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**MONITOR**  
SYSTEMS  
an AYDIN company

**... an Advanced Display System for World  
Wide Command and Control Applications**

# INTRODUCING THE **MONITOR 8400** COMMAND AND CONTROL DISPLAY SYSTEM

Tactical situations require real time interaction between fresh data and the decision making team. Monitor's new model 8400 provides the dynamic two-way interface between the computer-generated tactical data (in graphic and/or alphanumeric form) and the analysis and decision making team. The basic Monitor Model 8400 System is a fully redundant, dual branch system. Each branch has its own computer interface and two Direct View Consoles, with two displays each. Operating with

two computer trunks, four Direct View Consoles permit their operators to control four independent or interrelated situations. Single and multibranch systems may be directly integrated to fit the complexity of the situation.

Each console presents two main alphanumeric-graphic displays to its operator, as well as two secondary ones. The main displays may be used for Situation (Maps) and Tableau (Text) displays, while the secondary ones are useful for

cueing and verification, among other uses.

Displays from any console may also be selected for projection and shown on a large screen, thus allowing a larger audience to follow the proceedings.

The 8400 system utilizes proven state of the art techniques, which together with its modularity and all solid state design (except CRT's) ensures operational reliability with minimum maintenance.

## USER FEATURES

- Two independent branches, may be used separately
- Two independently controlled consoles per branch
- Each console has alphanumeric, special symbol and graphic capability, in both displays
- 2 CRT's per console, 2 displays per CRT
- One computer interface per branch
- Each computer interface includes a large refresh memory
- Clear, sharp, bright stroke display
- Generates vectors, ellipses and circles
- Large screen projection display repeats any console display
- Simplified maintenance
- System in production **NOW**

## DESIGN FEATURES

- Modular, solid state (except CRT's)
- Modern, single deflection, magnetic displays
- Burn-protected phosphor CRT's
- Each console has own character, vector, circle and ellipse generator
- Magnetic core buffer memory
- Programmable display storage locations
- Up to 40 strokes character/symbol generator
- Human engineered
- Substantial cabinets and consoles with slide-mounted electronic drawers. Computer-type appearance

## GENERAL DESCRIPTION

The MONITOR 8400 Command and Control System consists of two independent branches, each branch comprising an Interface Unit, two Direct View Consoles and two Large Screen Displays. The two branches may be run completely independently from each other, or they may be linked to use common timing. Alternatively, one may be used to provide 100% redundancy to the other, and all elements of either are interchangeable.

The Interface Unit accepts a parallel input from a computer trunk and updates its magnetic core refresh memory for its two DVC's,

which continuously display the latest information provided by the computer. The I/F Unit also provides timing and power control for its branch.

Each DVC generates its own display (characters, digits, symbols, vectors, circles, and ellipses) from the corresponding I/F unit data and displays it on two 21" CRT's, each with two display surfaces. The operator observes the displayed data (typically maps or text), and may question or command the computer by means of the keyboard. The computer in turn alters the corresponding display accordingly, thus closing the

loop and providing quick computer/operator interaction.

Any single DVC display may be projected by one LSD system, comprising the necessary electronics unit and projection head with Schmidt optics, plus a remotely controlled beaded screen showing a 44" x 56" image.

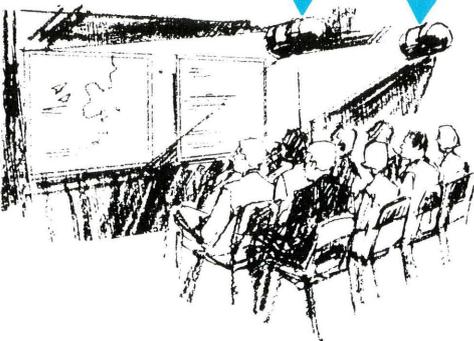
Standard word length in the present configuration is 30 bits. Word formats include Plot, Set Position, Vector (single and tip-to-tail), Conic (circles and ellipses) characters (Fixed or variable length block) plus Buffer Address Word to control loading. Loading rate is up to 300,000 words/sec.



