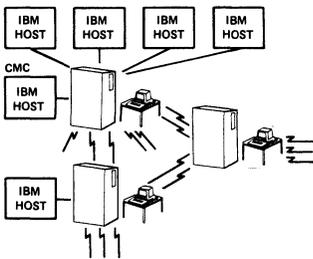
IBM 3725/3726 COMMUNICATION CONTROLLER

- ADVANCED TECHNOLOGY
- HIGH PERFORMANCE
- SYSTEMS MANAGEMENT ENHANCEMENTS
- SIMPLE TO CONFIGURE/UPGRADE
- UPWARD MIGRATION FROM IBM 3705
- SUPPORTS IBM'S SNA DIRECTION

Foil 3 IBM 3725 Communication Controller

The IBM 3725 introduces advanced technology with a faster instruction execution time, larger storage capacity, improved flexibility, enhanced functions, and higher throughput. These improvements are made possible by utilizing Large Scale Integration (LSI), thus making the hardware smaller and faster. This allows for easier customization of the machine to suit customer requirements by hardware standardization and increased modularity. Systems management is enhanced via a user interface which simplifies the activation and monitoring of the data communication network and provides ongoing problem determination coupled with greatly improved failure isolation and problem fix facilities. It is relatively easy to migrate from the IBM 3705 to the IBM 3725 using Emulation Program (EP) or Network Control Program (NCP) as its control program. The SNA direction is reinforced by the IBM 3725's use of the NCP functions and new systems management capabilities. To ease network evolution, the IBM 3725 can coexist with the IBM 3705 in the same network.

THE IBM 3725 COMMUNICATION ENVIRONMENT



- CHANNEL-ATTACHED COMMUNICATION CONTROLLER
- LINK-ATTACHED COMMUNICATION CONTROLLER
- MULTIPLE HOST NETWORKING
- CENTRALIZED COMMUNICATION MANAGEMENT VIA COMMUNICATION MANAGEMENT CONFIGURATION

Foil 4 The IBM 3725 Communication Environment

The IBM 3725 can meet a large number of communication controller requirements with its increased throughput and systems management enhancements. The IBM 3725 can be configured as a local communication controller with active channel attachments to six IBM host processors.

The IBM 3725, with its larger throughput capability, can concentrate a large number of lines at a remote location.

Multiple-host networking is supported via the Network Control Program.

The enhanced systems management functions of the IBM 3725 lend themselves to further enhancement of the communication management configuration concept of centralized network management.

HARDWARE CONFIGURATION

- ONE OR TWO FRAMES
- STORAGE IN BASE FRAME
 - 512K BYTES TO 2 MEGABYTES
 - 256K BYTE INCREMENTS
- SINGLE CHANNEL ADAPTER TYPE
 - SIX SINGLE HOST PROCESSOR ATTACHMENTS
 - FOUR MP HOST PROCESSOR ATTACHMENTS
- SINGLE COMMUNICATION SCANNER TYPE
 - MICROPROCESSOR-BASED
 - SUPPORTS SDLC, BSC, AND S/S PROTOCOLS
- FIVE LINE INTERFACE TYPES
 - 256 HDX OR FDX LINE ATTACHMENTS
- KEYBOARD DISPLAY OPERATOR CONSOLE

----SIMPLER TO CONFIGURE----

Foil 5 Hardware Configuration

The IBM 3725 is housed in one or two frames. This packaging approach often reduces the floor space required to support a larger number of communication lines.

The IBM 3725 base frame comes with 512K bytes of storage. Up to two megabytes of storage is available in 256K byte increments. All memory and logic function is contained in the first frame.

The second frame is used to house additional communication lines; 96 lines are attachable to the first frame, 160 lines to the second frame.

The 256 lines attachable to the IBM 3725 can operate in half duplex or full duplex mode depending on the line protocol. Line speeds up to 256 KPBS can be supported. The number of lines is not dependent on whether they are half or full duplex.

The controller has a single type of channel adapter for host attachment regardless of channel type attached. This flexibility and simplicity make configuring the controller easier and reduce the impact of change.

The host attachment capability of the IBM 3725 Communication Controller has been extended to six channel adapters from four on the IBM 3705. This permits more concurrent operation to IBM host processors.

The single type of communication scanner supports different protocol types providing maximum flexibility in attaching the communication lines in a customer network.

There are five types of line interface couplers that can handle single lines, or groups of four lines, depending on the type of coupler. Different line interface coupler types can be plugged into the same line attachment base. These characteristics give considerable flexibility in the number and type of lines that can be attached to the controller. This is particularly advantageous when an installation requires a few lines of several different types.

Console operation is accomplished through the IBM 3727 operator console unit attached to the IBM 3725. This console is required to operate and utilize the enhanced systems management functions that are an integral component of the IBM 3725.

The simplified structure of the IBM 3725 facilitates the ordering, change, and growth of the communication controller.

TECHNOLOGY

- ADVANCED TECHNOLOGY
- CCU LOGIC COMPARABLE TO IBM 4341 TECHNOLOGY
- STORAGE LOGIC COMPARABLE TO IBM 3081 TECHNOLOGY
- DUPLICATED ALU CIRCUITRY FOR RELIABILITY
- SINGLE BIT ERROR CORRECTION/DOUBLE BIT ERROR DETECTION FOR STORAGE
- HIGH-SPEED DATA BUS BETWEEN MAJOR COMPONENTS
- MULTIPLE MICROPROCESSORS FOR COMMUNICATION SCANNER

Foil 6 Technology

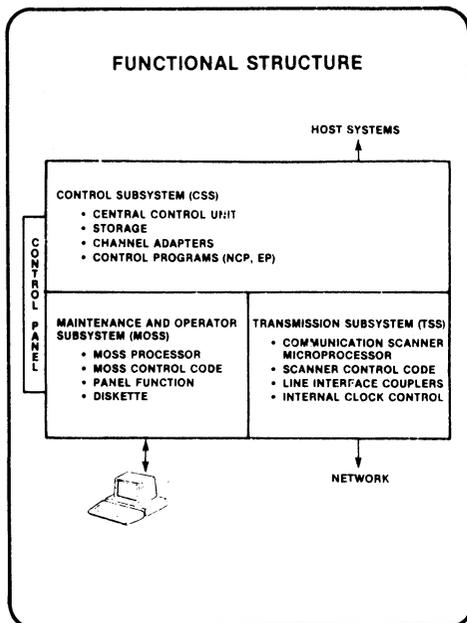
The IBM 3725 uses high density LSI technology. The Central Control Unit uses the same proven technology that is used in the IBM 4341. The storage logic is comparable to that used in the IBM 3081. The logic is designed for high reliability by duplicating the Arithmetic and Logic Unit (ALU) circuitry, thus reducing the impact of logic failures in the ALU.

The IBM 3725 implements single-bit error correction in the scanner and both single-bit error correction and double-bit error detection in main storage. This enhances error recovery for intermittent problems that may occur.

A high speed data bus is used between the Central Control Unit, the channel adapters, and the transmission subsystem. This high speed bus is a significant new architectural change that improves the performance of the IBM 3725.

The transmission subsystem uses LSI technology. Multiple microprocessors are used for the communication scanners. This will contribute to reliability, availability, serviceability improvement since single communication scanner failures will not impact the operation of other scanners.

FUNCTIONAL STRUCTURE



Foil 7 Functional Structure

The IBM 3725 Communication Controller is functionally structured in three parts. They are:

- A Control Subsystem (CSS) consists of a Central Control Unit (CCU) with up to 2 megabytes of storage in increments of 256K bytes, and zero to six Channel Adapters (CA). The control subsystem also contains and executes the control programs, the Network Control Program or the Emulation Program.
- A Transmission Subsystem (TSS) consists of one to fourteen independent communication scanners, each one of which supports one to eight Line Interface Couplers (LIC). Line Interface Couplers can attach up to four lines. The transmission subsystem may also contain the business machine clocks.

- A Maintenance and Operator Subsystem (MOSS). The operator uses MOSS to turn on the controller and to monitor the network operation. Maintenance personnel use the MOSS to isolate and repair software errors and hardware failures both within the controller and the MOSS itself. The MOSS comprises the MOSS processor and storage, the MOSS diskette with its control code and adapter, the console and its adapter, and the control panel and its adapter. MOSS is a significant feature of the IBM 3725 because it reinforces and contributes to the systems management direction to provide network operations with the tools to operate and maintain a network.

**CONTROL SUBSYSTEM
(CSS)**

- CHANNEL ADAPTER
 - UP TO SIX CHANNEL ADAPTERS
 - BYTE, BLOCK, OR SELECTOR MODE
 - TWO-PROCESSOR SWITCH (UP TO FOUR)
- CENTRAL CONTROL UNIT
 - OPERATES UNDER NCP/EP CONTROL
 - CYCLE STEAL DATA TRANSFER TO/FROM CHANNEL ADAPTERS AND COMMUNICATION SCANNERS
- PROCESSOR STORAGE
 - AVAILABLE IN SEVEN STORAGE SIZES

Foil 8 Control Subsystem (CSS)

The controller and its associated NCP can support up to 6 standard channel adapters, or up to 4 channel adapters equipped with the two-processor switch, or any mix of the two, provided that the total number of channel connections does not exceed eight. Only six channel connections can operate concurrently. For the Model 2, there is a maximum of two channel adapters. Only six channel connections can operate concurrently. The function of the channel adapters is to match the IBM 3725 to the host channels (whether byte-multiplexer, block-multiplexer, or selector channels).

NCP requires only one subchannel to a host for all traffic. EP, however, requires one subchannel per line. EP must use byte-multiplexer channels to communicate with a host. NCP can connect using any type of channel.

The first four channel adapters can be equipped with a Two-Processor Switch (TPS) which attaches to the same host channel twice or two different host channels. The TPS can be used to attach two hosts, either tightly coupled or loosely coupled.

For tightly coupled operation, the switches on the 3725 control panel select both hosts. Each host communicates with the controller on alternate channel cycles. The controller appears as the I/O unit to both hosts and both hosts access the controller in the same manner. This facility allows the access method, Advanced Communications Function/Virtual Telecommunications Access Method (ACF/VTAM), for example, to run on either processor, because the path to the controller is transparent to the access method.

For loosely coupled operation, the switches on the 3725 control panel select one host or the other. Only one host at a time can access the controller through this adapter. Manual switching at the 3725 control panel is necessary to access the other host.

The Central Control Unit (CCU) is an interrupt-driven processor that operates under NCP/EP control. As it occurs every event creates an interrupt on some level of NCP which activates the event processor. NCP manages the channel adapters and two-processor switches on the host side and the communication scanners on the line side. The data transfers between the host and the CCU, and between the CCU and the communication scanners are done by cycle stealing. During cycle stealing, vital areas of the CCU storage are fully protected against accidental damage by storage protection mechanisms. Cycle stealing avoids the overhead caused by data transfers between the host and the CCU storage and between the CCU storage and the communication scanner storage. Cycle stealing transfers data by interrupting execution of the control program. Program execution is stopped while cycle steals take place; the program resumes when cycle steals end. Cycle stealing contributes to the performance improvements of the IBM 3725.

The instruction set consists of 53 machine instructions, 51 of which are 3705-compatible at the source-program level, and two new I/O instructions which are designed to exploit the bus architecture to maximum advantage.

Processor storage is available in seven sizes, from 512K bytes to two megabytes in increments of 256K bytes. The storage address register is 22 bits long.

