DPS-470

DIGITAL COMPONENT AV SYNCHRONIZER

Service Manual

Copyright Information

Copyright

The printed version of this document is DPS Part Number 708-470 and the version number is 1.01.

Caveats

Information in this document is subject to change without notice and does not represent a commitment on the part of Digital Processing Systems Inc.

This product requires technical and mechanical ability and requires precautions against electrostatic discharge. The user assumes all risks when this product is installed by anyone other than an authorized Digital Processing Systems dealer.

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Introduction

The Digital Processing Systems DPS-470 Digital Component AV Synchronizer is a 10-bit video synchronizer, or audio/video synchronizer, featuring serial digital and analog component, composite and Y/C input and outputs. It is available in both video-only and audio/video configurations. In either configuration, the DPS-470 provides an ideal bridge between analog video signals, such as satellite and microwave feeds, and a digital production facility.

- Four different input and output formats are provided
- Serial Component Digital Video (SDI)
- Component Analog Video (Betacam / MII)
- S-Video (S-VHS / Hi8)
- Composite Video

An adaptive comb filter decoder and 10-bit ITU-R-BT.601 component processing provide maximum signal transparency. A built-in auto-sense TBC circuit provides seamless mode switching between direct color and heterodyne sources such as camcorders and VCRs.

The DPS-470 is also a transcoder and a digital test signal generator. In Test Signal Generator (TSG) mode, any one of 33 different 10-bit test patterns can be selected to appear at all four outputs. The operator can specify which test signals are used by the built-in Vertical Interval Test Signal (VITS) inserter.

With the addition of a DPS AS-470 four-channel audio synchronizer module, the DPS-470 can provide dual stereo audio and video synchronization in a single rack unit package. The internal audio synchronizer option supports balanced analog, AES/EBU digital and embedded SDI audio I/O. All outputs are active simultaneously, which enables both analog and digital audio devices to be connected at the same time. Incoming stereo audio pairs can be selected from the analog, digital or embedded SDI inputs. All four audio channels dynamically track the internal delay of the video synchronizer whenever auto-track mode is enabled. Up to 16 fields of fixed delay can also be specified, ensuring proper lip sync regardless of the program source. All audio parameters are controlled from an easy-to-use front panel menu. A variety of DPS multi-channel remote controls are also available.

The DPS-470 serial digital component synchronizer represents the ideal choice for broadcasters beginning their transition to DTV.

Chapter 1:Installation and Configuration

INSTALLATION

Unpacking and Inspection

This unit has been thoroughly calibrated and inspected, both electronically and mechanically, to ensure that it meets the published specifications. The following items are included with each DPS-470:

Description	Quantity
DPS-470 Digital Component AV Synchronizer	1
Operations Manual	1
AC Power Cord	1
Video Breakout Cable (Part # 774-565)	1
Audio Breakout Cable (Part # 774-470) (available only with the DPS-470AV)	1

Mounting

The size of the DPS-470 allows it to fit into most standard consoles or 19-inch racks. If the unit is to be mounted in a rack, then rack slides or trays must be used for support. Care must be taken to select a dry, well-ventilated location with a minimum of dust and vibration. Also, leave sufficient clearance from the unit's rear panel to allow for proper air circulation.

After unpacking the unit and before installing it in a console or rack, allow at least 30 minutes for temperatures to equalize and to eliminate any condensation that may have developed.

CONFIGURATION

DIP Switches

There are eight DIP switches located near the front edge of the DPS-470 board. DIP switches 1 and 2 can adjusted. DIP switches 3-8 are reserved for factory use and should not be changed.

Closed Caption Processing (DIP Switch 1)

Change this DIP switch of the closed caption lines 21 and 22 of fields 1 and 2 are to be processed through the COMB filter or to be bypassed.

- UP COMB Filter Active during closed caption lines
- DOWN Closed Caption Bypass COMB Filter

Vertical Interval Processing (DIP Switch 2)

Selects the function of the COMB filter during the vertical interval synchronizer mode.

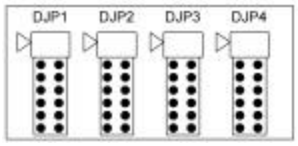
- UP Band-Pass mode
- DOWN Bypass mode

LCD Intensity

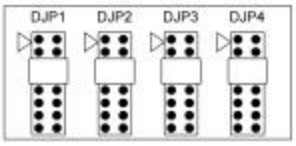
To change the LCD intensity, the top cover must be removed. Remove the screws that secure the top cover to the chassis and lift off the cover. The LCD intensity adjustment will be visible behind the front panel near the front left corner of the board (see diagram, next page). Use a small flat-head screwdriver to set the desired intensity.

Jumper Settings

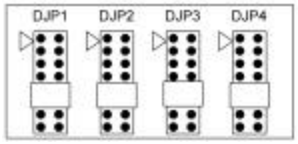
AES/EBU is comprised of 2 channels each transmitting (output) and receiving (input) audio. The channels are independent and can be set to transmit XLR balanced (110 ohms) audio or BNC unbalanced (75 ohms) audio. You could also configure the input as XLR and the output as BNC, or vice-versa. Do not use the XLR and BNC connections for the same input output channel at the same time. In order to select the right impedance on each channel, you must configure the jumper settings on the audio board's PCB. The headers are labeled DJP1, DJP2, DJP3 and DJP4. An arrow points to pin 1 on each header. Use the following diagrams to configure the jumpers to the desired settings. Please note that the BNC unbalanced (75 ohms) audio is the factory default. Also, depending on how the jumpers are set on the board determines which of the cables are active on the breakout cable.