CENTRAL PROCESSOR

BRANCH NO.1

BRANCH NO.2

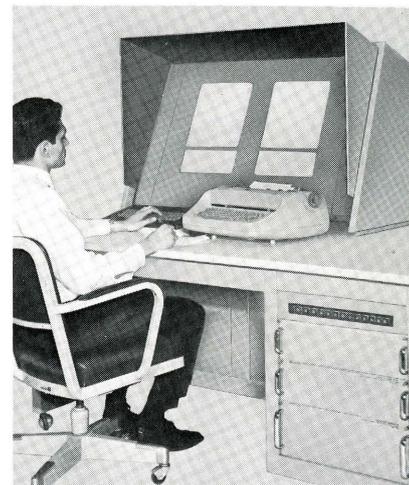


MONITOR MODEL 8400 COMMAND AND CONTROL DISPLAY SYSTEM

## DIRECT VIEW CONSOLE

### THE DIRECT VIEW CONSOLE CONSISTS OF THE FOLLOWING UNITS:

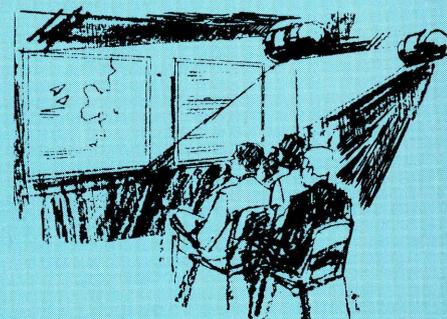
- **Two Identical CRT Displays:** with phosphor burn-protection, single-deflection magnetic, all solid state except for CRT. Each 21" CRT displays a 10" x 13" image, divided into two fields (10" x 10" and 2.5" x 10"). The sharp, highly linear image, can be manually adjusted for size, position and brightness (0 to 30 foot lamberts). The CRT includes a bonded faceplate. Displays Vectors, Circles, Ellipses and Characters (down to 0.2" high).
- **Keyboard:** for communications with computer (or optionally, with computer and/or console) and related electronics drawer.
- **Character Generator:** generates 20-stroke characters and digits, and 40-stroke symbols, at 500 nanoseconds per stroke (optional 100 nanosecond/stroke is available) from 30 bit computer word commands.
- **Function Generator:** generates point plots, vectors, circles, and ellipses from 30 bit computer word commands on a 512 x 512 reference matrix.
- **Console Cabinet:** human engineered, houses all equipment with sliding drawers and hood for easy access and has provisions to accept positive or negative pressure cooling.



## LARGE SCREEN PROJECTION SYSTEM

### THE LARGE SCREEN PROJECTION SYSTEM CONSISTS OF THE FOLLOWING UNITS:

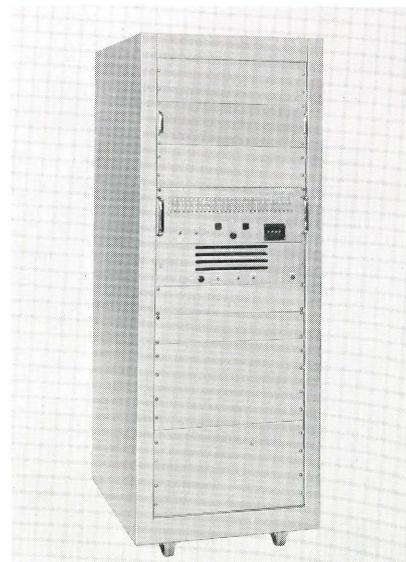
- **Projection Head:** Contains a high-intensity CRT and a Schmidt optic system for projection on a screen at a distance of 10 to 15 feet. Mounts suspended from ceiling.
- **Projection Electronics:** Contains all other electronics to transform the analog signal received from the driving DVC into the appropriate signals required to drive the projection head. Includes X, Y and Z amplifiers, power supplies, phosphor burn protection circuit. Suspended from ceiling, hinges down for easy maintenance.
- **Display Screen:** Beaded type, high efficiency — 44" x 56" image at 10 feet. Suspended from ceiling, actuated by remote control.



## INTERFACE UNIT

### THE INTERFACE UNIT CONSISTS OF THE FOLLOWING UNITS:

- **Computer Interface Unit:** Accepts computer generated digital instructions and enters them at the computer designated address fields in the buffer memory. Housed in one 7" high standard drawer. Utilizes standard MONILOGIC PC Cards. Also generates basic timing pulses for system and has provisions for manual entry and readout of data into the Buffer Memory.
- **Buffer Memory:** Refresh Memory for two DVC's, stores commands from I/F unit. Consists of a 4096 x 30 bit magnetic core memory (1.5 microseconds full cycle) and a memory tester.
- **Power Control:** Controls power applications and removal sequences.