An error checking and correction (ECC) feature has been added to the storage read cycle, which corrects all single-bit errors, and detects multiple-bit errors.

The controller has four interrupt levels, making five program levels, called interrupt levels 1, 2, 3, 4, and base level 5. The four interrupt levels are arranged in a priority schedule, so that the highest priority level always runs if not masked. Each type of event that can occur is associated with a particular level, where the event processing code is situated.

The different program levels are assigned as follows:

Level 1: This level handles those situations requiring the most urgent attention: I/O adapters, CCU and program checks. They are, therefore, assigned to the highest priority level.

Level 2: This level handles program controlled and TSS interrupts for handling lines and data, and MOSS diagnostics. The controller hardware and control program interact very closely at this level to ensure data integrity.

Level 3: This level handles channel adapter and timer interrupts. It also handles program controlled interrupts (PCI) for communication processing that can be deferred from Level 2. Requests from the control panel are serviced on this level.

Level 4: This level handles program controlled interrupts for overall management of system resources, buffer management, queue manipulation, and dispatching of level 5 tasks. It also handles interrupts coming from the MOSS.

Level 5: This is the base or background level of the controller. It has the lowest priority level, and is active only if none of the other four levels require servicing. It executes all the low-priority, non-time-dependent functions of the controller like line management, data and message handling, control command decoding and execution, block handling routines, as well as most SNA functions, including routing.

TRANSMISSION SUBSYSTEM (TSS)

- COMMUNICATION SCANNERS
 - UP TO FOURTEEN COMMUNICATION SCANNERS
 - MICROPROCESSOR-BASED WITH S/S, BSC, AND SDLC CONTROL CODE
 - ATTACHES UP TO 256 FDX/HDX COMMUNICATION LINKS
- LINE ATTACHMENT BASES
 - TYPE A:
 - ONE COMMUNICATION SCANNER
 - TYPE B:
 - TWO COMMUNICATION SCANNERS
- LINE INTERFACE COUPLERS
 - FIVE TYPES
 - ATTACHMENT TO 256K BPS
 - INTERFACE ATTACHMENTS TO:
 - RS 232/V.24, RS 366/V.25, WIDE BAND, V.35, X.21
- INTERNAL CLOCKS
 - DIRECT ATTACHMENT
 - NONCLOCKED MODEM ATTACHMENT

Foil 9 Transmission Subsystem

The communication scanners scan all input from the line interface couplers, send input data to CCU storage, and distribute all data coming from CCU storage to the line interface couplers. The other functions of the scanners are:

- Executing Data Link Control (DLC) functions.
- Providing serializer/deserializer facilities.
- Providing buffering facilities.
- Providing the correct interfaces for the different line types and line speeds (except for the hardware interface, which is done by the line interface coupler).
- Recognizing certain control characters (depending on the type of line).

- Providing control character insertion/deletion (depending on the type of line).
- Providing code translation for BSC lines operating in Network Control Program (NCP) mode. The scanner translates from ASCII to EBCDIC when receiving from the line, and from EBCDIC to ASCII when transmitting to the line.

There may be up to 14 communication scanners installed in the IBM 3725. The Model 2 has one.

The Line Attachment Bases (LAB) provide for attachment of Line Interface Couplers to the IBM 3725. There are two types of LABs:

Line Attachment Base Type A provides one communication scanner and a physical base for up to eight Line Interface Couplers, either Type 1 or Type 4A.

Line Attachment Base Type B provides two communication scanners and a physical base for up to eight Line Interface Couplers, Type 1, Type 2, Type 3, Type 4A or Type 4B. Each scanner controls up to four Line Interface Couplers.

The Line Interface Couplers (LICs) provide functions necessary to interface the communication scanner with the various external facilities such as modems and other common carrier interfaces. Line Interface Couplers provide functions similar to those provided by the line sets of the IBM 3705 Communication Controller.

There are five types of Line Interface Couplers (LICs). They are:

Line Interface Coupler Type 1 (LIC1)

LIC1 contains four interfaces and is used with line interfaces corresponding to EIA RS232/CCITT V.24 (both half and full duplex) at speeds up to 1200 BPS with internal clocking, or up to 19,200 BPS with external clocking, auto-call interfaces corresponding to EIA RS366/CCITT V.25, and X.21 bis leased or switched interfaces. Direct attachment is possible up to 19,200 BPS. The four interfaces may be of the same type, or different, and are configured individually by cabling or by the scanner control code. Up to eight LIC1s can be attached to a LABA or a LABB.

NOTE: LIC1 is equivalent to Line Sets 1A, 1B, 1C, 1D, 1E, 1F, and 1H on the IBM 3705.

Line Interface Coupler Type 2 (LIC2)

LIC2 contains a single high-speed interface, and is used to connect wideband interfaces to the IBM 3725. It is designed for high-speed operation on analog lines from 19,200 to 230,400 BPS.

NOTE: LIC2 is equivalent to Line Sets 1G and 1T on the IBM 3705.

Line Interface Coupler Type 3 (LIC3)

LIC3 contains a single high speed interface. It is used for line interfaces corresponding to CCITT V.35, full or half duplex, at speeds up to 256,000 BPS. Local attachments are provided at speeds up to 56,000 BPS.

NOTE: LIC3 is equivalent to Line Sets 1S and 1U on the IBM 3705.

Line Interface Coupler Type 4A (LIC4A)

LIC4A contains four line interfaces corresponding to the X.21 interface (leased or switched) at speeds up to 9600 BPS.

Direct attachment of terminals is possible for speeds up to 9600 BPS.

Line Interface Coupler Type 4B (LIC4B)

LIC4B contains one line attachment interface corresponding to the X.21 interface (leased or switched) at speeds up to 64,000 BPS.

Direct attachment of terminals is possible for speeds up to 56,000 BPS.

The internal clock control provides bit clocking when the attached external modem or communication facility does not provide this clocking, or when direct attachment of the DTE is required. It provides clocking for eight line interface couplers (up to 32 lines) at 50, 110, 134.5, 200, 300, 600, and 1200 BPS for operation with or without a modem and at speeds of 2400, 4800, 9600, 19,200, and 56,000 BPS for operation without a modem (direct attachment). Only one internal clock feature needs to be ordered per communication scanner for all of the supported speeds.

MAINTENANCE AND OPERATOR SUBSYSTEM (MOSS)

- OPERATOR CONSOLE AND MICROPROCESSOR-BASED SYSTEM
- CUSTOMER USE
 - ALARMS FOR PROBLEM NOTIFICATION
 - VIEW MACHINE ERROR RECORDS FOR PROBLEM DETERMINATION
 - DEVELOP AND EXECUTE PROGRAMMED LINE AND TERMINAL TESTS
 - RE-IML COMMUNICATION SCANNER
 - VIEW/UPDATE GRAPHIC CONFIGURATION FILE
- CUSTOMER ENGINEER USE
 - PROBLEM DETERMINATION
 - DIAGNOSTIC TESTS

Foil 10 Maintenance and Operator Subsystem

The Maintenance and Operator Subsystem (MOSS) is designed to give the operator easy procedures to manage the data communication network, and to give the customer engineer rapid isolation and repair procedures within the controller.

The various component parts of the MOSS are:

- MOSS processor
- MOSS diskette drive and diskette adapter
- MOSS storage, comprising 8K bytes of read-only storage and 88K bytes of random access memory
- MOSS and control panel adapters
- Primary operator console and an alternate remote operator console. Either the primary console or the alternate console can be selected for service by a switch mounted on the control panel. Both console(s) are IBM 3727 operator consoles.
- The control panel

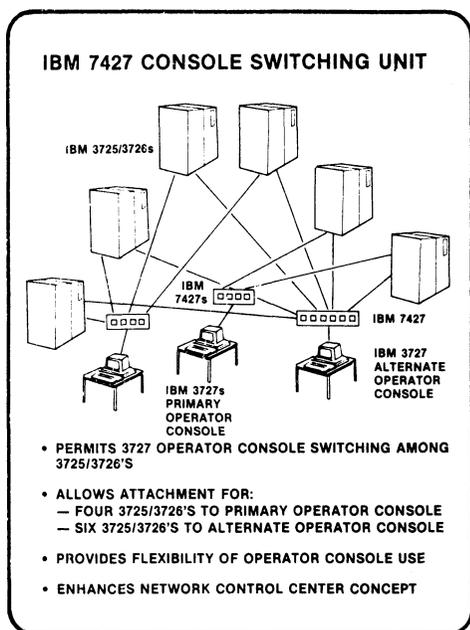
The MOSS processor operates independently of the main system. Its control code is loaded directly from the MOSS diskette during IML.

The MOSS provides:

- Initialization and monitoring functions for the operator to manage the controller.
- Functions that support the Network Problem Determination Application (NPDA) program at the host. The principal ones are the generation of ALERT messages to the host, ALARM messages to the operator console, and the running of diagnostic programs in the controller.
- Recovery procedures for failing hardware or software.
- Functions that maintain machine files defining the configuration of the communication controller, machine details of the controller, and parameters of the lines and channels used in the IPL process.

- Utility programs for the customer engineer for use in the maintenance procedures. They dump CCU storage and registers and transfer them to the host for printing; dump MOSS storage and registers on the MOSS diskette (the dump can be transferred later); dump scanner storage(s) on the MOSS diskette (the dump can be transferred to host later); modify the microcode (called ZAP); save vital files from the (faulty) diskette and write them on a new disk (called disk swap); repair software errors in the control program (NCP/EP); repair hardware and microcode failures in the controller.

MOSS is a significant enhancement to the communication controller systems management capability.

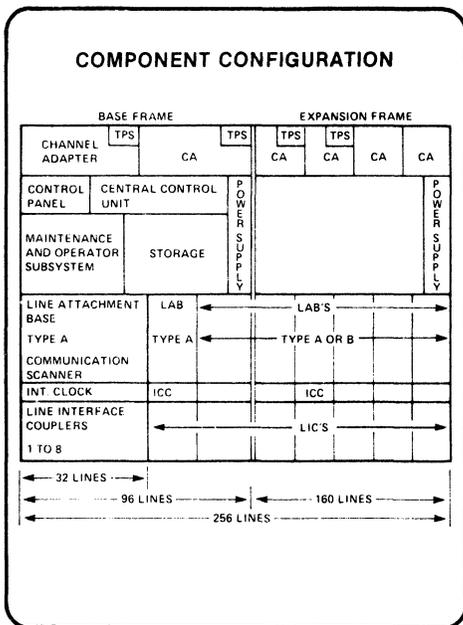


Foil 11 IBM 7427 Console Switching Unit

The IBM 7427 Console Switching Unit provides a means of mechanically switching the IBM 3727 operator console among several IBM 3725 Communication Controllers.

The IBM 7427 allows the attachment of up to four IBM 3725s to an IBM 3727 primary operator console or up to six IBM 3725s to an IBM 3727 alternate operator console. Both consoles are identical except that the IBM 3725 primary console cable is 7.5 meters (25 feet). The alternate console cable can be up to 150 meters (490 feet). The IBM 3725 has separate connectors for each of the console types. The primary console/alternate console switch on the IBM 3725 control panel selects which one will be used.

The alternate operator console can be located in the Network Control Center along with the NCCF/NPDA operator console. This permits additional access to information contained on the MOSS diskette or the execution of IBM 3725 procedures.