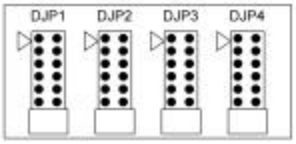
Channel 1:
Receive – 110 ohms
Transit – 110 ohms



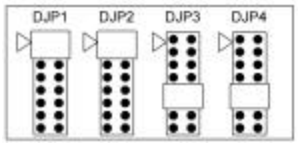
Channel 2:
Receive – 110 ohms
Transmit – 110 ohms



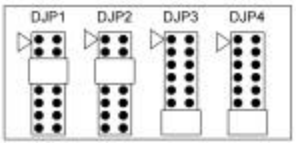
Channel 1:
Receive – 75 ohms
Transmit – 75 ohms



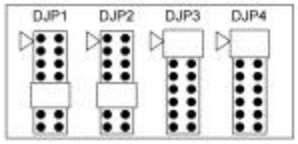
Channel 2:
Receive – 75 ohms
Transmit – 75 ohms



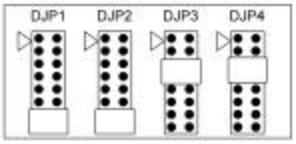
Channel 1:
Receive – 110 ohms
Transmit – 75 ohms



Channel 2:
Receive – 110 ohms
Transmit – 75 ohms

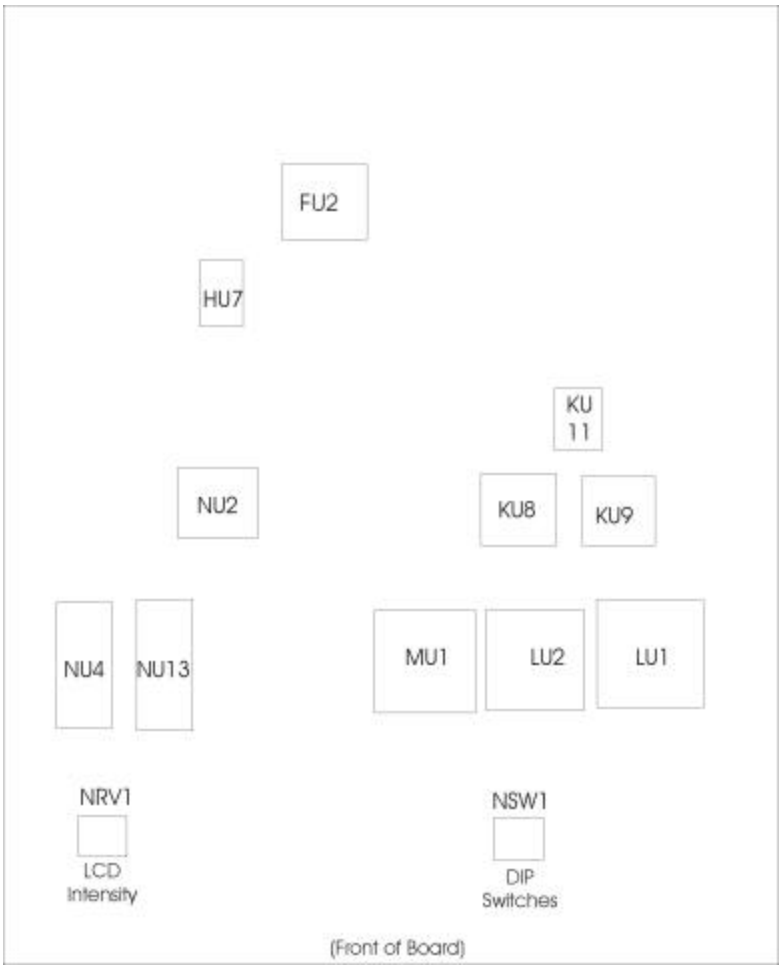


Channel 1:
Receive – 75 ohms
Transmit – 110 ohms



Channel 2:
Receive – 75 ohms
Transmit – 110 ohms

DPS-470: Simplified Video Board Layout



Chapter 2: Connections

This chapter describes how to interface the DPS-470 with other video and audio equipment in your system.

DPS-470: Back Panel

VIDEO INPUTS

S-Video Input

This 4-pin connector, labeled S-*VIDEO IN*, is used for S-Video signals, like S-VHS or Hi8. It is normally connected to the S-Video output of a playback VCR using a standard 4-pin to 4-pin S-Video cable. Some JVC 'industrial' type S-VHS players use a 7-pin connector for their S-Video output. To interface with such machines, a 7-pin to 4-pin adapter cable is required from the manufacturer of the VCR.

Component Analog Video Input

These BNC connectors, labeled *Y-IN*, *R-Y IN*, and *B-Y IN*, are used to input the signals from analog component devices, such as Betacam cameras or VTRs.

Serial Digital D1 Input

This BNC connector, labeled *SDI IN*, accepts serial digital ITU-R BT.601 video and embedded audio data at a rate of 270 megabits per second.

Composite Video Input

This BNC connector, labeled *COMPOSITE IN*, is used to feed composite 1 Vp-p video to the DPS-470. In Synchronizer Mode, the input video signal can be direct color or monochrome; in Timebase Corrector Mode, the input signal can be connected to the video output of a VCR.

VIDEO OUTPUTS

Serial Digital D1 Outputs

These BNC connectors, labeled S*DI OUT*, provide the synchronized/timebase-corrected serial digital ITU-r-BT.601, 270 megabits-per-second output.

Composite Video Output

These BNC connectors, labeled *COMP-1 OUT* and *COMP-2 OUT*, provide synchronized/timebase-corrected versions of any of the input signals, except when the DPS-470 is in either Bypass or TSG mode (for a discussion of the output in these modes, see the "Synchronizer Mode" section in Chapter 3). The *COMP-1* output can be bypassed from the front panel or will automatically do so when the DPS-470 is turned off.

S-Video Output

The synchronized /timebase-corrected S-Video version of the video input signal is part of the Multi I/O connector (see below).

Component Analog Video Output

The synchronized /timebase-corrected analog component video output is part of the Multi I/O connector (see below).

Multi I/O Breakout Cable (Component, S-Video, GPI)

A DB-15F high-density connector, labeled *MULTI I/O* is located on the right-hand side of the rear of the DPS-470. This connection and breakout cable contains the connections for Component Out, S-Video Out and GPI.

Genlock Reference

These BNC connectors, labeled *REF LOOP*, are used to loop a genlock signal through the DPS-470 to establish the timing for its video output signal. The signal for this input must always be stable, such as the output from a black-burst or color-bar generator. Do not attempt to use a signal that has not been timebase-corrected. When a valid signal is connected to the *REF LOOP* input, the video output of the DPS-470 will be genlocked to this signal. When no external reference is supplied to the genlock input, the DPS-470 will operate using its own internal sync generator. If the second *REF LOOP* is unused, terminate it with a 75-ohm terminator.

AUDIO INPUTS

The DPS-470 can process 2 stereo pairs of analog audio, 2 stereo pairs of AES/EBU audio, or Serial Digital (SDI) audio. You can select which 2 stereo channels to be processed. The audio inputs can be selected from the front panel. Since all of the outputs are active simultaneously, inputs can be mixed from any of the analog audio SDI audio or AES/EBU audio.

Analog Audio Inputs (Terminal Strip)

The analog audio input accepts 2 stereo pairs. The first pair is considered channel 1 and the second channel 2. Channel 1 and 2 are comprised of two components each, left and right. Please see the diagram of the Back Panel.

