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DEVELOPMENT OBJECTIVE

MAGNETIC TAPE TO PHOTO REPRODUCER

Declass Review by NGA.

1. INTRODUCTION. This document presents requirements for the design, assembly, installation and operation of equipment to produce high quality photographs from various types of video tapes.
2. CONCEPT. Several techniques are used to convert television imagery to photographic prints. These techniques vary widely in cost and quality and many of the systems are not compatible. Video tape widths which vary from $\frac{1}{4}$ inch to 2 inches and scan lines which range from 405 to 819 are two of the main problem areas. A system of integrated commercial components must be devised to accept tapes from the most common U. S. and European systems, display their contents at normal speeds or in stop motion at the highest possible quality consistent with the recording medium, and produce instant, high-quality, still photographs of selected scenes.
3. ADMINISTRATION.
 - 3.1. Evaluation of proposals will be based on cost, quality of imagery, indications of commitment to fulfill these objectives, and the experience and ability evidenced by inclusion of relevant specifics.
 - 3.2. Proposals should contain an indication of thorough comprehension of the areas of prime concern, suggested solutions to problem areas, and a schedule of major steps in the development process.
4. REQUIREMENTS.
 - 4.1. General Configuration.
 - 4.1.1. Playback. The basic component for this system will be a standard, commercial, transverse scan, video tape recorder. This equipment must utilize switching and/or plug-in modules to accept tape with the following standards; 525 scan line/50 field, 625/50, 405/50, and 819 scan line/50 field. The system must be compatible with "Intervision" as well as U. S. "high band" and "low band" broadcast systems. It also must have the quality of a color system, but does not need to have a full color capability. However, it must be designed to accept available commercial equipment for modification so that color capability can be achieved with minimum effort and expense.

4.1.2. Stop-Motion. A disk-type video recorder will be operated on line with the basic video recorder to provide it with a capability for temporary storage and selected stop motion or single frame display. Provisions must be made to accept signals from either helical scan or transverse scan recorders for a better quality stop motion capability. The system must be able to advance the recorded display frame-by-frame and to select and hold a particular frame to recorded imagery. A small monitor affixed to the disk recorder will display the imagery being stepped or held. Off-the-shelf equipment may be modified to suit this requirement.

4.1.3. Display. A Kinescope-type, flat-faced cathode ray tube (CRT) will be used to present imagery to be photographed. This CRT will be large enough to present a 3x4-inch display for reproduction. The display-recorder circuitry must include contrast, brightness, etc., controls.

4.1.4. Photography. A 4x5-inch, high-speed, frame camera will be used to photograph the quality CRT image. This camera will be set and rigidly attached in such a manner that full scale photographs (1:1) of the flat CRT can be produced. A fine focus control will be included so that the sharpest possible image can be obtained on the ground glass. A between the lens shutter with a "Time" setting and an adjustable exposure range from 1 second to 1/50th of a second will be adequate. There will be no need for an automatic exposure device, an exposure meter attachment will be sufficient. The camera will have a back that will accept cut film and "film packs" for use in producing optimum photographic records. The back will have provisions to accept a rapid, self-processing adapter for use in producing urgently needed photos without the need of a photographic laboratory.

4.1.5. Integration. All components must be interfaced for optimum performance. Equipment must be positioned and arranged for optimum man/machine operation and maintenance. Controls must be adequately marked and easily available, but must be positioned so as not to interfere with the operator.

4.2. Additional Equipment Considerations.

4.2.1. Proposals should provide for and discuss capabilities and limitations of the following types of electronic image manipulation devices and techniques.

- (a) "Spot Wobble" circuitry and controls for decreasing scan line patterns of CRT's.
- (b) "Vertical Aperture Equalizing" for apparent increase in vertical resolution of imagery.
- (c) "Gamma" or "Black Stretch" controls.
- (d) "Exponential" or "White Stretch" controls.
- (e) Edge enhancement or outlining techniques.
- (f) Electronic magnification controls.
- (g) Other circuitry or techniques to help produce and improved photographic still copy of video taped material.

4.2.2. Considerations must be given for reducing Radio Frequency Emissions in accordance with Federal Std. #222. This specification is to be limited to information carrying emissions.

5. PHYSICAL AND OPERATIONAL CONSIDERATIONS.

5.1. This equipment will be operated in a clean office type environment. Special considerations must be given to reduce heat output and noise emanating from the system.

5.2. The following facilities will be available as requested:

5.2.1. Electricity: 110V, 1 phase and 208V, 3 phase, 4 wire.

5.2.2. Chilled water and tap water.

5.2.3. Compressed air at 80 psi.

5.2.4. Vacuum

6. DETAILED REQUIREMENTS.

6.1. The maximum size of any single component is not to exceed 32" wide x 65" long x 71" high, and will not exceed 1600 pounds weight.

6.2. Environmental conditions within the room will be held to temperatures of 72 degrees F. +5 degrees F. and humidities of 55% + 15% - 5%.

6.3. Provisions must be made for maximum personnel protection from safety hazards that may be generated by the equipment.

6.4. The contractor is to assume responsibility for all facility hook-up from the point where the facilities may enter the room.

6.5. If any component of this system is vibration sensitive so as to adversely affect performance, adequate vibration isolation must be incorporated in the design.

7. MAINTENANCE AND TRAINING.

7.1. A listing and price quotation of recommended spare parts and test equipment will be provided as deliverable items under the contract.

7.2. Written instructions for recommended testing procedures must be included, as well as wiring diagrams and schematics.

7.3. It is highly desirable that initial utilization and operational evaluation of this system not be hampered by less than optimum operation of the equipment itself. However, the equipment embodies several concepts whose technical details are not familiar to most user personnel. Therefore, proposals must include a separate price quotation for provision by the contractor for a technician to help assure the proper and effective operation of the equipment during its introductory phase. This technician must have been acquainted with the development and assembly of the system and must be proficient in the operation and repair of the system components. During the crucial period of initial operation, he must keep the equipment constantly tuned to optimum performance and perform minor modifications, on the spot, as necessary. The technician provided should be available for one year. During that time, he will be expected to train customer maintenance personnel to assume his duties.

7.4. Proposals must include installation specifications, including estimates of necessary supporting services and equipment, such as floor space, atmospheric environment and power.

7.5. The contractor must provide monthly progress report, including currently updated schedules for delivery and installation in accordance with specification No. DB-1001 (attached).