Foil 12 Controller Configuration

One of the major benefits of the IBM 3725 is simplicity of configuration. The multiple use function of the components significantly reduces the number of feature code components needed to configure the IBM 3725 for any supported environment.

The communication controller is available in one frame (IBM 3725) or two (IBM 3725/3726), depending on the number of the lines, and the number of channel adapters required. The Model 2 is one frame only.

The base frame contains the Central Control Unit (CCU); the storage (up to 2 megabytes); the Maintenance and Operator Subsystem (MOSS); zero, one or two channel adapters (with or without the two-processor switch feature); and one to three Line Attachment Bases (LAB) for attachment of up to 96 half-duplex or duplex lines.

A fully configured machine consists of two frames: the base frame and an expansion frame. The expansion frame contains up to four additional channel adapters (or three, one equipped with a two-processor switch; or two, both equipped with a two-processor switch). The expansion frame also contains up to five additional LABs and the associated line interfaces to attach an additional 160 half- or full-duplex lines.

Storage size has no effect on the physical modularity; all the storage is contained in the base frame. Many combinations of storage size and frame combinations are therefore possible. Thus, a machine requiring a small number of high-speed lines and one megabyte of storage can be handled within the base frame. On the other hand, a machine requiring a large number of low-speed lines but only 512K bytes of storage can be configured with a base and an expansion frame.

All configurations require a primary operator console for the operator; an alternate operator console can also be attached as an option. A switch is provided on the MOSS control panel to select one console or the other.

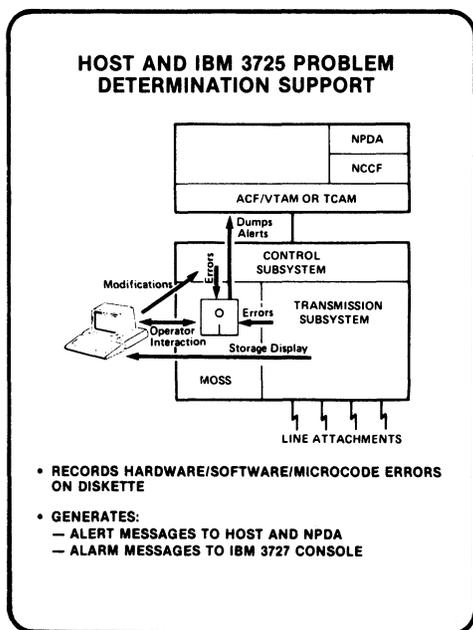
A channel adapter is mandatory only for channel-attached controllers: link-attached controllers do not require channel adapters or any other special feature.

Line Attachment Base Type A (LABA) contains one communication scanner and can support from one to eight Line Interface Couplers and up to 32 low- or medium-speed lines.

Line Attachment Base Type B (LABB) contains two communication scanners and can support from one to eight Line Interface Couplers and up to 32 high-speed lines.

The controller can contain from one to eight Line Attachment Bases, the first two being Type A. The remaining six line attachment bases can be Type A or B, as required. Each line attachment base can support from one to eight Line Interface Couplers. Line Interface Couplers LIC1 and LIC4A support from one to four lines and Line Interface Couplers LIC2, LIC3, and LIC4B support one line each.

The IBM 3725 controller can support up to 256 low-speed lines; fewer lines are supported if medium- and high-speed lines are required. The actual number of lines that can be supported by the controller depends on the traffic characteristics of the lines.



Foil 13 Problem Determination Support

The Maintenance and Operator Subsystem (MOSS) is a user-oriented subsystem and provides many facilities via a console that allows the operator to activate and monitor the functioning of the controller with ease. Problem determination is handled by the host in conjunction with the MOSS, and messages describing problems are immediately sent to the MOSS for display. The messages are sufficiently explicit so that the customer can call the appropriate maintenance organization. Many maintenance facilities are provided via the console that allow rapid problem isolation and fixing.

On detection of an error, the control code executing when the error occurred is retried a number of times. If the error cannot be recreated, the error environment is simply logged, a Box Error Record (BER) is created, and normal operation is resumed. If the error can be recreated and an error occurs again, a BER is created for each retry. The controller will try to recover from the error.

When the threshold of the number of retries is reached, either the failing component is re-IPLed or the component is shut down. The action taken is determined by the component part and type of error.

If a line or a scanner is disabled, the controller will continue functioning with a slight degradation. The line, or group of lines, is no longer operational.

If a channel is disabled, this route to a host is unusable and the controller routes the traffic to this host by alternate means, if there are any. Rerouting may introduce some degradation in performance, but the controller should continue to function.

The major part of problem determination is performed at the host by the Communication Network Management (CNM) facilities which comprise:

- Network Communication Control Facility (NCCF) which provides a program base for systems management programs.
- Network Problem Determination Application (NPDA) which runs under the control of the NCCF. It collects, organizes, and determines the origin of failures.

NPDA is a program product requiring an NCCF data base. NPDA gathers data, records, and displays it. The controller supports CNM by collecting failure data, processing it, and sending it to the host. This same failure data is displayed on the IBM 3727 operator console.

The controller also continuously monitors its operation for failures and differentiates between network and internal controller failures. Network failures are reported to the host only. Internal controller failures are reported to both the host and the MOSS.

Foil 14 ALERT and ALARM Information

ALERT AND ALARM INFORMATION

- DISPLAYS:
 - ALERT/ALARM NUMBER AND STATUS
 - CAUSES
 - DATA UNIQUE TO COMPONENT
 - ACTION RECOMMENDED TO OPERATOR
 - FAILING RESOURCE
 - TIME AND DATE OF DETECTION

The two major mechanisms for noting the occurrence of failures are the ALERT and ALARM messages.

The principal way the IBM 3725 operator is informed of trouble is by the ALARM messages sent for display on the operator console. The ALARM messages contain detail necessary for the operator to determine the nature, area, and probable cause of the failure.

When a failure is detected in a component of the controller, NCP/EP or MOSS constructs a Box Error Record (BER) and passes it to the MOSS where it is added to the BER file which is stored on the MOSS diskette. The BER contains all relevant details about the component at the instant of the detected failure.

An ALERT message is sent to the host processor to notify the host operator. Microcode stored on the MOSS diskette can be dumped to the host processor for analysis in case of a software problem in the IBM 3725.

In the systems management environment, ALERTS notify the host operator of IBM 3725 hardware and software failures that affect the operation of the network and that require intervention. There are sixteen categories of ALERTs and ALARMS. Each defines:

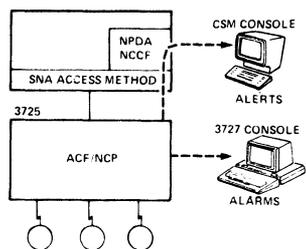
- ALERT number
- ALERT status
- Major and minor causes
- Data unique to the component
- Recommended operator action
- Failing resource and type
- Time and date of detection

In addition to the ALERT, a message lamp lights on the control panel to inform the operator that an ALARM message is waiting for display on the operator console. The ALARM displays to the MOSS operator the same information the ALERT displays to the host operator.

Foils 15 to 17 Systems Management Environments

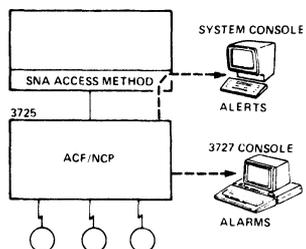
The way in which the host and MOSS operators are notified of controller malfunctions depends upon the type of control program installed and whether NPDA is installed at the host.

IBM 3725 WITH HOST SYSTEMS MANAGEMENT



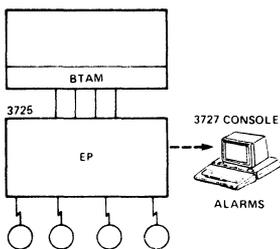
- ALARMS TO IBM 3727 CONSOLE
— STORED ON MOSS DISKETTE
- ALERTS TO NPDA CONSOLE
— TYPE AND LOCATION OF FAILURE
— COORDINATES ALERTS WITH OTHER DATA
— STORED ON NPDA DATA BASE
— PROVIDES OPERATOR GUIDANCE

IBM 3725 WITHOUT HOST SYSTEMS MANAGEMENT



- ALARMS TO IBM 3727 CONSOLE
— STORED ON MOSS DISKETTE
- ALERTS TO SYSTEM CONSOLE
— NO PROCESSING ON ALERTS

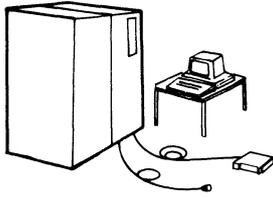
IBM 3725 WITH NON-SNA AND EP



- ALARMS TO IBM 3727 CONSOLE
— STORED ON MOSS DISKETTE
- NO ALERTS TO HOST

Control Program	With NPDA	Without NPDA
NCP/PEP	Host operator ALERT via NPDA ALARM raised at MOSS	Host operator ALERT via access method ALARM raised at MOSS
EP		ALARM raised at MOSS only. No ALERT message at host

IBM 3725-3726 ADDITIONAL AVAILABILITY FEATURES



PORT SWAPPING

- ALLOWS MOVEMENT OF COMMUNICATION LINK FROM FAILING PORT TO SPARE PORT
- USES MOSS PROCEDURES TO "SWAP PORTS"
- USES SAME SOFTWARE DEFINITIONS

Foil 18 Port Swapping

The 3275 Communication Controller allows the user to install extra ports in the controller. (A port is the part of the communication controller to which a communication link is attached.)

When a scanner component fails, the user can then move a communication link from the failing port to one of the spare ports. The user can use MOSS to request that the NCP use the new port when it is to use that communication link.

The spare port must be one that is not defined to the NCP. When the line with its modem is swapped to the spare port, the same symbolic address and NCP definition is used. A link can be moved from one LIC to another on the same scanner, or on a 3725 Model 1, from a LIC on one scanner to a LIC on a different communication scanner.

IBM 3725 PROBLEM DETERMINATION AIDS

FROM MOSS CONSOLE

- PROGRAMMED PROCEDURES
 - LINE TESTS
 - TERMINAL TESTS
- COMMUNICATION CONTROLLER SERVICES
 - ADDRESS COMPARE
 - BRANCH TRACE
 - DISPLAY/ALTER REGISTERS
 - DISPLAY/ALTER MAIN STORAGE
- LINE INTERFACE DISPLAY
 - DISPLAY LINE INTERFACE CONTROL LEADS

FROM SYSTEM CONSOLE

- NCP TRACE
 - LINE TRACE
 - TRANSMISSION GROUP TRACE
 - GENERALIZED PIU TRACE
- SCANNER INTERNAL TRACE
- NCP/EP DUMPS

Foil 19 Problem Determination Aids

The IBM 3725 has been enhanced over previous communication controllers with the inclusion of extensive systems management functions. This chart addresses a number of these aids.

Programmed Procedures

The equivalent IBM 3705 panel procedures are available via the IBM 3727 operator console plus additional procedures unique to the IBM 3725. Specialized procedures can also be developed by the operator to test lines and terminals. The line and terminal tests allow the user to address, poll, dial, and transmit to or receive from the station. These tests can be used to test the operation of lines, modems, and terminals, and can be activated without an active application program running in the host processor. This provides the opportunity for the operator to isolate and perform problem determination in a more timely fashion.

