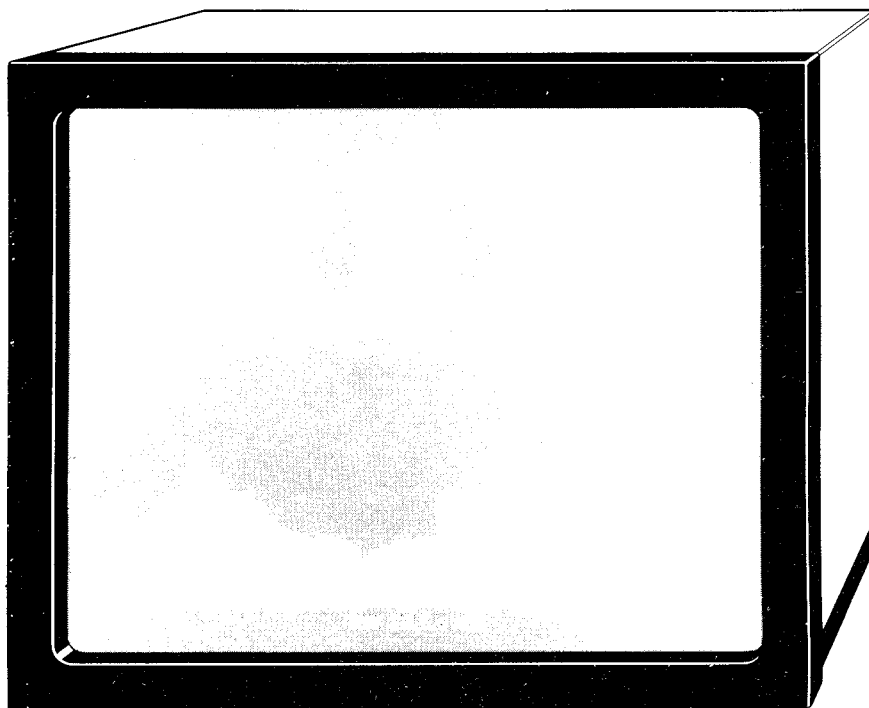




8811-4008

Logging Video

DESCRIPTION

GEM 80 video is supplied as a fully integrated optional extra of GEM 80/200 series controllers.

The logging video system comprises a video processor module (with logging video firmware) and RAM memory module or modules which plug into the central subrack of the host GEM 80 controller. Either colour or black and white video monitors may be connected.

Logging video can be used in one of two ways, either "On Demand" or "Regular Sampling".

- (1) On Demand:- This allows blocks of controller data to be stored in the logging memory. If there are, for example, 1000 locations in the logging memory and 100 adjacent controller table locations, then 10 sets of data can be stored. The cyclic store overwrites oldest data as new data arrives and any set of data can be recalled by the host controller for its use.
- (2) Regular Sampling:- Up to 100 host controller data table locations can be sampled and the maximum capacity is 5000 samples per channel (providing there is sufficient memory). Each channel can be programmed to sample at different intervals from 100ms to 9 hours and the cyclic store overwrites oldest data as new data arrives, thereby storing trend information.

Data is stored through power off by the battery memory support system.

Video can display the logged data by bar charts. Alternatively, the data can be superimposed onto more complex dynamic video formats, such as plant mimics. Up to 256 symbol character set, 8 colours and screen divisible into 4 areas are available. In fact, all the facilities of paged video except the editor.

FEATURES

- Hard copy print out of logged data for management information via host controller
- Several video monitors can be driven from one video output
- Can be used in conjunction with paged video
- Logging memory up to 320K bytes of read/write memory.

SPECIFICATION

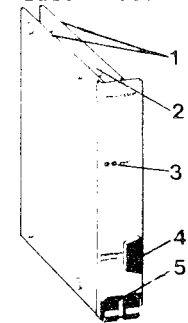
1. Controller/Video Display Relationship

The video display system operates independently of the host controller, except that the video has read/write access to the data tables of the host.

The self-test, watchdog and status (halt/run) of the host controller are independent of the video system.

Maximum capacities for logging video are shown in the Product Data Sheets for GEM 80/200 series controllers.