# APPLICATIONS

The dynamic two-way interface provided by the MONITOR 8400 Command and Control Display System between the computer-generated tactical data and the decision making team, has been designed for tactical situations requiring real time decisions based on continuously updated field information. The updated information may be outputted from one or more trunks of a central computer, each one connected by an Interface Unit to one or two Direct View Consoles and as many Large Screen Projection System repeaters as required.



## **LOGISTICS SUPPORT:**

Real-time management of material flow in quantity and type, as required and where needed.

## **SATELLITE MISSION CONTROL:**

Command, control and monitoring of multiple orbiting satellites.

## **ASW OPERATIONS:**

Command and control of ASW tactical operations through the total instantaneous assimilation of changing conditions.

## **MISSILE DEFENSE SYSTEM:**

Real-time decisive command and control through total interaction of changing defense elements.

## **BATTLEFIELD OPERATIONS:**

Provides the battlefield commander the facility to make rapid decisions based on real-time data in a fluid combat environment.

## **COMBAT INFORMATION CENTERS:**

Fast, decisive command-level reaction through real-time interaction of a fluid combat situation.

## **TROOP DEPLOYMENT:**

Total control and command of troop movement requirements, as needed, when needed, where needed.

# Specifications

## DIRECT VIEW CONSOLE

<b>Dimensions</b>	66" W x 50" H x 45" D Power required: 600 Watts approx.
<b>Two CRT Displays</b>	13" H x 10" W each
Brightness	30 ft.-Lamberts
Spot Size	0.020"
Pin Cushioning	3% max.
Linearity	1% max.
Face Shield	Bonded
Phosphor	P31 (others available)
Phosphor Protection	Yes
Character Size	.2" H x .15" W min. (1/3 spacing)
<b>Character Generator</b>	
Letters	26
Digits	10
Symbols	28 (up to 40 strokes each)
Speed	500 nanoseconds / stroke (100 nanoseconds per stroke available)
<b>Function Generator</b>	
Grids	512 x 512 points for 10" x 10" display 128 x 512 points for 2.5" x 10" display
Vectors	
accuracy	0.2% (end points)
speed	200,000" per second
Conics	
accuracy	1% (major and minor axis end points)
speed	167 microseconds writing time
Positioning	
accuracy	0.2%
speed	Full screen deflection: 20 micro-seconds

## LARGE SCREEN PROJECTION SYSTEM

<b>Units</b>	
Projection Head	20" H x 17" W x 28" D
Projection Electronics	10" H x 15" W x 28" D
Display Screen	67" H x 5" W x 6" D Box with drop screen 60" H x 50" W



## All units designed for ceiling suspension.

Power required:	600 watts approx.
Brightness	5 ft.-Lamberts
Spot Size	.080" max.
Keystoning	3% max. for 5% declination
Linearity	1% max.
Character Size	4 times DVC display size
Throw Distance	10 feet
Optics	Schmidt type
Screen	Beaded, with remote control

## INTERFACE UNIT

<b>Standard 19" Cabinet</b>	60" high, 30" deep
<b>Power Required</b>	800 Watts approx.
<b>Computer I/F Unit</b>	
Standard Interface	With MIL-C-81332 (AS) Computer (UNIVAC 1830A) Word length: 30 bits Word rate: 100,000/sec. (others available)
Word Format	Includes Load, Plot, Set Position, Vector, Conic and Type words, with blink and inhibit display features
Buffer Memory	
Capacity	4096 words, 30 bits each
Cycle Time	1.5 microseconds
Operation	Clear/write or Read/restore, random access
Tester Modes	Included, with display Operate, Manual, with display

## GENERAL

<b>Environment</b>	
Temperature	25 ± 10°C
Relative humidity	Up to 90% (no condensation) requires approximately 200 cfm/unit
Power	115 ± 10 vac. Single phase, 60 ± 2 Hz.
All Solid State (except CRT's).	
Modular, with test points.	
Automatic over/under voltage protection.	

### For additional information contact:

Sales Manager  
Computer Communications  
and Display Division  
Monitor Systems  
401 Commerce Drive  
Fort Washington, Penna. 19034  
(215) 646-8100  
TWX: 510-661-1520

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SYSTEMS**  
an AYDIN company

FORT WASHINGTON, PENNA. 19034