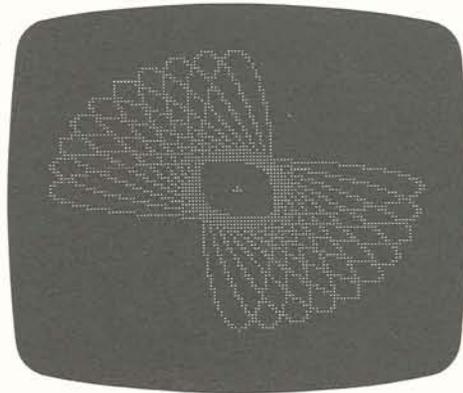


3/70

# CC-30 Communications Station



EMPLOYMENT RECORD

NAME	AGE	SEX
ADDRESS		
CURRENT LOCATION		
HIRE DATE	SALARY	
JOB DESCRIPTION		
DATE OF LAST REVIEW	ACTION	
TERMINATION DATE	REHIRE	

FLT NO.	SCHED DEPART	WILL DEPART	DATE NO.	DESTINATION - REMARKS
307	9 50A	ON TIME	C5	WASHINGTON
525	10 00A	ON TIME	B2	LACUARDIA
41	10 30A	ON TIME	C6	MIAMI NON-STOP
510	10 45A	ON TIME	C8	BANGOR
936	10 50A	ON TIME	C3	BURLINGTON
906	11 00A	11 00A	B4	LEWISTON/AUBURN
47	11 50A	11 50A	C6	MIAMI NON-STOP
517	12 00P	12 00P	B2	LACUARDIA
309	12 00P	12 00P	C5	WASHINGTON
359	12 45P	12 45P	C7	PHILADELPHIA
519	1 00P	1 00P	B2	LACUARDIA
356	1 45P	1 45P	C3	MONTREAL
823	2 15P	2 15P	B4	HYANNIS NANTUCK NARTHAS VINEYD

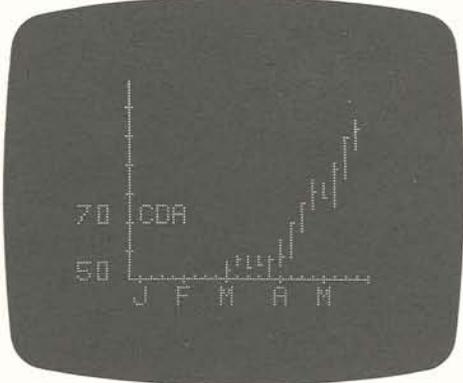
4. THE NATURE CLUB TOOK A WALK TO LOOK AT BIRDS. THERE WERE 28 GIRLS AND 22 BOYS. HOW MANY MORE GIRLS THAN BOYS WERE THERE?

A. 5  
B. 6  
C. 7

CORRECT. HOW MANY FEWER BOYS THAN GIRLS WERE THERE?

A. 4  
B. 5  
C. 6

RIGHT. WHEN YOU FIND HOW MANY MORE OR HOW MANY FEWER, YOU ARE FINDING THE DIFFERENCE BETWEEN TWO NUMBERS.



	AMPEX	AVCO	CHRYSLR	CON DAT	FORD
O	36.3	52.6	54.3	136.4	53.3
H	36.4	52.6	54.3	136.4	53.3
L	36.3	52.6	54.3	136.4	53.3
C	36.4	52.6	54.3	136.4	53.3

	GEN MOT	IBM	ITEK	LITTON	NOTROLA
O	84.7	588.2	153.8	185.5	134.6
H	84.7	588.2	153.8	185.5	134.6
L	84.7	588.2	153.8	185.5	134.6
C	84.7	588.2	153.8	185.5	134.6

	PAN AM	SCI DAT	TELDYN	UNIV AM	XEROX
O	25.1	119.4	118.3	22.6	288.1
H	25.1	119.4	118.3	22.6	288.1
L	25.1	119.4	118.3	22.6	288.1
C	25.1	119.4	118.3	22.6	288.1



# Versatile, Co

The CC-30 Communications Station is a low-cost input/output terminal designed for high-speed on-line access to a computer, whether that computer is in the next room or across the continent. It contributes directly to increased operating effectiveness by providing faster and more selective control of information.