Communication Controller (CCU) Services

MOSS allows the controller operator to display the status of the controller, and to examine and make changes to the contents of the registers and main storage. It provides the following facilities:

- Address Compare

- Branch Trace
- Display and Alter Register
- Display and Alter Main Storage

The Branch Trace lists all branches in the control program as they occur.

Line Interface Display

An improvement to the Line Interface Block Display for easier problem isolation: the status of most of the control leads on a line interface may be monitored at the IBM 3727 Operator Console.

NCP Traces

The NCP line trace records the activity on a designated line attached to the IBM 3725 from any given station. The trace is controlled and printed by the access method, while the information in the trace records is gathered by the NCP. The line trace can be used to verify that the IBM 3725 is sending and receiving correct data to and from a station when an error is suspected in the NCP.

A Transmission Group Line Trace records the activity on all lines contained in a transmission group. All lines are traced as if they were a single logical line.

The Generalized Path Information Unit (PIU) trace provides records for selected resources in an SNA network. This trace is activated by the host access method and forwarded by ACF/NCP to the host, where it can be recorded, formatted, and printed by a utility of ACF/SSP, the ACF Trace Analysis Program.

Scanner Internal Trace

The Scanner Internal Trace records the activity within the Communication Scanner Processor (CSP) for any given line attached to the IBM 3725 from a station. Trace information records are gathered by the CSP and are transferred to the host processor through NCP. This trace can be used to isolate problems to the NCP or CSP components. Both the Line Trace and Scanner Internal Trace can be operating at the same time. Used together, these traces can assist in isolating the cause of line and terminal errors.

NCP/EP Dump Facility

The NCP/EP Dump Facility produces a dump of the IBM 3725 storage. For local communication controllers, the dump can be obtained using the independent dump utility or the access method dump facility. For remote controllers, the dump can be obtained from the access method facility only. The contents of the dump facility provide helpful information when trying to determine the source of an NCP problem.

Foil 20 IBM 3727 Operator Console

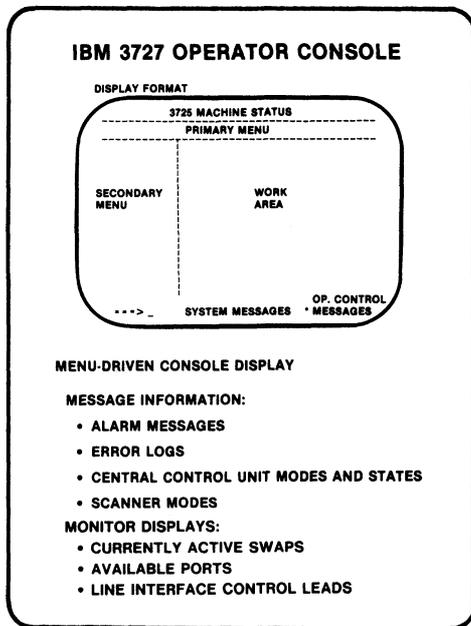
The IBM 3727 Operator Console provides new and enhanced systems management capabilities for the IBM 3725 Communication Controller. It enhances the management of the IBM 3725 via programmed routines resident on the MOSS diskette.

The operator supervises the operator console. The console screen is organized into several functional areas for the presentation of information to the operator. The upper part of the screen (the machine status area) is used to continually display the controller status. This area is updated every time a change occurs in the controller. The middle part of the screen is used to display the secondary menu and data corresponding to the primary and secondary functions selected. The lower part of the screen is used to display messages; it includes a special operator messages area to guide the operator when entering commands. At any time, the screen presents the operator with a menu of options, either in the primary menu area or the secondary menu area, with additional information displayed in the message area. The operator can write in the secondary menu area and in the select field. The operator proceeds through the MOSS facilities using the cursor, and will also be prompted by the system and given HELP assistance in order to make use of the MOSS as self-explanatory as possible.

The keyboard comprises the normal keyboard, plus screen editing function keys and Programmable Function (PF) keys. In a given menu, the function of the PF keys is defined on the screen.

The following types of messages are displayed:

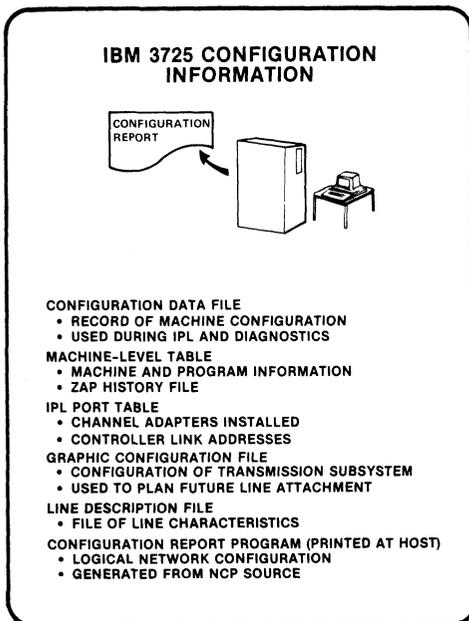
- ALARM messages.



- Error logs. There are six categories of errors which include: Channel adapter, CCU, Control Program, Input/Output control bus, TSS, and MOSS.
- CCU modes: process, instruction step, process and address compare and branch trace, and instruction step and address compare and branch trace.
- CCU states: Reset, wait, IPL, running, program stop and CCU stop.
- Scanner modes: Connect, disconnect, stop, go, initialized, inoperative (INOP), and Reset.

The following information can be monitored on the operator display:

- Currently active swaps
- Available ports
- Most line interface control leads via the LIBD function.



Foil 21 IBM 3725 Configuration Information

A set of configuration files is available to the operator to assist in determining which features are currently installed. This information is useful for control program generation purposes and for planning future expansion of the controller. The files available are:

Configuration Data File

The Configuration Data File (CDF) stores information defining the CCU, the main storage, the channel adapters and two-processor switches, the MOSS, the line attachment bases, the communication scanners, the line interface couplers, the cables, and the clock feature.

The CDF is maintained on the MOSS diskette. It is created at the manufacturing site and checked automatically against the current controller configuration at installation time. It is displayed and should be updated for each change in the IBM 3725 configuration. The file is used during IPL and by the diagnostic programs.

Machine Level Table

The Machine Level Table (MLT) stores information describing the customer number, machine serial numbers, machine type, control program type and level, and the ZAP history table.

The MLT can be displayed and updated by the maintenance personnel from the operator console. This file can be transferred to the NPDA on request (NCP only). The MLT can be printed at the host whenever a control code dump is requested.

IPL Port Table

An IPL Port is any channel or telecommunication line used to transfer the control program from the host to the controllers.

The IPL port table is maintained on the MOSS diskette and contains the parameters of the IPL port. It is initialized at installation time via the operator console, and is updated for future network changes. The IPL port table is used during IPL.

Graphic Configuration File

The Graphic Configuration File (GCF) provides the customer with a picture of TSS configuration to assist planning of future expansions.

It can be printed at the host and contains information defining the features installed, the LICs, the direct attachments installed, and the LIC positions available but not yet installed. The GCF is displayed and updated by the operator from the console.

Line Description File

A file containing user defined information for each line: physical address, symbolic name, speed and protocol. It may be used to keep track of actual line/machine "mapping". This file is created and maintained from the operator console. It may be displayed at the operator console or transferred and printed at the host system.

The Configuration Report Program

The configuration report program is a standalone program that creates reports showing certain characteristics of the resources in the user's network. These reports give information from the NCP, EP, or PEP standpoint only, and not from the host processor standpoint.

A title line, showing the type of device (SNA or non-SNA), date, and the NCP subarea internal name from the BUILD macro, is printed at the top of each page of the report. The remainder of the report contains the following information:

For Non-SNA Devices:

- Resource level (group, line, service, cluster, terminal, component)
- Resource name
- Network address (actual address of the station)
- Address (as specified on the appropriate macro)
- Control unit type
- Terminal type
- Line type (full duplex or half duplex)
- Line speed
- Resource type (NCP, EP, or PEP)
- Clocking (internal or external)
- Line control (BSC or S/S)
- Dial/dial number
- Comments/notes

For SNA Devices:

- Resource level (group, line, service, PU, LU)
- Resource name

- Network address (actual address of the station)
- Address (as specified on the appropriate macro)
- Control unit type
- Physical unit type
- Data mode (full duplex or half duplex)
- Line type (full duplex or half duplex)
- Line speed
- Subarea address
- Clocking (internal or external)
- Line control (user of SDLC)
- Virtual or real status
- Non-return-to-zero-inverted (NRZI) or return-to-zero-mode
- Dial
- Comments/notes

IBM 3725 SOFTWARE SUPPORT

- ADVANCED COMMUNICATIONS FUNCTION/NETWORK CONTROL PROGRAM V2 FOR 3725
 - ACF/NCP V1 R3 FUNCTIONS
 - IMPROVED DIAGNOSTICS, PROBLEM DETERMINATION AND ERROR RECORDING
 - SIMPLIFIED SYSTEM GENERATION
 - INTEGRATED NETWORK PERFORMANCE ANALYZER
- ACF/NCP V3/3725
 - ACF/NCP V2 FUNCTIONS
 - SNA NETWORK INTERCONNECTION (SNI)
 - MODULO 128 BETWEEN 3725s
 - 386X MODEM ENHANCEMENT SUPPORT
 - FORCED DEACTIVATION
- EMULATION PROGRAM/3725
- SYSTEM SUPPORT PROGRAMS (SSP)
- NETWORK TERMINAL OPTION (NTO)
- NON-SNA INTERCONNECT (SNI)
- X.25 NCP PACKET SWITCHING INTERFACE PROGRAM PRODUCT (NPSI)
- NETWORK ROUTING FACILITY (NRF)

Foil 22 IBM 3725/3726 Software Support

Advanced Communications Function/Network Control Program V2 for IBM 3725

ACF/NCP Version 2 & V3 for the IBM 3725 provide the con-controller with the flexibility to meet the demands of an ever expanding data communication network. NCP works with the host access methods ACF/VTAM or ACF/TCAM to control networks of any kind, from the simplest single-domain network with a single controller, to the most complicated multidomain networks using Advanced Communications Function networking, in accordance with the concepts of Systems Network Architecture (SNA).

The Network Control Program performs the following basic communication functions:

- Polling and addressing

- Data link control
- Recovery from line failures
- Dynamic buffering
- Character code translation
- Line control
- Control character recognition
- **Line timeout**
- **Message assembly/disassembly**
- **Error checking and recovery**

In addition, Version 3 provides advanced functions such as interconnection among SNA networks as well as supporting Modulo 128 for high speed links between 3725s.

NCP High Speed Links (Modulo 128)

When an NCP is sending data to another part of the network, it needs to know whether the intended receiver is actually getting the data.

Current NCP releases will send only seven information frames over an SDLC link before requesting a response from the intended receiver. This response indicates whether the frames were received successfully.

Newer technology, such as satellites and fiber optics, are more reliable and do not require this frequent checking to see whether the data arrived properly. The NCP could ask for a response less often, thus speeding up data transmission, and still have reliable data transmission.

NCP Version 3 will allow the customer to increase the number of frames that are sent before asking for a response to 127. This will improve the efficiency of the NCP's use of high speed SDLC links.

Emulation Program/IBM 3725

The Emulation Program program product runs in a channel-attached controller. The program emulates most of the functions of the IBM 2701 Data Adapter Unit, the IBM 2702 Transmission Control, and the IBM 2703 Transmission Con-

trol. Many host programs written for operation with the IBM 2701, IBM 2702, and IBM 2703, or for the emulation of these machines on an IBM 3705 will run with the IBM 3725 controller without modification.

