NV5000 Universal Sync Generator

Operations Manual

NVISION®

Manual Part Number: MN5000-00

Printing History

Model NV5000 Manual, Edition 1
Printed in the U.S.A.

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As of November 1st, 1997

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Effective January 1, 1994

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CHAPTER 1: INTRODUCTION

1.1 MANUAL DESCRIPTION

This manual describes the function and operation of the NVISION NV5000 Universal Sync Generator (NV5000). System configurations, operations, and interface procedures for a variety of applications are covered.

The NV5000 manual is divided into six (6) chapters as follows:

Chapter 1, "Introduction", summarizes the manual.

Chapter 2, "System Description", describes system function, specifications, composition, and configuration for a number of different applications. Principles of operation and procedures for set up and interconnection of the NV5000 with other systems are described. Illustrations are included as needed.

Chapter 3, "Installation", describes the various procedures required to install the NV5000 and cabling of the input and output signals and data streams.

Chapter 4, "Maintenance and Troubleshooting", provides maintenance guidelines and a step-by-step method of diagnosing any difficulties you may encounter with the NV5000.

Chapter 5, "Frame and Power Supply", provides a detailed technical description of the Frame (FR5001-00) and Power Supply (PS4001-00).

Chapter 6, "Technical Description", provides a general technical description of the NV5000. Schematics and component location drawings are included.

"Glossary", includes definitions of all technical terms used in this manual.

"Index", provides a thorough guide to all subjects within the NV5000 Operations Manual.

CHAPTER 2: SYSTEM DESCRIPTION

2.1 OVERVIEW

The NV5000 generates NTSC, PAL, and digital audio synchronization signals locked to a common reference frequency. NTSC 75% color bars or black burst, PAL 100% color bars or black burst, 48 kHz AES and SDIF-2 word clock, 44.1 kHz AES and SDIF-2 word clock and 44.056 kHz AES and SDIF-2 word clock are all generated from a single time base. This virtually guarantees that all video and audio equipment in a facility can be synchronized, eliminating the pops and clicks associated with sample slips due to unlocked digital audio sample rates. It provides for direct digital audio dubs between NTSC and PAL referenced VTRs and DTVRs as well as video locked audio mixers and RDATs.

The NV5000 can lock to a 5 MHz atomic reference, an NTSC video input or a PAL video input. When no input is present, it utilizes an ultra-stable ovenized crystal oscillator for its master time base. A 5 MHz output is provided for locking external devices to the internal ovenized oscillator.

The NV5000 is intended to function as the master time base reference for the plant. Subsequent downstream generators are intended to lock to the NV5000 as their master frequency reference and then utilize their own internal gen-lock capabilities to fine tune the timing at each video or audio equipment node.

The NV5000 is designed to be installed and operated with minimal effort. The input and output connections are all made with industry standard BNC and XLR type connectors. The product, once installed should operate continuously with minimal operator intervention.

2.2 FEATURES

The NV5000 generates both PAL and NTSC video simultaneously and locked to the same time base. The internal time base can be locked to either an NTSC video input, a PAL video input or a 5 MHz rubidium or cesium beam reference. If no input reference is used, an internal ovenized oscillator provides the common time base. Generating the PAL and NTSC signals locked to the same reference insures that digital audio sample rates generated by equipment locked to video will be frequency locked. This prevents the annoying and undesirable clicks caused by dropped frames of digital audio when sample rates are not identical. Each video signal type has 4 independent outputs. These outputs are front panel selectable between bars or burst. PAL bars are 100% modulated and NTSC bars are 75% modulated.

The internal 5 MHz signal is also provided as an output for locking additional external devices to the master time base. The stability of the internal oscillator is 0.25 ppm. This is in excess of almost any requirement for either NTSC or PAL sub-carrier frequency or AES/EBU synchronization.

AES/EBU digital audio synchronization signals are also generated. Effective sample rates of 48 kHz, 44.1 kHz and 44.056 kHz are provided. Each output is capable of being independently configured as digital silence or tone. The tone may further be configured as being either 1 kHz or 500 Hz and Full Scale digital level or -20 dB referred to full scale.

The 44.056 generator actually provides a 999Hz or 499.5 Hz tone.

Also, 2 outputs of each digital audio sample rate are available in the SDIF-2 word clock format.

All connections are made with BNCs except the AES signals which use Male XLRs. All connections are located at the rear of the frame. All signal format selections are made at the front of the frame with clearly marked, illuminated switches.

Front panel indication is also provided for input reference type and lock status.

The NV5000 requires 1 rack unit of space and less than 25 watts of power. The Frame and Power Supply are UL listed.

2.3 SYSTEM DESCRIPTION

The green power LED on the front panel is on as long as the power supply is operational and the line cord is plugged in. There is no ON/OFF switch. The NV5000 is designed to run continuously after installation and power plug connection.

If an external input is present, either the Video Reference LED or the Atomic Reference LED will be illuminated depending upon what type of input is applied. Atomic inputs should be 5 MHz sine or square waves with a 50 ohm source impedance. Sine waves may have a signal level of 1 volt rms or larger and square waves may have logic levels ranging from 1 Volt peak to peak to full CMOS levels. Video should be a standard 1 Volt peak to peak signal. A built in 75 ohm termination is integrated into the electronics. Determination of PAL or NTSC video format is made automatically. Once the input reference has been acquired by an internal phase locked loop circuit, the output signal time base will be stable and accurate to the specifications of the external input. The fact that the input loop has acquired lock is indicated by the steady state of the green LED labeled Lock. During acquisition, it is possible for the green lock LED to blink on and off until lock is acquired. Input reference signals should be accurate to ± 5 ppm.

If no external reference is applied, the internal ovenized oscillator is used as the master time base. The green Free Run LED will be illuminated and the two external reference LEDs and the lock LED discussed above will be off. The internal ovenized oscillator requires 10 to 20 minutes to reach thermal equilibrium and the stated stability of ± 0.25 ppm.

The two video outputs are generated from the common reference clock. The subcarrier frequency is digitally synthesized with 32 bit resolution to guarantee exceptional frequency accuracy for either NTSC or PAL operation. Each video output is digitally generated, converted to analog, and then lowpass filtered before being buffered by 4 individual output amplifiers. 4 outputs of each video type provide ample fanout. Individual amplifiers preserve channel isolation for long runs with many distributed loads. All outputs are voltage mode with a 75 ohm source impedance.

The video output may be selected as either bars or black burst for each video type. For NTSC, the bars are 75% modulated, for PAL the bars are 100% modulated. Selection between bars or black burst is made on the front panel with shadow switches. The green LED indicates bars and the yellow LED indicates black burst. One switch each is provided and labeled for NTSC and PAL.

Each AES/EBU digital audio output is actually a bi-phase serial data stream running 64 times the nominal audio sample rate. For example, if the sample rate is 48 kHz, the nominal data rate is 3.072 Mb/s. The content of each serial data stream is controlled by three shadow switches. The first switch is labeled TONE. If the green LED is on, a tone is generated, if off, digital silence is generated. The second switch selects a nominal frequency of either 1.0 kHz or 500 Hz. The green LED is 1.0 kHz and the yellow 500 Hz. The third switch controls the amplitude. The green LED indicates that the output is full scale digital, FS, the yellow LED indicates that the output is 20 dB below full scale, -20 dBFS. The switch function is identical for all three output rates of 48 kHz, 44.1 kHz or 44.056 kHz. One AES/EBU output is provided in accordance with the AES/EBU specifications for each audio sample frequency.

The SDIF-2 word clocks are TTL level square waves capable of driving 75 ohms. These are generated continuously and without options.

The NV5000 system is designed to "plug and play". There are no jumpers or set up option switches required for operation.

2.4 SYSTEM COMPONENTS

The NV5000 is a single rack unit frame that is entirely self contained. There are no user-serviceable parts in the unit, short of potential software upgrades. Each NV5000 consists of 4 pieces; an FR5001-00 frame, a PS4001-00 power supply, an EM5000 main board assembly, and an EM0028-00 Interconnect Panel. This assembly should be removed by qualified service personnel only.

2.5 SYSTEM CONFIGURATION EXAMPLES

The NV5000 internal time base can be configured for 4 different modes of operation.

1 FREE RUN: No reference input is applied. The unit will stabilize to ±0.25 ppm within 10 to 20 minutes. The green FREE RUN LED will be illuminated.

2 ATOMIC: Either a 5 MHz cesium beam referred output or a 5 MHz rubidium referred output is applied to the ATOMIC input on the rear of the frame. The NV5000 will lock to this master clock. The green ATOMIC REF. LED will be illuminated and the green LOCK LED will stop flashing once lock is obtained.

3 NTSC: NTSC video is applied to the VIDEO input on the rear of the frame. The NV5000 will lock to this master clock. The green VIDEO REF. LED will be illuminated and the green LOCK LED will stop flashing once lock is obtained.

4 PAL: is applied to the VIDEO input on the rear of the frame. The NV5000 will lock to this master clock. The green VIDEO REF. LED will be illuminated and the green LOCK LED will stop flashing once lock is obtained.

The NV5000 will automatically differentiate between PAL or NTSC video input formats.

2.6 APPLICATIONS

The NV5000 is used whenever it is required to synchronize the digital audio sample rates of equipment which derive their time base information from a video source. In particular, the NV5000 makes it possible to perform direct digital dubs between PAL, NTSC, RDAT, and other pieces of digital audio equipment.

Figure 2.6.1 shows two DVTRs, one PAL the other NTSC, locked to their respective video references from the NV5000. The AES signals can now be directly connected between the two machines resulting in a click free digital audio dub at a 48 kHz sample rate.

Any piece of audio equipment which locks to video and runs at a 48 kHz sample rate, can now be use used in an integrated plant environment.

Figure 2.6.2 shows an NV5000 time base reference and an NV3512 asynchronous AES switch used to in tandem to provide access to and from any digital audio signal source or destination in an integrated plant environment. All equipment derives its synchronization signal from the NV5000 as either video, AES, or SDIF-2 format inputs.

Figure 2.6.3 shows an NV5000, an NV3512 synchronous AES switch and an NV4448 used as a core for total synchronous plant integration. The NV4448 is a sample rate converter which can be used to convert unlocked audio signals to the 48 kHz master rate in an asynchronous mode or it can also convert synchronously to 48 kHz from 44.1 kHz or 32 kHz sample rates which are referenced to either the PAL or NTSC video timing signals. The NV5000 provides the most cost effective solution for synchronous plant integration.

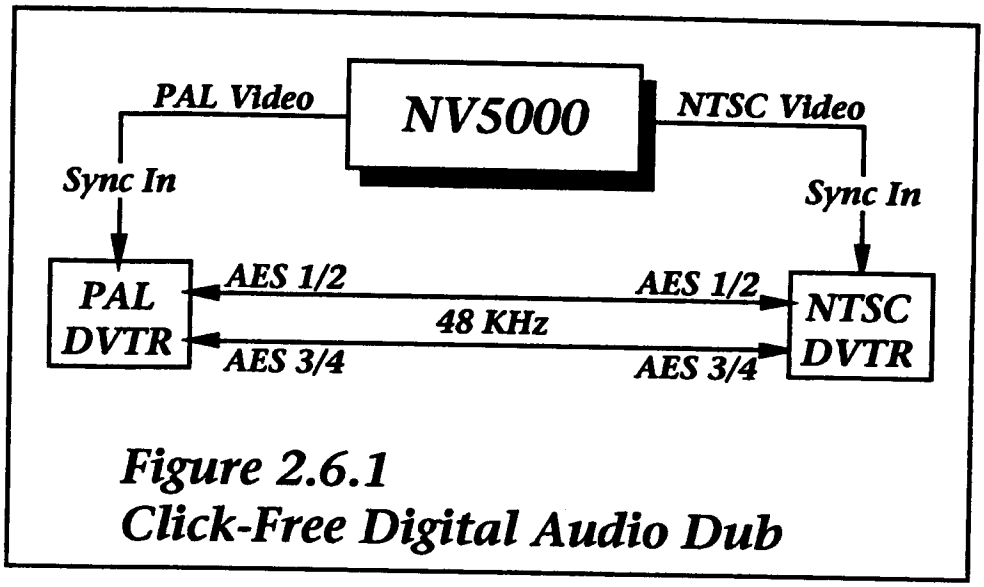

Figure 2.6.1
Click-Free Digital Audio Dub

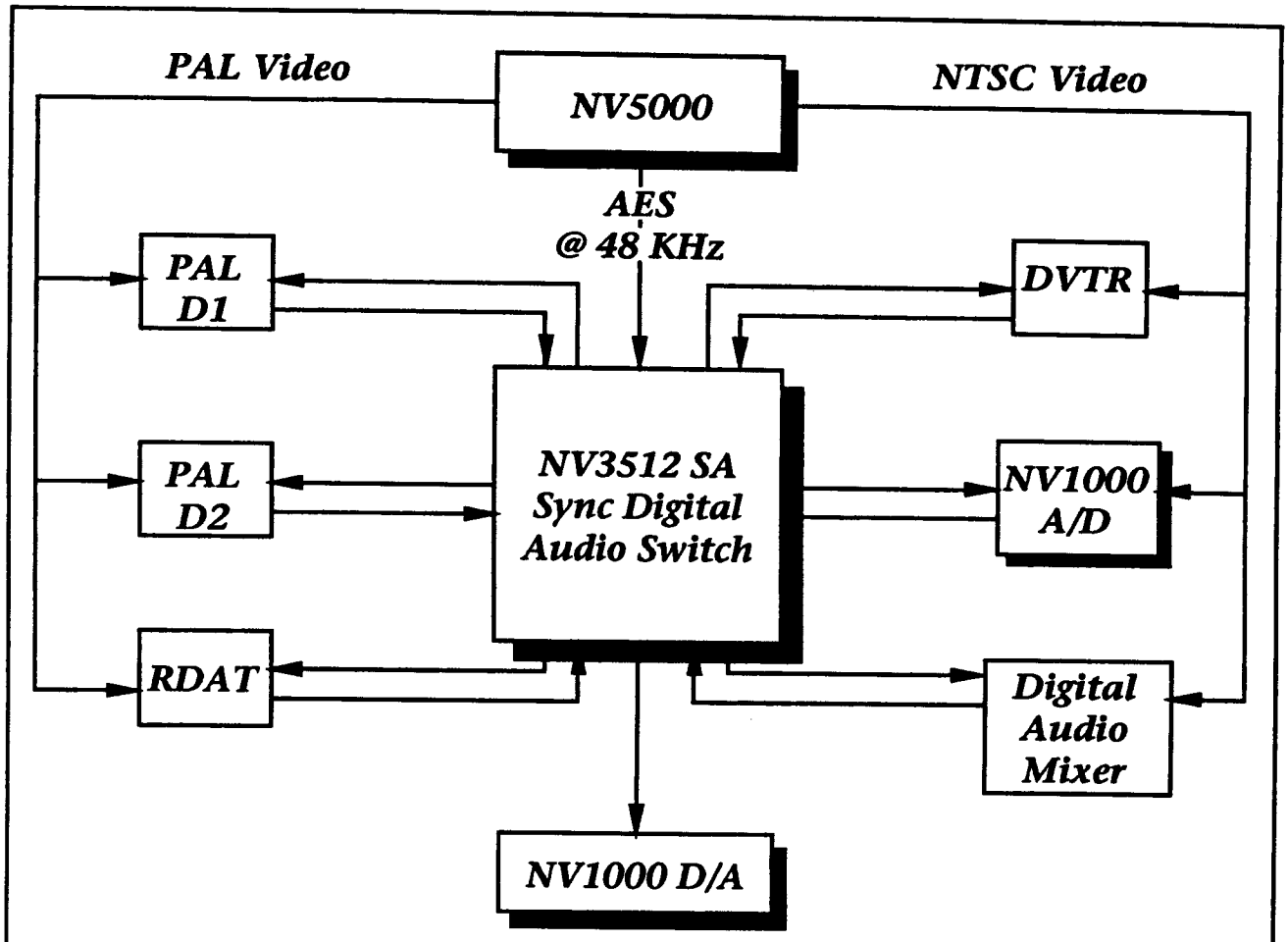

Figure 2.6.2
Digital Audio Switch Application

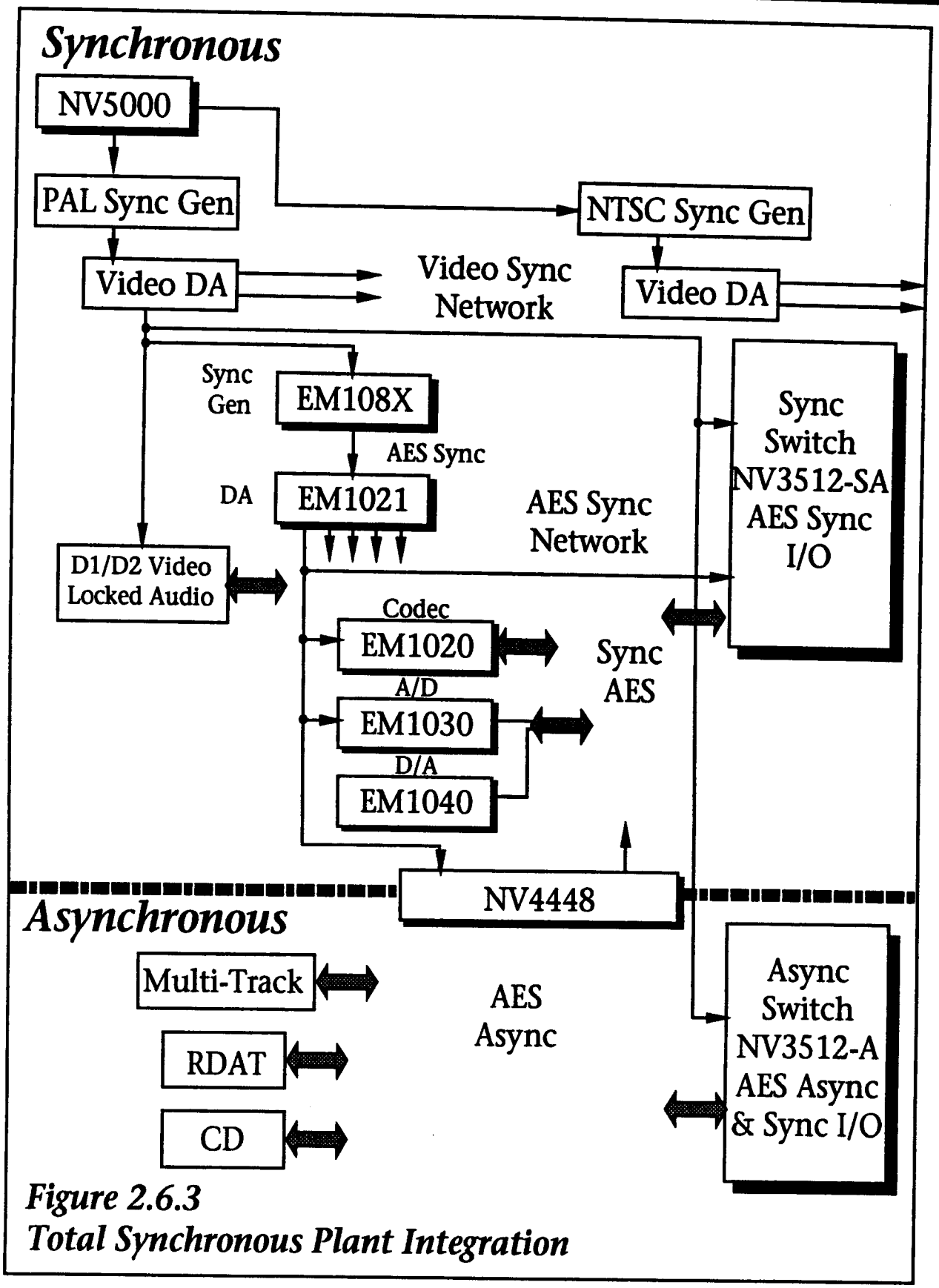

Figure 2.6.3
Total Synchronous Plant Integration

2.7 SYSTEM SPECIFICATIONS

NV5000 INPUT SIGNALS:

The atomic input reference signal may be a rubidium or cesium beam oscillator operating at 5.0 MHz. The stability should be at least ± 1 ppm. The internal circuitry is capable of locking to the signal within a ± 5 ppm range. The signal is expected to be a 1 Volt RMS sine wave into 50 ohms, resistive. A CMOS or TTL or 1 Volt peak to peak square wave should also work with negligible impact. The interconnect is a BNC.