Video Processor Module



1. Video processor printed circuit boards
2. Clamping pillars
3. Printer transmit activity lamp (screen print or program listing)
4. Socket for programming and monitoring
5. Withdrawal handle

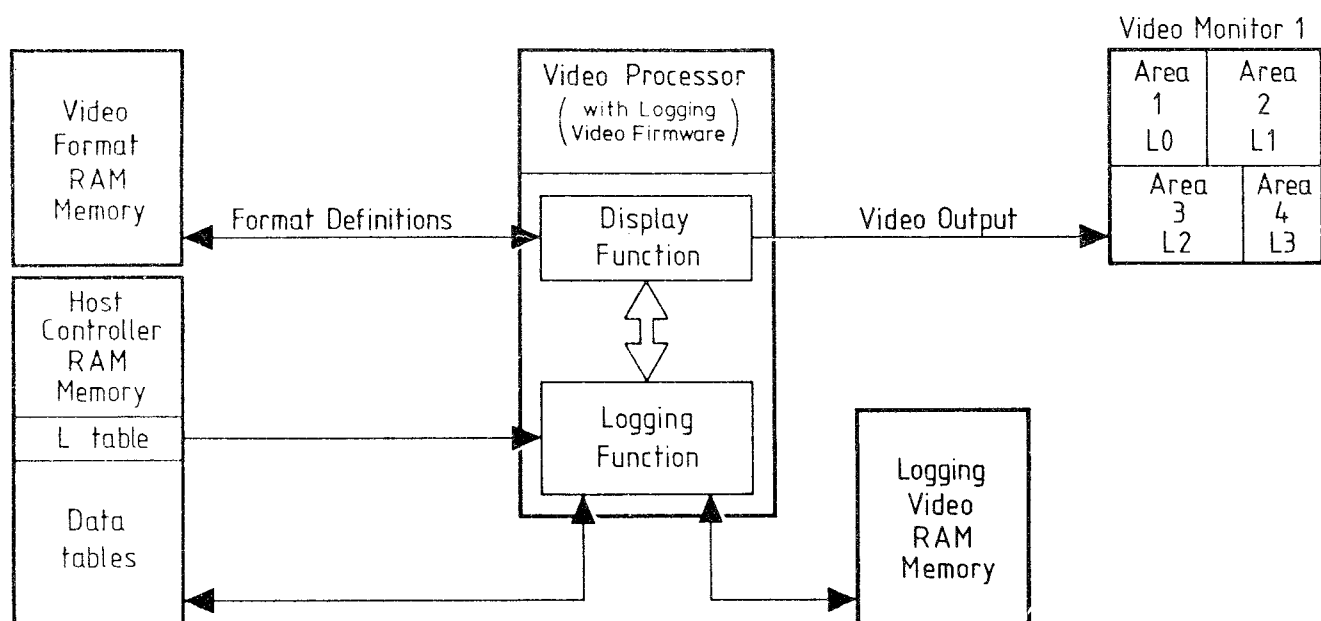
2. Logging Video Operation

Figure 1 shows a block diagram of the logging video system. The video processor performs two functions, a display function and a logging function.

(a) Operation of display function

- start up
- : performs simple self-test of video processor executive programs and on-board memory
 - : displays test format (zeros) followed by dummy format (GEM 80)
 - : starts operating cycle
- operating cycle
- : reads format requests in host controller L table
 - : if any change to format requests, reads format definition(s) from video memory modules into video processor
 - : reads variable data for display from data tables of host controller
 - : updates displayed picture
- cycle time (typical)
- : 1 to 2s complete new picture free
 - : 1/3 to 1s update running
 - : 1/10 to 1/2s full picture independent of host
 - : update small area
- multiple video processors
- : each video processor produces independent video output, displaying different video formats
 - : format definition programs are shared between all video processors in a system

Figure 1 Block diagram of Logging Video System



(b) Operation of logging function

logging function can read data from host controller's data tables and deposit this in the logging video memory. It is also possible for the host controller to recall data from the logging video memory and put it either into the host controller data tables for its use or onto the video display.

Logging function and display functions are controlled by either the portable programmer or the host controllers L table contents. This means the logging and display function can be changed by program while the system is on line if required.

The logging memory is organised in channels of cyclic store and the number of channels and size is program or user adjustable on or off line.

Initially the contents of all locations is zero and as the logging proceeds the store fills up.

