

# Ground Systems TV Data Flow Workbook GND TV 2102A

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Advanced Training Series

For Training Purposes Only  
Crew Training and Procedures Division  
Flight Training Branch

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National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas

## ERRATA SHEET

### GROUND SYSTEMS TV DATA FLOW WORKBOOK GND TV 2102A

Page 5-8

RCU should read as follows:

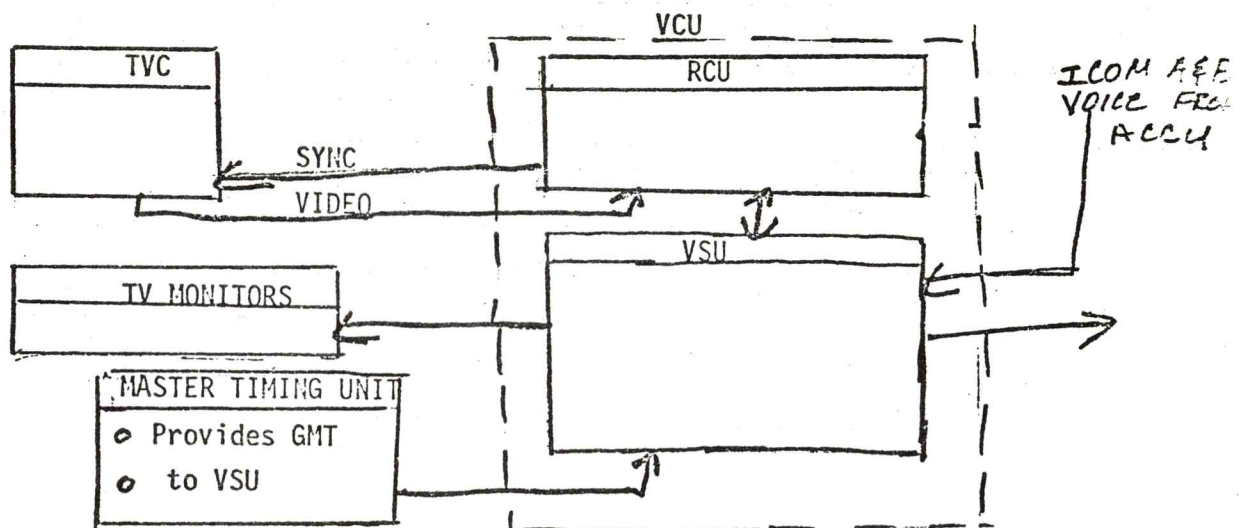
- o Accepts video uplink commands from PHS and MDM PF2
- o Provides master sync for TV cameras and TV monitors

VSU should read as follows:

- o Combines ICOM A&B voice with video for downlink
- o Incorporates GMT into video
- o Switches TV and voice to TV monitor and FM signal processor

Page 5-8

Drawing should be as follows:



## REVISIONS

Revision A to the Preliminary TV Data Flow Workbook contains the following changes:

### I. Additions

- Segment 4, TV Data Flow
- Segment 5, TV Major Subsystems have been revised to include the Operational TV Closed Circuit TV System

### II. Deletions

- Segment 2, Orbiter TV Camera Description
- Segment 3, TV Control Functions

If you have already taken the Preliminary TV Data Flow Workbook, you will only need to take Segments 4 and 5 of this Revision in order to receive credit for this course.

## FOREWORD

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This training material is part of a series of lectures, handouts, and workbooks for instruction on Ground Systems.

This training package should be studied before attending any classroom session on this material or taking any lesson for which this is a prerequisite.

The Ground Systems lesson sequence chart shows where this lesson fits in the series. The prerequisites for each lesson, and the optimum presentation order. The lesson sequence charts are located in the Shuttle Training Program catalog.

This material is for training purposes only; it should not be used as a source of operational data.

This workbook is part of the advanced training series with data for specific examples taken from the STS-1 Flight. This should not detract from its training value for later STS Flights.

The last two pages of this workbook are two forms:

(1.) "Lesson Critique Sheet"

(2.) "Training Report"

- (1) The "Lesson Critique Sheet" is used to obtain your comments on this workbook. Please fill it out and mail to the instructor when you have completed this workbook. (It need not be placed in an envelope nor be signed.)
- (2) The "Training Report" applies to FOD personnel ONLY. It provides the information to enter this training in your training record. To receive credit when you have completed this workbook, please complete the "Training Report" and mail to CG3.



## HOW TO USE THIS WORKBOOK

This book is organized into segments. You should proceed through the segments in the order they are presented. Within the segment, however, you control your own progress. You should begin each segment by reading the objective and the learning material. The learning material is set apart in a box. This is the central information to be learned. Supporting data following the learning material is provided as additional information to aid you in learning. If you are already quite familiar with the material presented in the learning material, skip right to the exercise items. For other segments with which you are somewhat familiar, you may want to read the objective, learning material, and some of the supporting data, then go on to the exercise. If the material is totally new to you, most of the supporting data should be very helpful.

Before going on, you should always make certain that you understand the correct answers to each of the exercise items. The feedback explains the correct response and is particularly helpful for items you missed. Exercise items are usually on the right-hand page and exercise feedback on the left-hand page so that you can fold the page over to compare your answer with the correct answer.

All the acronyms and abbreviations used in this lesson are discussed wherever first used in the Supporting Data section of a segment.

A content bibliography outline is often provided at the end of the lesson for those persons who may desire more detailed data on a specific topic.

This workbook is provided for your use. You may make notes or write comments anywhere you like. You may retain the text for later reference.

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## LESSON INTRODUCTION

This lesson discusses the end-to-end data flow of TV (video) signals from the Orbiter to MCC. Also included are the types of inflight activities that will be televised during early Space Transportation System (STS) flights, and the Ground Spaceflight Tracking and Data Network (GSTDN) sites that can receive, record and process TV data for transmission to MCC. This lesson traces the flow of TV signals from the Orbiter to MCC, and discusses the functions of the TV subsystems utilized for processing and transmitting TV data flow onboard the Orbiter, at the GSTDN site, and at MCC.

Later editions of this workbook will discuss TV data flow as it relates to the Payload interfaces and the Tracking and Data Relay Satellite Systems (TDRSS).

## SEGMENT 1

### TELEVISED INFLIGHT ACTIVITIES

#### OBJECTIVE:

Be able to specify the types of inflight activities that will be televised during early STS flights.

#### INTRODUCTION:

The objective in public release of inflight activities is to provide the public with an opportunity to view the interior of the spacecraft in operation, and to provide some indication of the vehicle's features and capabilities, especially the payload facilities. Television pictures, together with photography released postflight, will give the public a visual foundation on which to build an understanding of Shuttle operations and capabilities. The telecast will also provide television documentation of the Space Shuttle program for historical recording of the mission.

#### LEARNING MATERIAL:

##### SPACE SHUTTLE 1 SCHEDULED TELEVISED INFLIGHT ACTIVITIES

- PAYLOAD BAY DOORS OPENING AND CLOSING
- CREW ACTIVITIES IN THE FOLLOWING AREAS:
  - AFT FLIGHT DECK ON-ORBIT STATION
  - PAYLOAD HANDLING STATION (PHS)
  - FORWARD FLIGHT DECK (COCKPIT)
  - MID-DECK CREW QUARTERS
  - TRANSLATION BETWEEN FLIGHT DECK AND MID-DECK



## SUPPORTING DATA:

Preflight activities will be televised during GSTDN station\* passes. Each pass will provide a maximum of 7 minutes of viewing time. Each telecast will be accompanied by the related operational air-to-ground voice and/or operational intercom voice. The telecast will also be integrated with operational or test activities, as practical. Examples of activities to be televised includes the following.