Video input reference inputs should be stable to ± 1 ppm as well. The input capture range is ± 5 ppm which should be within the specifications of most all video test signal generators. The video level should be 1 volt peak to peak terminated into 75 ohms. This termination is built into the product. The input processing circuitry can automatically differentiate between PAL and NTSC formats. The interconnect is a BNC.

In free running mode, the internal ovenized oscillator will stabilize to ±0.25 ppm within 10 to 20 minutes. At the rear of the frame, a 5 MHz output is provided for synchronizing external devices to the NV5000. It is a TTL output, source terminated with 50 ohms. This provides a typical 1.7 Volt peak to peak square wave signal into a 50 ohm load.

NV5000 OUTPUT SIGNALS:

NTSC video is provided on 4 BNC connectors. The video outputs are independently driven and source terminated with 75 ohms. They provide a 1 volt peak to peak video signal into 75 ohms. All outputs may be selected, as a block, to be either black burst, or 75% color bars.

PAL video is provided on 4 BNC connectors. The video outputs are independently driven and source terminated with 75 ohms. They provide a 1 volt peak to peak video signal into 75 ohms. All outputs may be selected, as a block, to be either black burst, or 100% color bars.

Three AES/EBU data streams are provided simultaneously at 44.056 kHz, 44.1 kHz and 48 kHz sample rates. Each output is provided at the rear of the frame using XLR connectors. Each output is transformer coupled and provides a source impedance of 110 ohms and an output level of 5 Volts as per the AES/EBU specification.

Each AES data stream can be configured as either digital quiet or tone. The tone may be selected as either 1 kHz or 500 Hz at an amplitude of either Full Scale Digital or -20 dB with respect to Full Scale Digital. The 44.056 generator actually provides a 999Hz or 499.5Hz tone.

Six SDIF-2 word clock signals are also available, 2 at each frequency. They are TTL logic level signals capable of driving 75 ohm loads. The interconnect is made at the rear of the frame with BNC connectors.

The 5 MHz output is provided on a BNC connector with a 50 ohm source termination. It can drive a 1.7 volt peak to peak square wave into a 50 ohm load. If an external 5 MHz atomic reference is used, this output will be a buffered, hard limited version of the reference input. If a video reference is used, there will not be a 5 MHz output. If an external reference is not used the output will be a buffered version of the ovenized oscillator output. For models of the NV5000 without the internal ovenized oscillator, there will not be a 5 MHz output in any external reference configuration.

The NV5000 requires 1 rack unit of space and consumes less than 25 watts.

2.8 SYSTEM OPTIONS

The NV5000 family consists of 3 models. The model type affects video output and free run stability only. All three models below offer all three audio outputs.

The SG5500 provides both PAL and NTSC outputs as well as ±0.25 ppm stability in the free run mode.

The SG5200 provides an NTSC video output only. The free run stability is ± 10 ppm.

The SG5100 provides a PAL video output only. The free run stability is ± 10 ppm.

The SG5200 and SG5100 options DO NOT CONTAIN THE OVENIZED OSCILLATOR and do not provide a 5mHz output.

2.9 SUMMARY

The NV5000 Universal Sync Generator provides a complete integrated time base for PAL, NTSC, and Digital Audio reference signals. By generating all the above signals locked to a common reference, the NV5000 allows for complete integration of a digital audio/video plant. Direct digital transfers between video referenced material are now possible without the clicks or pops caused by dropped samples. The NV5000 can provide video directly to the destination machines, or it can feed an already existing NTSC or PAL video signal generator. The digital audio signals can then be distributed to audio equipment requiring an SDIF-2 or AES reference.

It provides 4 PAL and 4 NTSC video outputs as well as 1 AES/EBU data stream and 2 SDIF-2 word clocks for each of three sample rates, 48 kHz, 44.1 kHz and 44.056 kHz. It is capable of locking to an external video reference or an atomic standard clock. In the free run mode of operation, the long term stability is ±0.25 ppm.

The NV5000 requires one rack unit of space and consumes less than 25 watts.

The Frame and Power Supply of the NV5000 are UL listed.

CHAPTER 3: SYSTEM INSTALLATION

3.1 SYSTEM INSTALLATION

The NV5000 is easily installed. It is shipped as a single rack mountable unit. All cards are installed and should be mechanically retained in the frame. Physical installation is accomplished by mounting the NV5000 unit into your existing rack.

Apply power to the rear of the frame with the line cord which is included in the shipment.

- All connections are on the back of the unit so, allow for backpanel access when the unit is installed.
- All operator controls are on the front panel.
- Air flow is from back to front in the NV5000. Air enters through the side panels and is expelled through the holes in the center of the front panel. Keep the front panel area clear at all times. This is necessary for switch access as well as for system cooling.

AES/EBU connections require industry standard three pin XLR connectors. The NV5000 generates only outputs on male pins.

SDIF-2 format word clocks require BNC connectors as do video inputs, outputs and atomic reference inputs. There is one BNC each for either an atomic or video input. There is one BNC output for the 5 MHz internal oscillator. There are 4 BNCs for each video output format, and 3 groups of 1 Male XLR with 2 BNCs for AES/EBU outputs and SDIF-2 word clock outputs.

Figure 3.1 shows the rear panel connections.

If the NV5000 fails to perform on power up, review Chapter 4: Maintenance and Troubleshooting.

3.2 SYSTEM INTERFACING

All NV5000 interconnections are made through industry standard connectors.

Reference inputs to the NV5000 should be made with a point to point cable only.

All video outputs of the NV5000 provide voltage mode outputs with source terminations of 75 ohms. The 5 MHz reference output is 50 ohms. The AES/EBU outputs are source terminated with 110 ohms and transformer coupled as per the AES/EBU specification. The SDIF outputs provide TTL Level into 75 ohm terminations.

The NV5000 outputs can be expanded with either conventional fanout DAs or with standard cable loop-thru techniques. If the output drivers are used in the loop-thru mode, usual care should be exercised with respect to transmission line techniques for distributed loads.

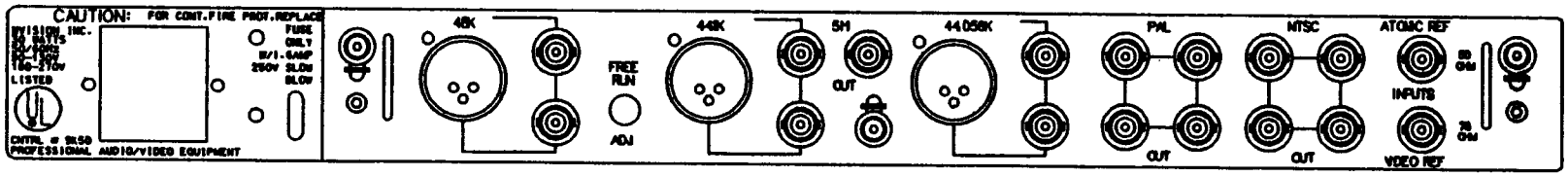

FIGURE 3.1

REVISIONS

REV	ECO	DFTR	DATE	CHK	APVD	M/F

DRAWN	SJS 11MAY95
CHECKED	
APPROVED	
PLOT DATE	
DRAWING SIZE	

USED ON | NEXT ASSY

APPLICATION

NVISION®
RENO, NEVADA

CONNECTOR CHANNEL SYNC GENERATOR

SIZE C | DRAWING NO. NV5000 | REV

SCALE 1 TO 1 | SHEET 1 OF 1

NV5000

CHAPTER 4: MAINTENANCE AND TROUBLESHOOTING

4.1 MAINTENANCE

The NV5000 requires very little maintenance.

Adjusting the Free Run Frequency:

The Free Run accuracy may require adjustment, particularly during the first year of operation. This process requires a non-metallic adjustment tool and a calibrated frequency counter. Connect the 5 MHz output of the NV5000 to the input of the frequency counter. Be sure that the NV5000 has been on for at least 20 minutes and that no external reference is applied. Insert the adjustment tool through the hole in the rear panel of the frame and adjust the oscillator until the desired frequency accuracy is achieved.

All crystal oscillators age. Since the NV5000 uses an ovenized oscillator, aging effects will be minimized by leaving the NV5000 powered on continuously. The adjustment range on the NV5000 should be sufficient to allow for up to 7 years of operation within the ± 0.25 ppm specification.

No other maintenance should be required.

4.2 TROUBLESHOOTING

There are very few serviceable parts inside the NV5000. The following procedure should help isolate the problem to a specific area of the board so that the factory can provide you with the fastest support.

CAUTION: **THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.**

1) No outputs on any connector:

Check that the green POWER LED is illuminated on the front panel of the NV5000. If not, verify that the line cord is plugged in, that the fuse is not blown, and that the Power Supply is selected for the proper line voltage input. The fuse is located in the line filter module which houses the receptacle for the power cord. The power supply jumper setting is described in the Power Supply section in the manual. If the green LED is still not on, the power supply has most likely failed. Consult the factory to arrange for a power supply exchange.

2) No output on a single connector:

For example, one of the two SDIF-2 word clocks is functional, the other is not.

The particular output driver has failed. Consult the factory to arrange for either replacement parts, or a card exchange.

3) No output on a common group of connectors.

For example, all 4 PAL outputs are not functional.

A common video generator part has failed. Consult the factory to arrange for either replacement parts, or a card exchange.

4) Input LOCK light blinks continuously:

Input loop circuitry cannot lock to input reference.

Verify that the input reference signal is present and that it is applied to the correct input BNC. Atomic references should be connected to the 50 ohm input and video references should be connected to the 75 ohm input.

Verify that the input reference signal has the correct signal levels. Atomic signals should be at least 1 Volt RMS. Video signals should be 1 Volt peak to peak when terminated.

Verify that the input signal is within ± 5 ppm of nominal frequency. For Atomic references, this should be ± 25 Hz at 5 MHz. For NTSC video, this should be ± 0.078 Hz at 15,734.265 Hz horizontal and for PAL video this should be ± 0.078 Hz at 15,625.0 Hz horizontal.

If the problem still exists, the input reference PLL has most likely failed. Consult the factory for repair or exchange support.

5) Destination Equipment appears un-locked:

This measurement will require the use of a very accurate frequency counter, a scientific calculator and some math. Since one cannot expect the counter output to be exactly calibrated, the only way to verify the locked state of the oscillators is to calculate the ideal ratios of the input reference or 5 MHz internal oscillator to the output oscillators.

This ratio is then multiplied by the measured value of the input reference or 5 MHz internal oscillator to calculate the expected output frequency for each of the output word clocks as well as the expected output video horizontal line rate.

The expected output can then be compared to the actual measured output and the error can be determined. If the error is within ±1 ppm, (0.0001%) , the loop can be considered to be locked.

As a step by step example:

1) Measure the frequency of the input reference signal, or the 5 MHz internal oscillator. If an input reference is not used, measure one of the SDIF word clocks and verify the other outputs relative to it.
2) Write this number down:
3) Measure each suspect SDIF-2 word clock or analog video output. Video horizontal or vertical frequency will need to be extracted from the composite video output.
4) Write these numbers down:
5) Calculate the error by first calculating the ratio of the measured frequencies at the SDIF and Video outputs to the measured reference frequency.

6) Ratio Measured = Number in step 4 / Number in Step 2

7) The error = (Ratio Ideal - Ratio Measured)/(Ratio Ideal)

8) Multiply the result from 7 by 1,000,000 to convert to ppm.

9) The result from 8 should be less than ± 1.

The ideal ratios are as follows:

NTSC Horizontal = 15,734.26574/5,000,000.0 = 0.003146853

PAL Horizontal = 15,625.00/5,000,000.0 = 0.003125000

48 kHz = 48,000.0/5,000,000.0 = 0.009600000

44.1 kHz = 44,100.0/5,000,000.0 = 0.008820000

44.056 kHz = 44,055.94406/5,000,000.0 = 0.008811189

It should be noted that some pieces of older equipment were not designed correctly for generation of AES/EBU digital audio. Common mistakes include equipment which locks to video and produces 47.952 kHz or 44.056 kHz. Also, some lesser techniques for generating AES data used PLLs which drop pulses and then do not provide appropriate filtering to insure low levels of short term jitter. The NV5000 can not remedy these problems, should they occur. Fortunately, they are the exception, not the rule.

CHAPTER 5: FRAME AND POWER SUPPLY

5.1: FRAME

FR5001-00

CONTENTS:

5.1.1 GENERAL DESCRIPTION

The NV5000 frame houses both a removable power supply and the NV5000 main assembly. The frame is rack mountable and one rack unit (RU) high. The front of the frame provides switches for selection of all user options as well as LED's for visual indication of current operational status.

The rear of the frame provides for connection of the analog video and digital audio signals with industry standard connectors; BNC's and XLR's.

The power cord is connected at the rear of the frame.

The FR5001-00 is UL Listed.

5.1.2 TECHNICAL INFORMATION

The basic frame includes the power interface and switch interconnect motherboard. This printed circuit board assembly provides raw, pre-regulated power from the power supply module to both the switch circuitry on this assembly and to the main printed circuit board assembly which plugs into the frame.

Power enters from the rear of the frame via the AC line cord. The input AC is filtered in the power entry, which is an integral part of the power supply module. The power entry module is fused (a spare fuse is included).

The power supply is installed from the rear of the frame. The line cord plugs into it and the power supply module plugs into the power interconnect motherboard mounted inside the frame.

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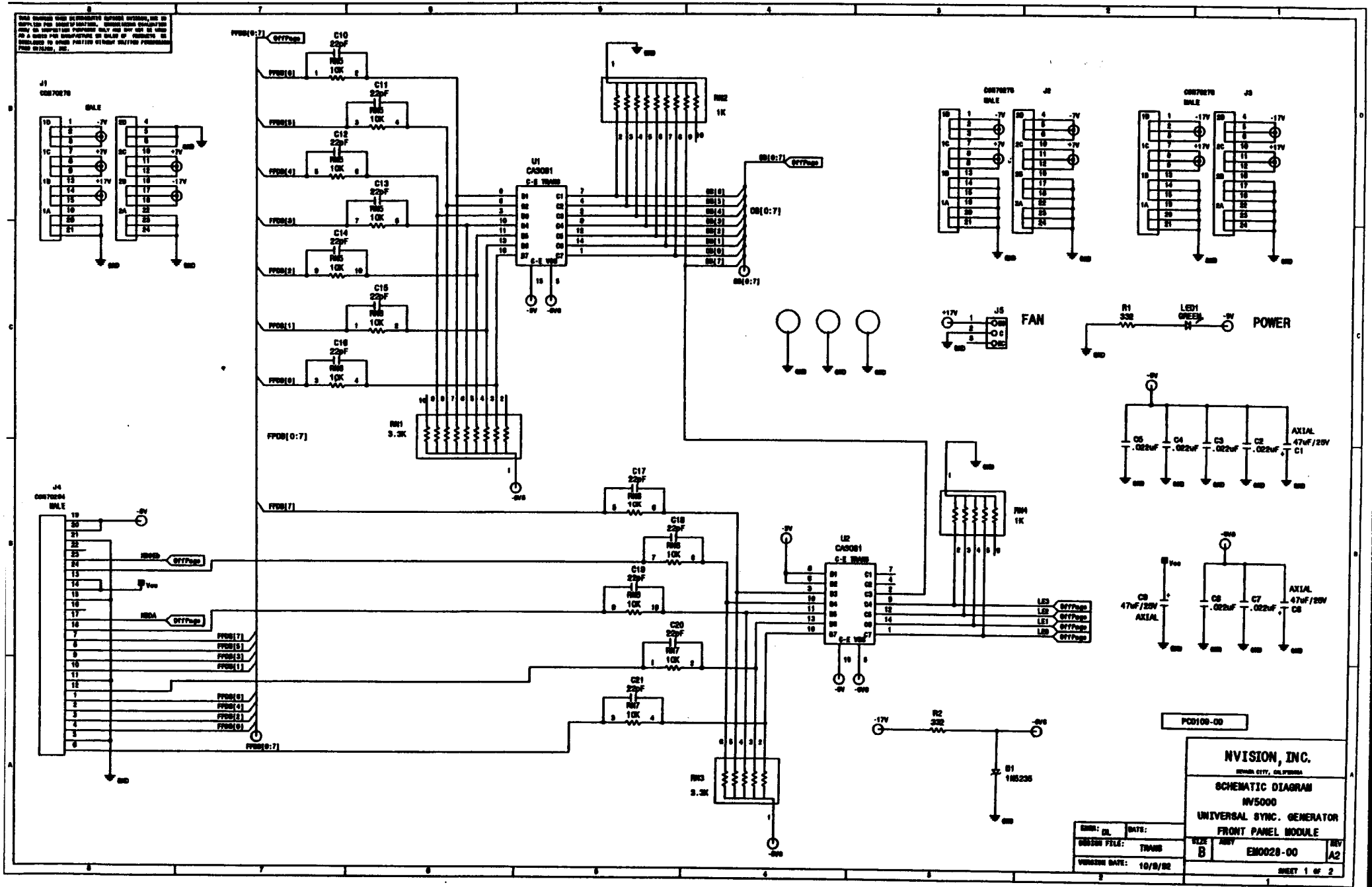
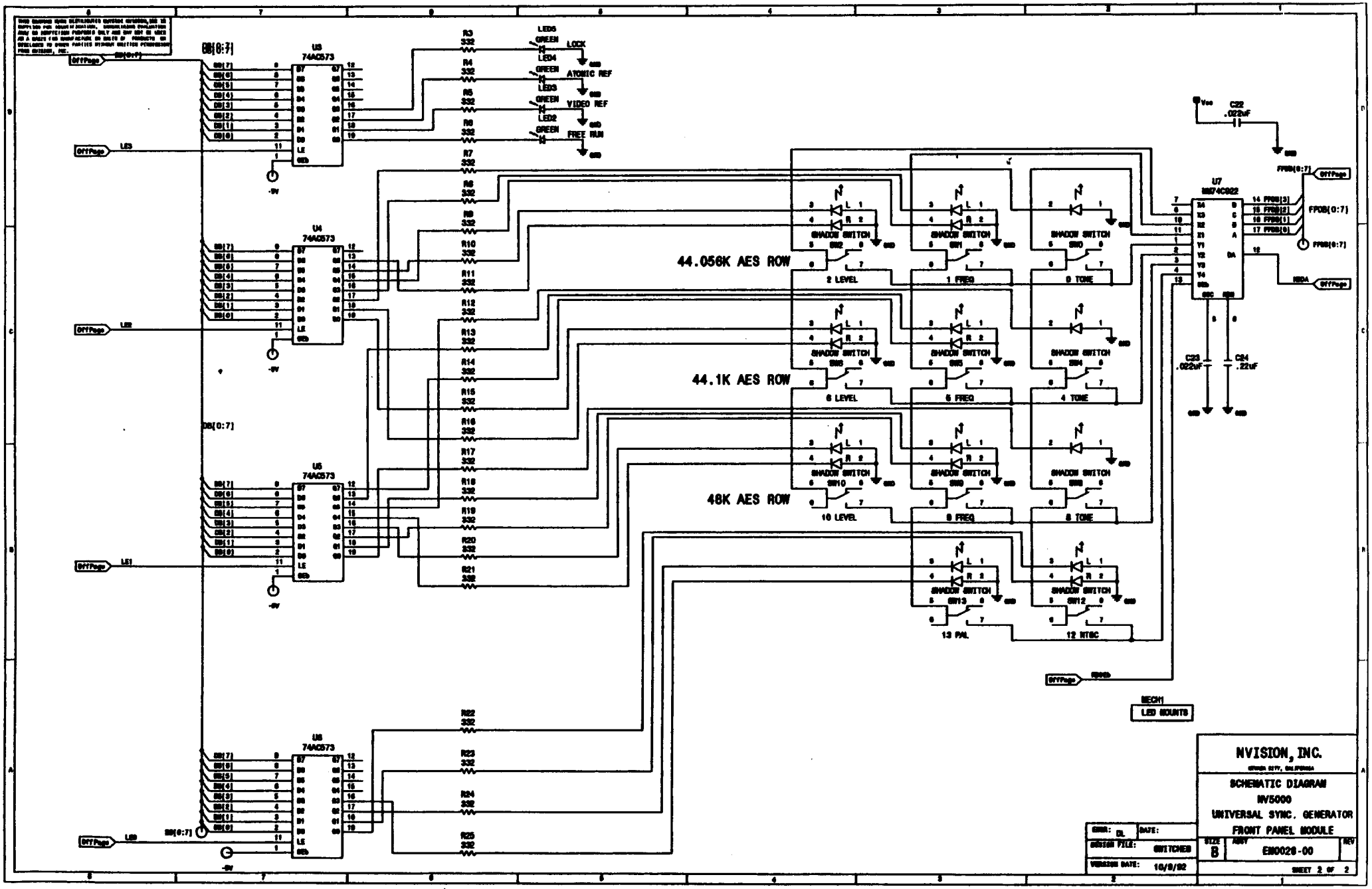
A line voltage selection switch is provided on the supply module to choose between 110 VAC or 220 VAC operation.