## CC-30

COMMUNICATIONS STATION

The CC-30 Communications Station has proven its usefulness at hospitals, in industry, and with government agencies, universities, computer manufacturers, and research laboratories. The CC-30 is being used to obtain data not only in reference to things as they exist at present, but as they are likely to exist in the future; not only is it being used to update file records, but to answer the urgent need for current information on production control, cost control, inventory management, status reports, analytical forecasts, and sales analysis.

## CC-33

TELETYPE COMPATIBLE  
DISPLAY STATION

The CC-30 is already in use with IBM, UNIVAC, CDC, SDS, GE, DEC, Varian, and other computers. All components of the station are modular and designed for desktop operation in a normal office environment. A wide selection of models and options means the CC-30 can be specifically tailored for any application.

A teletype compatible display station — the CC-33 — lets users of time-sharing systems update their terminals to the new generation of remote display stations while still utilizing existing software. The CC-33 is fully code and transmission compatible with Model 33 and 35 teletype units.

# Color Display Capability

Color display is invaluable when separation and identification of text is important.

In business, color displays help differentiate between formatted data and changing information. In process control environments color can be used in startup procedures, operations control, predictive displays and alarm-scan monitoring.

But while color display can be important, even critical, it has always required a very specialized, very expensive terminal. Until now.

Because the CC-30 Communications Station uses an ordinary television set to display data, color can be used easily and inexpensively.

The CC-30 Color Display Terminal enables characters to be entered on the screen in any one of four colors: green, red, blue, and yellow. Color selection is specified by control codes which can be entered from the keyboard or transmitted by the computer. Color selection can be changed at any time either by the operator or by the computer.

Using color does not change the communications interface characteristics of the display controller. All optional equipment — card readers, light pens, line printers, etc. — remain unchanged.

# Compatible, Flexible, C

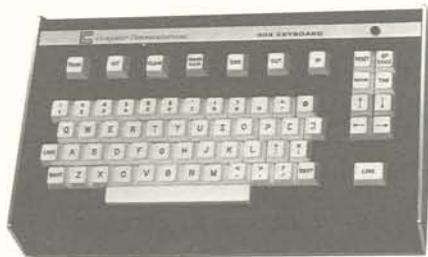
## CC-301 DISPLAY CONTROLLER



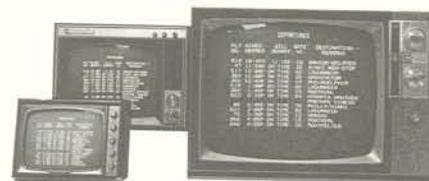
The CC-301 TV Display Controller is the heart of both the CC-30 and CC-33 stations. It displays alphanumeric or graphic data on a standard television receiver (a big factor in keeping the cost of the station far below others), accepts information from a keyboard or other input device, controls all input/output devices at the station, and communicates with any computer.

The CC-301 consists of a 1024 character random access core memory, a character/graph generator, and an input/output control section. In alphanumeric mode, characters are stored in memory in standard ASCII format. The character generator transforms these characters into the proper patterns and displays them in a format of 20 lines of 40 characters each (a format of 24 lines of 40 characters each is available as an option). In graph mode, data is displayed in a 108 x 85 dot matrix. Input/output to the CC-301 can be in either serial or parallel mode. Data Phone interfaces are available for all 100 and 200 series phone lines. A parallel path of 8 bits can be used for direct connection to computer I/O channels. The CC-301 can accommodate transmission speeds of up to 500,000 characters/second in parallel connection.

## CC-303 ALPHANUMERIC KEYBOARD



The CC-303 Alphanumeric Keyboard attaches directly to the CC-301 TV Display Controller and contains the standard character set keys and the control keys required for operation of the CC-30 station. It generates 7-bit ASCII characters plus parity. Text entered from the keyboard is displayed on the CRT as it is composed to provide instant visual verification. The keyboard has been functionally designed to resemble a conventional electric typewriter in key appearance and touch pressure. Data, cursor control, and function keys are grouped separately for maximum ease of operation.