Eventually, the number of samples equals the size of the store, so it is full and the next sample over-writes the oldest item in that channel's store. The system can be set to either logging "on demand" or "regular sampling". It is not possible to have some channels "regular sampling" and some "on demand". All channels must be either "on demand" or "regular sampling".

(Note: Retrieval of logged data leaves stored data unchanged).

3. Logging Function Program

capacity : 100 channels maximum
: 5000 samples maximum per channel
: capacity of 1st 64K byte RAM is (32766 minus 11n) samples, where "n" is no. of channels specified
: capacity of subsequent 64K byte RAMs is 32768 samples

Maximum quantity of logging RAM modules depends on type of controller and quantity of space occupied by video processors and format RAM modules.

sample interval : overall package scan interval 100ms or 1s. (Common to all channels)
: individual channel sample interval 1 to 32767 scans, i.e. 0.1s to 54 min. in 0.1s increments or 1s to 9 hrs. in 1s increments

programming of : Menu driven interactive
logging channels : sequence via standard GEM 80 programming unit
: handshake sequence from user program of host controller via L table interface
: channels can be added or reconfigured on-line via L table interface whilst logging is in progress on other channels

4. Printing

direct print : when logging halted, user can
out of logged : print logged data via GEM 80
data : programmer (simple interactive sequence)
: print out has simple title set by user, followed by columns of unscaled numeric values
: this facility is not available on early GEM 80 programmers, i.e. 8920 with pre-version 4 software

indirect print : Logged data can be transferred
out of logged : to data tables of host
data : controller whilst logging in progress, and printed in any desired format using facilities of user program for scaling, units and annotation, and combination of logged data from more than one channel

5. Video Display

video display : facilities identical to paged
: video. Any formats programmed for paged video will give indistinguishable display
: if paging facility used for stored formats, logging video can display formats from extension format RAM modules

display : figure 2 shows display structure
: format areas may be preset to any size and shape and any number of format areas up to 4 can be created. Data in the video program defines position of partitions

character set : standard character set as Table 2. Contact GEC for details of special character sets
: numerical characters are single width/double width/triple size, with/without decimal point, with/without leading zeros

attributes for : see Table 3
each cell

variable data : see Table 4
instructions

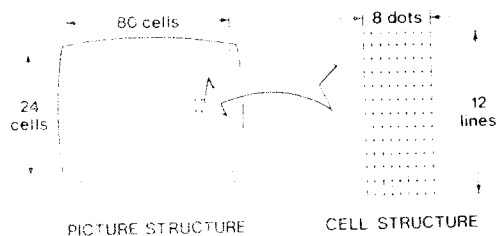


Figure 2 - Display Structure

Table 2 - Video Character Set

Type	Characters Available
ASCII/ISO-7 character set	letters A to Z, a to z numbers 0 to 9 punctuation !"(),./:;?[]{} arithmetic + <-> = symbols #%%&*@~
1 x 1 cell	
Extra large characters	letters A to Z numbers 0 to 9 punctuation ?
3 x 3 cells	
Block graphics	 All 64 combinations of 6 elements per cell (each element 4 x 4 dots)
Bar charts	1 cell wide, height in 1/12 cell increments
Boundary or pipe symbols	Set of corners, horizontal lines, vertical lines and joints, with arrows to indicate flow. Lines 2 dots wide
Line lines	Horizontal and vertical line 1 dot wide
Microchannel	CEC logo; double width ON/OFF

Line characters can be displayed normal width or double width. Each line of cells starts normal width, each subsequent width change occupies one cell, i.e. there is a space between normal and double width characters.

Table 3 - Attributes for Each Cell

Attribute	Description
Colour	Independent choice of foreground and background colour:- Black, white, red, green, blue, light blue (cyan), yellow, purple (magenta)
Flashing	Alternating character and space at 0.8 Hz 50% mark-space ratio
Reverse video	Interchanged foreground and background colours

Monochrome output is white on black irrespective of chosen colours except that character suppressed if foreground and background colours identical (black on white if reverse video).