Partitioned Emulation Program Extension

Partitioned Emulation Program (PEP) Extension is an option of NCP that allows certain lines to operate in network control mode while operating others in 270X emulation mode. An NCP with the PEP option can be executed only in a channel-attached controller. The PEP communicates with one or more access methods in the host processor.

System Support Programs

These programs, which are executed in the host processor, are used to generate control programs and load them into controller storage or to dump the controller storage to the host printer.

Network Terminal Option

NTO allows access of certain non-SNA terminals to selected host subsystems.

Non-SNA Interconnect

NSI allows non-SNA RJE terminals and host software to participate in SNA networking.

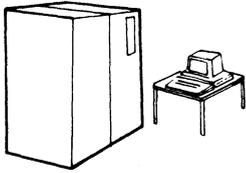
X.25 NCP Packet Switching Interface Release 4

The X.25 NPSI Program Product provides SNA users flexibility in selecting optional transmission facilities for their applications.

Network Routing Facility

NRF provides routing between two terminals attached to different NCP's.

**IBM 3725/3726 COMMUNICATION
CONTROLLER**



- ADVANCED TECHNOLOGY
- SUPPORTS MEDIUM TO LARGE, HIGH-SPEED NETWORKS
- ENHANCES OPERATOR AND COMMUNICATION NETWORK MANAGEMENT FUNCTIONS
- ENHANCES AND REINFORCES IBM'S SNA DIRECTION

Foil 23 IBM 3725 Communication Controller

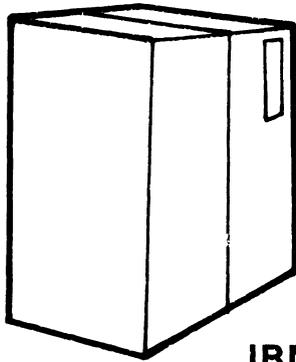
The IBM 3725 Communication Controller's new architecture implements advanced LSI technology and allows it to support the larger and higher-speed networks required in the 1980s. To meet the increased demands of systems management, new communication network management functions have been incorporated into the product.

The IBM 3725 will be an integral part of the communication networks of the future. And, most importantly, the IBM 3725 Communication Controller reinforces IBM's commitment to Systems Network Architecture.

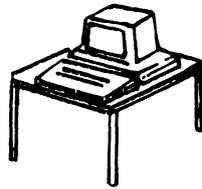
**Systems
Network
Architecture**

**IBM 3725
Communication
Controller**

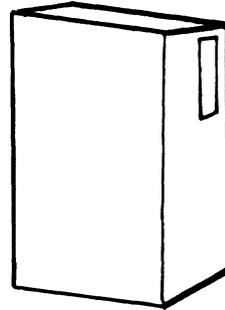
IBM 3725/3726 COMMUNICATION CONTROLLER



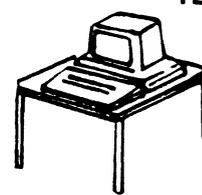
IBM 3725/3726
MODEL 1



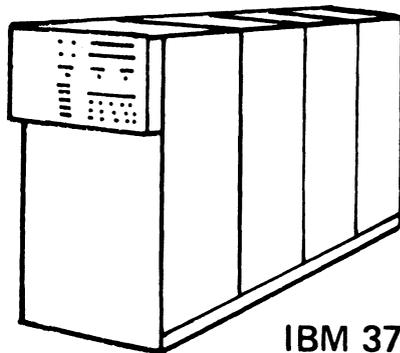
IBM 3727



IBM 3725
MODEL 2

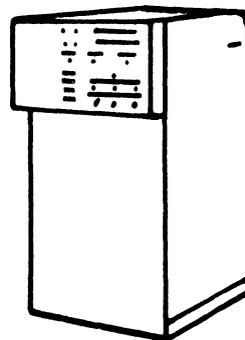


IBM 3727



IBM 3705

IBM 3705 -- 80

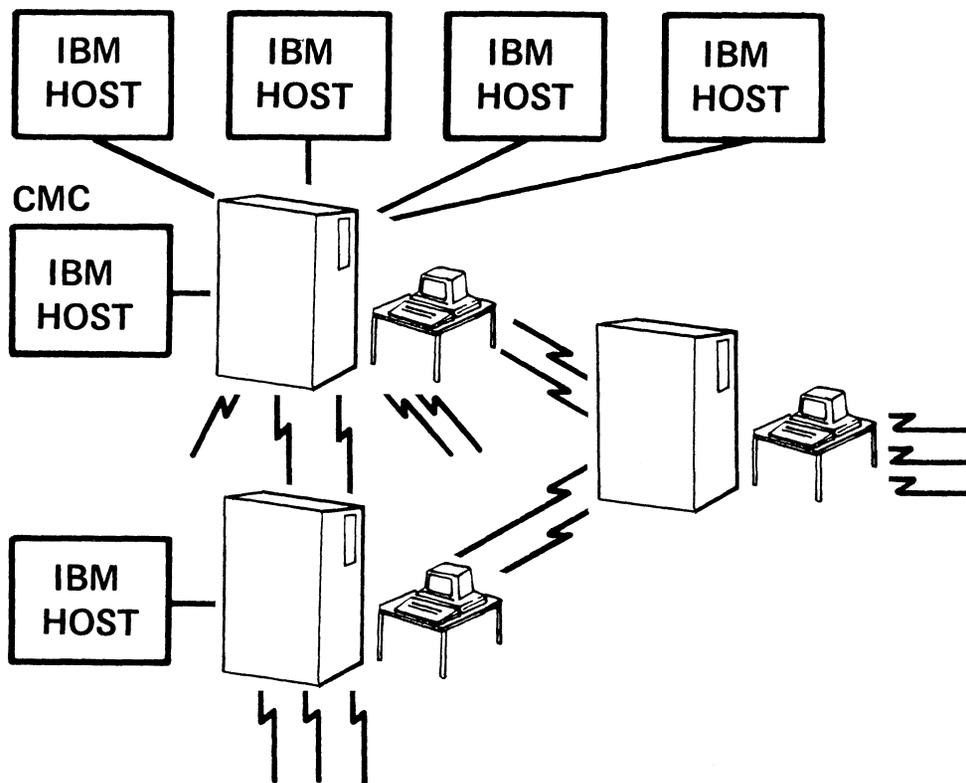


COMMUNICATION CONTROLLERS FOR ALL ENVIRONMENTS

IBM 3725/3726 COMMUNICATION CONTROLLER

- **ADVANCED TECHNOLOGY**
- **HIGH PERFORMANCE**
- **SYSTEMS MANAGEMENT ENHANCEMENTS**
- **SIMPLE TO CONFIGURE/UPGRADE**
- **UPWARD MIGRATION FROM IBM 3705**
- **SUPPORTS IBM'S SNA DIRECTION**

THE IBM 3725 COMMUNICATION ENVIRONMENT



- CHANNEL-ATTACHED COMMUNICATION CONTROLLER
- LINK-ATTACHED COMMUNICATION CONTROLLER
- MULTIPLE HOST NETWORKING
- CENTRALIZED COMMUNICATION MANAGEMENT VIA COMMUNICATION MANAGEMENT CONFIGURATION

HARDWARE CONFIGURATION

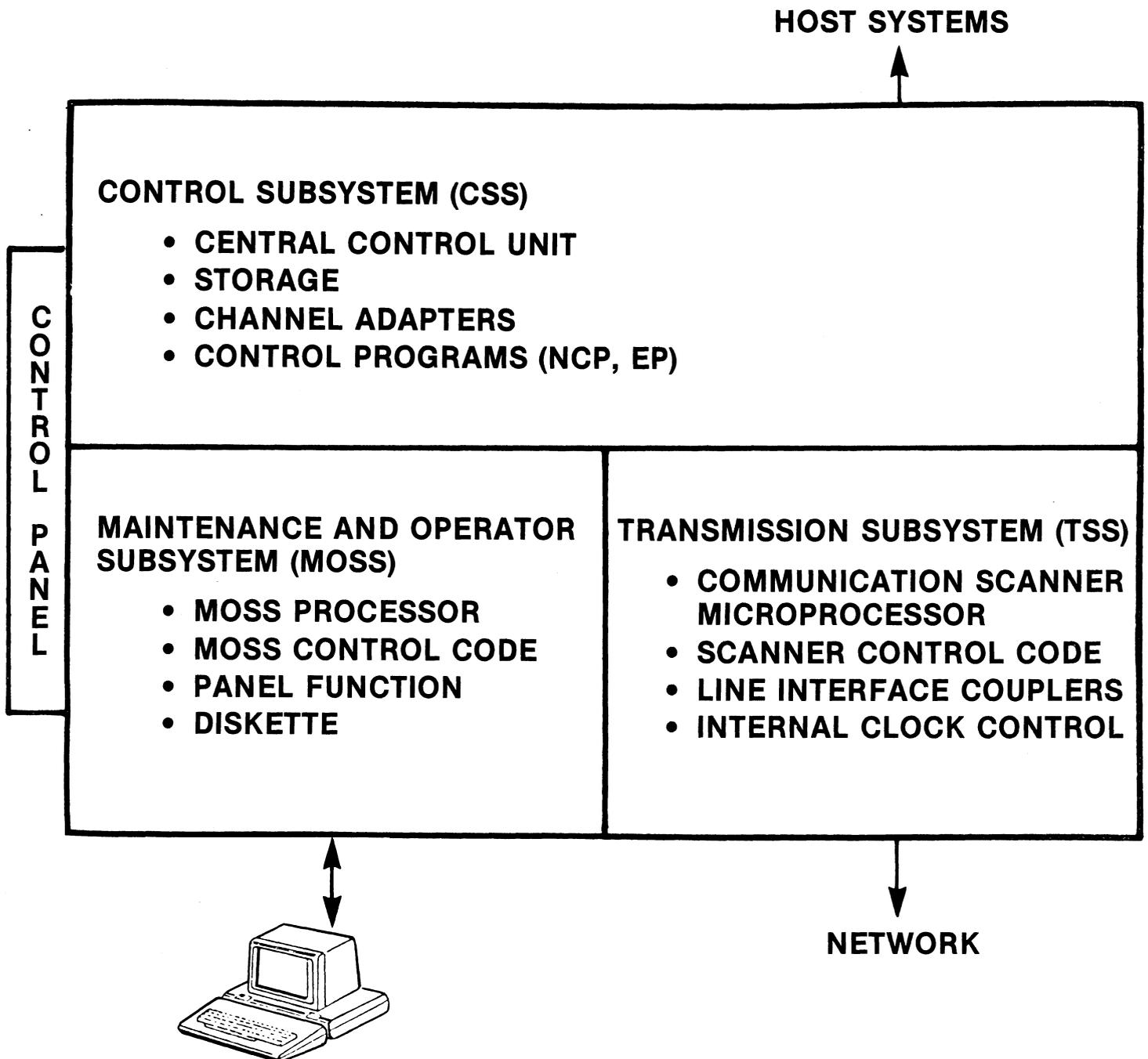
- ONE OR TWO FRAMES
- STORAGE IN BASE FRAME
 - 512K BYTES TO 2 MEGABYTES
 - 256K BYTE INCREMENTS
- SINGLE CHANNEL ADAPTER TYPE
 - SIX SINGLE HOST PROCESSOR ATTACHMENTS
 - FOUR MP HOST PROCESSOR ATTACHMENTS
- SINGLE COMMUNICATION SCANNER TYPE
 - MICROPROCESSOR-BASED
 - SUPPORTS SDLC, BSC, AND S/S PROTOCOLS
- FIVE LINE INTERFACE TYPES
 - 256 HDX OR FDX LINE ATTACHMENTS
- KEYBOARD DISPLAY OPERATOR CONSOLE