The rear frame connectors and backpanel are an integral part of the main printed circuit assembly. Both the main assembly and the power supply module have locking mechanisms. These mechanisms can be unlocked with an Allen wrench (loosening the captive nut) if the module needs to be removed. Be sure to tighten these screws when replacing the modules.

Caution: ***Be sure to remove the power cord before removing the supply.***


FAN
POWER
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
FRONT PANEL MODULE
PCD100-00
EM0028-00
SHEET 1 of 2


44.056K AES ROW
44.1K AES ROW
48K AES ROW
2 LEVEL
1 FREQ
0 TONE
6 LEVEL
5 FREQ
4 TONE
10 LEVEL
9 FREQ
8 TONE
13 PAL
12 NTSC
SHADOW SWITCH
LED5 GREEN LOCK
LED4 GREEN ATOMIC REF
LED3 GREEN VIDEO REF
LED2 GREEN FREE RUN
U3 74AC573
U4 74AC573
U5 74AC573
U6 74AC573
U7 MM74C922
C22 .022uF
C23 .022uF
C24 .22uF
MECH LED MOUNTS
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
FRONT PANEL MODULE
SIZE B
ASSY E80026-00
REV
SHEET 2 OF 2
DRAWN: DL
DATE:
VERSION FILE: SWITCHES
VERSION DATE: 10/9/92

5.2: POWER SUPPLY

PS4001-00

CONTENTS:

5.2.1 GENERAL DESCRIPTION

The Power Supply Module, PS4001-00, powers the NV5000 from the AC line at a nominal voltage of 115 VAC — 60 Hz or 230 VAC — 50 Hz. The power supply is designed to accept input voltages in the range of 88 VAC to 135 VAC, or 210 VAC to 270 VAC.

The PS4001-00 is UL Listed.

5.2.2 TECHNICAL INFORMATION

Refer to the end of this chapter for a full schematic of the power supply.

Power enters the system through the power entry module, J1. This module provides AC line filtering for both Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) as well as a 1.6 ampere fuse. This bi-directional filter attenuates noise on the power line and noise generated by the power supply to acceptable maximum limits set by the FCC and the VDE guidelines. A spare fuse, accessible at the rear of the frame, is included inside the power entry module.

The Line filter output is rectified by diodes D1 - D4 and filtered by capacitors C1 and C2. This provides raw DC at a high voltage.

Improper input source voltage will cause faulty operation and may damage the module. When the switch is in the 115 VAC position, the input circuit acts as a voltage doubler. The raw DC output is the sum of the positive and negative half-cycle peak voltages. When the jumper is in the 230 VAC position, the AC input is rectified by the full-bridge diode circuit. Both configurations produce the same nominal 230 VDC raw output voltage.

The power supply module incorporates several protective elements.

A grounded top cover shield as well as an insulated solder-sided shield prevent accidental human contact to high voltage DC or AC line inputs should the line cord remain attached to a supply

which is removed from the frame.

A common problem with off-the-line switching power supplies is a high peak in-rush current. This is due to the low impedance found at the power supply input. The power supply module of the NV5000 prevents this high peak in-rush current through the use of thermistor, RP1. The resistance-temperature characteristic of the thermistor is such that when the thermistor is cold, the high resistance of the device limits the current. As the capacitors start to charge, current flowing in the circuit warms the device, lowering the resistance and minimizing its effect on the circuit.

Lightning storms and nearby inductive switching can cause high voltage spikes on the AC lines. Metal oxide varistor (MOV) DV1 protects against AC line spikes. Transient Absorption Devices, D5 and D6, protect the raw DC output side of the supply against line spikes. These components serve to clamp the line voltages to safe levels during transient line voltage conditions.

The high voltage raw DC is fed into switching FET's Q100 and Q101. These FET's are configured in a half-bridge topology. This arrangement is popular for off-the-line switching power supplies. The DC voltage is then chopped at 40 kHz into a square wave. The square wave is subsequently fed into a step-down, primary-to-secondary, isolated transformer, T200. The turns rations of the transformer set the output voltages on the secondary side of the transformer.

The secondary side of the transformer has two identical sets of windings which feed full-wave rectifiers D300 - D307. Both windings share a common ground. Regulation is improved by the use of Schottky diodes D300 - D303 to minimize voltage losses in the outputs.

The rectified output waveforms are filtered through the two-stage inductors, L300 - L304 and the capacitors, C309 - C318. This produces low voltage DC outputs at approximately ± 17 Volts and ± 7 Volts. Inductor L300 is a coupled inductor. The coupling of the output windings improves the load regulation, particularly at light loads.

The pulse width modulation (PWM) submodule, U100, tightly regulates the secondary outputs. A primary-side auxiliary winding on the transformer T1 monitors the flux and feeds back a relative voltage to U1. This voltage is then compared to a reference voltage. The pulse width modulated outputs of U100 are adjusted accordingly to regulate the output pulse

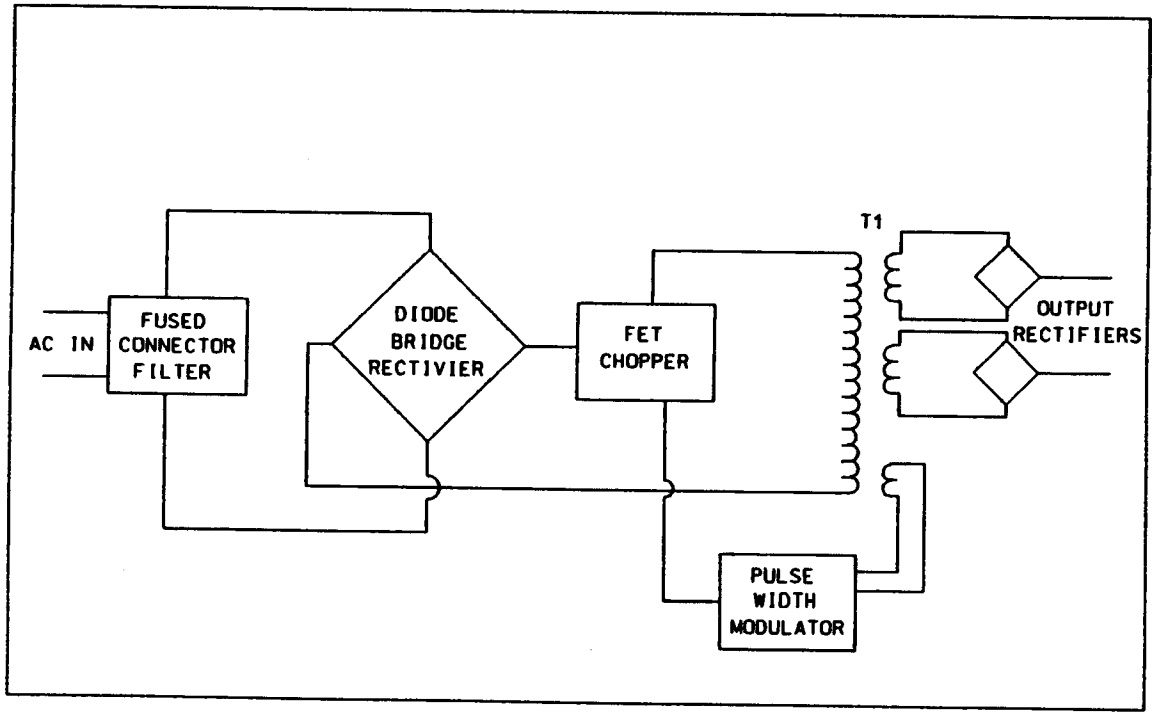
width of the drive signal applied to the switching FET's, Q100 and Q101.

A primary side boot-strap multivibrator circuit is used to start-up the power supply. This circuit is contained in the PWM submodule, U100. The multivibrator circuit provides pulses to FET Q102. This produces enough voltage to start the PWM and the power supply circuit.

After the power supply starts, an auxiliary winding in the main transformer T1 provides the necessary power to the PWM submodule, U100, to keep the power supply in operation.

Although the main board regulators have their own current limiters, the power supply also has its own current limiting function. This protects the system from fault conditions on-board where excessive current could be drawn from the primary.

Current transformer T200 is shown in the center of the power supply schematic. This transformer monitors the primary current and steps it down to a level where it can safely drive the PWM submodule, U1. When the current limit threshold is exceeded, a pulse-by-pulse shutdown is generated. Operation is restored immediately once the excessive current is minimized. Operation will resume via soft-start initiation just as if the supply had been powered up from a cold or dormant state.



REVISIONS						
REV	ECO	DFTR	DATE	CHK	APVD	M/F
		SJS	28APRIL95			

APPLICATION	
USED ON	NEXT ASSY
FILE NAME	

SJS 27FEB95	DATE
CM	DATE
CHECKED	DATE
APPROVED	DATE
RLSD PROD RLSE	DATE
DRWG RLSE	DATE

NVISION®
SIMI VALLEY, CALIFORNIA

BLOCK DIAGRAM
PS4001 PWR SUPPLY
ONE RACK UNIT

SIZE	DRAWING NO.	REV
C	NV5000	

SCALE NONE SHEET 1 OF 1

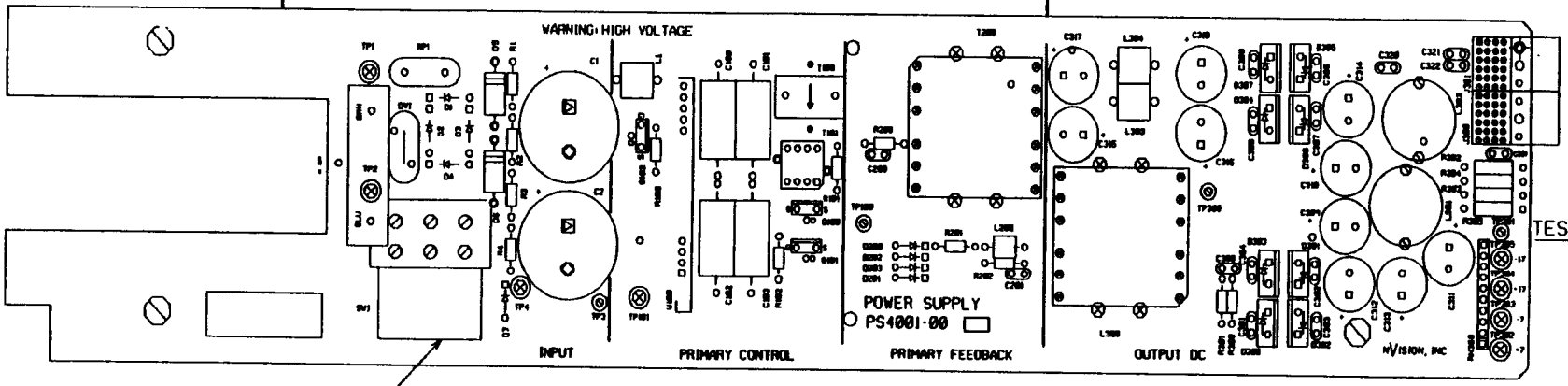
SH		DRAWING NO.	SIZE
1		PS4001-00	B

REVISIONS

REV	ECO	DFTR	DATE	CHK	APVD	M/F

CAUTION:

HAZARDAOOUS VOLTAGES EXIST
IN THE PRIMARY CIRCUITY



TEST POINTS
-17V
+17V
-7V
+7V

SW1
LINE VOLTAGE
SELECT SWITCH

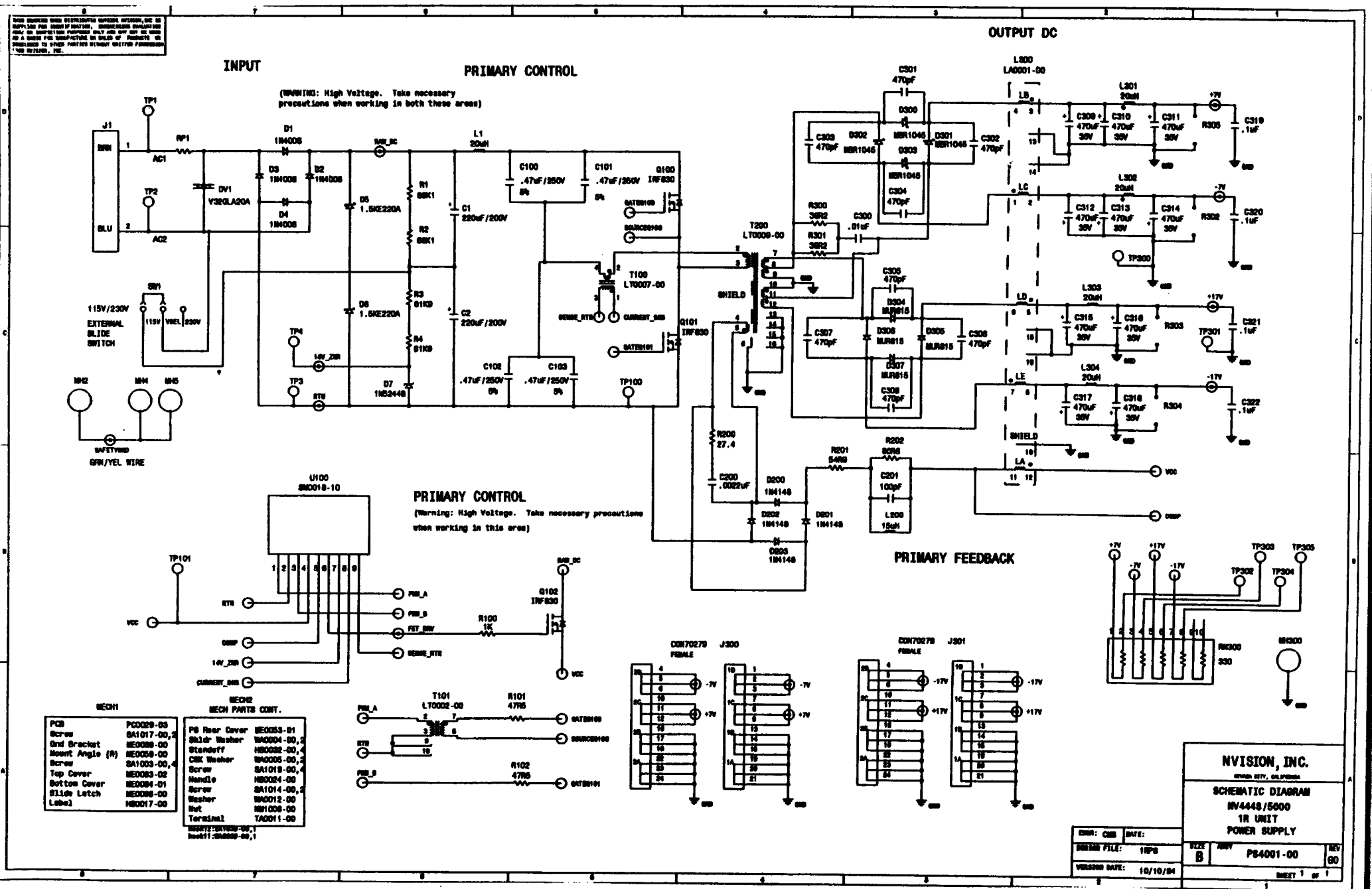
	PC0029
USED ON	NEXT ASSY
APPLICATION	

DRAWN	SJS DATE
ENGINEER	DATE
CHECKED	DATE
APPROVED	DATE
PILOT RUN RLSE	DATE
RELEASED	DATE

NVISION, INC.
NEVADA CITY, CALIFORNIA

COMPONENT LOCATION
NV5XXX/4448
ONE RACK UNIT
POWER SUPPLY

SIZE	DRAWING NO.	REV
B	PS4001-00	
SCALE 1:1	SHEET 1 OF 1	


INPUT
PRIMARY CONTROL
(WARNING: High Voltage. Take necessary precautions when working in both these areas)
OUTPUT DC
115V/230V EXTERNAL SLIDE SWITCH
GRN/YEL WIRE
PRIMARY CONTROL
(Warning: High Voltage. Take necessary precautions when working in this area)
PRIMARY FEEDBACK
MECH1
MECH2 MECH PARTS CONT.
NVISION, INC.
SCHEMATIC DIAGRAM
NV4448/5000
1R UNIT
POWER SUPPLY
PS4001-00

CHAPTER 6: TECHNICAL DESCRIPTION

6.1 TECHNICAL DESCRIPTION

The NV5000 uses 5 phase-locked loops to generate all the necessary clock relationships required. The phase locked loops use software programmable frequency synthesizers to minimize the hardware requirements of the product. Video is generated by a VLSI chip, low pass filtered by a custom, passive, low pass filter and then individually buffered for output drive. Digital audio is programmed into EPROMS and an AES/EBU transmitter IC is used to create the appropriate output data stream. SDIF word clocks are generated out of the phase locked loop timing signals.