The analog audio inputs can be configured to 600 ohms balanced/unbalanced or high impedance balanced/unbalanced audio.

AES/EBU Audio (Breakout Cable)

The following is a description of the breakout cable accompanied with the DPS-470.

Audio Inputs

XLR CH-1

The XLR CH-1 connector is used for AES/EBU balanced audio input on channel 1.

XLR CH-2

The XLR CH-2 connector is used for AES/EBU balanced audio input on channel 2.

BNC CH-1

The BNC CH-1 is used for unbalanced AES/EBU audio input on channel 1.

BNC CH-2

The BNC CH-2 is used for unbalanced AES/EBU audio input on channel 2.

NOTE: Any combination of two connectors above can be used, providing that they are on a separate channel.

Serial Digital Embedded Audio Input (SDI)

The DPS-470 accepts four channels of audio on the SDI input port. The four channels can be selected from any group on the SDI input.

AUDIO OUTPUTS

Analog Audio Outputs (Terminal Strip)

The analog audio output accepts 2 stereo pairs. The first pair is considered channel 1 and the second channel 2. Channel 1 and 2 are comprised of two components each, left and right. Please see the diagram of the Back Panel.

The analog audio outputs can be configured to 600 ohms balanced/unbalanced or high impedance balanced/unbalanced audio.

XLR CH-1

The XLR CH-1 connector is used for AES/EBU balanced audio output on channel 1.

XLR CH-2

The XLR CH-2 connector is used for AES/EBU balanced audio output on channel 2.

BNC CH-1

The BNC CH-1 is used for unbalanced AES/EBU audio output on channel 1.

BNC CH-2

The BNC CH-2 is used for unbalanced AES/EBU audio output on channel 2.

Serial Digital Embedded Audio Output (SDI)

Any of the selected audio inputs can be embedded into the output of the SDI stream.

REMOTE CONTROL PORTS

In addition to remote triggering of the Freeze function via the GPI interface, all functions of the DPS-470 can be remotely controlled by devices capable of either RS-232 or RS-422. The DPS-470 is the first DPS studio product to also feature a *DPS Coaxial Network* (DCN) port. The type of control is selected in the Configuration Menu, under the Remote Control sub-menu (see Chapter 3, “Operation”).

RS-232 and RS-422

This DB-9F connector is used to remote control the DPS-470 via either RS-232 or RS-422. When this port is in use, a Unit Address must be set to an appropriate value in the range of 1-127. This allows the DPS-470 to be used in a multi-drop configuration where only the unit addressed will respond to remote commands.

DCN Port

This BNC connector is used to provide a DCN (DPS Coaxial Network) interface for remote control and status monitoring. DCN is a simple proprietary network in which 75-ohm coax is used as a multi-drop, bi-directional network. Using a BNC T connector on the DPS-470, loop coax between each DPS-470 and RC-4000. At each end of the chain,

install a 75-ohm terminator. Every DPS-470 is assigned a unique DCN address at the factory, so there is no software configuration required. Maximum cable length (total) in a DCN configuration should be limited to 2000 feet. Remember to enable DCN at the DPS-470 front panel when using the RC-4000.

Use with RC-4000

To control the DPS-470 from a RC-4000 remote control panel, any of the above ports may be used. However, for new installations, the DCN port is recommended. If using the DCN port, then you may use the “Search for devices” menu option on the RC-4000. The RC-4000 will find all DPS-470s attached to it’s DCN port and configure itself to control them. This may be done for any number of units at one time. DCN also allows multiple RC-4000s to control a single DPS-470.

To use RS-232 or RS-422 for control, the normal installation procedures should be followed on the RC-4000. The DPS-470 uses MIDI for its control protocol and must, therefore, be connected to a port configured for MIDI devices. Similarly, the baud rate and line type (RS-232 or RS-422) must match between the RC-4000 and the DPS-470. The cables required are straight connections (e.g., pin 1 to pin 1), but custom cables will be required to operate in multi-drop mode where multiple DPS-470s reside on a single RC-4000 serial port (see the RC-4000 manual for examples).

It is possible to remotely disable and enable the front panel of the DPS-470 from the RC-4000 using the “KeyLock” option. If neither this option nor the rear-panel KEYLOCK switch is activated, then it is possible for a local user to modify the remote-user’s settings from the front panel. However, the RC-4000 will periodically poll the device and show the new parameters if the local user changes them. If remote control is the usual case, then it is probably best to disable front-panel access once the device has been installed.

SWITCHES

There are two toggles switches on the back panel, labeled *KEYLOCK* and *TERM*.

Keylock

When this switch is down, or in lock position, none of the front panel keys will function.

Term

This switch terminates the RS-422 receive signal. Engage it when more than one unit is connected to the DPS-470 via RS-422.

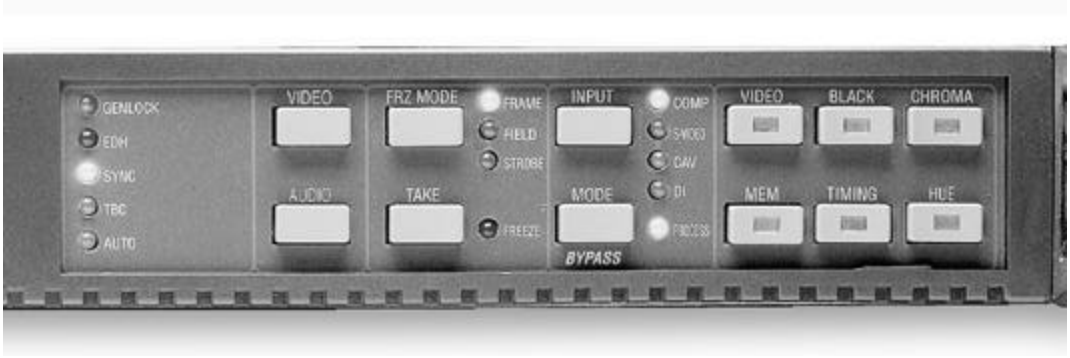
Chapter 3:Operation

DPS-470: Front Panel

The operation of the DPS-470 is organized into six main functional areas:

- Proc Amps
- Input Selection
- Synchronizer Mode
- Freeze Menu
- Video Configuration Menu
- Audio Configuration Menu

DPS-470: Front Panel Control Area



PROC AMPS

Luma

Pressing this button enables the luminance amplitude to be changed by rotating the control knob. The range is approximately +/- 30 percent.