— — — SIMPLER TO CONFIGURE — — —

TECHNOLOGY

- **ADVANCED TECHNOLOGY**
- **CCU LOGIC COMPARABLE TO IBM 4341 TECHNOLOGY**
- **STORAGE LOGIC COMPARABLE TO IBM 3081 TECHNOLOGY**
- **DUPLICATED ALU CIRCUITRY FOR RELIABILITY**
- **SINGLE BIT ERROR CORRECTION/DOUBLE BIT ERROR DETECTION FOR STORAGE**
- **HIGH-SPEED DATA BUS BETWEEN MAJOR COMPONENTS**
- **MULTIPLE MICROPROCESSORS FOR COMMUNICATION SCANNER**

FUNCTIONAL STRUCTURE



CONTROL SUBSYSTEM (CSS)

- **CHANNEL ADAPTER**
 - UP TO SIX CHANNEL ADAPTERS
 - BYTE, BLOCK, OR SELECTOR MODE
 - TWO-PROCESSOR SWITCH (UP TO FOUR)
- **CENTRAL CONTROL UNIT**
 - OPERATES UNDER NCP/EP CONTROL
 - CYCLE STEAL DATA TRANSFER TO/FROM CHANNEL ADAPTERS AND COMMUNICATION SCANNERS
- **PROCESSOR STORAGE**
 - AVAILABLE IN SEVEN STORAGE SIZES

TRANSMISSION SUBSYSTEM (TSS)

- **COMMUNICATION SCANNERS**
 - UP TO FOURTEEN COMMUNICATION SCANNERS
 - MICROPROCESSOR-BASED WITH S/S, BSC, AND SDLC CONTROL CODE
 - ATTACHES UP TO 256 FDX/HDX COMMUNICATION LINKS

- **LINE ATTACHMENT BASES**
 - TYPE A:
 - ONE COMMUNICATION SCANNER
 - TYPE B:
 - TWO COMMUNICATION SCANNERS

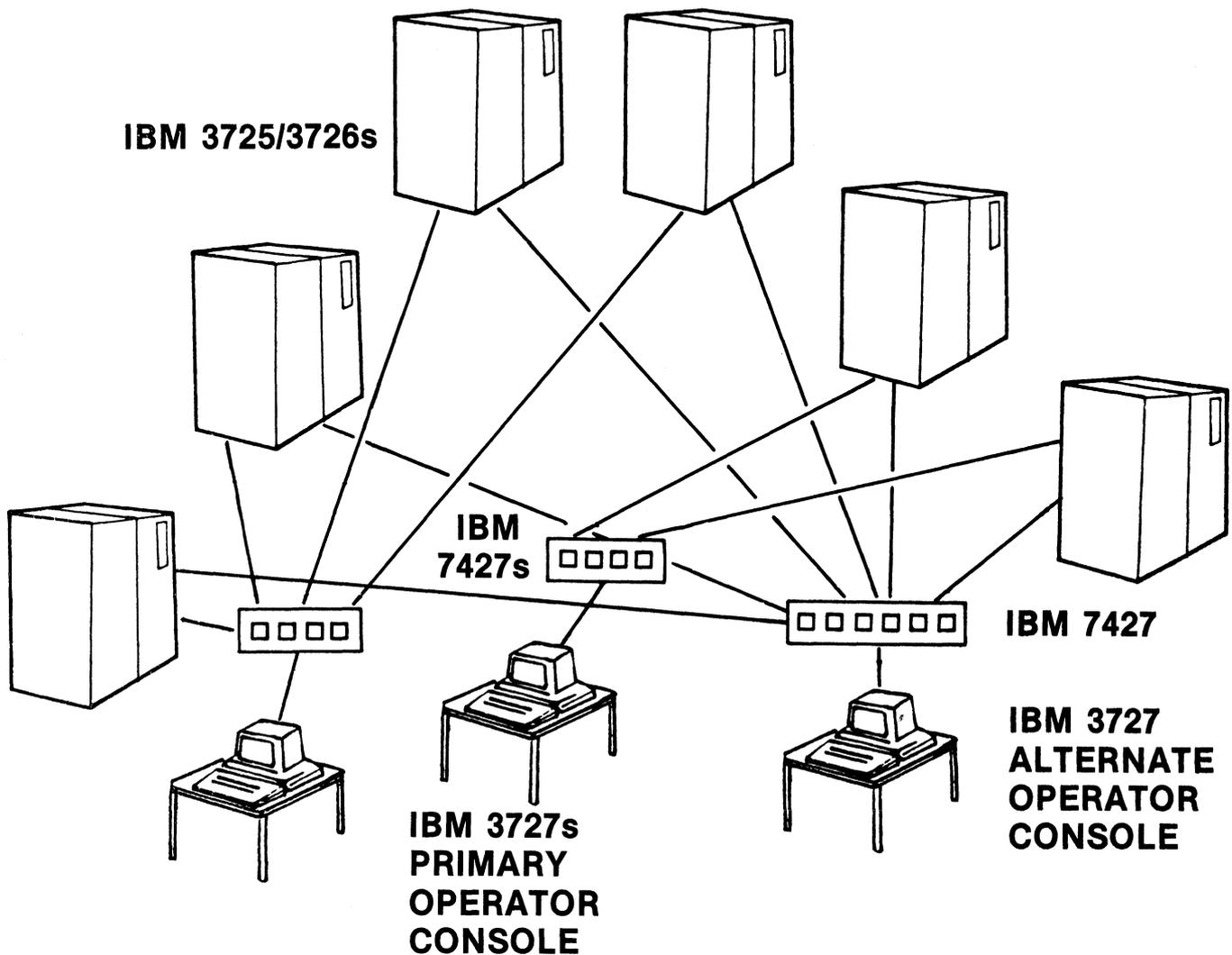
- **LINE INTERFACE COUPLERS**
 - FIVE TYPES
 - ATTACHMENT TO 256K BPS
 - INTERFACE ATTACHMENTS TO:
 - RS 232/V.24, RS 366/V.25, WIDE BAND, V.35, X.21

- **INTERNAL CLOCKS**
 - DIRECT ATTACHMENT
 - NONCLOCKED MODEM ATTACHMENT

MAINTENANCE AND OPERATOR SUBSYSTEM (MOSS)

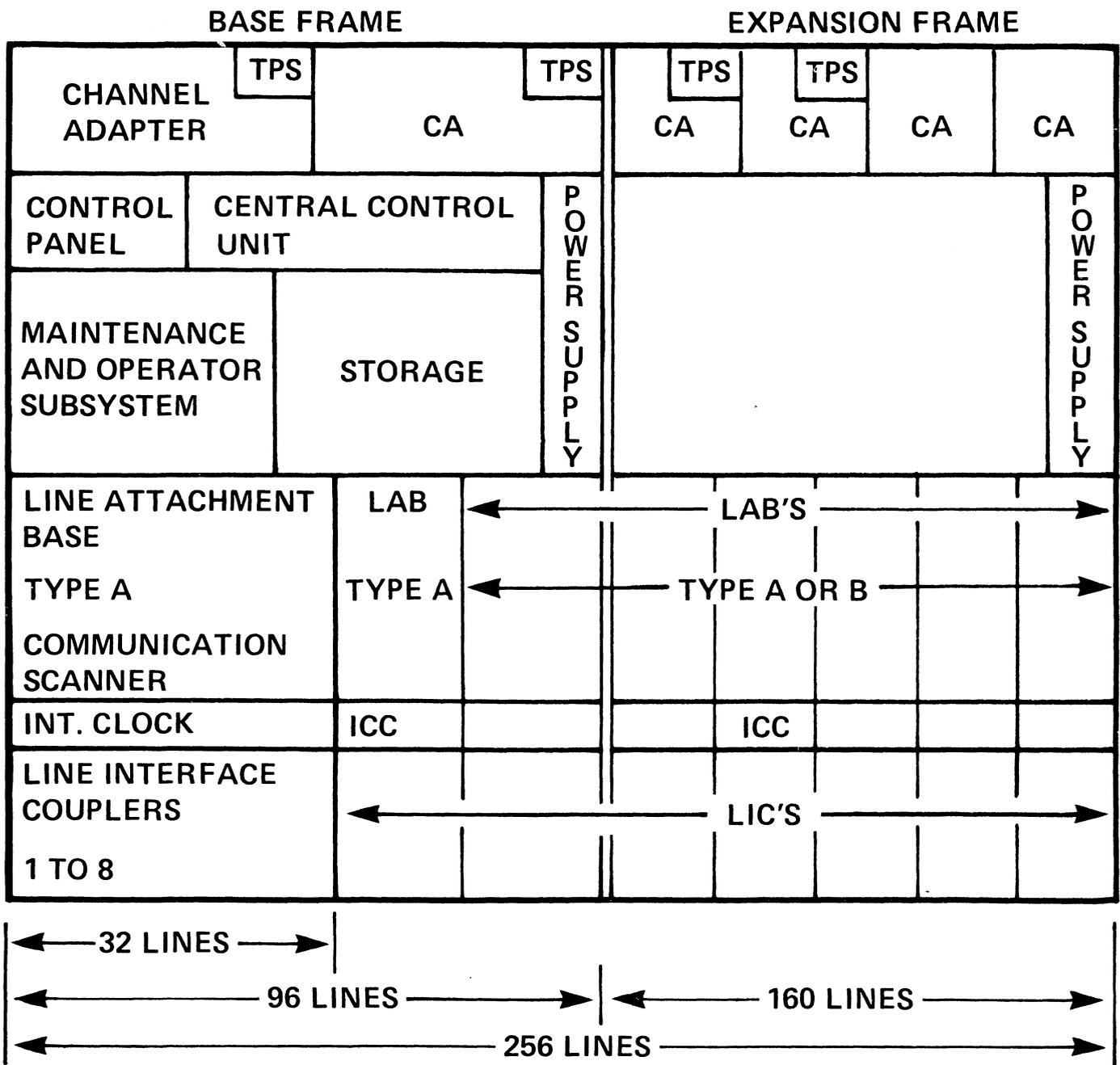
- **OPERATOR CONSOLE AND MICROPROCESSOR-BASED SYSTEM**
- **CUSTOMER USE**
 - **ALARMS FOR PROBLEM NOTIFICATION**
 - **VIEW MACHINE ERROR RECORDS FOR PROBLEM DETERMINATION**
 - **DEVELOP AND EXECUTE PROGRAMMED LINE AND TERMINAL TESTS**
 - **RE-IML COMMUNICATION SCANNER**
 - **VIEW/UPDATE GRAPHIC CONFIGURATION FILE**
- **CUSTOMER ENGINEER USE**
 - **PROBLEM DETERMINATION**
 - **DIAGNOSTIC TESTS**