- Telecast of a payload bay door opening and closing will be accomplished in one or two telecasts.
- Telecast of crew activities at the payload handling station in the aft flight deck will show at least one crewmember operating Shuttle equipment.
- Telecast of crew activities in the forward flight deck area will show at least one seated crewmember operating equipment.
- Telecast of crew activities in the crew quarters area (mid-deck) will show crewmembers translating to or from the flight deck.

The telecasts specified above will be made available for real-time release to the public, and for recording on the ground. The telecast will be televised from mounted TV cameras. However, if necessary for proper camera angles, or activity coverage not obtainable with a fixed mounted camera, the cameras will be handheld.

Command and control for selection of the inflight activities for viewing at MCC is controlled by the instrumentation and communications officer (INCO) and the orbiter crew.

\*GSTDN stations with TV capability will be discussed in Segment 4.

PRACTICE:

List the types of inflight activities that will be televised during early STS flights.

PRACTICE FEEDBACK:

List the types of inflight activities that will be televised during early STS flights.

Televised inflight activities

- Payload bay doors opening and closing
- Crew activities in the following areas:
  - AFT flight deck on-orbit station
  - Payload handling station
  - Forward flight deck (cockpit)
  - Mid-deck crew quarters
  - Translation between flight deck and mid-deck

## SEGMENT 2

### ORBITER DATA DOWNLINKS

#### OBJECTIVE:

Be able to state the names of the three Orbiter data downlinks, tell which downlink contains TV, and identify the data that is given up when TV is being downlinked.

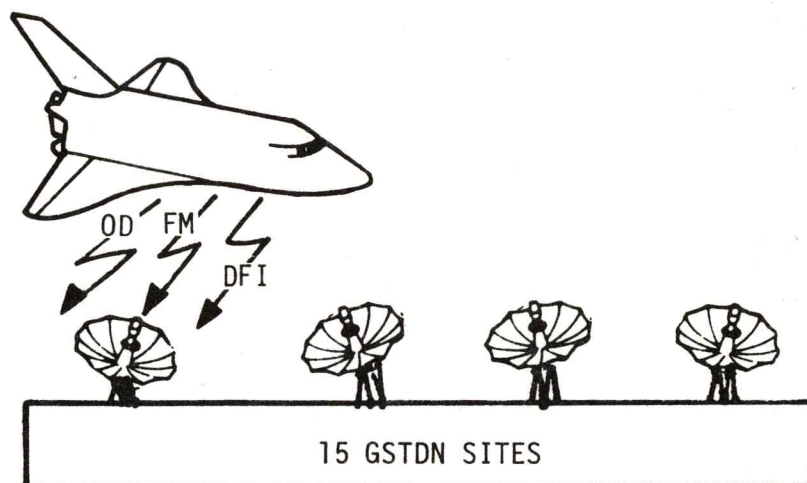
#### SUMMARY DATA:

##### ORBITER DATA DOWNLINKS

- FM WIDEBAND (WBD) DOWNLINK (TRANSMISSION ONE AT A TIME OF THE FOLLOWING):
  - TV (VIDEO)
  - ONBOARD ORBITER RECORDER DUMPS
  - REAL TIME (R/T) SPACE SHUTTLE MAIN ENGINE (SSME) DATA
  - R/T PAYLOAD DATA
- DEVELOPMENT FLIGHT INSTRUMENTATION (DFI)
  - PCM TELEMETRY
  - 15 SUBCARRIER CHANNELS ANALOG FLUTTER MEASUREMENTS
- OPERATIONAL DOWNLINK (OD)
  - OPERATIONAL INSTRUMENTATION
  - GENERAL-PURPOSE COMPUTER (GPC) DOWNLIST DATA
  - DIGITAL AIR-TO-GROUND (A/G) VOICE CHANNELS
  - PAYLOAD 'HOUSEKEEPING' DATA



## SUPPORTING DATA:



### FM-Wideband-Downlink (WBD)

The FM WBD downlink functions when line-of-sight exists between the Orbiter and remote sites. This link provides a single wideband channel for transmitting directly from the Orbiter to the GSTDN site (one at a time) R/T TV, onboard recorder dumps, R/T main engine data, and R/T payload data.

### Development Flight Instrumentation (DFI)

The DFI downlink is a result of a unique OFT package supplying additional engineering telemetry. The link will be received and recorded at the GSTDN sites for transfer to MCC after the mission.

### Orbiter Downlink (OD)

Of the three data links, the OD is termed operational because it is the only link providing Orbiter-to-MCC telemetry for use in real-time control and monitoring. The OD is discussed in detail in the Telemetry-Data-Flow-Workbook.

PRACTICE :

1. State the three Orbiter data downlinks.

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2. State the Orbiter downlink over which TV is transmitted.

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3. From the following list of downlink data, identify the data that is given up when TV is downlinked.

- ☐ Onboard Orbiter recorder dumps
- ☐ R/T SSME data
- ☐ R/T payload data
- ☐ PCM telemetry
- ☐ 15 subcarrier channels flutter measurement
- ☐ Operational instrumentation
- ☐ GPC 'downlist' data
- ☐ Digital A/G voice channels
- ☐ Payload 'housekeeping' data

PRACTICE FEEDBACK:

1. State the three orbiter data downlinks.

FM wideband downlink

Operational downlink

Development flight Instrumentation

2. State the orbiter downlink over which TV is transmitted.

FM wideband downlink

3. From the following list of downlink data, identify the data that is given when TV is downlinked.

✓ Onboard orbiter recorder dumps

✓ R/T SSME data

✓ R/T payload data

## SEGMENT 3

### GSTDN TV CAPABILITY

#### OBJECTIVE:

Be able to identify the sites that will have the capability to receive, record, and process TV signals for transmission to MCC.

#### INTRODUCTION:

Four Ground Spacecraft Tracking and Data Network (GSTDN) ground stations are designated for OFT-1. Each will have the capability to receive, record, and process TV signals. This segment identifies these GSTDN sites.

#### LEARNING MATERIAL:

GSTDN SITES THAT CAN RECEIVE, RECORD, AND PROCESS TV SIGNALS FOR TRANSMISSION TO MCC:

- MIL (MERRITT ISLAND)
- MAD (MADRID)
- GDS (GOLDSTONE)
- HAW (HAWAII)

#### SUPPORTING DATA:

The world map on the following page shows the location of the four S-band sites that can receive, record, and transmit TV signals.