Black

Pressing this button enables the black level to be changed by rotating the control knob. The range is approximately +/- 143 mV.

Chroma

Pressing this button enables the chrominance amplitude to be changed by rotating the control knob. The range is approximately +/- 50 percent.

Hue

Pressing this button enables the output phase to be changed by rotating the control knob. The range is approximately +/- 45 degrees. Hue cannot be adjusted in D1 or CAV modes.

Timing

Pressing this button enables adjustments of the horizontal position and genlock timing. Adjustments are:

- Horizontal Fine: increments of 2.314 ns
- Horizontal Coarse: increments of 74.074 ns
- Range: +/- 9.5 µs
- Subcarrier Fine: increments of 0.175 degrees
- Subcarrier Coarse: increments of 1.406 degrees
- Range: 0 - 360 degrees

By pressing the *TIMING* button multiple times, the DPS-470 cycles through the above selections. Use the control knob to set the exact timing.

Mem

The Memory button accesses the Store and Recall functions.

Store

Allows the current Proc Amp settings to be stored in the memory location selected using the control knob. Up to 10 settings can be stored, containing information on Video, Black, Chroma and Hue. Valid Store locations are numbered 001 - 010; location 000 is reserved for factory preset unity. To store a Proc Amp setting:

1. Press the *MEM* button
2. Use the control knob to select Store and press the *MEM* button again
3. Use the knob to select a memory location and press *MEM* again

Recall

Allows previously stored Proc Amp settings to be recalled. To recall:

1. Press the *MEM* button
2. Use the control knob to select Recall and press *MEM* again
3. Use the knob to select the desired memory location and press *MEM* again

(To abort, press any other Proc Amp control button before completing step 3.)
To recall factory preset unity, press the *MEM* button three times in succession. (Recalls location 000)

(NOTE: The *MEM* button cannot be used while in the Configuration Menu.)

INPUT SELECTION

The LED indicators, not on the LCD panel show the current (active) input selection. Inputs are selected by pressing the *INPUT* button until the desired input LED becomes active.

Possible inputs are:

- COMP (Composite)
- SVID (S-Video)
- CAV (Component Analog Video)
- SDI (Serial Digital)

A flashing LED indicates that video is not present at the selected video input.

SYNCHRONIZER MODES

In Synchronizer Mode, there are three choices of operation:

- PROCESS
- BYPASS
- TSG (Test Signal Generator)

Process

Process is the normal mode of operation. The *PROCESS/BYPASS* LED will stay lit when the synchronizer is active.

Bypass

In Bypass Mode the *COMPOSITE IN* video signal is bypassed to the *COMP-1 OUT*. To enter this mode:

1. Press the MODE button. The PROCESS/BYPASS LED will flash to indicate that the composite input is being bypassed to the composite output. No other signal will be bypassed.

2. To exit Bypass, press the MODE button again.

TSG

The DPS-470 has a selection of 33 test patterns that will appear on all video outputs. To use the 10-bit TSG Mode:

1.1 Press and hold the *MODE* button. The PROCESS LED will go out, TSG is enabled, and the LCD shows the active test signal name along with another test signal to select.

3. Rotate the control knob to select a test signal.

4. Press the *VIDEO* button to activate the selection.

5. To exit the TSG Mode, press the *MODE* button again.

NOTE: While in TSG Mode only the *MODE* and *VIDEO* buttons are active.

FREEZE MENU

Pressing the *FRZ MODE* button multiple times will cycle through the different freeze modes with an LED indicating one of the following modes:

- FRAME
- FIELD
- STROBE
- Press the *TAKE* button to actually freeze the video.
- if FIELD mode is selected, the LCD indicates the current field (1, 2, 3 or 4) and the control knob selects which field to be displayed;
- if STROBE mode is selected, the LCD indicates the current strobe rate (number of frames per update, 000 to 127) and the control knob allows the rate to be changed.

CONFIGURATION MENU

The Configuration Menu contains the video and audio options or sub-menus. The procedure to select and use any one of the sub-menus is the same:

1.1 To enter the Video Configuration Menu, press the *VIDEO* button. The LCD panel will display the beginning of the video menu. Press the *AUDIO* button to enter the audio configuration menu. What follows in steps 2–5 describes how to use the *VIDEO* menu; the procedure for the *AUDIO* menu is identical.

1.1 Use the control knob to select one of the sub-menus listed below, i.e., scroll through until the arrow (>) is pointing to the desired sub-menu. Press the *VIDEO* button again to enter the menu.

1.1 Use the control knob to choose and activate the option you want.

1.1 Press the *VIDEO* button to go to further sub-menus, if they are available, or to return to the beginning of the Configuration Menu, or,

1.1 Press any other button to exit the Configuration Menu (except *MEM*, and *AUDIO*).

VIDEO CONFIGURATION

Sync Mode

- Synchronizer: for this mode the input must be a stable, RS-170A signal (used for most satellite and camera feeds).
- TBC: used for heterodyned signals (i.e., from a VTR).
- Auto-Switch: will sense the incoming composite video signal and select Synchronizer or TBC setting automatically.

Genlock Mode

- Auto (default): with an external genlock source, the front panel GENLOCK LED will be lit. If the genlock source disappears, the DPS-470 will automatically switch to Internal mode and the GENLOCK LED will flash.
- Internal: the unit will operate on its own internal crystal and the GENLOCK LED will be off.

Blanking Width

Sets the number of video lines blanked by the DPS-470 during the vertical interval.

- Narrow (default): vertical blanking ends at line 10 of field 1, and line 9 of field 2.
- Wide: vertical blanking ends at line 21 of field 1, and line 20 of field 2.
- Superwide: vertical blanking ends at line 23 of field 1, and line 22 of field 2.

Hot Switch

- Off (default): automatic freeze is disabled.
- On: automatically goes into freeze mode whenever the input video signal is lost.
- Drop to Black: automatically goes into black output mode whenever the input video is lost.

Color / Monochrome

- Color Mode (default)
- Monochrome Mode
- For all outputs, selecting Monochrome places the DPS-470 into 'Forced Monochrome' mode where the chrominance picture detail is suppressed, and a black-and-white image is created. The color burst is still present.

Video Out

- Normal (default)
- Force Black Out: all outputs are forced to super-black.

Clamp Speed

Applicable to the COMPOSITE Synchronizer and the CAV input modes.