IBM 7427 CONSOLE SWITCHING UNIT

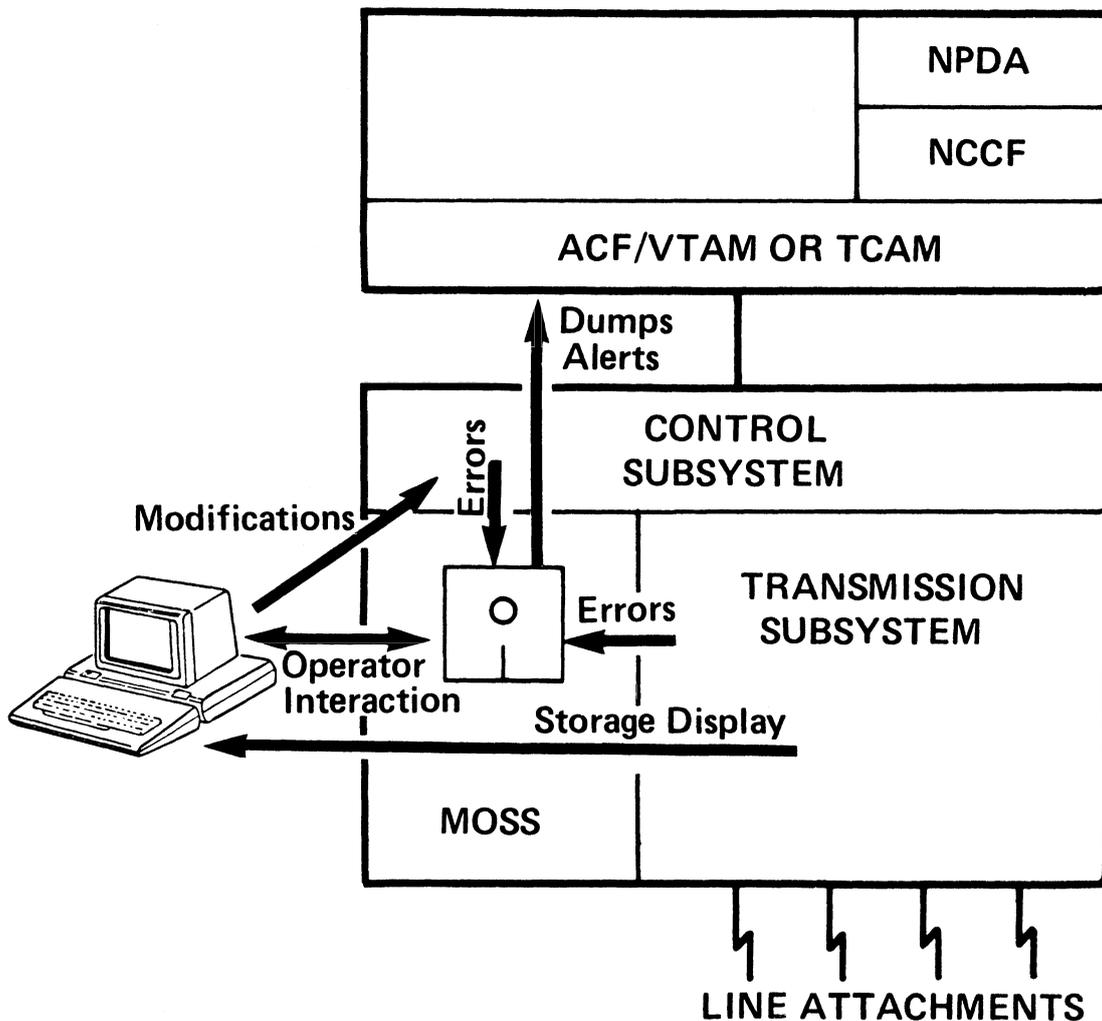


- PERMITS 3727 OPERATOR CONSOLE SWITCHING AMONG 3725/3726'S
- ALLOWS ATTACHMENT FOR:
 - FOUR 3725/3726'S TO PRIMARY OPERATOR CONSOLE
 - SIX 3725/3726'S TO ALTERNATE OPERATOR CONSOLE
- PROVIDES FLEXIBILITY OF OPERATOR CONSOLE USE
- ENHANCES NETWORK CONTROL CENTER CONCEPT

COMPONENT CONFIGURATION



HOST AND IBM 3725 PROBLEM DETERMINATION SUPPORT

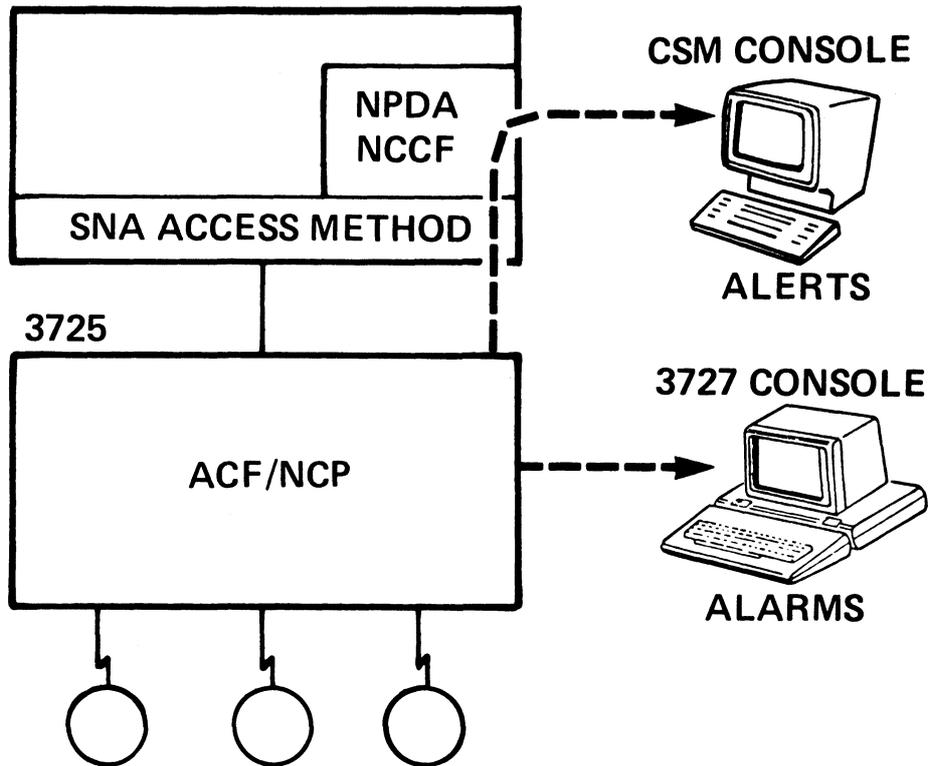


- **RECORDS HARDWARE/SOFTWARE/MICROCODE ERRORS ON DISKETTE**
- **GENERATES:**
 - **ALERT MESSAGES TO HOST AND NPDA**
 - **ALARM MESSAGES TO IBM 3727 CONSOLE**

ALERT AND ALARM INFORMATION

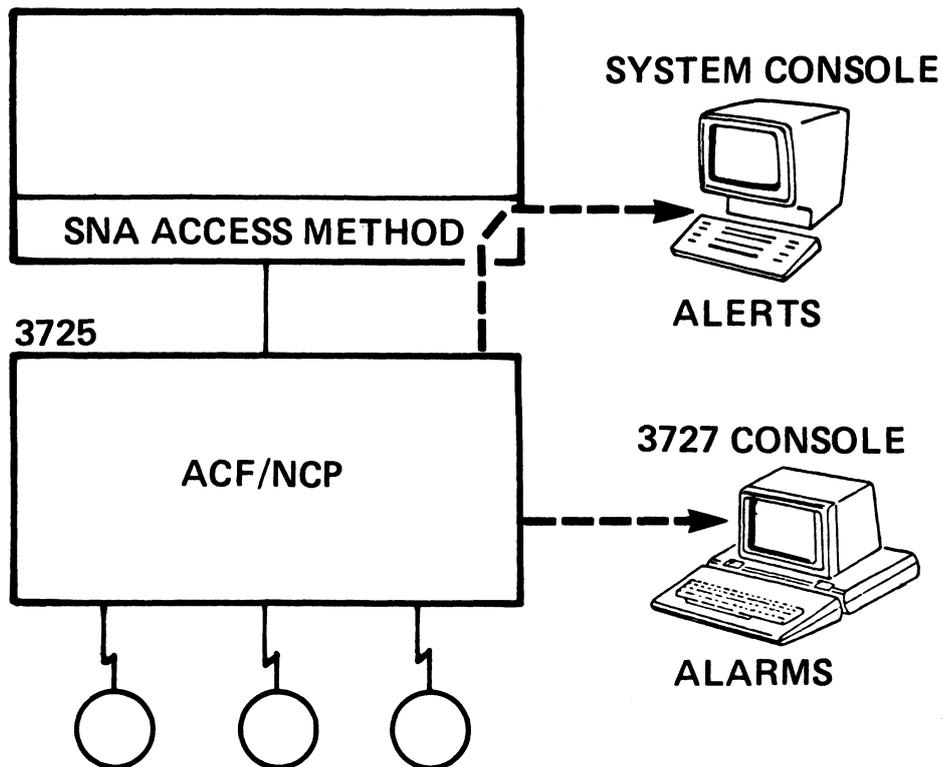
- **DISPLAYS:**
 - **ALERT/ALARM NUMBER AND STATUS**
 - **CAUSES**
 - **DATA UNIQUE TO COMPONENT**
 - **ACTION RECOMMENDED TO OPERATOR**
 - **FAILING RESOURCE**
 - **TIME AND DATE OF DETECTION**

IBM 3725 WITH HOST SYSTEMS MANAGEMENT



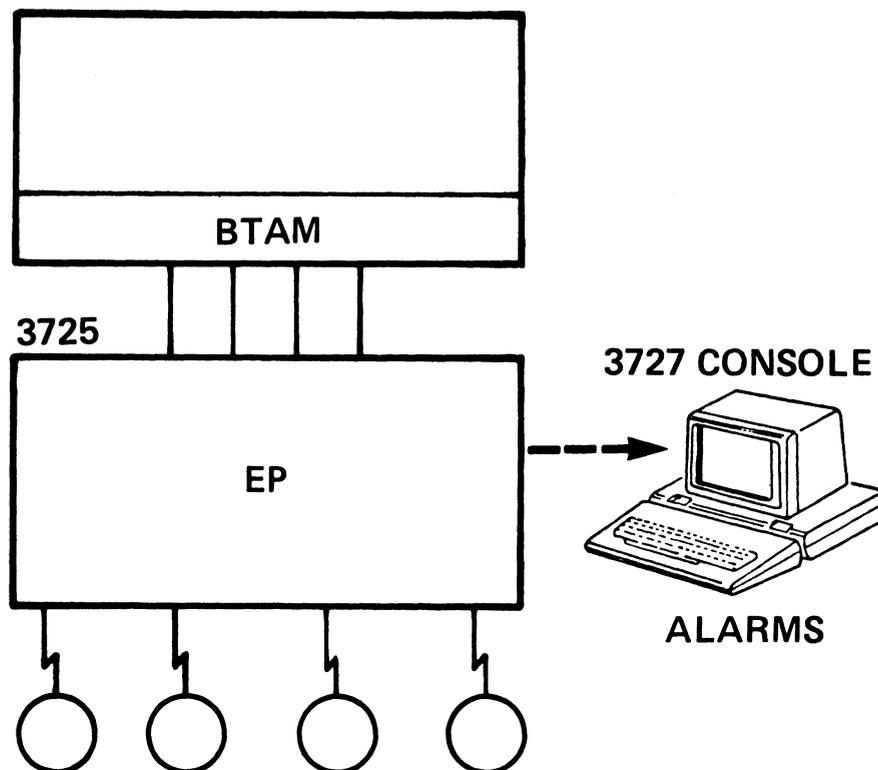
- **ALARMS TO IBM 3727 CONSOLE**
 - STORED ON MOSS DISKETTE
- **ALERTS TO NPDA CONSOLE**
 - TYPE AND LOCATION OF FAILURE
 - COORDINATES ALERTS WITH OTHER DATA
 - STORED ON NPDA DATA BASE
 - PROVIDES OPERATOR GUIDANCE