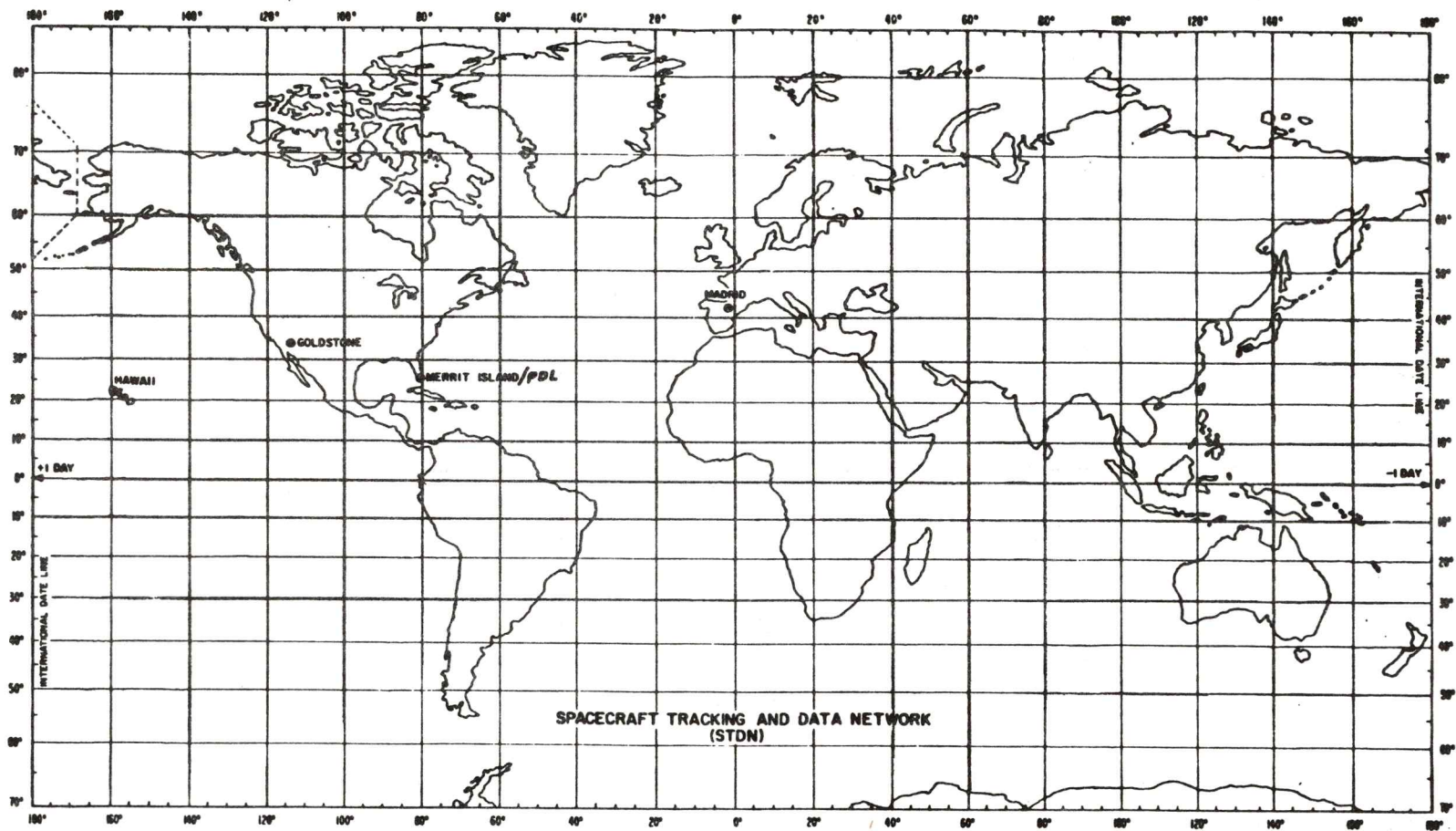


FIGURE 1-1 STDN STATION LOCATIONS

PRACTICE:

Given the following list of S-band GSTDN sites, identify the sites that can receive, record, and process TV signals for transmission to MCC.

BDA \_\_\_\_\_

MIL \_\_\_\_\_

MAD \_\_\_\_\_

IOS \_\_\_\_\_

AGO \_\_\_\_\_

GDS \_\_\_\_\_

HAW \_\_\_\_\_

BUC \_\_\_\_\_

PRACTICE FEEDBACK:

Given the following list of S-Band GSTDN sites, identify the sites that can receive, record, and process TV signals for transmission to MCC.

BDA \_\_\_\_\_

MIL \_\_\_\_\_ X \_\_\_\_\_

MAD \_\_\_\_\_ X \_\_\_\_\_

IOS \_\_\_\_\_

AGO \_\_\_\_\_

GDS \_\_\_\_\_ X \_\_\_\_\_

HAW \_\_\_\_\_ X \_\_\_\_\_

BUC \_\_\_\_\_

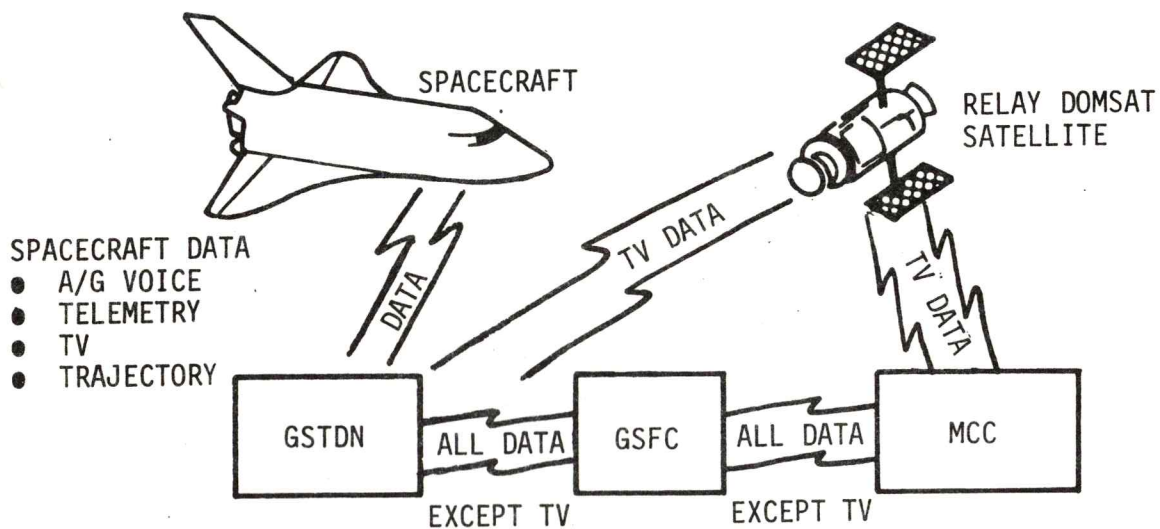
## PRELUDE

### Segments 4 and 5

Segments 4 and 5 discuss TV data flow from the Orbiter to MCC. In order to acquire a general overall picture, consider the following drawing. The drawing depicts a simplified picture of TV data flow from the Orbiter to MCC. A more detailed data flow drawing will be presented later.

Note that only TV data is transmitted directly from the GSTDN site to a relay satellite, then to MCC. Other data are transmitted from the GSTDN site through Goddard to MCC.

In addition to learning the TV data flow, you will also become familiar with the major functions of the TV subsystems onboard the Orbiter, at the GSTDN site, and at MCC.





## SEGMENT 4

### TV DATA FLOW

#### OBJECTIVE:

Be able to trace the flow of TV data from the orbiter to MCC on the STS Orbiter-to-MCC TV Data Flow drawing.

#### INTRODUCTION:

This segment is based on three data flow functional drawings. These drawings contain the major TV subsystems (along with A/G voice, telemetry, ranging, and command) onboard the Orbiter, at the GSTDN sites, and at MCC. This segment is designed to give you an overall picture of the TV data flow from the orbiter to MCC. A detailed discussion of the major subsystem functions will be given later.

#### LEARNING MATERIAL:

The drawings on pages 5-8, 5-9, and 5-10 are your Learning Material.