Table 4 - Variable Data Instructions (DRNs)

Variable	Description
Attributes	Switched on variable attributes for whole area or n cells across up or down
Numbers	Range +32767. Optional decimal point or hex display. Optional double width or triple size.
Characters	Any characters from character set
Text	Text string, e.g. shown with printer
Bar charts	Vertical or horizontal

programming : automatic generation of simple video formats for trend displays using bar charts. Uses simple interactive question and answer sequence via standard CEM 80 programming unit. Figures 3 and 4 show examples of these bar charts
: generates formats for page 0 only (format nos. 1 - 25)

Format program : any format program tape from load/dump
: formats (including page 0 automatically generated trend display formats) can be dumped to tape and subsequently reloaded

Note: There is no on board editor system so user cannot program video formats other than automatically generated trend format. However, video formats can be put into format RAM in several ways see Application Note 3 - Format Definitions for Video Displays.

6. Memory

- logging video : for capacities see Relevant
RAM memory Controller Product Data Sheet.
- : logging video permanently
write enabled by factory
fitted link between pins 13
and 14 on programmer socket
on 8603 module
- format RAM : 16K on host controller memory
memory capacity plus optional 64K modules
(capacity depends on
controller type)
- : 8 typical complicated full
screen formats per 16K page
of memory
- : 25 typical simple formats per
16K page of memory
- : 25 formats maximum per 16K
page of memory
- memory support : primary battery (lithium) on
each memory module
- : battery life 4 years typical
1.5 years minimum (continuous
support with power off)
- : shelf life 10 years typical 5
years minimum (battery
isolated or main power on)

7. Output from Video Processor

- video output : composite video suitable for
colour and monochrome
industrial monitors
- : 1V into 75 ohm
- : red/green/blue signals (sync.
on green)
- : independent monochrome signal
- : 320 lines per field, 64 /us
line period
- : 48.8 fields per second

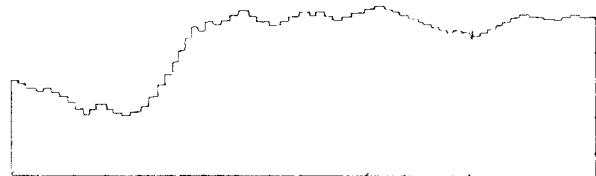
Note: Monitors are often fitted with "loop
through" input terminals enabling one
video processor to drive more than one
monitor by a "daisy chain" connection.

- printer output : printout of screen contents.
- : 20mA current loop
- : ASCII character set
(equivalent to ISO-7)
- : 1 start bit, 8 character bits,
2 stop bits (last character
bit is zero, corresponding to
unused parity bit, for ASCII
cod.)
- : 300 bit/s; 80 characters per
line

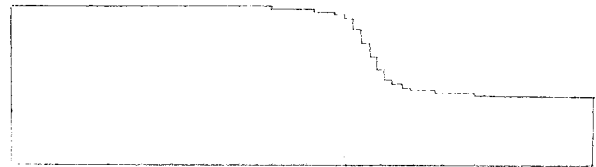
- screen.print : print-out of displayed
picture or single format area
- : video displays normally
during print
- : suitable only for normal size
text and numeric data, see
note below

Note: Screen print-out of graphics and large
characters will substitute asterisks (*)
for such characters.

- connection : ribbon cable from rear of
subrack to video termination
panel (2m std. length)
- : 75 ohm B.N.C. connectors on
termination panel for video
output
- : screw clamp connectors on
termination panel for printer
output
- : 3 video leads are provided
each 2 metres long, with
B.N.C. connectors on both ends

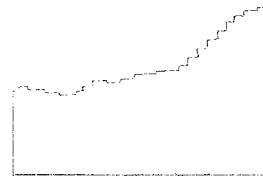


TITLE 1



TITLE 2

Figure 3 -- Example of Format with Two Bar Charts



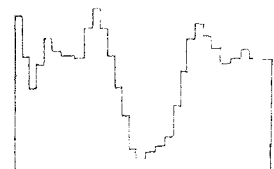
TITLE 1



TITLE 2



TITLE 3



TITLE 4

Figure 4-Example of Format with Four Bar Charts

APPLICATION NOTES

1. RAM Modules

It is important for the user to appreciate the distinction between the memory modules used to store video formats and those used to log data.

The RAM module supplied as part of the host controller includes 16K bytes which are used as page 0 of the video formats. This area cannot be used for logging.

Subsequent 64K byte RAM modules can be used EITHER for formats OR for logging, depending on the address links set up at the backplane. It is not possible to mix logging and formats on the same module.