IBM 3725 WITHOUT HOST SYSTEMS MANAGEMENT



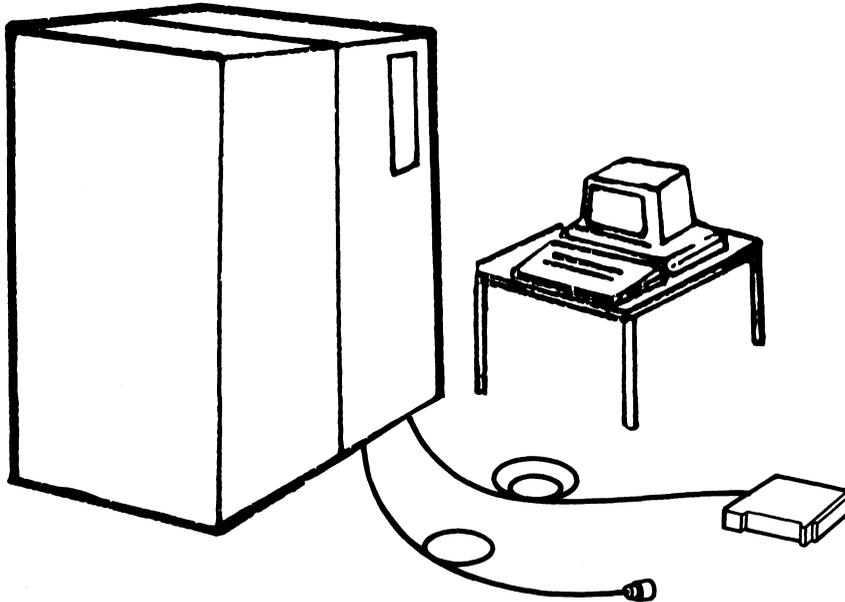
- **ALARMS TO IBM 3727 CONSOLE**
— STORED ON MOSS DISKETTE
- **ALERTS TO SYSTEM CONSOLE**
— NO PROCESSING ON ALERTS

IBM 3725 WITH NON-SNA AND EP



- ALARMS TO IBM 3727 CONSOLE
— STORED ON MOSS DISKETTE
- NO ALERTS TO HOST

IBM 3725-3726 ADDITIONAL AVAILABILITY FEATURES



PORT SWAPPING

- **ALLOWS MOVEMENT OF COMMUNICATION LINK FROM FAILING PORT TO SPARE PORT**
- **USES MOSS PROCEDURES TO “SWAP PORTS”**
- **USES SAME SOFTWARE DEFINITIONS**

IBM 3725 PROBLEM DETERMINATION AIDS

FROM MOSS CONSOLE

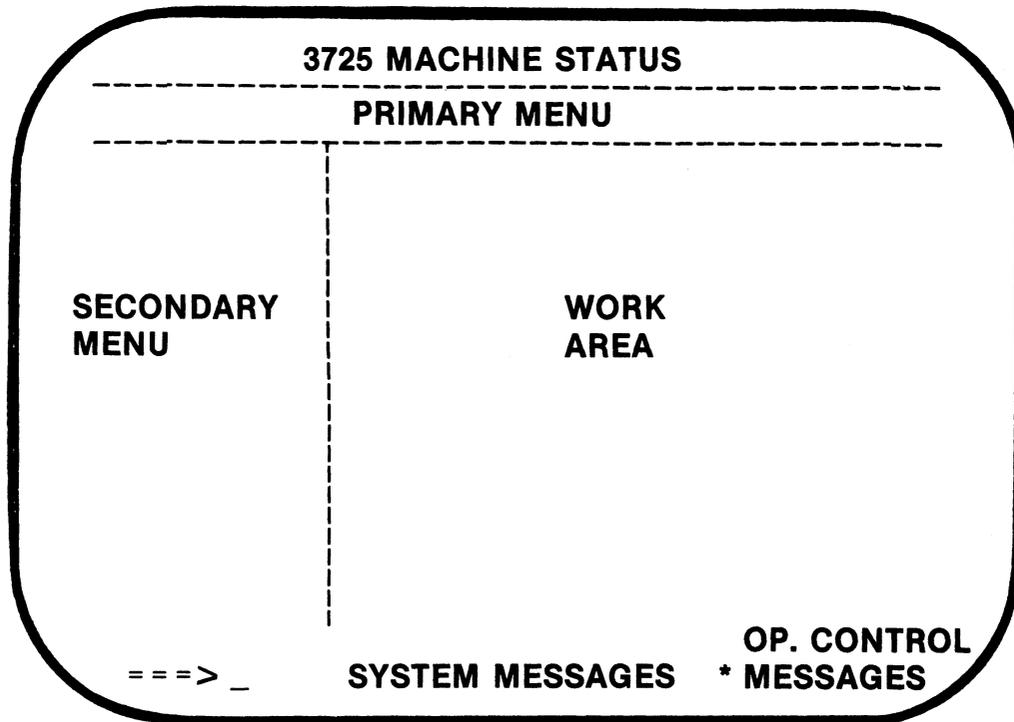
- PROGRAMMED PROCEDURES
 - LINE TESTS
 - TERMINAL TESTS
- COMMUNICATION CONTROLLER SERVICES
 - ADDRESS COMPARE
 - BRANCH TRACE
 - DISPLAY/ALTER REGISTERS
 - DISPLAY/ALTER MAIN STORAGE
- LINE INTERFACE DISPLAY
 - DISPLAY LINE INTERFACE CONTROL LEADS

FROM SYSTEM CONSOLE

- NCP TRACE
 - LINE TRACE
 - TRANSMISSION GROUP TRACE
 - GENERALIZED PIU TRACE
- SCANNER INTERNAL TRACE
- NCP/EP DUMPS

IBM 3727 OPERATOR CONSOLE

DISPLAY FORMAT



MENU-DRIVEN CONSOLE DISPLAY

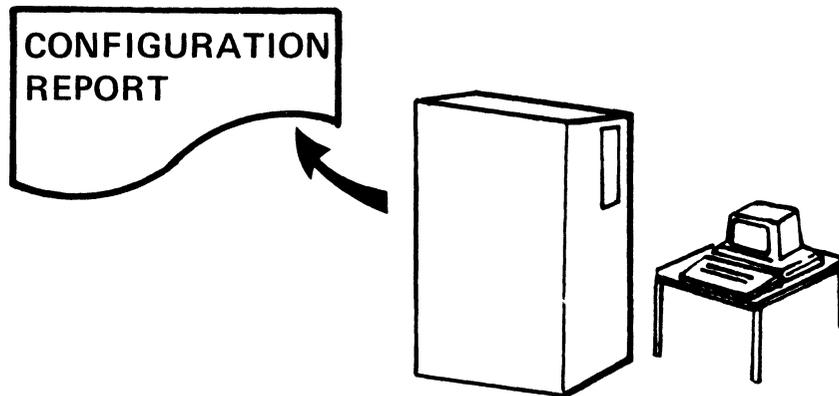
MESSAGE INFORMATION:

- ALARM MESSAGES
- ERROR LOGS
- CENTRAL CONTROL UNIT MODES AND STATES
- SCANNER MODES

MONITOR DISPLAYS:

- CURRENTLY ACTIVE SWAPS
- AVAILABLE PORTS
- LINE INTERFACE CONTROL LEADS

IBM 3725 CONFIGURATION INFORMATION



CONFIGURATION DATA FILE

- RECORD OF MACHINE CONFIGURATION
- USED DURING IPL AND DIAGNOSTICS

MACHINE-LEVEL TABLE

- MACHINE AND PROGRAM INFORMATION
- ZAP HISTORY FILE

IPL PORT TABLE

- CHANNEL ADAPTERS INSTALLED
- CONTROLLER LINK ADDRESSES

GRAPHIC CONFIGURATION FILE

- CONFIGURATION OF TRANSMISSION SUBSYSTEM
- USED TO PLAN FUTURE LINE ATTACHMENT

LINE DESCRIPTION FILE

- FILE OF LINE CHARACTERISTICS

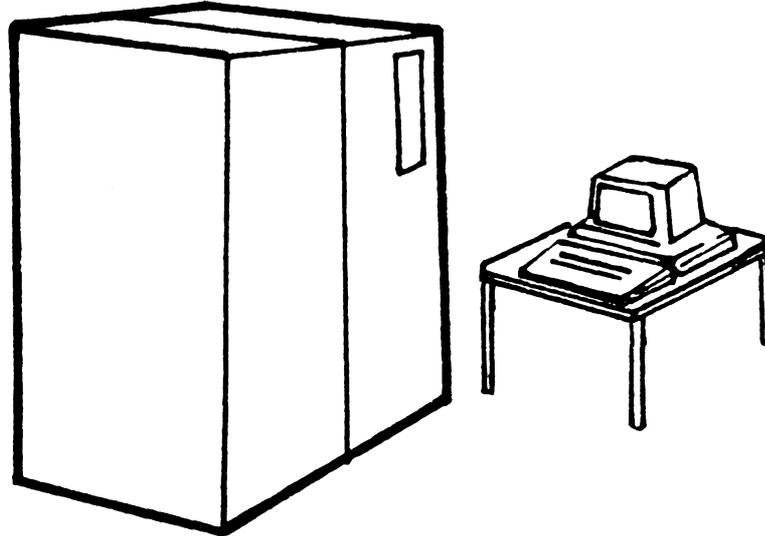
CONFIGURATION REPORT PROGRAM (PRINTED AT HOST)

- LOGICAL NETWORK CONFIGURATION
- GENERATED FROM NCP SOURCE

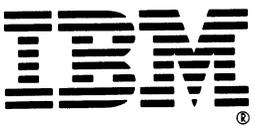
IBM 3725 SOFTWARE SUPPORT

- **ADVANCED COMMUNICATIONS FUNCTION/NETWORK CONTROL PROGRAM V2 FOR 3725**
 - ACF/NCP V1 R3 FUNCTIONS
 - IMPROVED DIAGNOSTICS, PROBLEM DETERMINATION AND ERROR RECORDING
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 - 386X MODEM ENHANCEMENT SUPPORT
 - FORCED DEACTIVATION
- **EMULATION PROGRAM/3725**
- **SYSTEM SUPPORT PROGRAMS (SSP)**
- **NETWORK TERMINAL OPTION (NTO)**
- **NON-SNA INTERCONNECT (SNI)**
- **X.25 NCP PACKET SWITCHING INTERFACE PROGRAM PRODUCT (NPSI)**
- **NETWORK ROUTING FACILITY (NRF)**

IBM 3725/3726 COMMUNICATION CONTROLLER



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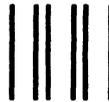
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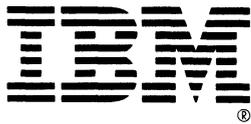
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