- Normal (default): the input video clamp is set to a '30-line' time constant.
- Fast: the input video clamp is set to a '3-line' time constant. This mode is used when hum is present on the input video signal.

Y/C Horiz Delay

The control range is from -592 ns to +518 ns, in 74 ns increments. The factory default setting is 0 ns delay. (Does not affect D1 input.)

Y/C Vert Delay

The control range is from -2 lines to +1 line. The factory default is 0 lines. (Does not affect D1 input.)

CAV In

Selects component analog input format.

- Beta In (default)
- MII In

CAV Out

Selects component analog output format.

- Beta Out (default)
- MII Out

D1 Clip Mode

This feature applies only to serial digital outputs, and enables (or disables) black clip level.

- Enabled (default): all levels below black – digital level 64 – are clipped.
- Disabled: digital levels below 64 are allowed.

EDH Mode

Error Detection Handling (EDH):

- Poll Off (default): disables EDH. Errors are not detected nor reported. The EDH LED is not lit.
- Poll: enables EDH and lights the EDH LED. Input errors are detected and reported in the "EDH RX ERROR COUNT" menu (see below). When errors are detected the EDH LED flashes.

EDH RX Error Count

A flashing EDH LED indicates that errors have been detected and not cleared. Actual error counts will be displayed as:

- AP: for the active picture.
- FF: for a full field.

To clear the error count, press the *VIDEO* button twice. The counter will be reset and the LED will stop flashing until the next error is detected.

Remote Control

Selects the remote control interface.

- RS-232 IN
- RS-422 IN
- DCN

RS-232 and RS-422 share the same DB-9. DCN uses the connector labeled "DCN" on the rear panel. See the INPUT section for more information about DCN. Whichever input type is selected, a valid controller must be connected to the correct connector on the back of the DPS-470.

Baud Rate

Allows you to change the remote port data rate:

- 9,600 BPS
- 38,400 BPS

Unit Address

Selects the DPS-470's unit address for remote control purposes. The DPS-470 can be controlled remotely by the RC-4000 2RU high super remote, the RC-2001 universal studio remote, the RC-2000 desktop remote, or PC-based custom remote software.

When using the RS-232 or RS-422 method, the user must select a unit address. Allowable address selections are from 1 to 127. Each installed DPS-470 must have a unique address setting. The setting for the first is unit 1, for the second (if installed) unit 2, and so on. However, addresses don't have to be sequential.

When using the DCN method, there is no need to set the unit address. Each unit has a unique address that is set at the factory and the RC-4000 will seek, find and control all of the DPS-470s that are connected to it through the DCN coaxial cable.

Genlock Adjust

This menu item allows you to disable the genlock adjustment. It locks in the current setting, so that it cannot be changed inadvertently.

- Enabled (default): genlock adjustment is allowed.
- Disabled: genlock adjustment is not allowed.

GPI Function

- Disabled (default): no effect on the Freeze function.
- Enabled: Freeze function is controllable by GPI (i.e., Freeze/Live).

D1 Edge Insertion

When the DPS-470 is in SDI input mode, this control allows you to add a soft transition from super-black to setup on the analog outputs.

NOTE: Setup is always added to the analog outputs in D1 input mode.

- Enabled
- Disabled

VITS Field 1

The Vertical Interval Test Signals (VITS) menu has two areas in which to make selections:

- LN#: specifies the number of the line in field 1 for the insertion of the test signal. The choices available for LN# are OFF, 16, 17, 18, 19.
- PAT#: specifies one of the nine test signals for insertion. The choices available for PAT# are 01 to 09.

One test signal can be inserted into one of the four lines; a field can contain only one test signal. (See Appendix B for the test signals available.)

VITS Field 2

Same as above for field 2.

TBC Mode

Enables adjustment to the VCR circuit time constant.

- Normal (Default): used for high-end broadcast VCRs.
- Extreme Head Switch used for home type or extreme head switch VCRs.

Transcoder Function

Normally the video delay through the DPS-470 varies over time from one line to two fields. In transcoder mode, the DPS-470 will have a fixed minimum delay of three lines.

- Normal Operation (Default): normal synchronizer mode.
- Min Dly D1 Transcoder: the DPS-470 will have a fixed video delay of three video lines.

NOTE: In the Min Dly D1 Transcoder Mode, only the D1 output is valid. All analog outputs are offset by three lines and should be used for monitor purposes only.

DPS Software Version

This menu item displays the current software version.

AUDIO CONFIGURATION

Analog Audio Mode

The user can choose to process or bypass the analog input audio. The audio is bypassed when the power is off.

CH1:	PRCS	CH2:	PRCS
	BYPS		BYPS

AES/EBU Audio Mode

The user can choose to process or bypass the AES/EBU input audio. The audio is bypassed when the power is off.

CH1:	PRCS	CH2:	PRCS
	BYPS		BYPS

Audio Input Source

This menu is used to select the audio source to be processed. The input audio choices are Analog, SDI and AES/EBU.

CH1:	ANLG	CH2:	ANLG
	SDI		SDI
	AES		AES
	AFV*		AFV*

* Another mode, “Audio Follow Video”, is available but not shown in this menu unless it is enabled. If a video input with AFV enabled is selected, this menu will show “AFV” under the appropriate channel. It cannot be changed from within this menu. Under the AFV menus, the user can select any combination of audio inputs to be linked to a particular video input so that when that video input is selected, the desired audio input will also be selected. AFV can be enabled for channel 1, channel 2 or both channels. More information is provided in the “AFV” menu description.

Input Level CH1

Selects the input operating level for the analog audio data of channel 1. R and L input levels are locked together. Output levels are independent (not locked).

R:	+8 dBm	L:	+8 dBm
	+4 dBm		+4 dBm
	0 dBm		0 dBm
	-4 dBm		-4 dBm
	-10 dBm		-10 dBm

Input Level CH2

Selects the input operating level for the analog audio data of channel 2. R and L input levels are locked together. Output levels are independent (not locked).

R:	+8 dBm	L:	+8 dBm
	+4 dBm		+4 dBm
	0 dBm		0 dBm
	-4 dBm		-4 dBm

-10 dBm -10 dBm

O/P Gain CH1

Adjusts the output audio gain for channel 1.

R: -20dB - +20dB L: -20dB - +20dB
(0dB is the default value)

O/P Gain CH2

Adjusts the output audio gain for channel 2.

R: -20dB - +20dB L: -20dB - +20dB

Auto Track

Disables or enables the auto track. When enabled the unit will automatically delay the audio data to match the delay of the video data through the synchronizer (up to 4 fields).

