28 November 1983

TO: VLBA Acquisition Group

FROM: Alan E. E. Rogers

SUBJECT: Proposed Video Converter Block Diagram

1]   FRONT PANEL

In order to reduce cost I suggest that local front panel control switches are not necessary. All control would come from a resident microprocessor which in turn receives commands from the monitor and control bus. During checkout, any control more sofisticated than the local defaults would have to oome from a simple monitor control bus simulator. It might not be too expensive to provide a LCD to display the functions selected and the total (or synchronous) power.

2]   SYNCHRONOUS DETECTION

If a signal/reference control line is provided at a relatively low rate (say odd/even seconds) it would be quite easy for the resident microprocessor to perform cumulative differences between the total power counts.

3]   GAIN CONTROL

The most flexible way of leveling the video outputs to the digitizers in the formatter is to provide gain control via the local resident microprocessor. The microprocessor can set the gain (via D/A converter to analog gain control) based upon the counter vaules.
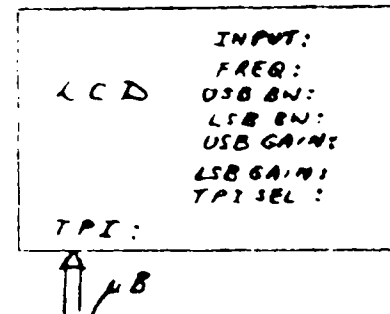
4]   SUGGESTED MONITOR/CONTROL
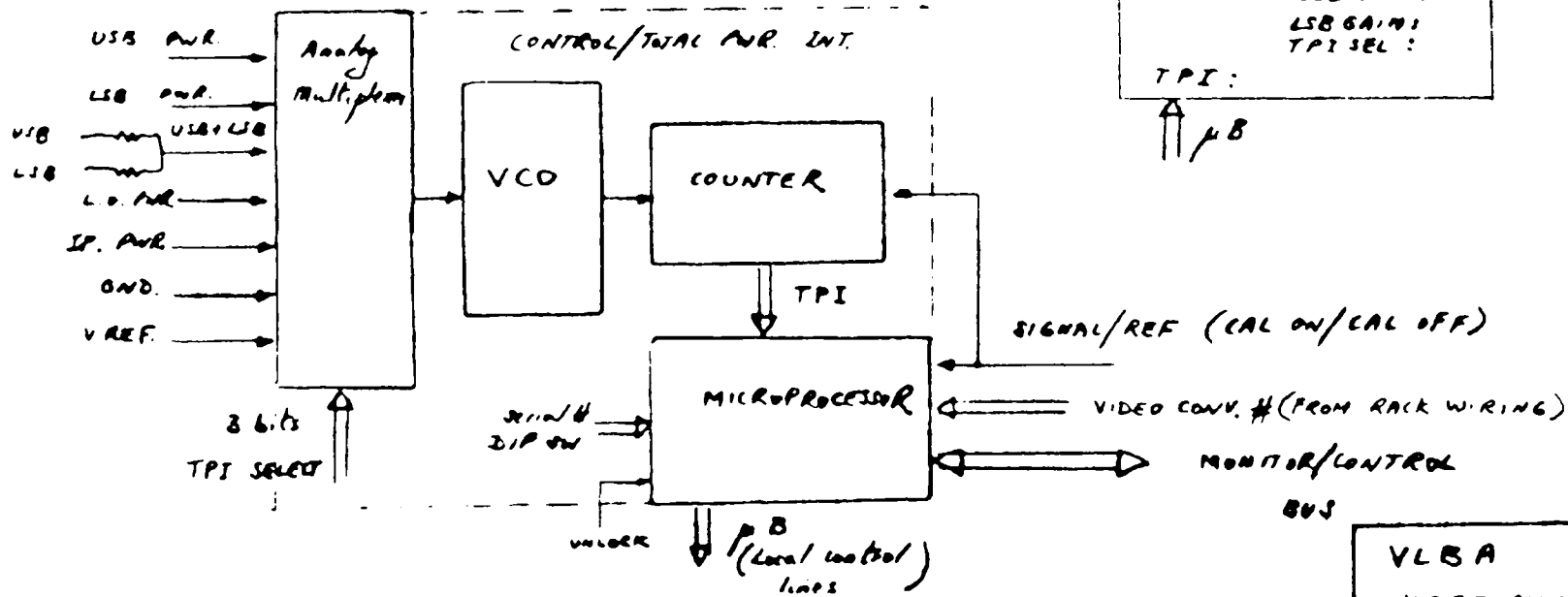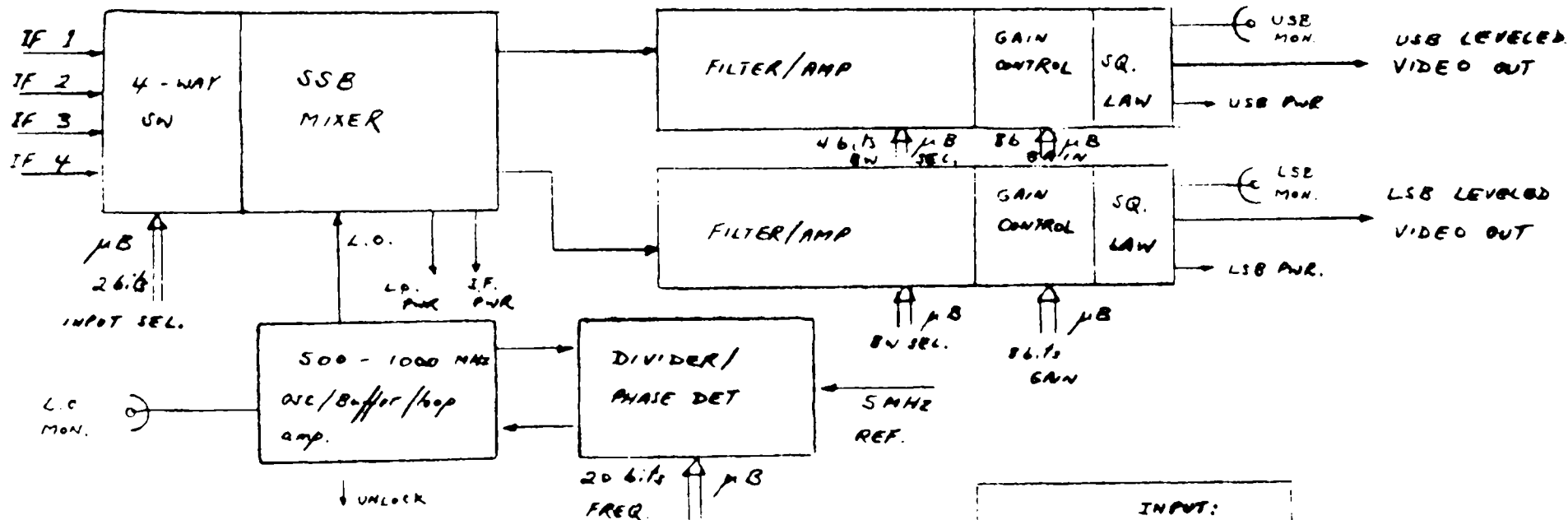
NAME	# BITS	CONTROL	MONITOR
IF input select	2	Y	Y
Frequency	20	Y	Y
L.O. Unlock	1	N	Y
USB Bandwidth	4	Y	Y
LSB Bandwidth	4	Y	Y
USB Gain	8	Y	Y