#### INSTRUCTIONS:

Turn to pages 5-8, 5-9, and 5-10. You will find three fold-out drawings entitled 'STS Orbiter-to-MCC TV Data Flow.' Detach the three drawings from the workbook and place them in front of you. You can connect these drawings so that a complete diagram from the Orbiter to MCC is depicted. Trace the flow of TV data through the TV subsystems as the flow is discussed in the Supporting Data section. Disregard the groups of functions inside the blocks at this time. They will be discussed in Segment 5. The actual tracing of the TV flow by you, as we go through the Supporting Data discussion, will be your exercise.

## SUPPORTING DATA:

### (ORBITER)

When a preselected inflight activity is ready for viewing at MCC, the INCO sends a command to select the camera that will televise that particular activity. This command signal\* is received in the General Process Computer (GPC). (Command signals can also be initiated at the crew station and at the Payload Handling Station.) The GPC sends the command to the Video-Control Unit (VCU) via Multiplexer/Demultiplexer (MDM) PF2. The VCU selects the TV camera, switches TV signals from the TV camera, combines A/G voice with the TV signal, and switches the composite signal of TV and A/G voice to the FM Signal Processor. The FM signal processor transfers the TV signal to the FM Transmitter. The FM transmitter frequency modulates the signal and transmits the signal to a GSTDN site (with TV capability) that is within the Orbiter's line-of-sight. The signal is transmitted over the FM wideband RF link.

### (GSTDN SITE)

The FM receiver at the GSTDN site receives the TV signal and transfers it to the Video Processing System (VPS) for processing and recording. After the VPS processes and records the signal, both TV and voice are transferred to leased commercial lines for transmission to MCC.

### (MCC)

The TV signal is received in the switching equipment at MCC. This equipment consists of the Land Line Interface (LLI) Patch and Distribution Switch and 525-Line TV Switch. The switching equipment transfers TV to the 525/945-Scan Converter, where the incoming 525-line black and white signal is converted to 945-line TV, and transferred to Video Tape Recorders (VTR) for recording.

After the signal has been converted to 945-line TV, it is made available to the flight controller consoles via the Video Switching Matrix (VSM). The switching equipment also switches incoming TV to Bldg. 8 for FS-to-NTSC (National Television Standards Committee) color conversion. Color TV can be viewed in MCC at the 525-line color TV display after color conversion in Bldg. 8.

\*Uplink command data flow is discussed in detail in the Command Data Flow Workbook, GND Command 2102.

## SEGMENT 5

### TV MAJOR SUBSYSTEMS

#### OBJECTIVE:

Be able to identify the major functions for each of the TV subsystems, given the TV Data Flow drawing and a list of subsystem functions.

#### INTRODUCTION:

In Segment 4, you traced the data flow through the TV subsystems. In this segment, the major functions of these subsystems will be discussed. The drawings that you used for Segment 6 will be required for this segment.

#### LEARNING MATERIAL:

The drawings on pages 5-8, 5-9, and 5-10 are your Learning Material.

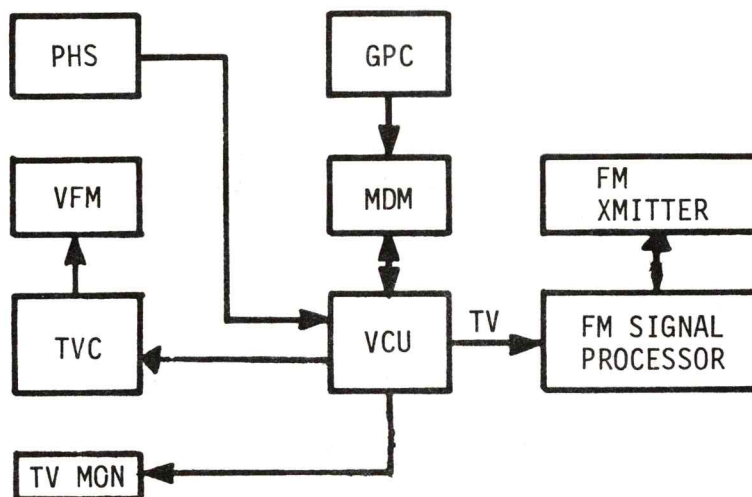
#### INSTRUCTIONS:

For this segment, you should use the fold-out drawings that you used in Segment 4. You are only expected to learn the highlighted blocks (the blocks with the groups of functions inside). You are not required to learn those blocks that are shaded, or words inside the blocks that are bracketed. They are included only to provide a comprehensive data flow with interfaces. Their functions and contents will be covered in other lessons. Also, you are not expected to memorize all the functions of each subsystem. You should, however, familiarize yourself with the functions, so that, given a group of functions, you can match them to the appropriate subsystem. Start as before with the General Purpose Process Computer (GPC) onboard the Orbiter.



## SUPPORTING DATA:

### ORBITER



- General Process Computer (GPC)

The GPC accepts uplink commands initiated by the INCO, the crew and/or the PHS, and outputs these commands to various MDM's. A more detailed discussion of the GPC can be found in the Command Data Flow Workbook.

- Multiplexer/Demultiplexer (MDM) PF2

This MDM routes the uplink TV command to the Video Control Unit (VCU)

- Video Control Unit (VCU)

The VCU consists of a Remote Control Unit (RCU) and a Video Switching Unit (VSU). The RCU provides a stable sync source for the TV cameras, combines TV signal and A/G voice signal, and routes the composite signal to the VSU.

The VSU switches the composite signal to the S-band signal processor.

- TV Cameras (TVC)

The TVC's are used for televising selected Orbiter activities. Eight TVC's comprise the Space Shuttle operational closed circuit TV system.

They are:

- (1) Flight deck camera
- (2) Mid-deck camera
- (3) Aft payload bay camera
- (4) Port manipulator camera
- (5) Keel camera
- (6) STBD manipulator camera
- (7) Forward payload bay camera
- (8) Payload camera

- TV Monitors

TV monitors are used by the crew for viewing televised flight activities.

- View Finder Monitors (VFM)

These are small TV monitors used by the crew in setting up the TV cameras when televising activities.

- S-Band Signal Processor

The S-band signal processor accepts, processes, and selects for FM transmission, (one at a time) TV (video data), playbacks (operational recorder dumps) and digital data.

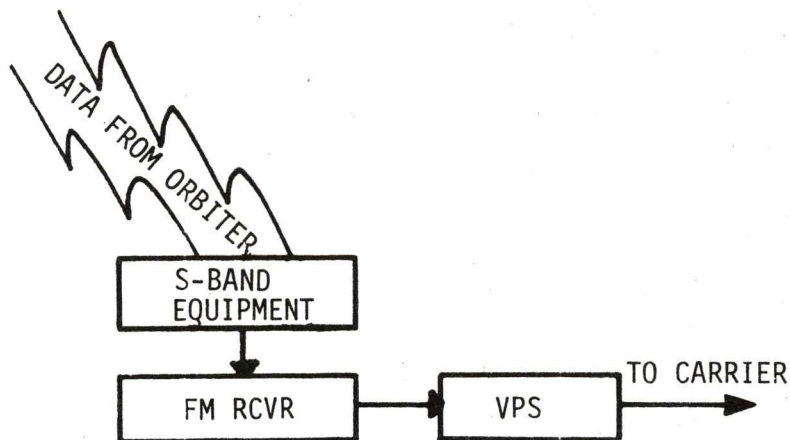
- FM Transmitter

The FM Transmitter frequency modulates the signal received from the S-band signal processor for transmission (via the FM antennas) to the GSTDN sites.

