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Electronics Documentation
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Now that the first front ends and modules for the VLBA are being completed and tested, it is time to consider the detailed documentation of the VLBA electronics. This documentation should largely follow the system used for the VLA, which is outlined in VLA Electronics Report No. 31 and an unnumbered VLA Electronics memorandum written by me in September 1974: the latter is now superceded by this memorandum. For each type of module or other unit a drawing package and a descriptive manual is required, as outlined below.

The drawing package should contain all of the drawings required for reproduction of the unit. These include schematic diagrams, circuit diagrams, artwork for printed circuit boards, wiring lists for wirewrap boards, drawings of mechanical parts, assembly drawings and bills of materials (parts lists). Each drawing or list will be assigned a number by the VLBA drawing office, and original copies of all drawings should be filed in that location. In cases where the same part is used in more than one type of unit, the same drawing number is common to each drawing list.

The manual for each module should contain the information required for testing and adjustment of a module when first constructed, and for subsequent troubleshooting. The following is a suggested layout for a manual: the relative importance of different sections will depend upon the type of unit being described.

1. Table of Contents
2. List of Related Materials
 - (a) Drawing list (with drawing numbers)
 - (b) Specifications
 - (c) Related material such as VLBA electronics memoranda, etc.
3. General Description

This should begin with a brief explanation of the purpose of the unit, although this may be omitted for such things as front ends and power supplies to which the purpose is obvious. It can also include a block diagram, and a brief description of controls, operation, etc.

4. **Theory of Operation**
This should include schematic diagrams, and descriptions of the design and operation of any special subsystems.
5. **Circuit Details**
Circuit diagrams and descriptions of special components should be included. For example, the function of components included for temperature compensation may not be obvious from the circuit diagrams alone, and should be described.
6. **Front-Panel Controls and Indicators**
These should be described unless they are obvious or non-existent.
7. **Input and Output Connections and Power Levels**
Frequencies and levels of input and output signals should be given, including both optimum values and tolerable ranges. The corresponding connector pins should be identified. For waveguide flanges, gas- or vacuum-line connections, etc., mechanical specifications or drawings should be referred to. Power supply voltages and maximum current levels should also be specified.
8. **Addresses and Bit Assignments**
These should be listed for all control and monitor functions.
9. **Test and Adjustment Procedures**
Drawings or photographs of waveforms, spectrum analyzer displays, etc. should be included, where helpful.
10. **Replacement Instructions**
Basic instructions for replacement of a faulty unit with a new one from the array maintenance center should be given. These should be as simple as possible since they may have to be used by a person with minimal electronic training.
11. **Reference Material**
 - (a) Bill of materials for the unit.
 - (b) Data sheets (for all special subunits and for all integrated circuits except those most commonly used.)

A date and revision number should be given with the manual title on the front page, so that outdated versions can be readily identified.

In cases where several types of units perform similar functions, such as front ends or converter units for different frequency bands, it may be simplest to cover a number of them in a single manual. Tables giving parameters for different frequency bands and a separate drawing list for each type of unit should be included. Any special parts or adjustment procedures applicable to particular units should be fully described.