## CC-300 TV DISPLAY

A unique feature of the CC-30 station is that any standard TV set or monitor can be used to display information from the CC-301 Controller. As the tube size increases, the size of the display raster and the symbols displayed increases proportionately. This means the CRT size can be selected to suit specific viewing requirements. But no matter what the CRT size, the clarity, legibility, and stability of the characters are outstanding. Bright, flicker-free viewing is made possible by automatically refreshing the display 60 times/second.

# Compact, Portable

## CC-302

### TELEPHONE COUPLER

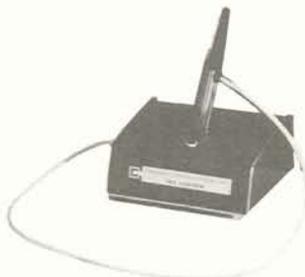


Designed for use with the CC-30 or CC-33 station at a remote site, the CC-302 is an acoustic coupler

which enables either station to communicate with a computer using an ordinary telephone. Communication takes place over a narrow band or voice grade serial transmission (telephone) line which must be terminated at the computer site. The CC-302 is attached directly to the CC-301 Controller. Communication between the two is via DC data signals. Communication between the coupler and the telephone is via FSK tones. Conversion of data signals to tones and back is performed in the CC-302 Coupler.

## CC-304

### LIGHT PEN



The CC-304 Light Pen is similar in shape and size to an ordinary fountain pen. It employs a photo-transistor detector (eliminating bulky fiber optic bundles) and provides the operator with a fast and direct means of communicating with a computer. When the light pen is directed toward the display in alphanumeric mode and a Search switch is depressed, a marker appears on the CRT, indicating the character position at which the light pen is directed. The operator notifies the computer of his selection, and allows the computer to determine the selected character and its screen position.

## Optional Equipment

## CC-305

### LINE PRINTER



The CC-30 Communications Station can be configured with non-impact or impact printers. The CC-305 Model I is a high-speed non-impact printer capable of transferring data from the buffer memory of the CC-301 Controller at 300 characters per second in a format of 40 to 80 character lines. The CC-305 Model II is a 300 line per minute impact printer for applications requiring larger column formats or multiple copy, high-quality printout. The printer mechanism prints up to 132 columns and accepts forms from 4 to 19 inches wide and up to 22 inches in length. The CC-305 option includes a printer controller (control electronics) as well as the printer mechanism. Up to four printer mechanisms can be operated by one controller.

## CC-306

### CARD READER



The CC-306 Card Reader gives the CC-30 and CC-33 stations added capability as remote computer terminals. The CC-306 can read either binary or coded cards with selection of the mode under operator or computer control. It reads standard 80-column punched cards at the nominal rate of 300 cards per minute and loads the data into the buffer memory of the CC-301 Controller from where it is available for transmission to the computer. The card reader can also be used to transfer data from cards to any output device at the station under computer or operator control in an off-line utility I/O application. If a card contains any ASCII control codes, the CC-301 will perform the appropriate function.

# Powerful Programming Features

The CC-30 Communications Station has been designed to provide the programmer with complete flexibility in all aspects of system operation. Control features are implemented in the CC-301 Controller for 17 ASCII control characters. These control characters can be intermixed with data characters to allow station control and data transfers to be achieved with a single operation. For example, since the cursor position can be controlled by control characters embedded within the data characters, a completely formatted message can be transferred in a single block of data. Any combination of the 17 control characters can be transmitted by the computer at any time and in conjunction with any set of data characters. Thirteen of the 17 control characters can also be generated by the CC-303 Alphanumeric Keyboard and are available for operator use in station control. The 17 control characters are summarized in the opposite chart.

In addition to the control provided by the 17 control characters, additional features to supplement the communications and control aspects of computer/remote site interaction are available in the CC-301. By means of 13 function characters the programmer is provided with complete and absolute control of the cursor. Function characters are also used to switch operation of the CC-301 between alphanumeric and graphic mode, to enable or disable the generation of the display from memory, and to perform other powerful station control operations.

The powerful cursor positioning and control commands provide the programmer complete versatility in the transfer of information to and from the station. The computer can selectively read or write any sequence of characters beginning and ending anywhere on the display screen. Moreover, since the CC-301 features a fast, random-access core memory, the operation is initiated immediately and proceeds at data rates limited only by the capability of the computer or the bandwidth of the communications line.