2. Regular Sampling at Two Intervals

Sometimes it is a requirement to maintain a record of plant data sampled at frequent intervals over a short period, and at less frequent intervals over a longer period. This may easily be achieved by setting more than one channel to log the same data table location.

If the data to be stored is required to be average figures over a given period, then the averaging calculation will have to be performed by the host controller before logging.

3. Format Definitions for Complex Video Displays

Format definitions can be put into the format RAM in one of the following ways:-

- (a) In a multiple video system, video formats can be programmed using one of the paged video processors. The programmed formats are then common to all the video processors in the system, including the logging video.
- (b) If the only video processor in a system is a logger, it is possible temporarily to substitute a paged video processor in order to program video formats. The paged and logging processors can simply be exchanged when programming is complete.
- (c) Alternatively, a set of video formats can be prepared at a remote location, using any paged video processor. The format program can be dumped to tape for transit to site, and loaded into format memory via the logging video processor.

4. Multiple Video Systems

In a multiple video system, only one of the video processors can be a logging video. It is recommended that the other video processors should be paged videos, which have exactly the same display facilities.

The original unpagged video could be used in the same system, but care would be needed because of differences in the DRNs supported, the lack of a paged format facility, and the inability directly to display logged data.

5. Execution Times

Normally, the execution time for logging activity is so short that no effect can be seen on the update speed of the video display or on the scan time of the host controller.

At the regular scan interval specified by the user, the logging package interrupts the video display update for as long as is necessary to perform one scan. The effect is a small delay (up to 50ms) in the picture update. The effect will be least visible if 1 sec. scanning is chosen.

The central highway activity associated with logging loads the scan time of the host controller by a tiny amount (typically less than 1%).

When the host program requests an "on demand" transfer, there is a delay until the next logging scan before the transfer begins (up to 100ms or 1 sec. depending on chosen scan interval). The transfer itself takes less than 30ms per 1000 data table locations.

6. Data Integrity

Logging video ensures word integrity of the data logged at regular intervals by taking two samples in very quick succession, and taking further samples if they do not agree. If the host controller happens to change the data at the same instant as a sample is taken, there is a small statistical possibility of one sample having the two bytes out of step, but it is not possible for the same conditions to arise in two consecutive samples.

When data is logged or retrieved "on demand", the processor performs a simple block copy. To guarantee word integrity, the user should ensure that the host program cannot alter the source data whilst the transfer to logging memory is in progress. Similarly, the user should ensure that the host program cannot make use of the retrieved data whilst the transfer from logging memory is in progress.

During recompilation of the user program on a 250 series controller all L table requests are ignored and no regular samples are taken.

7. Controllers for Use with Logging Video

The following controllers can be used with logging video:-

- (a) All GEM 80/252/253/254 series controllers
- (b) GEM 80/225/235/245 with software issue C or later (i.e. not issue A or B)
- (c) GEM 80/225E/235E/245E with software issue B or later (i.e. not issue A)
- (d) GEM 80/225/235/245 BASIC issue D (V1.3) or later

8. Character Set

A logging video uses exactly the same EPROMs for storing the display character set as paged video.

Any special character set generated for paged video is equally suitable for logging video.

9. Requirements for Printers for Use to Obtain Video Print outs from the Output on the Video Termination Panel

Full details of Printers for use with GEM 80 is given in "PRINTERS" Application Note. The essential points are:-

- (1) That the printer should be able to accept a 20mA current loop serial input
- (2) The printer must be able to accept ASCII character codes
- (3) The printer must be able to receive signals transmitted at 300 bit/s
- (4) This printer port is not designed to accept handshake signals
- (5) The printer must be able to accept characters sent as 11 bits, each comprising 1 start bit, 7 code bits in ASCII, 1 even parity bit and 2 stop bits.
- (6) The line length of the printer must be at least 80 characters.

ORDERING CODES

GEM 80 video is normally ordered as part of a GEM 80 controller, and the user should refer to the appropriate controller Product Data Sheet for full details.

The user should note that 250 series controllers require issue B or later of the logging video software.

Note The Company's policy is one of continuous development and improvement and therefore the right is reserved to supply products which may differ in detail from those described and illustrated in this publication. All our products and materials are sold subject to Conditions of Sale available from us on request

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