IC U35 is the microprocessor which controls the configuration of the phase locked loops as well as monitors the front panel switches. IC U33 is the EPROM which contains configuration data for the loops, the video VLSI chips and the code for the processor.

IC U791, a programmable gate array, provides the required decode logic for the microprocessor as well as other miscellaneous glue logic required on the board.

ICs U780 and U781 are buffers used to interface the front panel switch signals with the microprocessor. ICs U774 and U775 are used to store the sine wave selection information for each of the three AES/EBU outputs.

IC U766 is the video input reference buffer amplifier. Its output is processed by U761 to extract composite sync. Composite sync is filtered by U739 to extract horizontal and monitored by U739 to determine video input presence. U740 uses the vertical output of U761 to determine if the video input signal is 59.94 Hz NTSC or 50 Hz PAL.

Atomic Reference input amplifier U160 provides a 50 ohm input termination for the signal and a gain of 10. The buffered atomic input reference is fed to amplifier IC U737. IC U692 is used to determine if an atomic reference is present. IC U723 is the ovenized oscillator. IC U708 is a multiplexer which selects between the atomic or ovenized 5 MHz clock. U721 is a digital phase comparator. It is used for either video or atomic input signals. U710 is a multiplexer used to select which phase comparator is used. U722 is a programmable divider used to generate the feedback frequencies to the phase comparators, U721.

IC U668 is the loop filter for the 18.000 MHz phase locked loop. IC U639 is the 18.000 voltage controlled crystal oscillator, VCXO. Transistor Q665 is used to clamp the input voltage of the 18.000 MHz VCXO to a nominal frequency for the case that no reference or ovenized oscillator input is available. IC U637 provides the conversion from a sine wave to logic level square wave for the 18.000 MHz clock signal. U624 and U623 are used programmable dividers used to lock 27.000 and 6.144 MHz to the 18.000 MHz oscillator. U533 and U532 are the 27.000 MHz and 6.144 MHz loop filters. U598 is a 27.000 MHz VCXO and U527 is a 6.144 MHz VCXO. U517 and U518 are used to lock the 5.6448 MHz and 5.639 MHz oscillators to the master clock. U429 and U430 are the respective loop filters and U424 and U419 are the respective VCXOs.

U412 and U378 generate the NTSC and PAL video based on a 13.5 MHz pixel clock. U396 and U362 are low pass reconstruction filters used to anti-alias the video output which is generated at 27.000 MHz. U395 and U361 are buffer amplifiers used to isolate the output load of the passive lowpass filter and to provide a gain trim for insertion loss of the filter and inaccuracies in the video encoder ICs. U329 - U336 are video driver ICs. They operate at a gain of 2 and provide a source impedance of 75 ohms for the output video signals.

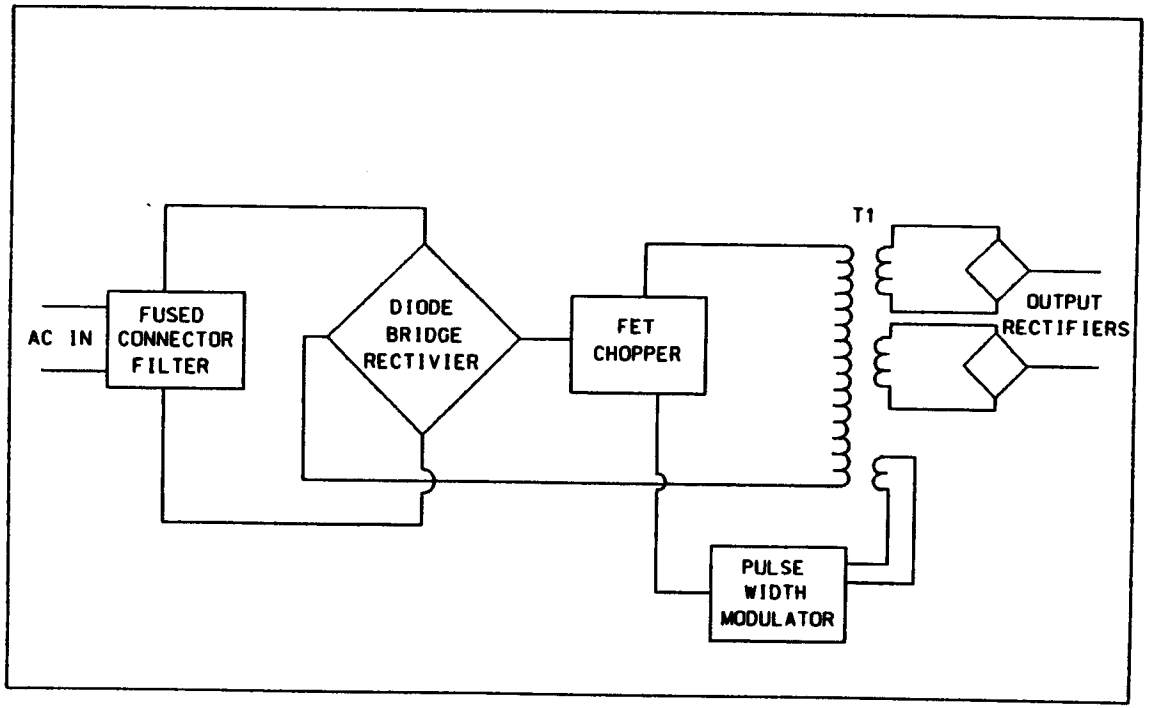
AES/EBU sine waves are generated with counters and tables in EPROM. For example, U272, U271, and U270 form the counter for the 48 kHz sine wave. PROM U268 contains the data and IC U269 is used to convert the data from parallel to serial form. The serial data is fed to IC U267 which is an AES/EBU transmitter IC. The reference designators are different but the topology is identical for the 44.056 and 44.1 kHz sine wave generators. AES outputs are transformer coupled through T163, T164, and T165. SDIF-2 word clocks are driven off the board by ICs U173, U174, and U176. These parts are capable of driving a TTL logic level into 75 ohms. The 5 MHz output reference is driven off the board by IC U161. It is source terminated with 50 ohms and will provide a 1.7 Volt signal into a 50 ohm load.

IC U790 is the serial prom used to configure the programmable gate array, U791. IC U796 is a power on reset chip used to initialize the gate array when power is applied to the NV5000.

ICs U81, U80 and U137 are ± 5 Volt regulator components. IC U131 is used to regulate ± 15 Volts. U72 and Q73 are used to generate an isolated +15 Volt supply for the ovenized oscillator.