NOTE: The audio will be further delayed by the amount specified in the "Fixed Delay" menu.

- ENABLED
- DISABLED

Fixed Delay

Specify, in 4ms increments, how much fixed delay to add to the audio path. This delays the audio data according to the selection below. When *AUTO TRACK* is enabled, the total delay will be the sum of the fixed delay and the amount of auto track delay (see above). The maximum fixed delay is equivalent to about 16 fields of video.

CH1: 000 to 260ms CH2: 000 to 260ms (in 4ms increments)

Analog O/P CH1 Adjust

This function is used to attenuate the analog audio output for channel 1 as indicated by the LCD.

R: 00.0 to -50.0dB L: 00.0 to -50.0dB (in –0.5dB divisions)

Analog O/P CH2 Adjust CH2

This function is used to attenuate the analog audio output for channel 2 as indicated by the LCD.

R: 00.0 to -50.0dB L: 00.0 to -50.0dB (in –0.5dB divisions)

Analog I/P Termination

Terminates the analog input with a 600-ohm load or sets as high impedance input.

CH1: 600R CH2: 600R
HIGHZ HIGHZ

Analog Input Type

This selects whether the analog audio inputs are balanced or unbalanced.

CH1: BAL CH2: BAL
UNBAL UNBAL

Stereo Mode CH1

Swaps the left and right outputs of channel 1. The last mode in this menu is the sum of the left and right channel divided by two. For example (L+R)/2..

- Stereo (Default)
- Mono Left
- Mono Right
- Mono Sum

Stereo Mode CH2

Swaps the left and right outputs of channel 2. The last mode in this menu is the sum of the left and right channel divided by two. For example (L+R)/2.

- Stereo (Default)
- Mono Left
- Mono Right
- Mono Sum

AES/EBU Grade

Select the AES/EBU grade as either professional or consumer.

CH1:	PRO	CH2:	PRO
	CONS		CONS

1 kHz Sinewave Tone

When “ON”, the DPS-470 produces a 1 kHz sinusoidal wave on all of the audio outputs. The signal level can be adjusted in 1dBFS increments.

SN:	OFF	GN:	-24dBFS
	ON		-23dBFS
			-22dBFS
			……..
			0dBFS

SDI I/P Channel Sel

The DPS-470 is capable of processing four channels of audio (2 stereo pairs). This menu specifies which group of four channels from the incoming SDI input data the DPS-470 will process.

- CH01, CH02, CH03, CH04
- CH05, CH06, CH07, CH08
- CH09, CH10, CH11, CH12
- CH13, CH14, CH15, CH16

SDI O/P Channel Sel

Select which audio group you would like the DPS-470 to insert its SDI audio data into.

- CH01, CH02, CH03, CH04
- CH05, CH06, CH07, CH08
- CH09, CH10, CH11, CH12
- CH13, CH14, CH15, CH16

Route O/P Channels

Connects the input channels to one of the output channels according to the selection below. You can swap the output channels or have one input channel go to both output channels.

	Input	Output	Input	Output
•	CH1→	CH1	CH2→	CH2
•	CH1→	CH1	CH1→	CH2
•	CH2→	CH1	CH2→	CH2
•	CH1 →	CH2	CH2→	CH1

Audio Follow Video

This control enables or disables all of the AFV selections. When AFV is enabled, the audio input selection is based on the setting in the "AFV" menu for each video input.

NOTE: When AFV is "ON", the "Audio Input Source" menu changes to "AFV" for any channel that has it enabled for the currently selected video input.

- OFF
- ON

AFV Composite

Specifies which audio input to automatically use when the Composite Video input is selected.

NOTE: When this menu is not in the "OFF" position and the "Audio Follow Video" control is "ON", this menu selection will override the "Audio Input Source" menu when the Composite video input is selected. When any other video input is selected that does not have AFV enabled, then the "Audio Input Source" menu takes precedence.

CH1	OFF	CH2	OFF
	ANLG		ANLG
	SDI		SDI
	AES		AES
	MUTE		MUTE

AFV SVHS

Specifies which audio input to automatically use when the SVHS is selected.

NOTE: When this menu is not in the "OFF" position and the "Audio Follow Video" control is "ON", this menu selection will override the "Audio Input Source" menu when the S-Video input is selected. When any other video input is selected that does not have AFV enabled, then the "Audio Input Source" menu takes precedence.

CH1	OFF	CH2	OFF
	ANLG		ANLG
	SDI		SDI
	AES		AES

	MUTE		MUTE

AFV Component

Specifies which audio input to automatically use when the Component Video input is selected.

NOTE: When this menu is not in the "OFF" position and the "Audio Follow Video" control is "ON", this menu selection will override the "Audio Input Source" menu when the Component video input is selected. When any other video input is selected that does not have AFV enabled, then the "Audio Input Source" menu takes precedence.

CH1	OFF	CH2	OFF
	ANLG		ANLG
	SDI		SDI
	AES		AES
	MUTE		MUTE

AFV SDI

Specifies which audio input to automatically use when the SDI Video input is selected.

NOTE: When this menu is not in the "OFF" position and the "Audio Follow Video" control is "ON", this menu selection will override the "Audio Input Source" menu when the SDI video input is selected. When any other video input is selected that does not have AFV enabled, then the "Audio Input Source" menu takes precedence.

CH1	OFF	CH2	OFF
	ANLG		ANLG
	SDI		SDI
	AES		AES
	MUTE		MUTE

SDI Audio Embedder

Embedding of digital audio into the AD1 data stream can be disabled.

- OFF (default)
- ON

AES/EBU Sampling Rate

Adjusts the sampling rate of the input audio. The default rate is 48kHz whenever the SDI input is selected. When the AES/EBU is selected, the sampling rate can be set as below:

- 48kHz (default)
- 44.1kHz
- 32kHz

Master Mute Control

Mutes all of the output audio channels.

- OFF
- MUTE

Chapter 4: Theory of Operations

Input Section

The DPS-465 accepts video in 4 different formats:

- Composite Analog
- SVHS
- Component Analog (CAV)
- Serial Digital (D1)

Composite Analog Video

The composite analog video input signal connects to BNC CN11 on the secondary I/O PCB (see sheet 16). The input video signal goes directly to a bypass relay; the output of the relay connects to CN15 (composite video out #1). This provides a bypass path for the input composite signal in case of power failure. Under normal circumstances the signal is routed to the main PCB through connector P3. The signal is buffered through AU1 and AU8. The output of AU1 and AU8 connects to video multiplexer AU4. When composite NTSC *Synchronizer Mode* is selected from the front panel the microprocessor selects the composite video input from AU1as the main video source (AU4, pins 1 & 2). The selected video signal appears at AU4 pin 14. When composite NTSC *TBC mode* is selected from the front panel the microprocessor selects the composite video input from AU8 as the main video source.