- S-Band Combiner

The S-band combiner is a device which provides for two FM downlink transmissions simultaneously.





- S-Band Equipment

The S-band equipment consists of the antennas, their associated servo-drive systems, acquisition tracking systems, and amplifiers. This equipment acquires, amplifies, and converts the Orbiter S-band signal for distribution to the FM and PM receivers.

- FM Receiver

The FM receiver recovers the carrier modulating signal and demodulates the WBD link. This link carries (one at a time) main engine data, TV, payload, and onboard OD recorder dumps.

- Video Processing System (VPS)

The VPS regenerates the synchronization signals (such as frame, color, vertical, and horizontal) for the incoming TV signal. It monitors TV quality and adds ground Vertical Interval Test Signals (VITS)\* to the signal for downlink. Video recorders within the VPS record the TV signal, along with a mixture of the uplink and downlink voice that is associated with the televised activity.

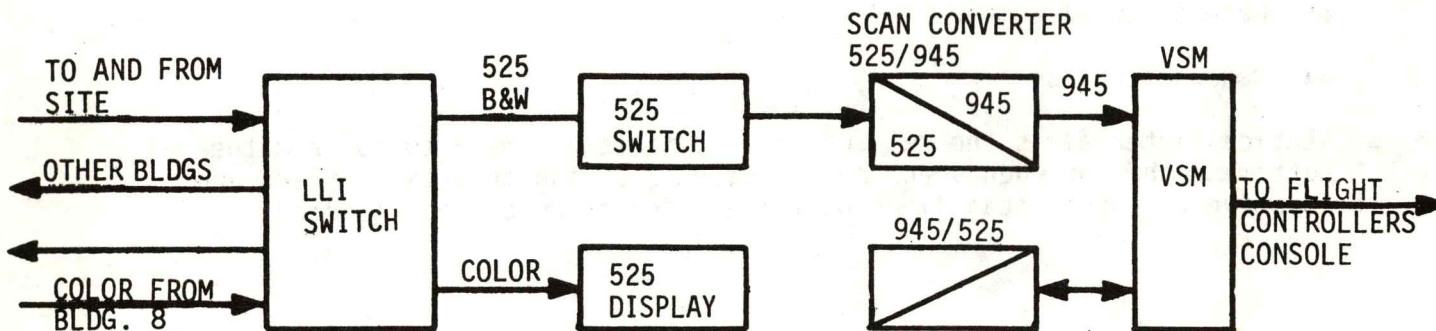
After processing the TV (video) signal, the VPS feeds it to common carriers (leased commercial television circuits) for transmission to MCC.

\* VITS are test and information signals inserted in the vertical interval of the TV signal. This describes certain features and characteristics about the transmission line. Included in this information are

- Frequency response pulse signal
- Sine square pulse parameters
- Temperature pulse

- Greenwich Mean Time (GMT)
- Gain and rise time
- Camera serial number
- Camera location
- Vertical interval is the retrace time it takes a camera to go from the bottom to the top when scanning a picture. During this time, there are inactive or unused scan lines on which information can be inserted.

## MCC



- Switching Equipment

- Land Line Interface (LLI) Switch

TV is received at MCC through the LLI. The LLI switches TV signals to and from external user sites including other JSC buildings, JSC management, the press room, and others.

- 525 Line TV Switch

The 525-Line TV switch distributes incoming black and white 525 LSR TV signals to the scan converters, and distributes outgoing color 525 LSR to the LLI for distribution to external users and to the 525 TV display.

- Video Tape Recorders (VTR)

The VTR records and plays back incoming TV signals, plus the uplink and downlink A/G-1 voice channel that is associated with the televised flight activity being recorded.

- 525 Color TV Display

Both the Public Affairs Officer (PAO) and the INCO will have 945, and 525 TV display on their consoles for viewing Orbiter TV data.

- Scan Converters

- 525/945 Scan Converter

This scan converter converts incoming 525 LSR TV signals to 945 LSR TV signals for display on flight controller consoles.

●● 945/525 Scan Converter

This scan converter converts 945-line TV to 525-line TV.

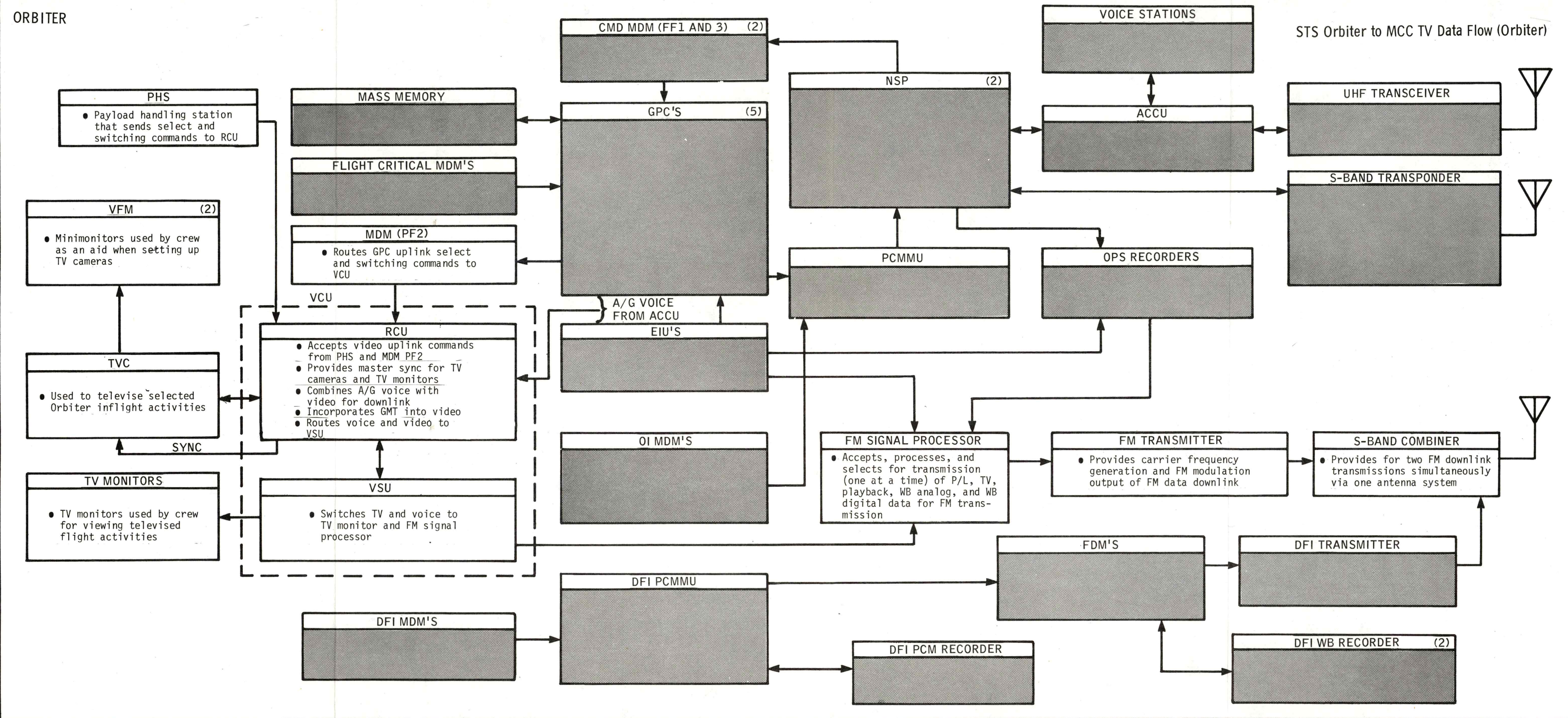
● Video Switching Matrix (VSM)

The VSM makes black and white 945-line TV available to the flight controller consoles for viewing.