## CC-301 CONTROL CHARACTERS

CONTROL CHARACTER NAME	KEYBOARD SYMBOL
CURSOR FORESPACE Advance cursor one character position	→
CURSOR BACKSPACE Backspace cursor one character position	←
CURSOR UP Move cursor vertically up one line	↑
CURSOR DOWN Move cursor vertically down one line	↓
CURSOR RESET Move cursor to initial position of first line	RESET
CURSOR RETURN Move cursor to initial position of current line	RETURN
MIDTAB Move cursor to middle position of current line	TAB
NEW LINE Move cursor to initial position of next line	LINE
TRANSMIT Initiate transmission to computer. Transmission begins at current cursor position and continues through end of text.	TRANS
END Serves as end of message indicator	END
INTERRUPT Notifies Channel Adapter to energize appropriate interrupt line to computer.	INT
INITIATE INPUT Initiate input from selected CC-30 input device to CC-301 memory.	IN
INITIATE OUTPUT Initiate output from CC-301 memory to selected CC-30 output device.	OUT
CLEAR Clear CC-301 memory and reset cursor	CLEAR
END OF TRANSMISSION Enables keyboard after transmission from computer	(NOT AVAILABLE)
PARITY ERROR Indicates detection of transmission parity error	(NOT AVAILABLE)
FUNCTION When communicating in serial mode, conditions CC-301 to interpret the following character as a function character.	(NOT AVAILABLE)

## CC-301 FUNCTION CHARACTERS

FUNCTION CHARACTER NAME	FUNCTIONAL DESCRIPTION
SELECT ALPHANUMERIC MODE	Sets controller into alphanumeric mode.
SELECT GRAPHIC MODE	Sets controller into graphic mode.
ENABLE REFRESH	Controller will begin to display information in memory. The contents of memory are not changed.
DISABLE REFRESH	Controller will cease to display information in memory. The contents of memory are not changed.
READ CURSOR ADDRESS REGISTER	Controller transmits to computer two characters which specify current cursor row and column address.
LOAD CURSOR ADDRESS REGISTER	Controller loads next two characters received from computer into row and column positions of cursor address register.
READ CURSOR CHARACTER	Controller transmits to computer character which is contained in memory at location specified by contents of cursor address register.
ENABLE TRANSMIT	Transmission to computer is initiated when controller is in block mode and receives a TRANSMIT control character.
DISABLE TRANSMIT	Transmission to computer is initiated only when controller is in block mode, a Transmit Ready status bit is set, and a TRANSMIT control character is received.
HALT LOCAL I/O	Input/Output operations involving any optional devices are halted, keyboard is locked out, controller is conditioned to accept next transmission from computer.
READ MEMORY	Controller transmits to computer contents of its memory beginning with initial memory location and proceeding to end of memory.
READ LIGHT PEN ADDRESS	Controller transmits to computer address at which light pen was last energized.
REQUEST STATUS	Controller transmits to computer a 7-bit status character as follows: Bit 1—Input device not ready; Bit 2—Output device not ready; Bit 3—Transmission parity error; Bit 4—Transmit ready; Bit 5—Graph mode; Bit 6—Light pen interrupt; Bit 7— Controller not ready.

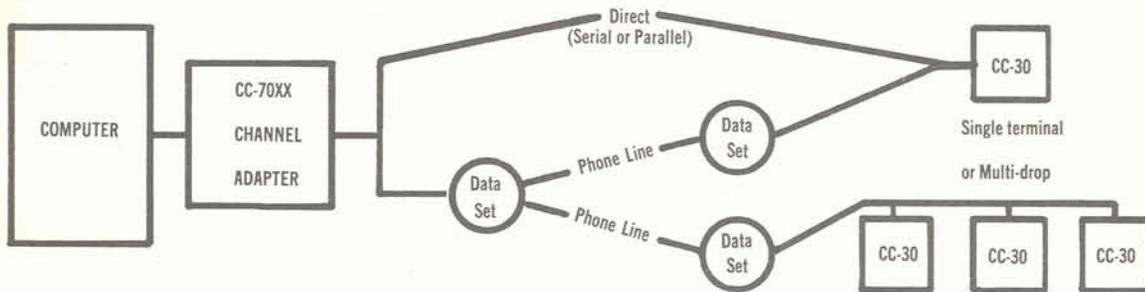
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# Unlimited Configuration