Synchronizer Mode

In this mode the video signal is passed through a low pass filter (BFL1). Vertical and Horizontal sync pulses are extracted from the input video signal at KU6. A bandpass filter formed by AL1, AC12, AL2, and AC13 passes the burst portion of the video signal to KU1. KU1 is a burst-locked 4 fsc oscillator that generates a 3.58MHz signal. This signal becomes part of a phase-locked loop that generates the 27MHz clock from the incoming subcarrier frequency. The loop components are KU3, KU5, KQ1-KQ4, KU8, KU9, and KOSC1.

The 27MHz clock is fed to KU9, which multiplexes the clock onto the main 27MHz clock line (i.e., I27A, I27B...I27E). KU9 fans out the clocks and the input sync pulses (H & V sync) to input timing generator IC LU1.

The input video is black level clamped at BU4. The output of the clamp feeds the 10 Bit analog-to-digital converter BU1. The 10-bit digital stream is then routed through the COMB filter CU1. The COMB filter output video is stored in field stores on sheet 5.

TBC Mode

The output of AU4 is buffered and fed to KU7 TBC chip. KU7 generates all of the sync pulses as well as a 27MHz line locked clock. The clock connects to KU9 (clock multiplexer IC). When TBC mode is selected KU9 multiplexes the timing signals generated from KU7. KU7 generates two 8-bit luma and chroma streams that connect to KU10. KU10 multiplexes the luma and chroma data onto one 27 MHz parallel stream. It also controls proc amp adjustments in TBC mode. KU10 data connects to the field stores shown on sheet 5.

SVHS Video

The SVHS video connects to CN13 on the secondary PCB. The analog luma portion of the video signal connects to video multiplexer AU4. The path of SVHS luma is identical to composite TBC mode. KU7 generates timing signals that are derived from the input SVHS luma. The chroma is buffered through AU2 and filtered at AFL1. The output of AFL1 feeds TBC circuit KU7. KU7 generates 8-bit luma and 8 bit-chroma data that connects to KU10, where the data is multiplexed into one 10-bit parallel digital stream. The data then makes it's way to the field stores.

Component Analog Video (CAV)

Component analog signals are buffered at AU2 and AU1. The luma is low-pass filtered and connects to gain control circuit BU7. The output of BU7 is clamped at BU4 and converted to 10-bit digital bus at BU1.

The component color signals are buffered at AU3. The chroma gain is accomplished through BU8 and BU9. The baseband chroma is then clamped and converted to a 10-bit digital stream. At BU1, BU2, and BU3 the component analog data is converted to three 10-bit digital streams. The 3 streams are then multiplexed onto one 10-bit parallel video stream at CU9, CU8, and CU7. The output of CU11 feeds the field stores.

Serial Digital Video (D1)

The serial digital input circuit is shown in sheet 4. The serial stream is converted to a 10-bit parallel video bus. The input D1 circuit provides 27 MHz clock, horizontal, vertical, and field ID timing signals.

The D1 clock connects to the KU9 clock multiplexer IC. The D1 timing signals connect to LU1 (see sheet 12). When D1 input mode is selected the D1 clock is multiplexed and fanned out as I27A, I27B, I27C, I27D, I27E and I27F. These clocks are used to run the entire input section.

LU1 generates all of the input timing signals, such as clamp pulses, field store write pulses, vertical reset, horizontal reset, field ID, and micro vertical interrupt pulses. When D1 input mode is selected, all LU1 input timing signals are generated from the D1 timing signals, horizontal sync, vertical sync, field ID, and the 27MHz clock.

The 10-bit bus connects to COMB filter CU1 through 10-bit latch CU12. The COMB filter locks its internal state machine to the D1 stream. Internal to the COMB filter IC, the D1 data bypasses the COMB section of the IC. The COMB filter IC in D1 mode is only used to control the D1 Proc amp levels (Video, Black & Chroma). The output of the COMB filter connects directly to the input of the field stores. The data is continuously written into the field stores, supervised by the microprocessor.

Output Section:

The output section is comprised of:

- Test signal generator (TSG)
- Genlock IC
- 10 bit digital-to-analog converters (DACs)
- Analog filters
- Chroma modulation IC
- D1 output circuit
- Output timing generator

The microprocessor controls all of the DPS-465's operations. Its circuit is shown on sheet 14.

Test Signal Generator (TSG)

The TSG is shown on sheet 13; MU1 is its supervisory IC. When the user selects a test signal through the front panel controls, the microprocessor loads the desired test signal into RAM (MU2, MU3). Writing to and reading from RAM is all controlled by MU1. When the TSG is active, MU5 and MU6 latches are enabled and the multiplexed 10-bit video stream is output to the chroma modulator, component output 10-bit DACs, and to the D1 output circuit.

Genlock IC

The genlock IC (GU2) generates a 27MHz clock, which can be free running or locked to a black burst source. It also generates horizontal and vertical timing signals. The 27MHz clock is fanned out to all the output section circuitry via buffer GU4. GU2 is responsible for adjusting the output horizontal timing.

Output Timing Generator IC

The output timing generator IC (LU2) supervises the horizontal sync, vertical sync, and 27MHz clock feed. LU2 generates all of the field stores read pulses, composite blanking, output vertical interrupt, TSG, and D1 timing pulses.

Other Output Comments

When in processing mode (not TSG), LU2 reads the video data from the field stores (see sheet 5). The output data is demultiplexed at HU2 (TSG data and processed video) and fed to the 10-bit DACs (see sheet 10). Also, a multiplexed chroma stream is fed from HU2 to the chroma modulation ICs JU1 and JU2 (see sheet 10). JU2 generates a composite sync signal which is added to the luma DAC output (see sheet 9, IU1). Chroma generated from JU1 and JU2 is added to the luma output as well to generate the composite video out. The chroma is also fanned out to the SVHS connector.

The multiplexed 10-bit data bus – from the field stores or from the TSG – is fed to the TRS inserter IC FU2. The output of FU2 is fed to the EDH encoder IC FU3. The 10-bit video bus is then serialized at FU4 and output at the cable driver FU5.