6.2 SCHEMATICS

1. Component Locator
2. Block Diagram
3. Schematic



REVISIONS						
REV	ECO	DFTR	DATE	CHK	APVD	M/F
		SJS	28APRIL95			

APPLICATION	
USED ON	NEXT ASSY
FILE NAME	

SJS	27FEB95	DATE
CM		DATE
		DATE
		DATE
		DATE

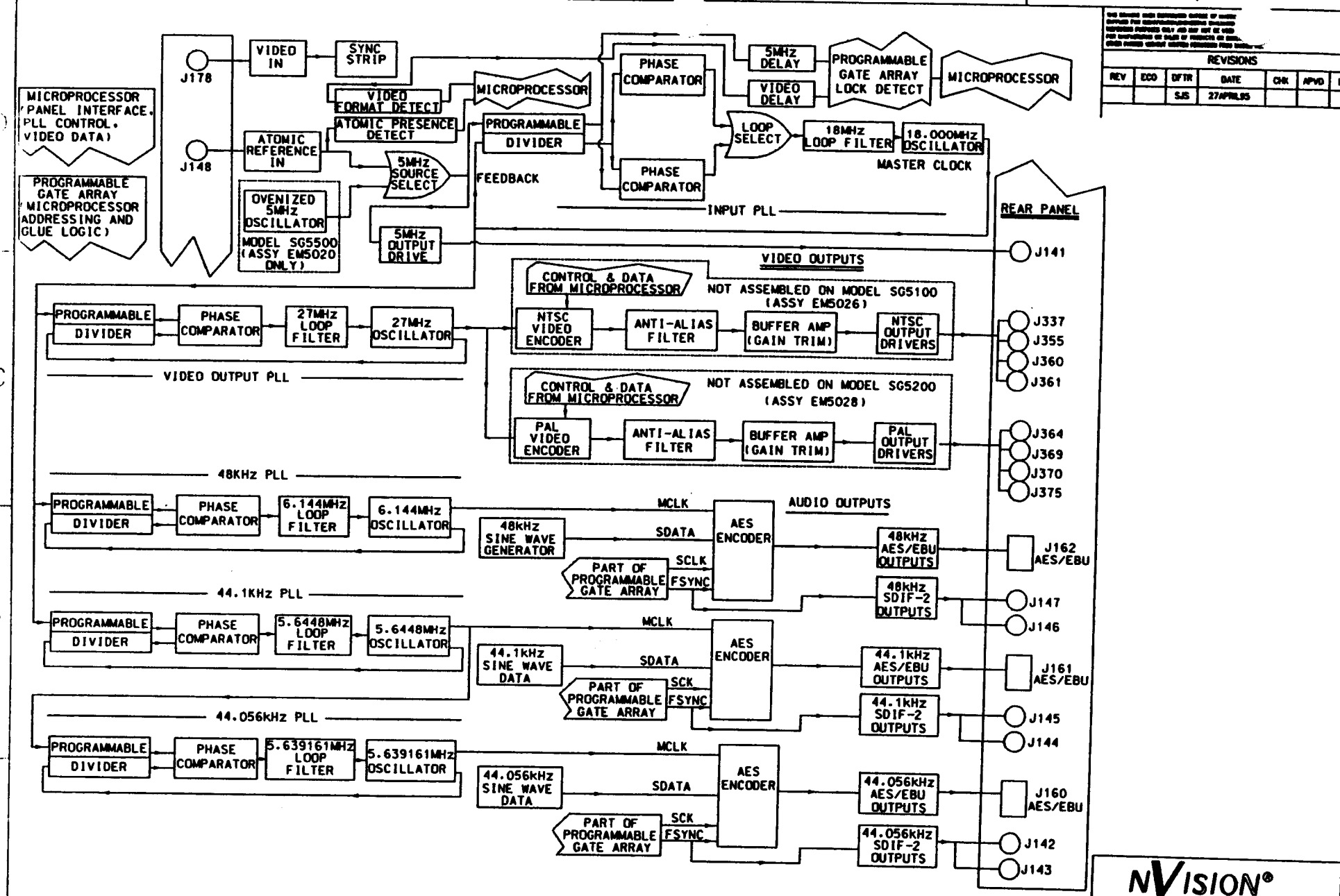
NVISION®
NEVADA CITY, CALIFORNIA

BLOCK DIAGRAM
PS4001 PWR SUPPLY
ONE RACK UNIT

SIZE	DRAWING NO.	REV
C	NV5000	

SCALE NONE | SHEET 1 OF 1

NV5000



REVISIONS						
REV	ECO	DFTR	DATE	CHK	APVD	M/F
		SJS	27APRIL95			

APPLICATION	
USED ON	NEXT ASSY
FILE NAME	

SJS DATE
CM DATE
CHECKED DATE
APPROVED DATE
MFG RELEASE DATE
ENG RELEASE DATE

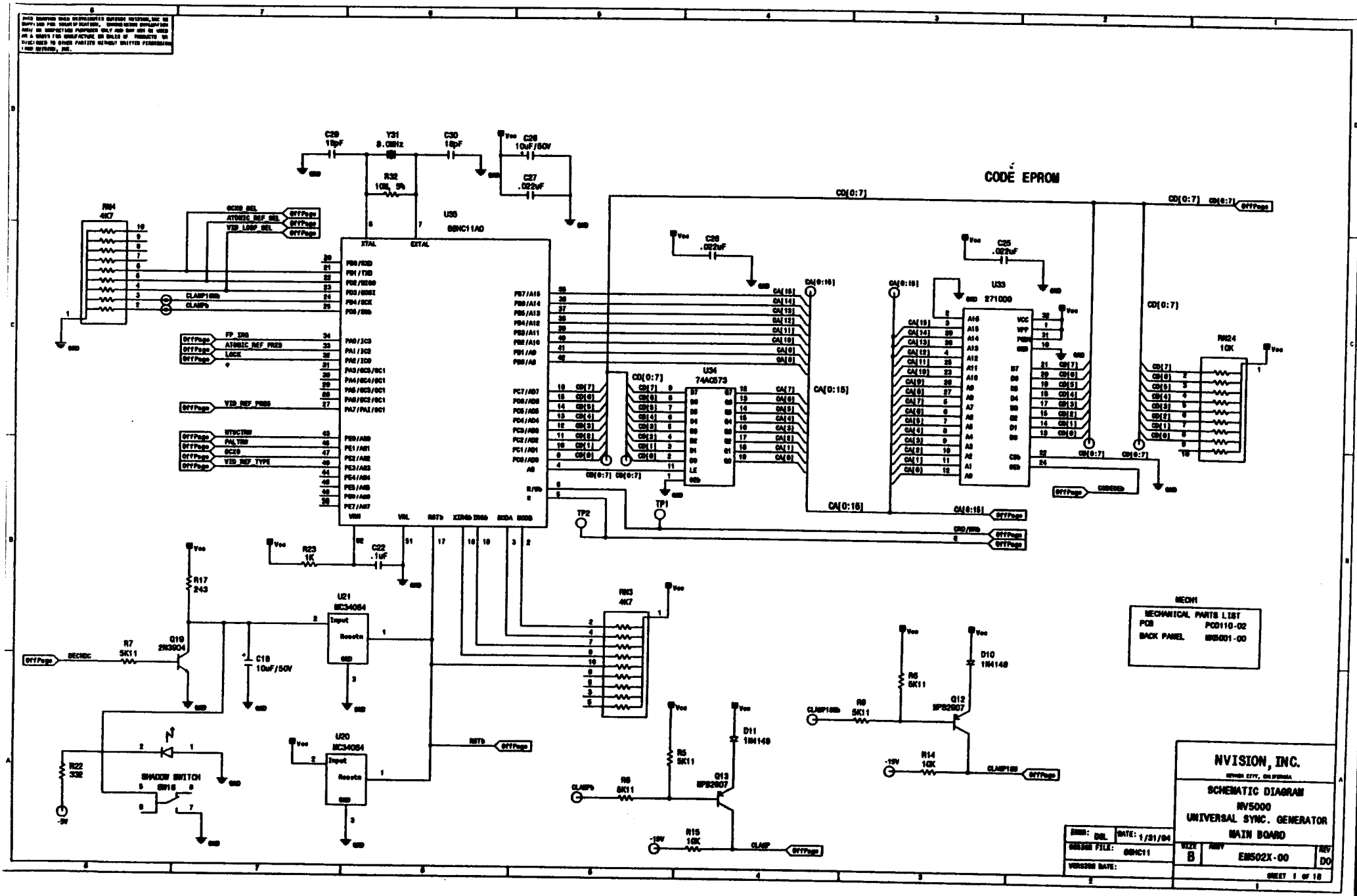
NVISION®
RENO, NEVADA CITY, CALIFORNIA

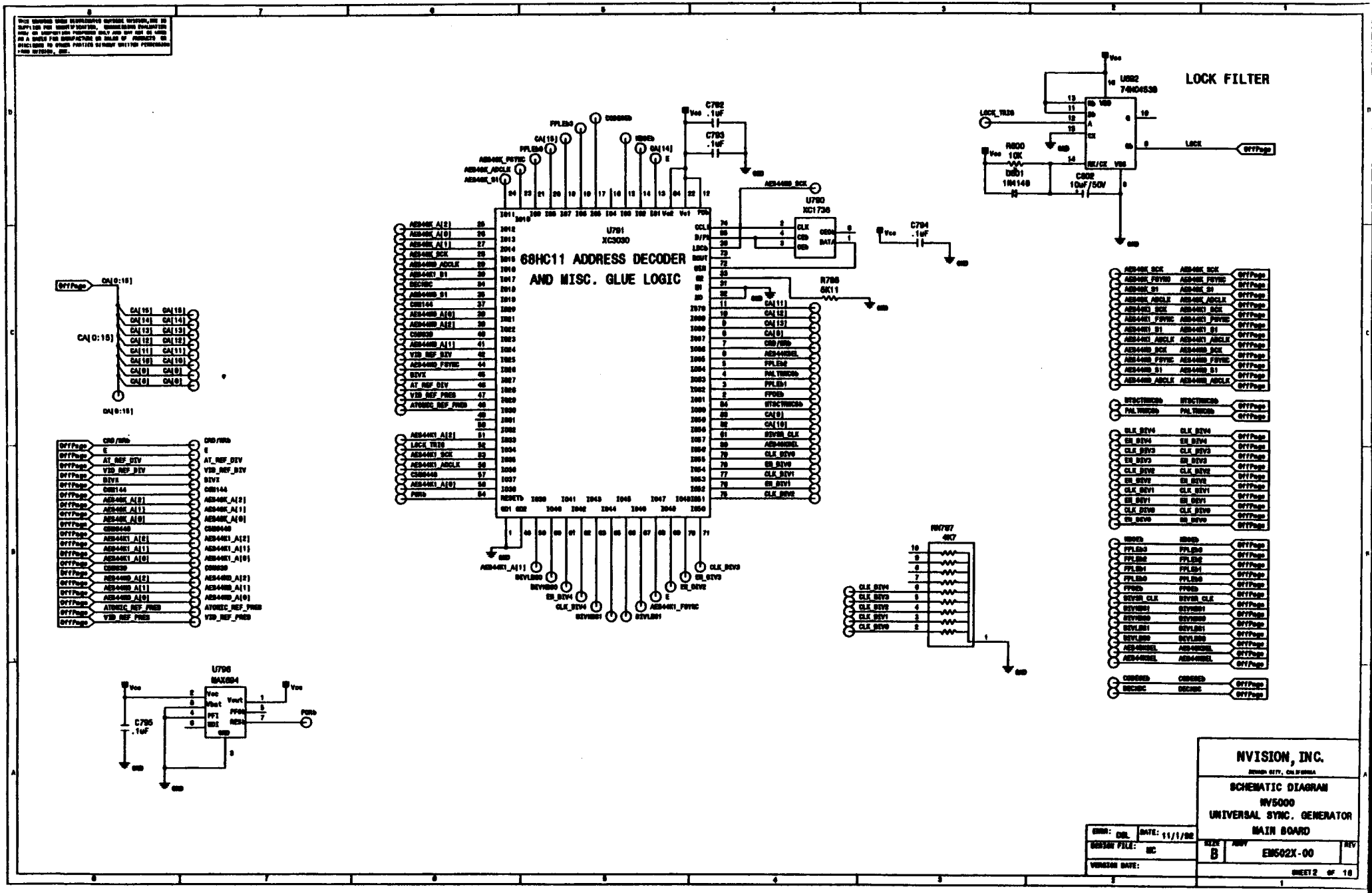
BLOCK DIAGRAM
UNIVERSAL SYNC GEN

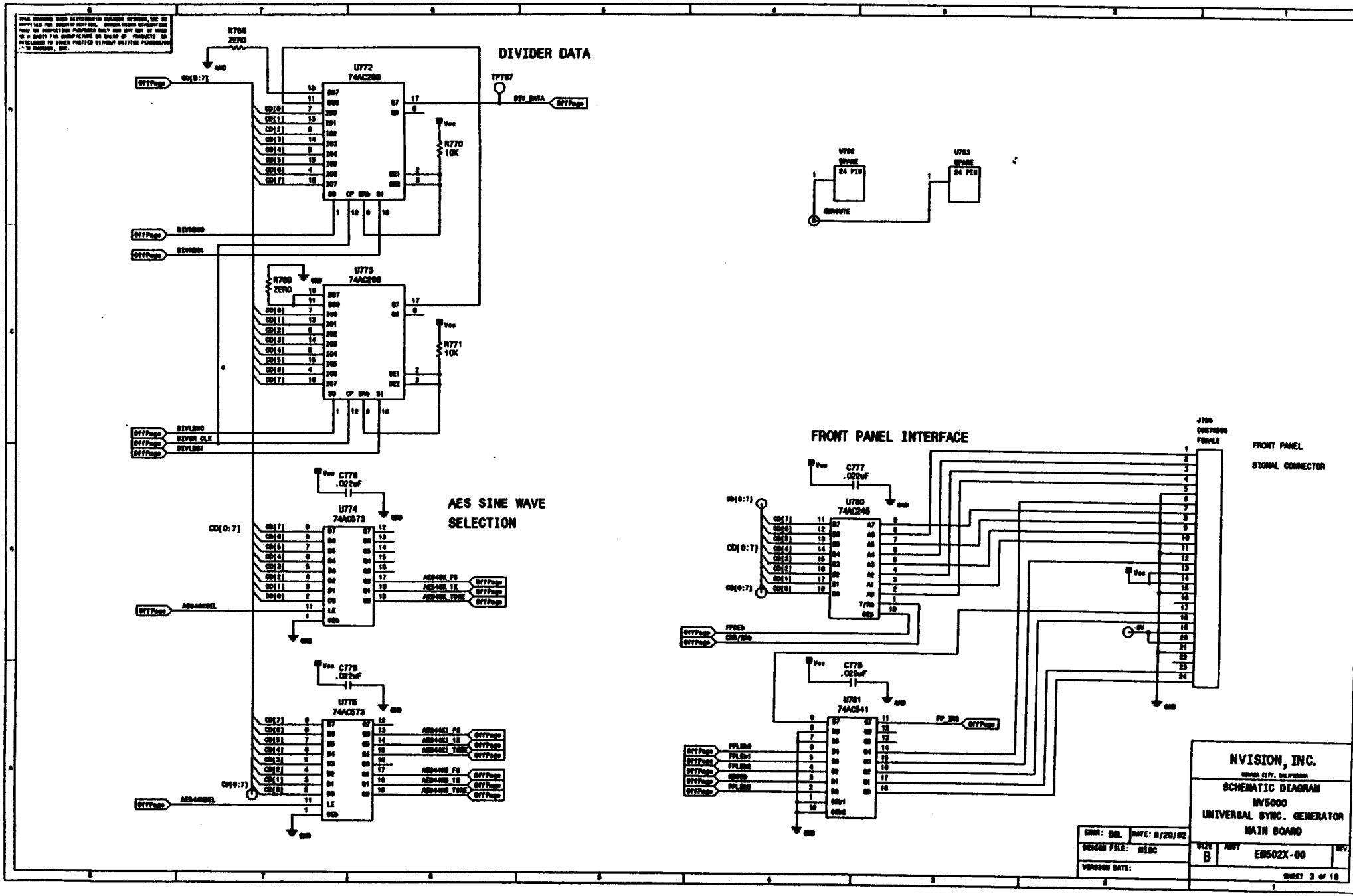
SIZE C | DWG NO. NV5500 | REV

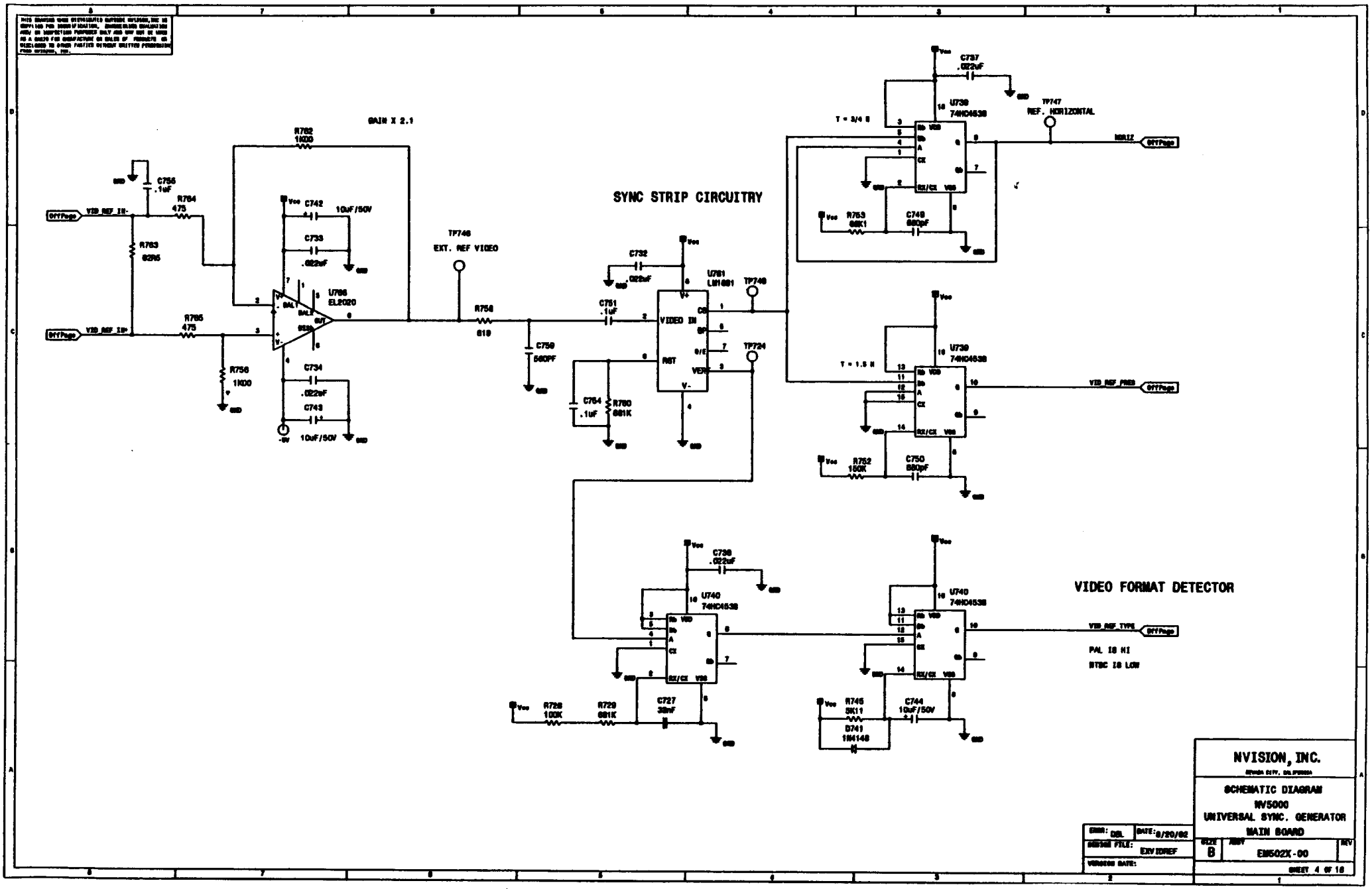
SCALE NONE | SHEET 1 OF 1

NV5500 C 1

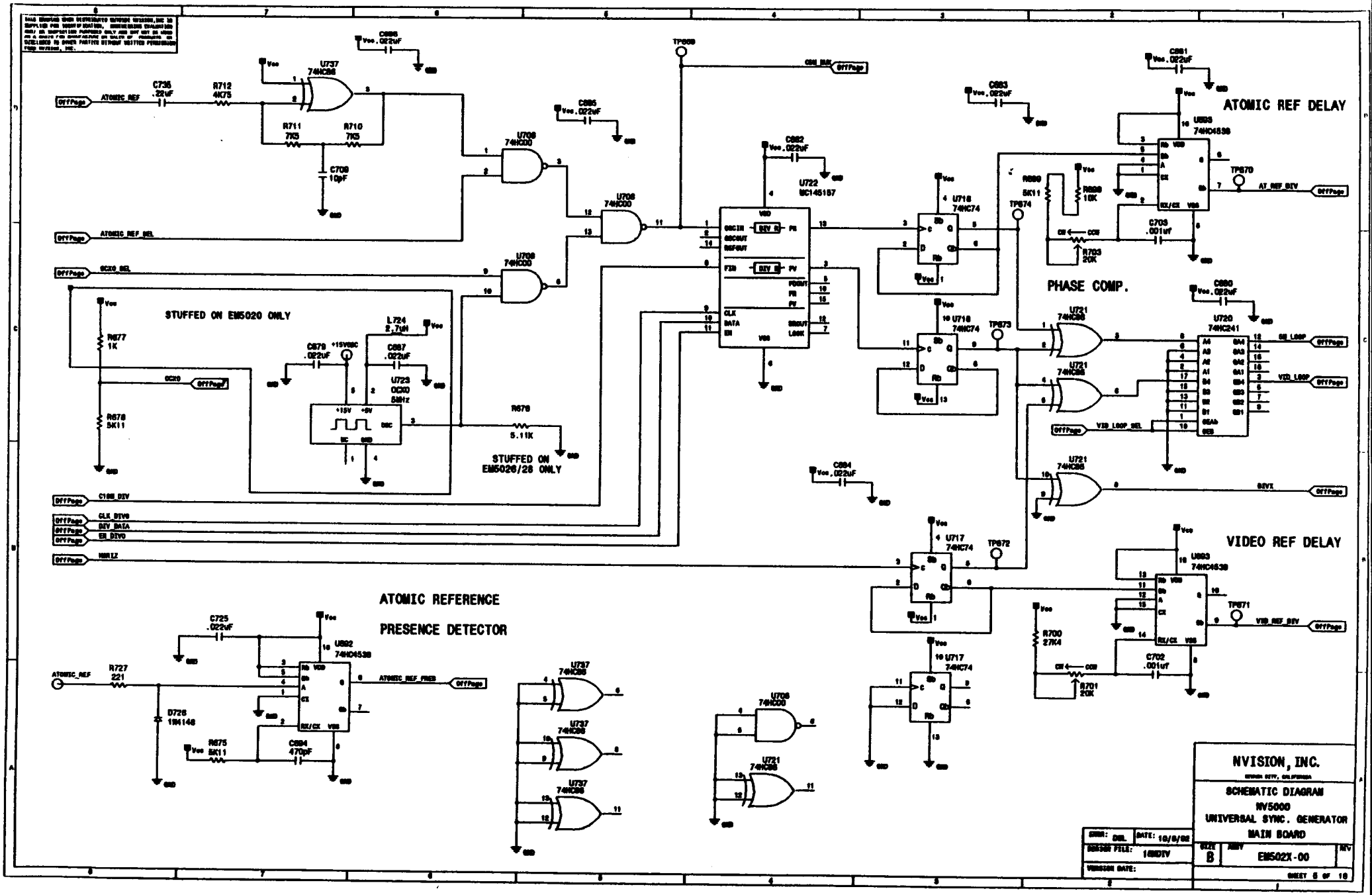

CODE EPROM
U35
68HC11A0
U34
74AC573
U33
27C1000
U21
MC34064
U20
MC34064
Y31
8.0MHz
C29
18pF
C30
18pF
C28
10uF/50V
C27
.022uF
C26
.022uF
C25
.022uF
C22
.1uF
C18
10uF/50V
R32
10K 5%
R23
1K
R17
243
R7
5K11
Q19
2N3904
R22
332
SHADOW SWITCH
SW16
R83
4K7
RN4
4K7
RN24
10K
R5
5K11
R6
5K11
D11
1N4148
Q13
MPS2907
R15
10K
R8
5K11
D10
1N4148
Q12
MPS2907
R14
10K
TP1
TP2
CD[0:7]
CA[0:15]
MECH
MECHANICAL PARTS LIST
PCB PC0110-02
BACK PANEL BP5001-00
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
SIZE B
ASSY EM502X-00
REV D0
SHEET 1 OF 18
DRAWN: DGL
DATE: 1/31/94
DIAGRAM FILE: 68HC11
VERSION DATE:

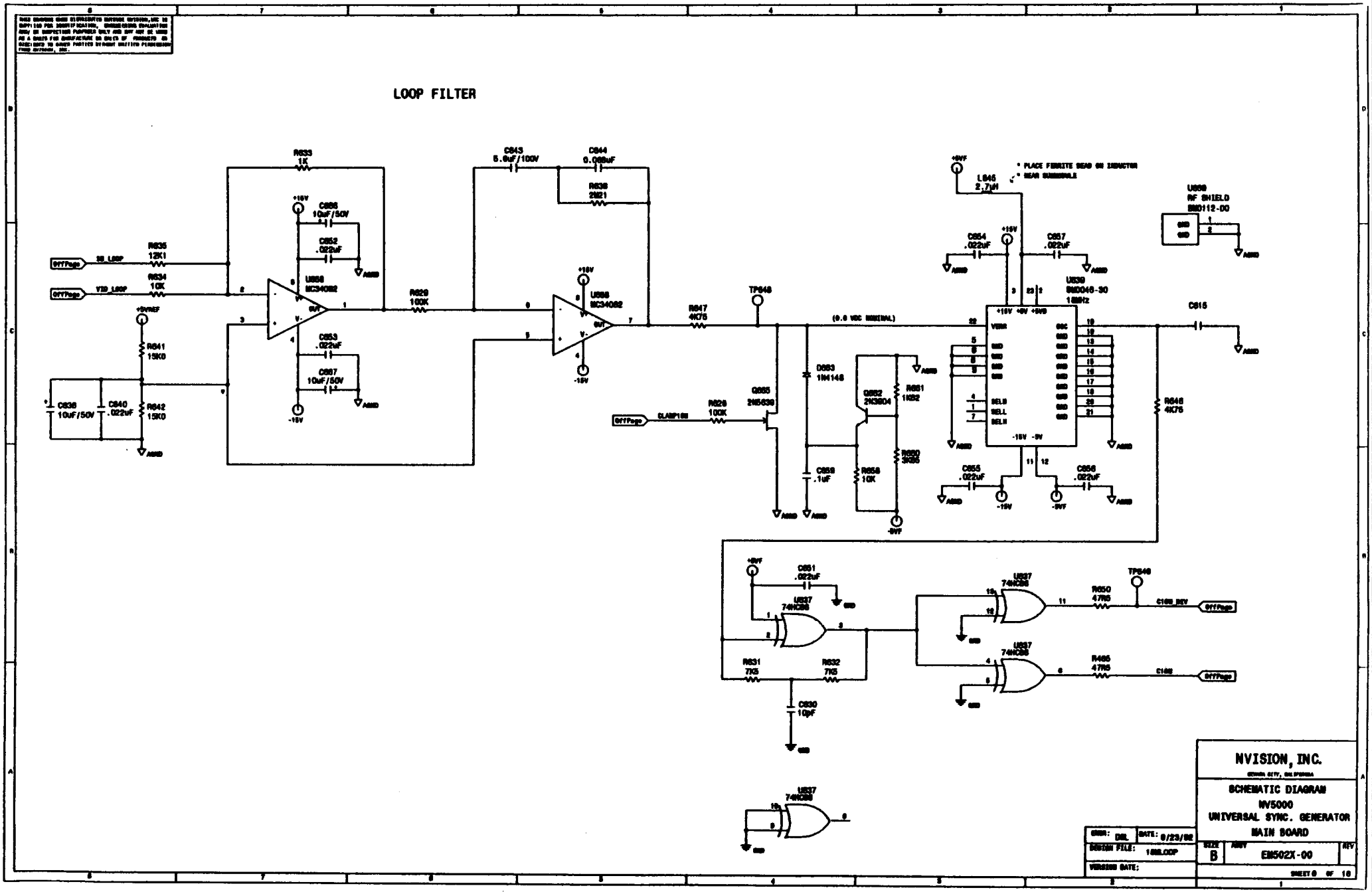

LOCK FILTER
68HC11 ADDRESS DECODER
AND MISC. GLUE LOGIC
U791
XC3030
U790
XC1736
U792
74HC4538
U796
MAX694
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
E8502X-00
SHEET 2 OF 10


DIVIDER DATA
U772
74AC299
U773
74AC299
R768
ZERO
R770
10K
R771
10K
TP787
DIV_DATA
AES SINE WAVE
SELECTION
U774
74AC573
U775
74AC573
C776
.022uF
C777
.022uF
C778
.022uF
C779
.022uF
FRONT PANEL INTERFACE
U780
74AC245
U781
74AC541
FRONT PANEL
SIGNAL CONNECTOR
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
B
EB502X-00
SHEET 3 OF 10



NVISION, INC.	
SCHEMATIC DIAGRAM	
NV5000	
UNIVERSAL SYNC. GENERATOR	
MAIN BOARD	
SIZE: B	REV: EM502X-00
SHEET 4 OF 16	
DRAWN: DBL	DATE: 8/20/02
SCHEMATIC FILE: EXVIDREF	
VERSION DATE:	


ATOMIC REF DELAY
PHASE COMP.
VIDEO REF DELAY
STUFFED ON EM5020 ONLY
STUFFED ON EM5026/28 ONLY
ATOMIC REFERENCE
PRESENCE DETECTOR
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
E95O2X-00
SHEET 5 OF 10