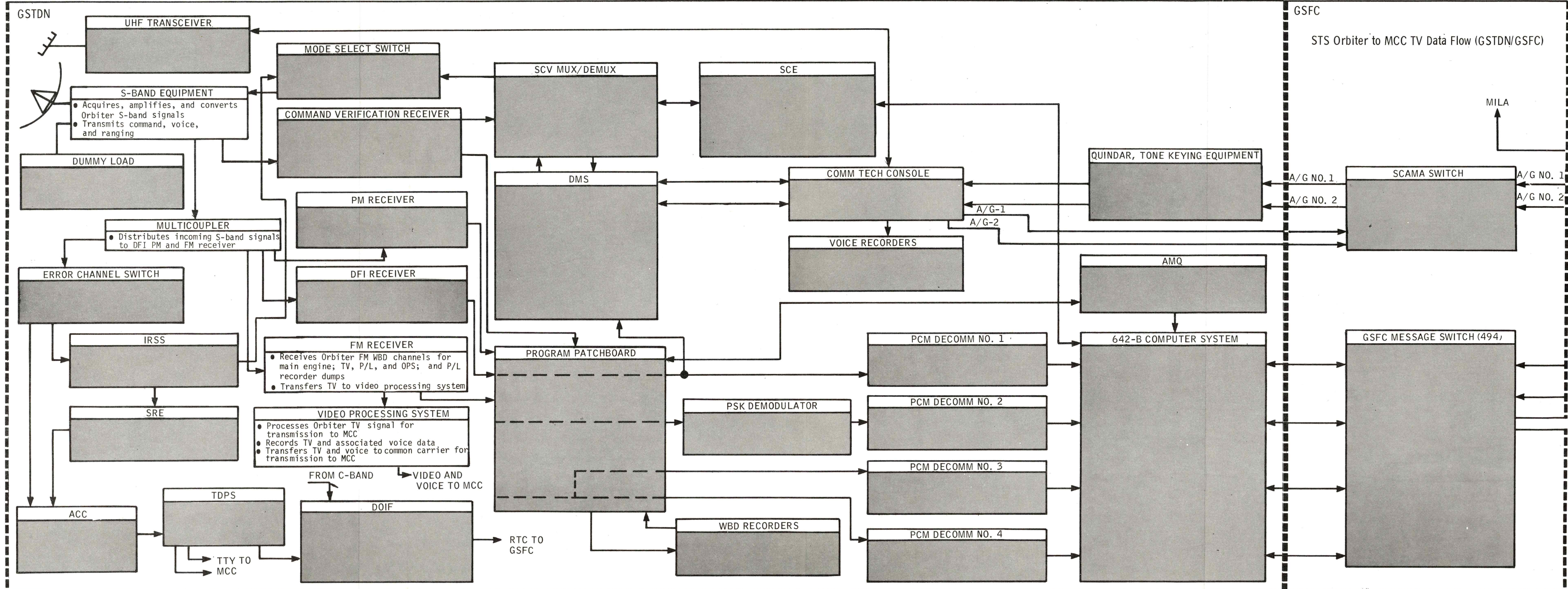
# Learning Material

ORBITER



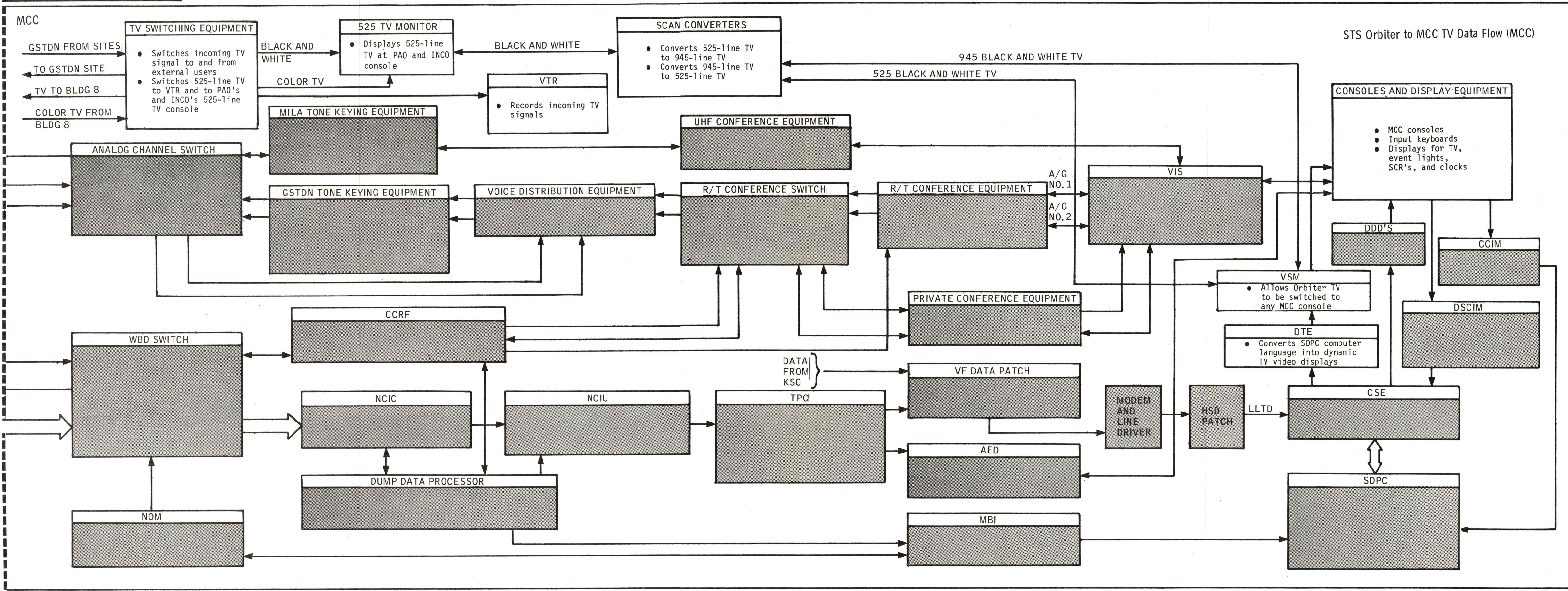


# Learning Material





# Learning Material





PRACTICE:

I. Match the functional group descriptions listed below to the blank STS Orbiter-to-MCC TV Data Flow drawing provided on the following page.

ORBITER

A.

- Provides for two simultaneous FM downlink transmissions via one antenna system

B.

- Provides carrier frequency generation and FM modulation output of FM data downlink

C.

- Payload handling station that sends select and switching commands to RCU

D.

- TV monitor used by the crew for viewing televised flight activities

E.

- Used to televise selected orbiter inflight activities

F.

- Accepts video uplink commands from PHS and MDM PF2
- Provides master sync for TV cameras and TV monitors
- Combines A/G voice with video for downlink
- Incorporates GMT into video

G.