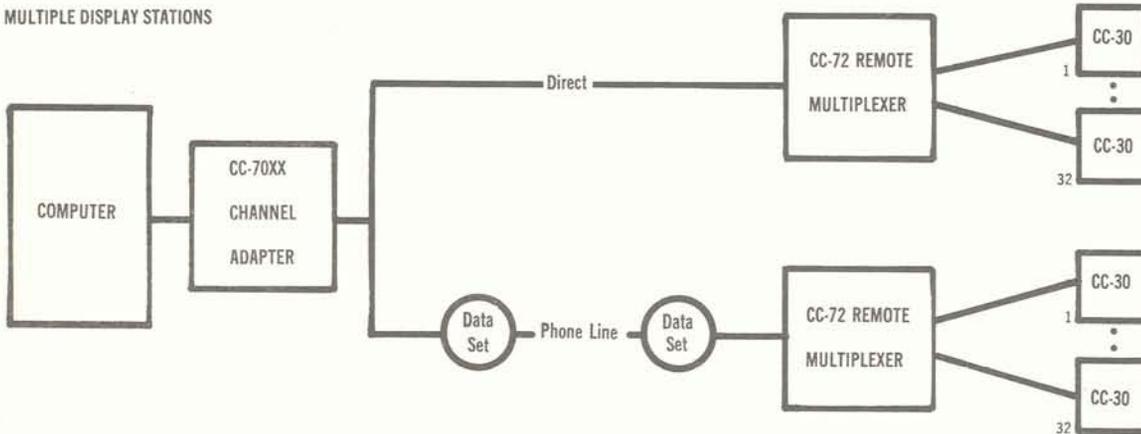
The design below illustrates a few of the many configurations possible with the CC-30 Communications Station. The CC-70XX represents one of a family of channel adapters which permit any computer to be used with these systems. The channel adapters provide a direct connection to the CC-30 Communications Station or to the CC-72 Remote Multiplexer. Option-

ally, a channel adapter can also interface to a Data Set or to the CC-70 Computer Communicator. The CC-70 provides the control, termination, and buffering of multiple communications lines with a connection to a data channel of the computer. The CC-72 allows up to 32 stations to share a single transmission line or direct connection to the computer.

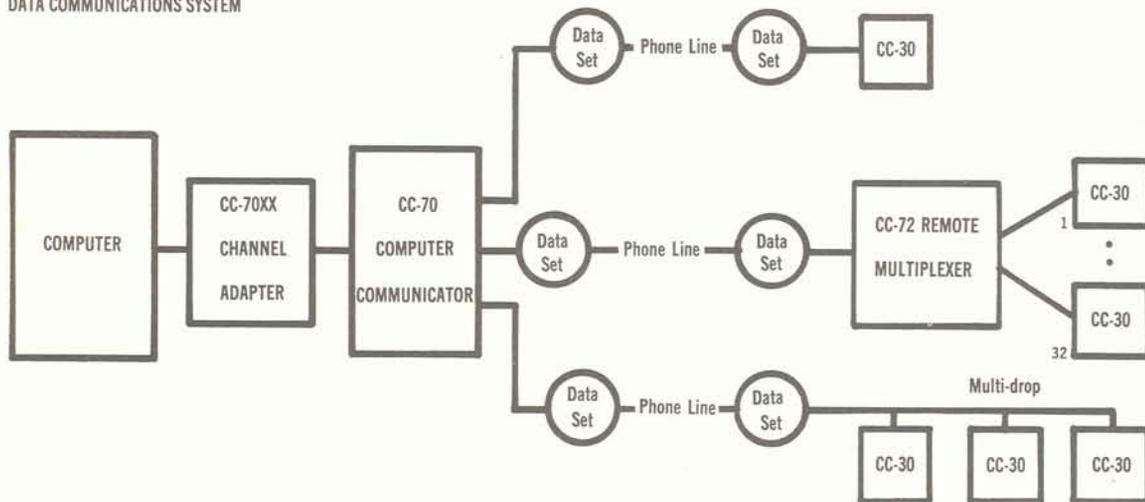
SINGLE DISPLAY STATION



MULTIPLE DISPLAY STATIONS



DATA COMMUNICATIONS SYSTEM



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