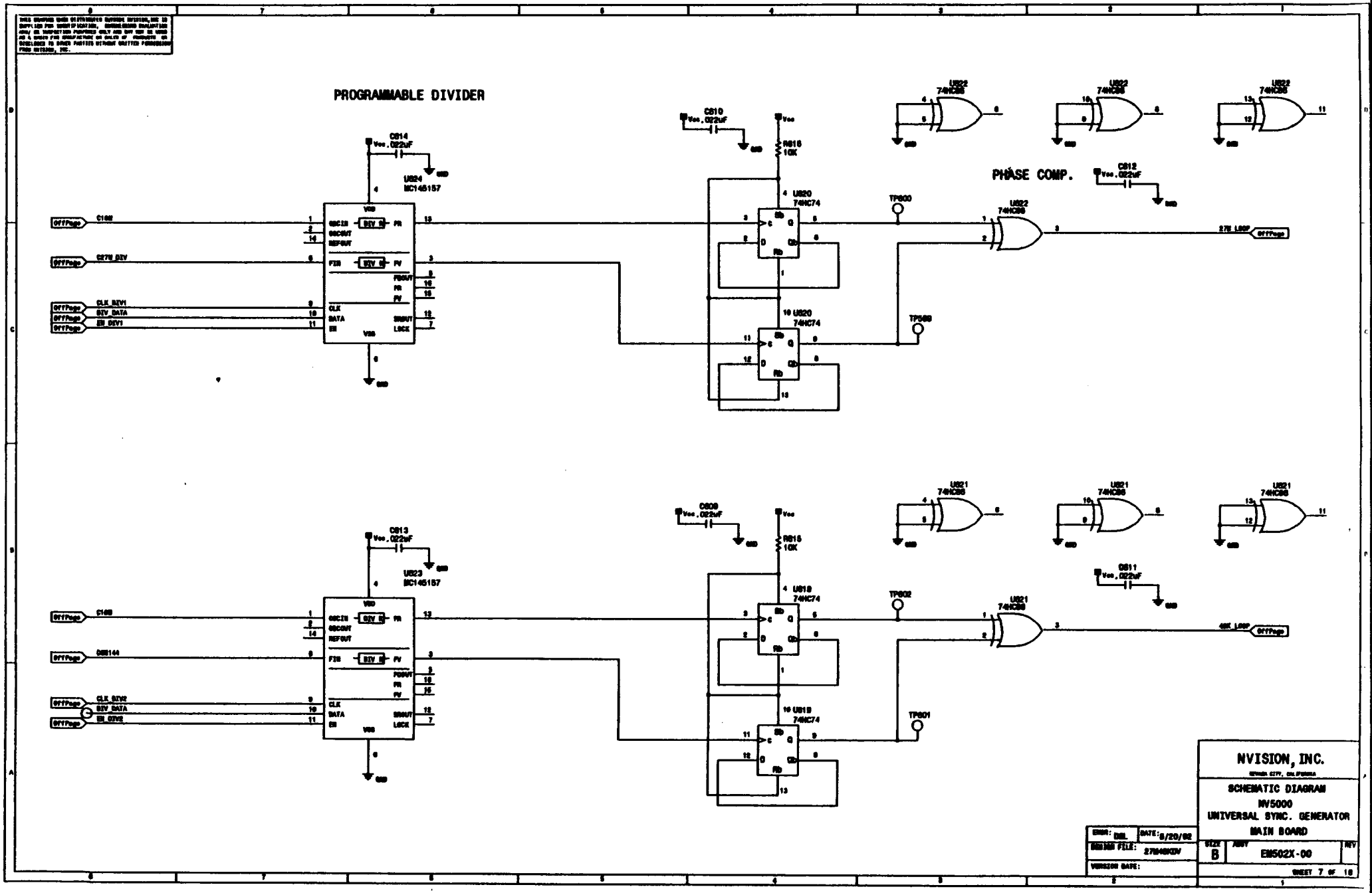
NVISION, INC.

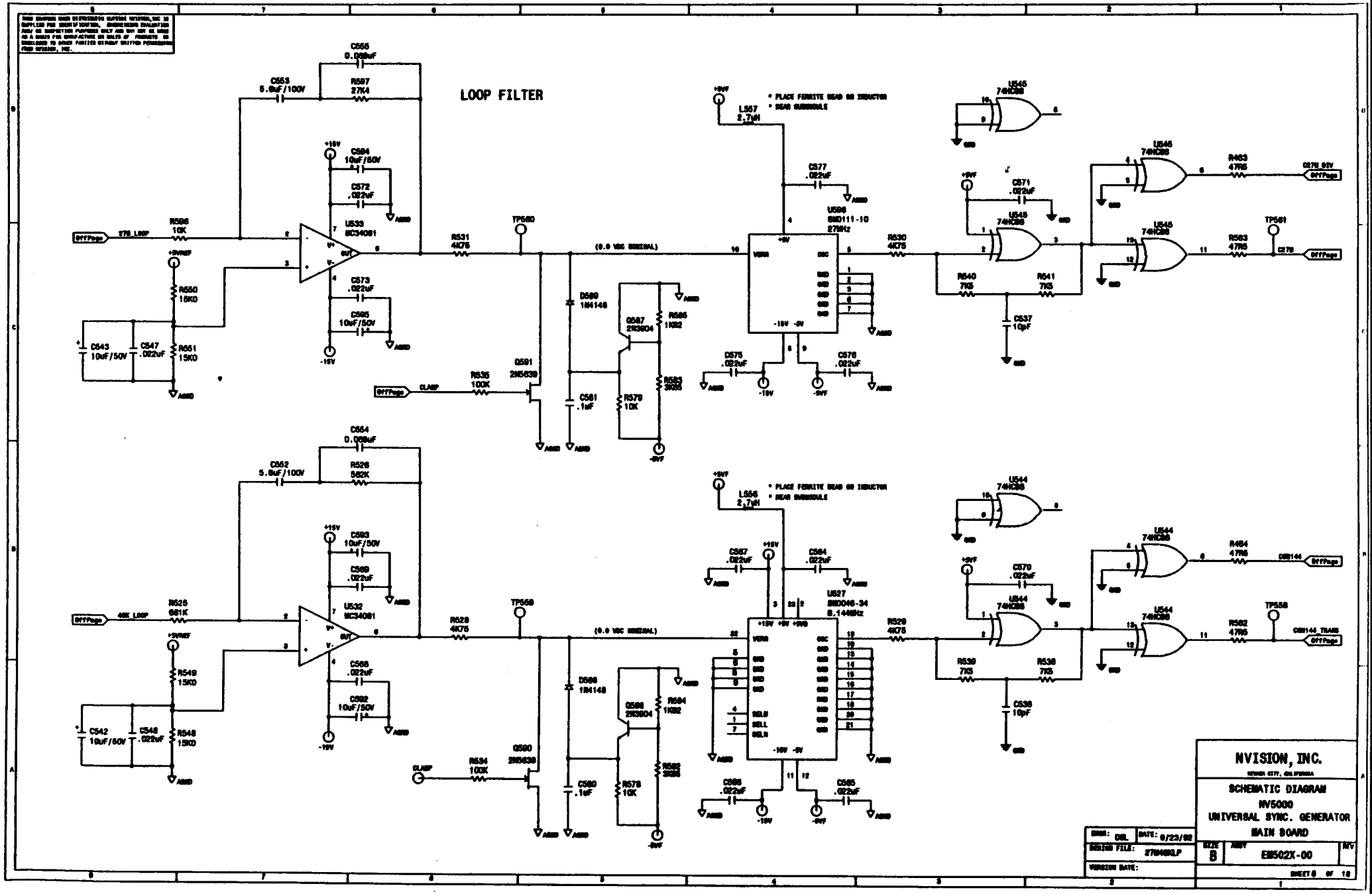
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD

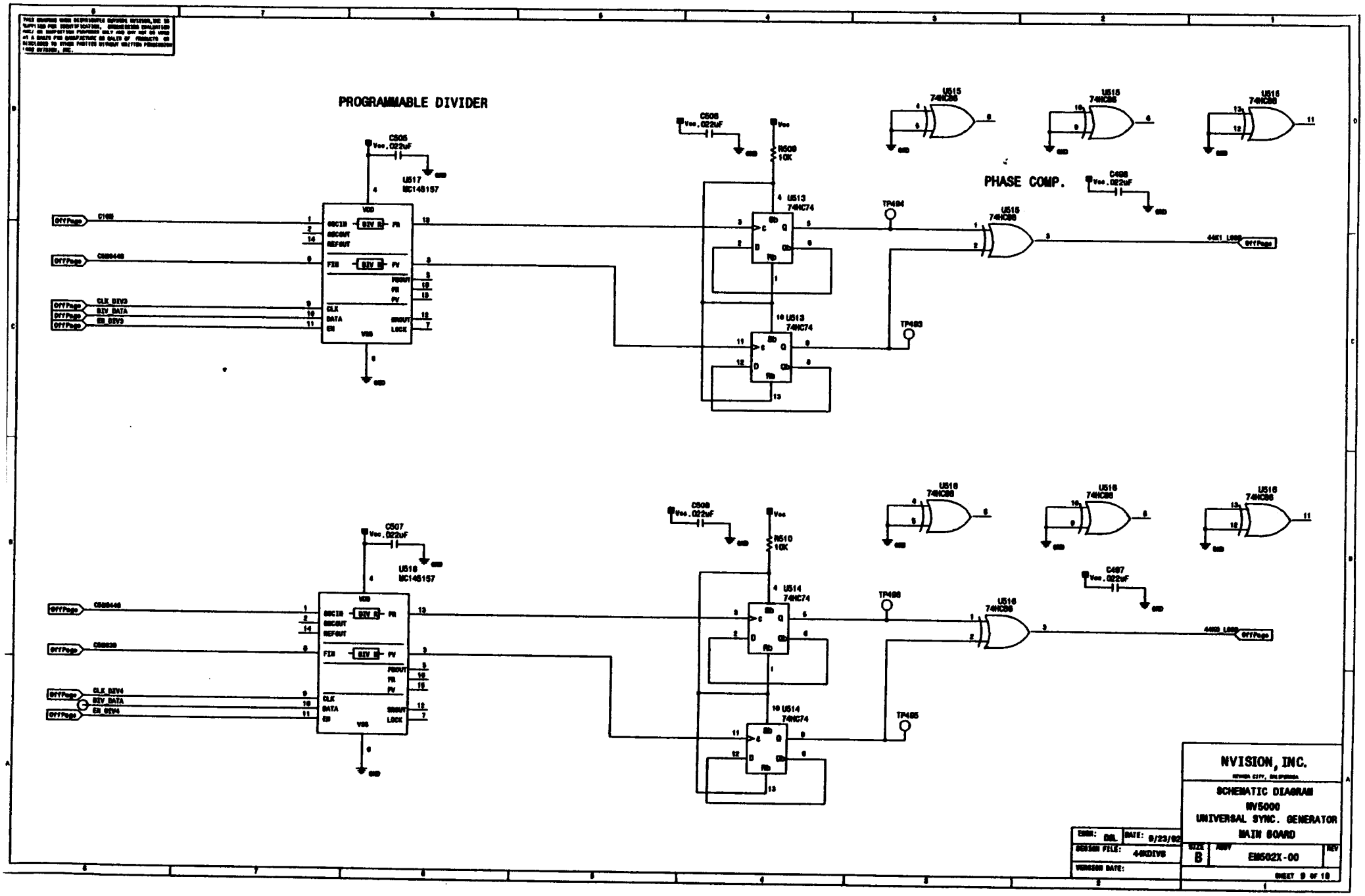
SIZE B | ASSY EM502X-00 | REV

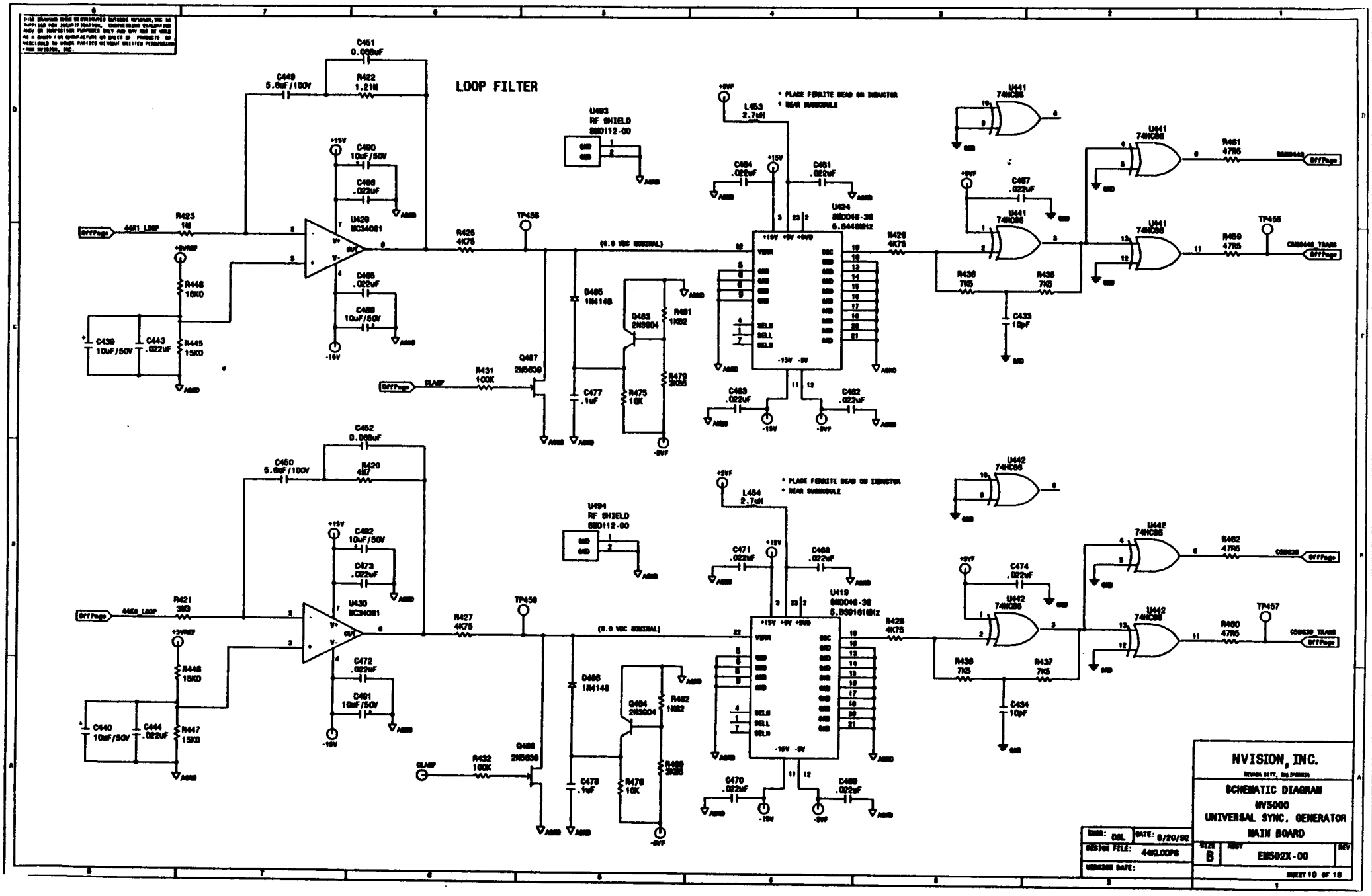
SHEET 8 OF 10

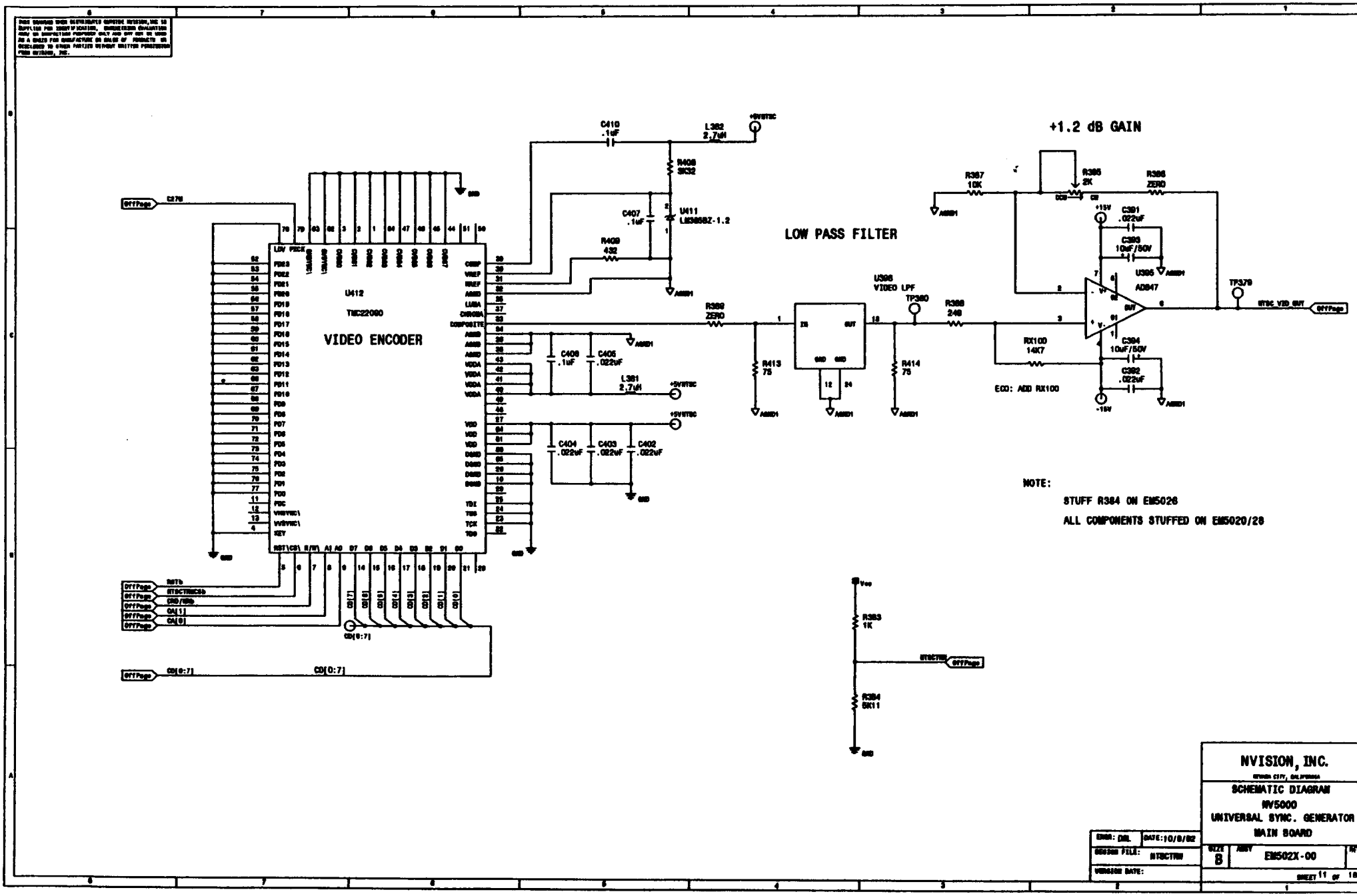
DRAWN: DBL | DATE: 8/23/96
DESIGN FILE: 18B_LOOP
VERSION DATE:

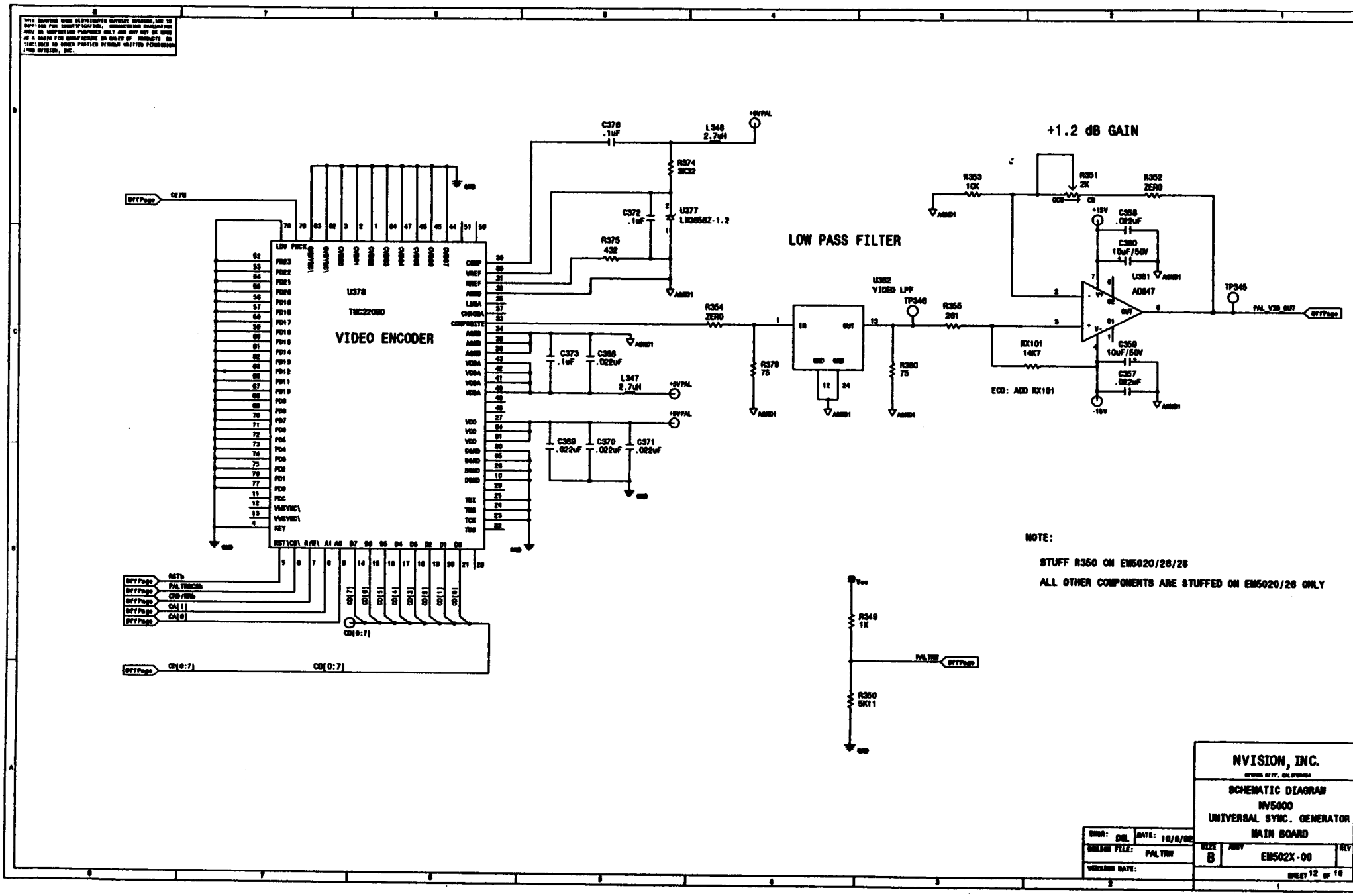

PROGRAMMABLE DIVIDER
PHASE COMP.
U824
MC145157
U823
MC145157
U820
74HC74
U819
74HC74
U822
74HC86
U821
74HC86
C814
C810
C812
C813
C809
C811
R816
10K
R815
10K
TP800
TP802
TP801
TP799
27E LOOP
40K LOOP
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
B
EM502X-00
SHEET 7 OF 10

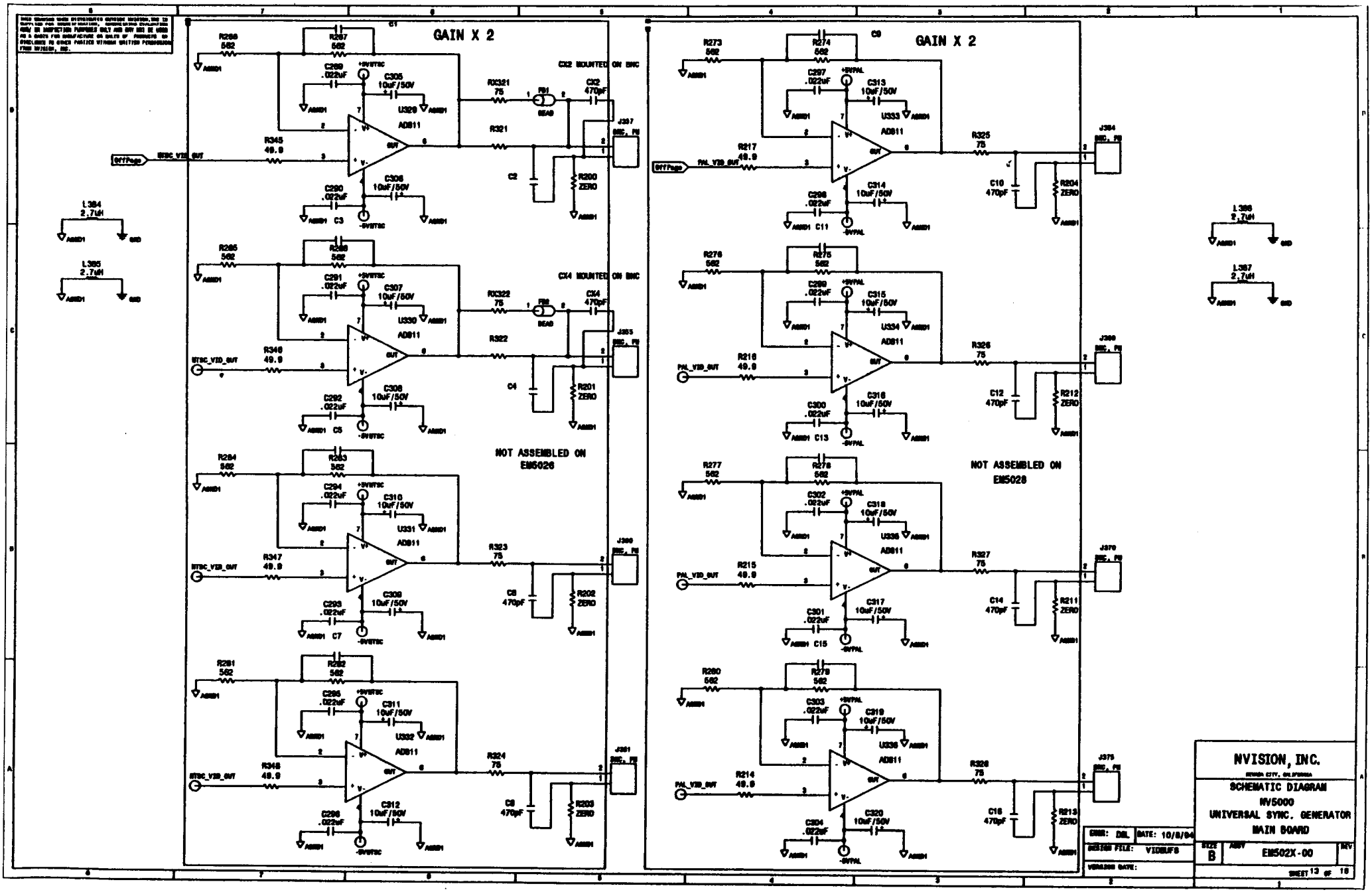

LOOP FILTER
* PLACE FERRITE BEAD ON INDUCTOR
* NEAR SUBMODULE
(0.0 VDC NOMINAL)
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
EB502X-00

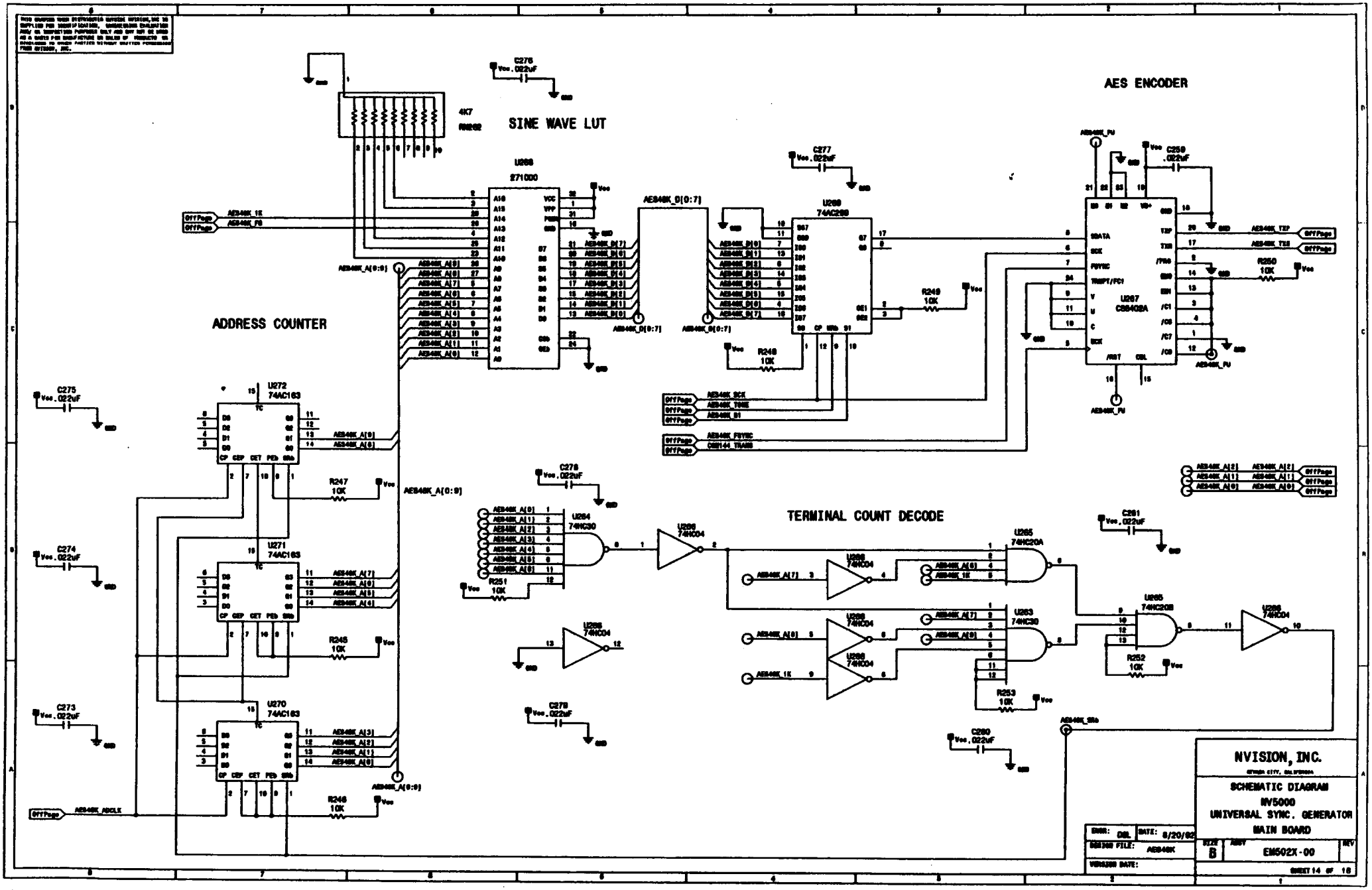

PROGRAMMABLE DIVIDER
PHASE COMP.
U517
MC145157
U513
74HC74
U515
74HC86
U516
MC145157
U514
74HC74
U516
74HC86
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
EM502X-00
SHEET 9 OF 10

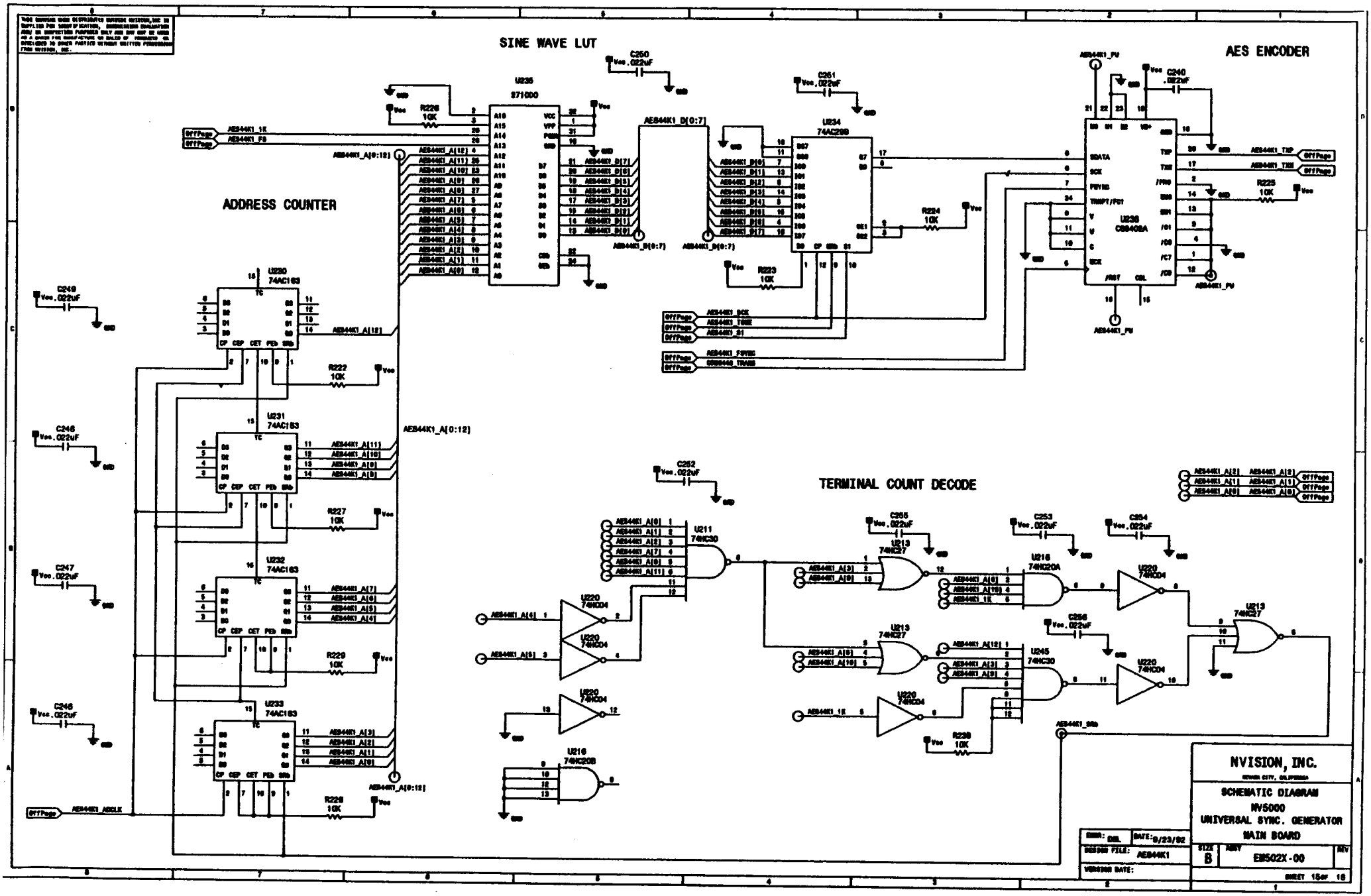

LOOP FILTER
C451 0.068uF
C449 5.6uF/100V
R422 1.21M
U429 MC34081
C490 10uF/50V
C496 .022uF
C498 .022uF
C499 10uF/50V
R423 1M
R425 4K75
TP456
R448 15KΩ
R445 15KΩ
C439 10uF/50V
C443 .022uF
U493 RF SHIELD 88D112-00
L453 2.7uH
C484 .022uF
C481 .022uF
U424 88D046-36 5.6448MHz
C483 .022uF
C482 .022uF
R426 4K75
D485 1N4148
Q483 2N3904
R481 1K82
R475 10K
R479 3K65
Q487 2N5638
R431 100K
C477 .1uF
C433 10pF
R436 7K5
R435 7K5
U441 74HC86
R461 47R5
R459 47R5
TP455
C452 0.068uF
C450 5.6uF/100V
R420 4K7
U430 MC34081
C492 10uF/50V
C473 .022uF
C472 .022uF
C491 10uF/50V
R421 3K3
R427 4K75
TP458
R448 15KΩ
R447 15KΩ
C440 10uF/50V
C444 .022uF
U494 RF SHIELD 88D112-00
L454 2.7uH
C471 .022uF
C468 .022uF
U419 88D046-36 5.5991618Hz
C474 .022uF
C470 .022uF
C469 .022uF
R428 4K75
D486 1N4148
Q484 2N3904
R482 1K82
R476 10K
R480 3K65
Q488 2N5638
R432 100K
C478 .1uF
C434 10pF
R438 7K5
R437 7K5
U442 74HC86
R462 47R5
R460 47R5
TP457
* PLACE FERRITE BEAD ON INDUCTOR
* NEAR SUBMODULE
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
DRAWN: DSL
DATE: 8/20/92
DESIGN FILE: 440LOOP6
VERSION DATE:
SIZE B
EM502X-00
REV
SHEET 10 OF 18


+1.2 dB GAIN
LOW PASS FILTER
VIDEO ENCODER
U412
THC22090
U411
LM3886Z-1.2
U398
VIDEO LPF
U395
AD847
TP380
TP379
R369
ZERO
R368
249
R367
10K
R386
2K
R385
ZERO
R408
3K32
R409
432
R413
75
R414
75
R384
5K11
R383
1K
C410
.1uF
C407
.1uF
C408
.1uF
C405
.022uF
C404
.022uF
C403
.022uF
C402
.022uF
C391
.022uF
C393
10uF/50V
C394
10uF/50V
C392
.022uF
L382
2,7uH
L381
2,7uH
RX100
14K7
ECO: ADD RX100
+5VHTDC
+15V
-15V
AGND
GND
NOTE:
STUFF R384 ON EM5026
ALL COMPONENTS STUFFED ON EM5020/28
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
SIZE B
ASSY EM502X-00
REV
SHEET 11 OF 18
DRAWN: DBL
DATE: 10/8/02
VERSION DATE:


VIDEO ENCODER
U378
TMC22080
LOW PASS FILTER
+1.2 dB GAIN
U382
VIDEO LPF
U381
AD847
C378 .1uF
L348 2.7uH
R374 5K32
C372 .1uF
U377 LM385BZ-1.2
R375 432
R354 ZERO
C373 .1uF
C366 .022uF
L347 2.7uH
C368 .022uF
C370 .022uF
C371 .022uF
R379 75
R380 75
TP346
R355 261
R353 10K
R351 2K
R352 ZERO
C358 .022uF
C360 10uF/50V
C359 10uF/50V
C357 .022uF
RX101 14K7
ECO: ADD RX101
TP345
PAL_V39_OUT
R349 1K
R350 5K11
PALTRM
CD[0:7]
NOTE:
STUFF R350 ON EM5020/26/28
ALL OTHER COMPONENTS ARE STUFFED ON EM5020/26 ONLY
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
SIZE B
DWG NO EM502X-00
REV
SHEET 12 OF 16


GAIN X 2
GAIN X 2
NOT ASSEMBLED ON EM5026
NOT ASSEMBLED ON EM5028
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
EM502X-00
SHEET 13 OF 18


SINE WAVE LUT
AES ENCODER
ADDRESS COUNTER
TERMINAL COUNT DECODE
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
EM502X-00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ADDRESS COUNTER
TERMINAL COUNT DECODE
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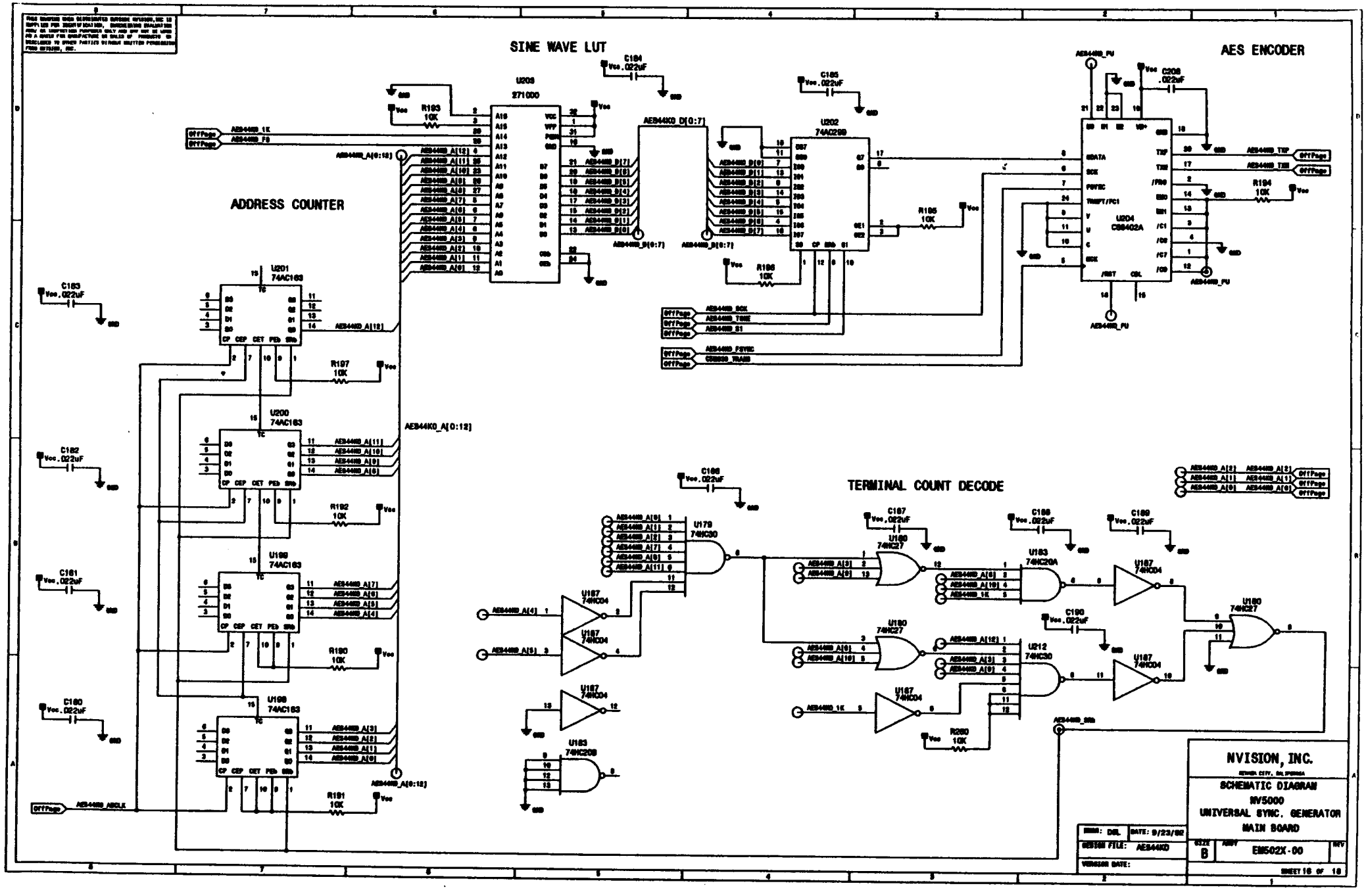
U234
74AC299
U238
C8840BA
U230
74AC163
U231
74AC163
U232
74AC163
U233
74AC163
U211
74HC30
U213
74HC27
U216
74HC20A
U220
74HC04
U245
74HC30
U216
74HC20B
R222
10K
R223
10K
R224
10K
R225
10K
R226
10K
R227
10K
R228
10K
R229
10K
R238
10K
C249
Vcc .022uF
C248
Vcc .022uF
C247
Vcc .022uF
C246
Vcc .022uF
C250
Vcc .022uF
C251
Vcc .022uF
C252
Vcc .022uF
C253
Vcc .022uF
C254
Vcc .022uF
C255
Vcc .022uF
C256
Vcc .022uF
C240
.022uF
AE844K1_A[0:12]
AE844K1_D[0:7]
AE844K1_PU
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
SIZE B
ASSY EB502X-00
REV
SHEET 15 OF 18
DRAWN: GBL
DATE: 9/23/92
DESIGN FILE: AE844K1


SINE WAVE LUT
AES ENCODER
ADDRESS COUNTER
TERMINAL COUNT DECODE
U208
27100D
U202
74AC299
U204
CS8402A
U201
74AC163
U200
74AC163
U199
74AC163
U198
74AC163
U179
74HC30
U180
74HC27
U183
74HC20A
U187
74HC04
U212
74HC30
U183
74HC20B
C183
C182
C181
C180
C184
C185
C186
C187
C188
C189
C190
C208
R193
R194
R195
R196
R197
R192
R190
R191
R260
10K
.022uF
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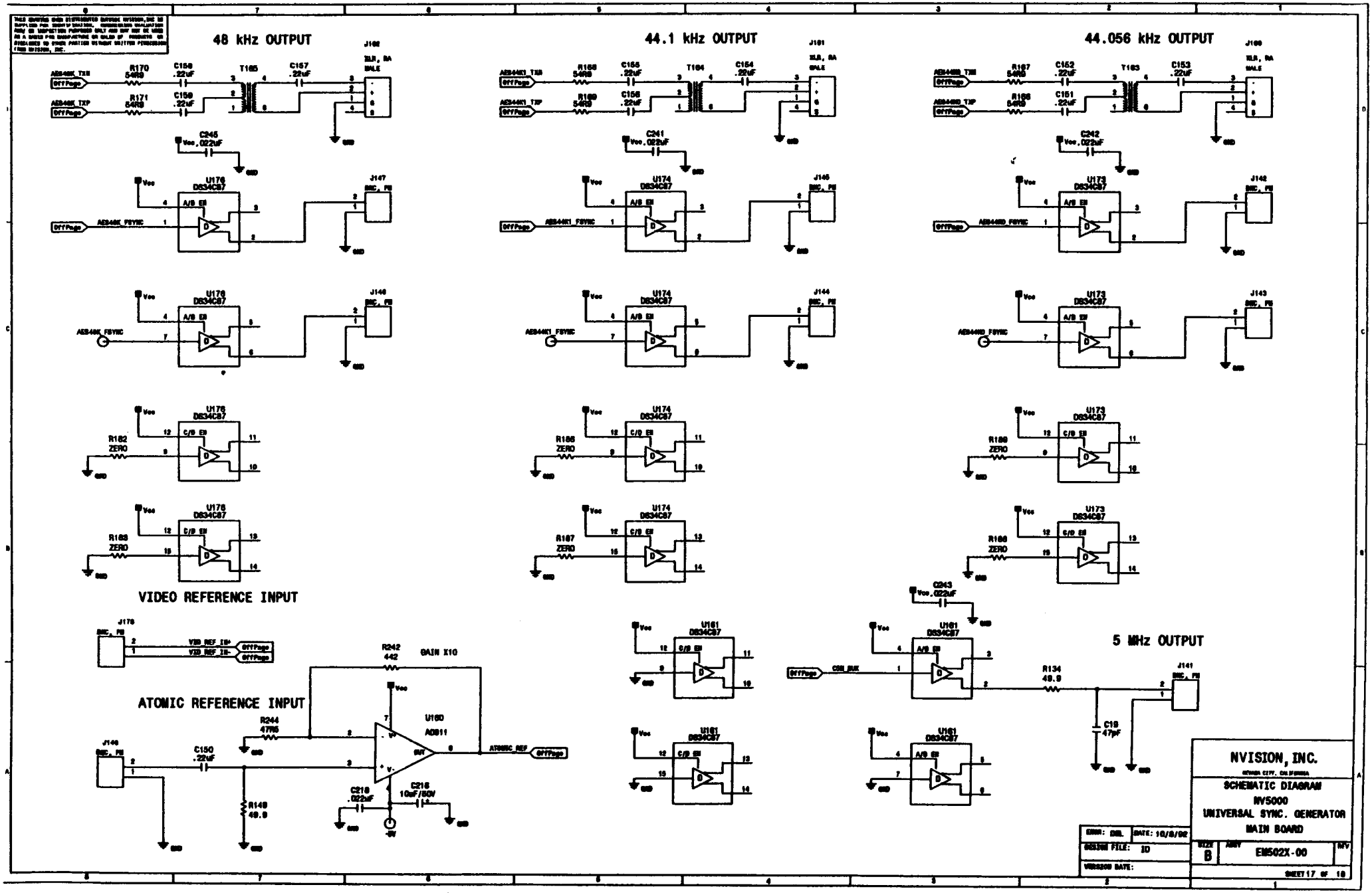
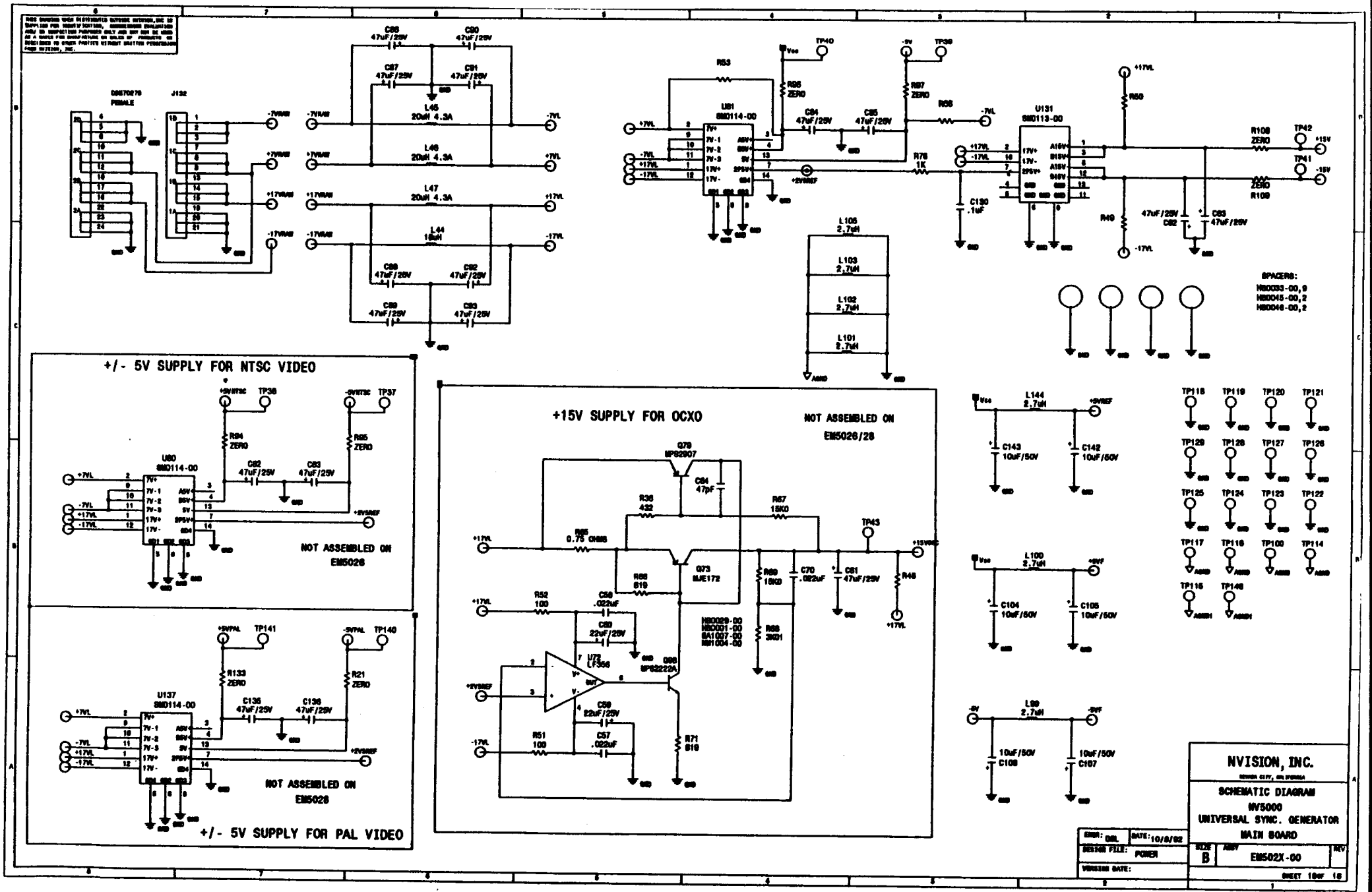
AEB44KD_A[0:12]
AEB44KD_1K
AEB44KD_F0
AEB44KD_ABCLK
AEB44KD_FU
AEB44KD_TXP
AEB44KD_TXN
AEB44KD_SCK
AEB44KD_TXNE
AEB44KD_S1
AEB44KD_FSYNC
CS8402A_TRANS
AEB44KD_Stb
OFFPage
Vcc
GND
NVISION, INC.
NEWARK CITY, CALIFORNIA
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
DRAWN: DBL
DATE: 9/23/02
DESIGN FILE: AEB44KD
VERSION DATE:
SIZE B
ASSY EM502X-00
REV
SHEET 16 OF 18


48 kHz OUTPUT
44.1 kHz OUTPUT
44.056 kHz OUTPUT
VIDEO REFERENCE INPUT
ATOMIC REFERENCE INPUT
5 MHz OUTPUT
GAIN X10
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
EM502X-00
SHEET 17 OF 18


+/- 5V SUPPLY FOR NTSC VIDEO
NOT ASSEMBLED ON EM5026
+/- 5V SUPPLY FOR PAL VIDEO
NOT ASSEMBLED ON EM5026
+15V SUPPLY FOR OCXO
NOT ASSEMBLED ON EM5026/28
SPACERS:
HB0033-00,9
HB0045-00,2
HB0046-00,2
NVISION, INC.
SCHEMATIC DIAGRAM
NV5000
UNIVERSAL SYNC. GENERATOR
MAIN BOARD
EM502X-00
SIZE B
DWN: DBL
DATE: 10/8/02
DESIGN FILE: POWER

APPENDICES

A TIME BASE ACCURACY REQUIREMENTS FOR VARIOUS STANDARDS AND SYSTEMS.

PAL B, G, & H	subcarrier = 4.433618.75 ± 5 Hz = ± 1.1277 ppm
PAL I	subcarrier = 4.433618.75 ± 1 Hz = ± 0.225 ppm
NTSC M	subcarrier = 3.579545 ± 10 Hz = ± 2.79 ppm
AES/EBU	Grade 1= ± 1.0 ppm

GLOSSARY

AES/EBU ..... Audio engineering Society/European Broadcast Union

ATR ..... Commonly used abbreviation for Audio Tape Recorder

Audio ..... Sound element of a television program, composed of one or more channels of sound, music, and narration

Bi-phase ..... Data encoding format for serial transmission

Cue audio ..... Audible information sound track

D1 ..... Component digital (4:2:2) videotape format

D2 ..... Component digital videotape format

DAC ..... Digital to Analog Convertor

Delta-Sigma ..... Analog to Digital conversion technique

Duplex ..... Bi-directional

ECL ..... Emitter Coupled Logic

FCC ..... Federal Communications Commission (government agency)

FET ..... Field Effects Transistor

Fiber ..... Refers to glass core of fiber optic cable

Fiber Optic ..... Glass transmission cable used in all modern telecommunications systems

HDTV ..... Commonly used abbreviation for High Definition Television

HDVS ..... Commonly used abbreviation for High Definition Video System

Hybrid ..... Electrical component technology

I/O ..... Commonly used abbreviation for Input and Out interfaces and/or modules

IC ..... Commonly used abbreviation for Integrated Circuit

LED ..... Light Emmitting Diode

Monaural ..... Single audio channel

MOV ..... Abbreviation for Metal Oxide Varistors

MUX ..... Commonly used abbreviation for Multiplexer Board

Nm ..... Nanometer - metric measurement, refers to frequency of fiber optic spectrum

NTSC ..... National Television Systems Committee. The standard broadcastspecifications approved by the Federal Communications Commission (FCC) in 1953 for commercial color television in the U.S. Television signal is scanned in 525 lines

Oversampling ..... Digital sampling technique to increase digital sample rate

PAL ..... Phase Alternate Lines. European, Asian, and Australian color television standard. An improvement on the NTSC. Television signal is scanned in 625 lines

PROM ..... Programmable Read Only Memory

PWM ..... Abbreviation for Pulse Width Modulation

RAM ..... Abbreviation for Random Access Memory

S/N ..... Commonly used abbreviation for Signal to Noise ratio.

Simplex ..... Uni-directional

SMPTE ..... Society of Motion Picture and Television Engineers

ST type connector ..... A fiber optic connector

Stereo ..... A system of sound reproduction for two precisely phased channels of audio

Stereo pair ..... Left and right channels of stereo audio

STL ..... Studio Transmitter Link

Switcher ..... A device which performs simple or complex video transitions, i.e, cuts, dissolves, wipes, keys

Synchronization ..... The process whereby two machines are controlled by identical time bases

Timecode ..... Standard for encoding time in hours, minutes, seconds and frames of video

TTL ..... Transistor, Transistor Logic

VCXO ..... Voltage Controlled Crystal Oscillator

VDE ..... Verband Deutscher Electrotechniker

Video ..... Picture element of a television signal

VTR ..... Commonly used abbreviation for Video Tape Recorder

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