LSB Gain	8	Y	Y
TPI input select	3	Y	Y
TPI for last reference period	16	N	Y
TPI for last signal period	16	N	Y
TPI average for reference	16	N	Y
TPI average for signal	16	N	Y
TPI (signal-reference)	16	N	Y
Reset running averages	1	Y	N
Number TPI cycles since last reset	16	N	Y
Auto-level on/off	1	Y	Y
Serial Number	16	N	Y

5] AUTO-LEVEL

The simplest auto-level scheme would be to adjust the gains at the end of the reference cycle. When USB power is selected only the USB gain would be controlled. When USB+LSB is selected both USB and LSB gains would be controlled on the assumption that they should be equal (calibration constants being stored if needed).

IF 1
IF 2
IF 3
IF 4

4-WAY SW

SSB MIXER

FILTER/AMP | GAIN CONTROL | SQ. LAW
USB MON.
USB LEVELED VIDEO OUT
USB PWR

√ 6.15 BW SEL, μB | B6 GAIN μB

FILTER/AMP | GAIN CONTROL | SQ. LAW
LSB MON.
LSB LEVELED VIDEO OUT
LSB PWR

μB
26.15
INPUT SEL.

L.O.

L.O. PWR   I.F. PWR

500 - 1000 MHz OSC/Buffer/loop amp.

DIVIDER/PHASE DET

5 MHz REF.

BW SEL.   μB   B6.15 GAIN   μB

L.C. MON.

↓ UNLOCK

20 bits μB FREQ.

LCD
INPUT:
FREQ:
USB BW:
LSB BW:
USB GAIN:
LSB GAIN:
TPI SEL:
TPI:
μB

USB PWR.
LSB PWR.
USB
LSB   USB+LSB
L.O. PWR.
IF. PWR.
GND.
V REF.

Analog Multiplexer

CONTROL/TOTAL PWR. INT.

VCO

COUNTER

TPI

SIGNAL/REF (CAL ON/CAL OFF)

MICROPROCESSOR

serial/4 DIP SW

VIDEO CONV. # (FROM RACK WIRING)

MONITOR/CONTROL BUS

3 bits
TPI SELECT

UNLOCK

μB (Local control) leds

VLBA
VIDEO CONVERTER
BLOCK DIAGRAM
AIR   Nov 83