- Mini-monitors used by the crew when setting up TV cameras

H.

- Switches TV and voice to S-band signal processor

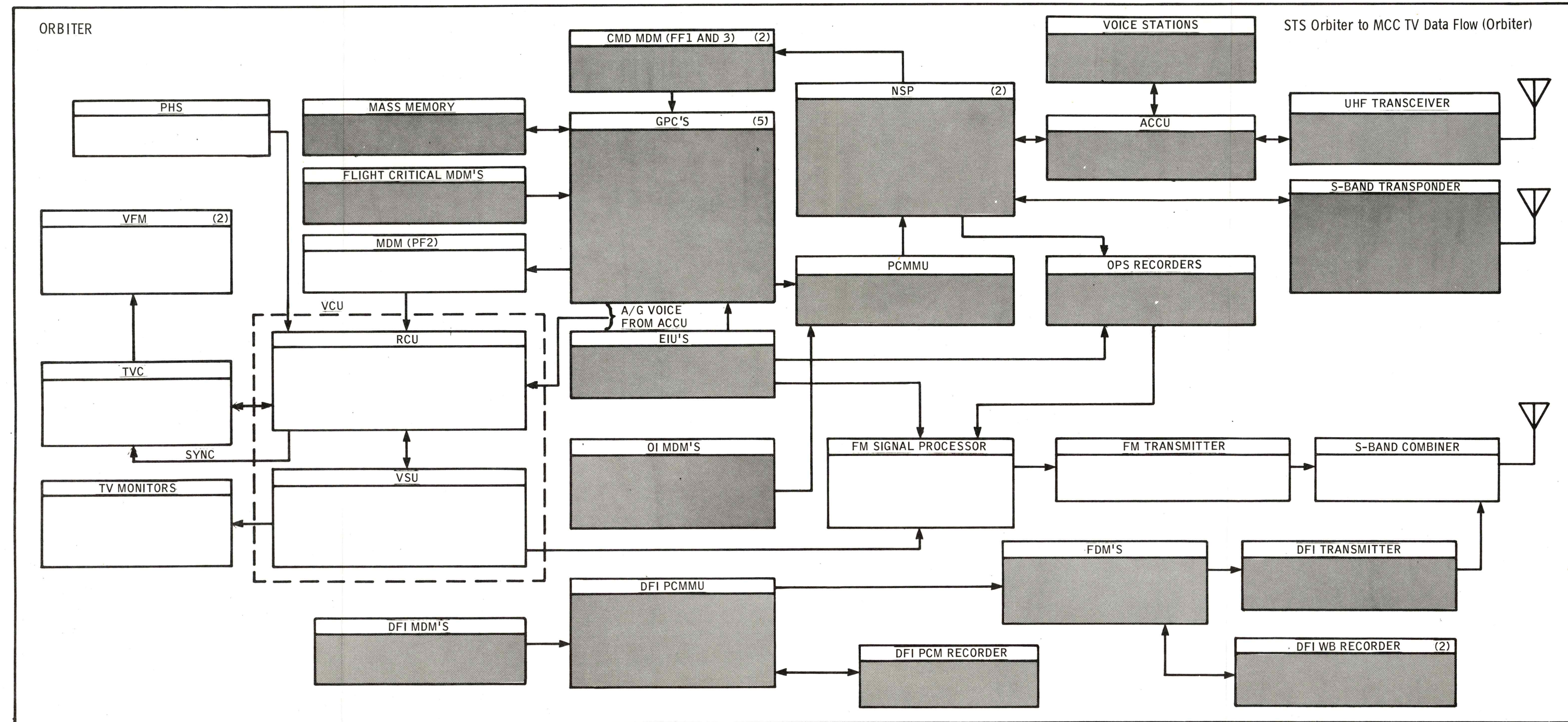
I.

- Routes GPC uplink select and switching command to VCU.

J.

- Accepts, processes, and selects for transmission (one at a time) TV, playback, WB analog and WB digital data for FM transmission







PRACTICE FEEDBACK:

Compare your answers with the orbiter TV data flow drawing in your Learning Material.



PRACTICE:

II. Match the functional group descriptions listed below to the blank STS Orbiter-to-MCC TV data flow drawing on the following page.

GSTDN Site

A.

- Processes Orbiter TV signal for transmission to MCC
- Records TV and uplink and downlink A/G voice
- Transfers TV and voice to common carrier for transmission to MCC

B.

- Distributes incoming S-band signals to the PM and FM receivers

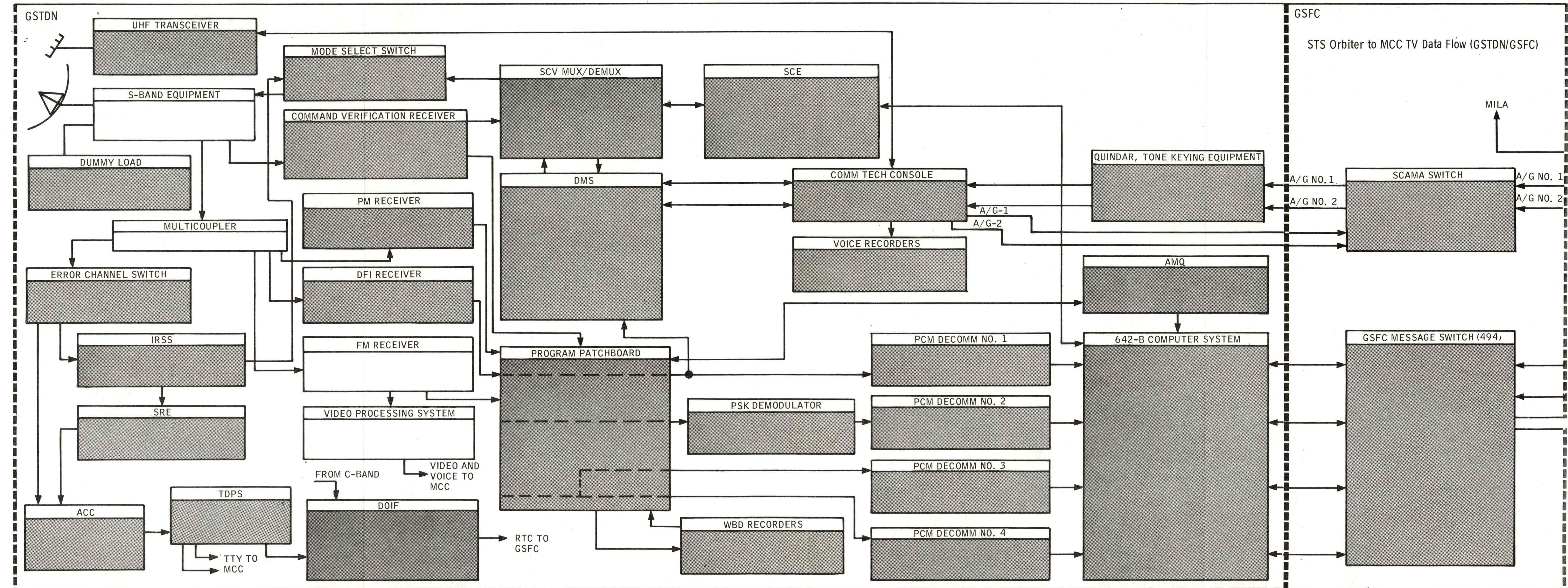
C.

- Acquires, amplifies, and converts Orbiter S-band signals
- Transmits (command), voice, and (ranging).

D.

- Receives Orbiter FM WBD channels for main engine; TV, P/L, and OPS and P/L recorder dumps







PRACTICE FEEDBACK:

Compare your answers with the GSTDN/GSFC TV data flow diagram in your Learning Material.

PRACTICE:

III. Match the functional group descriptions listed below to the blank STS Orbiter-to-MCC TV data flow drawing provided on the following page.

MCC

A.

- Converts 525-line TV to 945-line TV
- Converts 945-line TV to 525-line TV

B.

- Switches incoming TV signal to and from external users.
- Switches 525-line TV to VTR, and to PAO and INCO 525-line TV consoles

C.

- Records incoming TV signal

D.

- Displays 525-line TV at PAO and INCO consoles

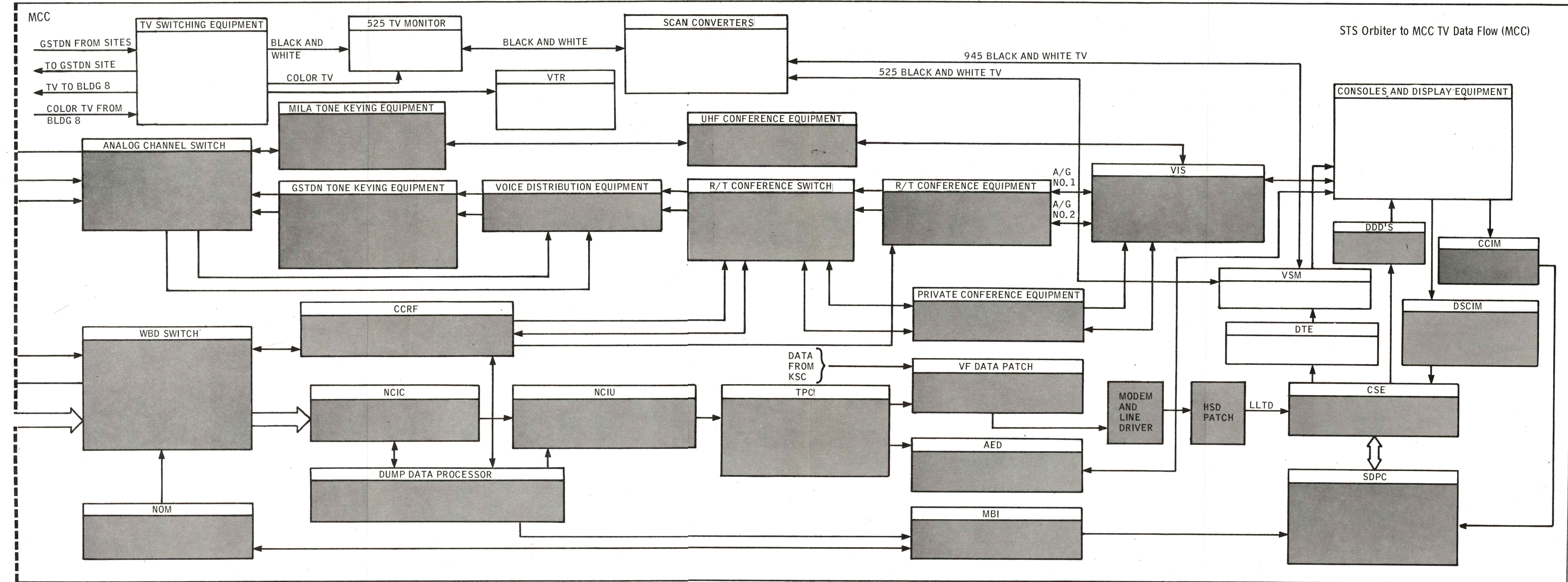
E.

- Converts SDPC computer language into dynamic TV video displays

F.

- Allows Orbiter TV to be switched to any MCC console.







PRACTICE FEEDBACK:

Compare your answers with the MCC TV data flow drawing in your Learning Material.

## LESSON SUMMARY

At this point you should know the following:

- Types of televised flight activities
- GSTDN sites with TV receive, record, and process capability
- The Orbiter downlink for TV transmission
- The flow of TV from the Orbiter to MCC
- Functions of the major TV subsystems

Future editions of this workbook will include the TDRSS and payloads.

If you do not feel that you understand the contents of this lesson, you should review those areas of concern.

## APPENDIX A

### ABBREVIATIONS AND ACRONYMS

A/G	Air-to-Ground
CVPU	Consolidated Video Processing Unit
DFI	Development Flight Instrumentation
ETC	Engineering Training Center (Edwards, Greenbelt, Maryland)
GDS	Goldstone (GSTDN Site)
GPC	General Purpose Computer
GSFC	Goddard Spaceflight Center
GSTDN	Ground Spacecraft Tracking Data Network
HAW	Hawaii (GSTDN Site)
INCO	Instrumentation and Communications Officer
LLI	Land Line Interface
LSR	Line Scan Rate
MAD	Madrid (GSTDN Site)
MCC	Mission Control Center
MDM	Multiplexer/Demultiplexer
MIL	Merritt Island, (GSTDN Site)
NTSC	National Television Standards Committee
OD	Operational Downlink
OPS	Operations
PAO	Public Affairs Officer
P/L	Payload
PHS	Payload Handling Station
RCU	Remote Control Unit
R/T	Real Time
SSME	Space Shuttle Main Engine
SYNC	Synchronizations
TDRSS	Tracking and Data Relay Satellite System
TVC	Television Camera
VFM	View Finder Monitor
VITS	Vertical Interval Test Signal
VPS	Video Processing System
VSM	Video Switching Matrix
VTR	Video Tape Recorder
WBD	Wideband Data

APPENDIX B

LESSON CRITIQUE SHEET

LESSON CODE GND TV 2102A

DATE OF HANDOUT 3-21-79

Please explain any negative answers to the questions below in specific terms.  
Use the back of the sheet if required.

1. Was the lesson material presented in a logical manner?
2. Comments on handout organization:
3. Were the figures and diagrams optimum to understanding the material?
4. Did the lesson start from your entry level?
5. In your opinion, was the level of detail about right?
6. Additions or deletions form the lesson?
7. Prior Knowledge: Considerable \_\_\_\_\_ Some \_\_\_\_\_ Very Little \_\_\_\_\_
8. Other comments:

MAIL TO: CG3/TRAINING COORDINATOR



MAIL TO: CG3/TRAINING COORDINATOR

WORKBOOK TRAINING REPORT

INSTRUCTIONS:

When you have completed this lesson, please fill this sheet out and return it to the Training Coordinator (CG3) in order to have completion entered on your record.

STUDENT

STUDENT NAME

MAIL CODE

LAST NAME

INITIALS

1	2	3

6	7	8	9	10	11	12	13	14	15	16	17	18				

20	21

LESSON CODE

ALPHA

G	N	D		T	V			
25	26	27	28	29	30	31	32	33

NUMERIC

2	1	0	2
37	38	39	40

A
41

ENTER TIME TO COMPLETE THIS LESSON

	:		
47	48	49	50

HR:MIN

DATE COMPLETED (M/D/Y)

		/			/		
52	53	54	55	56	57	58	59

WORKBOOK DATE (M/D/Y)

0	3	/	2	1	/	7	9
61	62	63	64	65	66	67	68

I certify that I have completed the above described lesson

STUDENT SIGNATURE

KH/78/001 27 NOV