Chapter 5: Alignment Procedure

Test Equipment Required

- NTSC, SVHS, CAV Beta/MII Test Generator
- Serial (Digital) Test Generator
- Analog and Digital Audio Signal Generator
- PC containing Audio Test Program
- Serial Component Monitor
- Waveform Monitor
- Vectorscope (NTSC and Component)
- Oscilloscope
- Colour Monitor
- Cable Clone Box
- Remote Control (i.e., RC-2001, RC-4000)

Procedures

Perform the following procedures in the order shown.

General

- Check front and rear panel for defects, etc.
- Tighten ground strap on **KX1**
- Tighten connectors, cables, screws, nuts, etc.
- Push down on all socketed ICs.
- Align threading hole on all TO-220 style regulators.
- **Do not connect DCN board** to P7 until the SNA (video board) is calibrated.

Jumpers

CHE1	=	NTSC
CHE2	=	NTSC
KHE1	=	Opp. Dot
P7	=	5,6

DIP Switches

1-6, 8	UP
7	DOWN

Miscellaneous

- Connect all video cables.
- Test Patterns – **Colour Bars**
- Power up unit.
- Put DIP Switch **7** in the UP position.

Front Panel Settings

Mode .....Process

Input .....Comp (Composite)

Freeze .....Off

Menu .....Defaults

Indicator LEDs .....Genlock On, Sync On

Adjustments

Initial

1. Remove top cover.
2. Remove **BLK REF** and adjust **GRV1** for minimum vector drift. Reconnect **REF** when done.
3. Adjust **KC12** for flattest waveform at **KU1-3**.
4. Remove **BLK REF** termination and observe NTSC vector jitters. This is normal for now.
5. Remove **KHE1** and **COMP VIDEO IN**. Adjust **KRV2** for minimum signal drift on **BU4-7**. Reconnect **KHE1** and **VIDEO** when done. NOTE: Sync mode only.
6. Check **NU1-9** for TTL levels.
7. Select **D1 Input**, enable **POLL** on menu and check **NU1-28** is switching. Verify that the signal is inactive HIGH when **POLL** is off.
8. Replace the top cover. Allow the unit to warm up.

Front and Rear Panels

1. Check **front panel switches** and some **menu functions**.
2. Store a proc. Amp setting in location **05** and verify that it is retained when the unit is powered on/off.
3. Verify **GPI** function (enable GPI on menu).
4. Test the **BYPASS** function.

Final Adjustments: TSG Mode

1. Select **TSG MODE** and **FF BARS**.
2. Adjust **IRV2** for 286mV sync on **CAV Y OUT**.
3. Adjust **IRV5** for 1.00Vp-p on **CAV Y OUT**.

4. Adjust **IRV3** (MII B-Y) and **IRV4** (MII R-Y) to get dots in their boxes on the component vectorscope.
5. Select **BETA OUT** on menu and return to **TSG Mode**.
6. Adjust **IRV6** (BETA B-Y) and **IRV7** (BETA R-Y) to get dots on their boxes on the component vectorscope.
7. Observe **SVHS-Y OUT** is 1.00Vp-p.
8. Select the **SHALLOW RAMP** pattern and adjust **JRV1** for smoothest chroma transition on **SVHS-C OUT**.
9. Adjust **IRV1** for 1.00Vp-p on **NTSC OUT**.
10. Adjust **JRV2** for correct **NTSC Chroma** on the NTSC vectorscope.
11. Verify both **D1** outputs on the WFM601. Observe display in parade, vector and lightning modes.
12. Display **EYE** function on WFM601 and adjust **FRV1** to its midpoint position.
13. Select the **SHALLOW RAMP** test pattern.
14. Connect the **CABLE CLONE BOX** between the **D1 OUT** and the WFM601 input. Select 250m and run the **EDH DET** test for 2 minutes. NOTE: press **RESET** on the WFM601 to start the timer.
15. Repeat these steps for second D1 output.

Final Adjustments: Process Mode

1. Select **COLOUR BARS** test pattern and **PROCESS** mode and set proc. amp to unity for all input modes.
2. Select **CAV IN** and adjust **ARV7** and **ARV8** to “center the spot” on the NTSC vectorscope.
3. Select **COMP IN** and **PULSE AND BARS 100** test pattern and adjust **ARV9** for correct setup level.
4. Select **CAV IN** and adjust **ARV13** to obtain same setup level as in previous step. Then return to **COMP IN**.
5. Select **COLOUR BARS** and adjust **ARV1** for 1.00Vp-p on **NTSC OUT**.
6. Select **TBC** on menu and adjust **ARV12** for 1.00Vp-p on **NTSC OUT**.
7. Verify that the **NTSC OUTPUT** is the same for the SYNCHRONIZER and TBC modes, otherwise re-adjust **ARV1** and **ARV12**.
8. Select **SVHS IN** and adjust **ARV3** for 1.00Vp-p on **NTSC OUT**.
9. Adjust **ARV4** for correct **chroma** on NTSC vectorscope.
10. Select **CAV IN** on menu and **CAV BETA OUT COLOUR BARS** from the Component Test Generator.
11. Adjust **ARV2** for 1.00Vp-p on **NTSC OUT**.
12. Adjust **ARV5** and **ARV6** for 700mVp-p on **B-Y OUT** and **R-Y OUT**. NOTE: do BETA IN, then MII IN.
13. Select **MII INPUT** on menu and **MII OUTPUT** on Component Test Generator.
14. Adjust **ARV10** and **ARV11** for 700mVp-p on **B-Y OUT** and **R-Y OUT**.
15. Select **BETA INPUT** on menu and **BETA OUTPUT** on Component TSG when done.
16. Select **D1 IN** and observe NTSC out (no adjustment). Try several test patterns. It is normal for setup to be 7.5 IRE in vertical blanking.

17. Enable **POLL ON** on menu and observe **EDH RX ERROR COUNT** on menu for errors. Verify **EDH LED** is lit.
18. Connect the **CABLE CLONE BOX** between the cable from the D1 Test Generator and the DPS-470's D1 Input. Set the length to 200m and repeat step 17 for 2 minutes. If the test fails set the cable length to 190m. Turn off **POLL** on menu when done.
19. Select **UNITY GAIN** and **COMP IN**. Monitor the NTSC output on the oscilloscope.
20. Select **TIMING HOR FINE** and adjust knob to line up the output burst waveform to the **BLK REF**'s burst waveform.
21. Select **TIMING SUBCARRIER FINE** and adjust knob to line up the NTSC output burst waveform to the **BLK REF**'s burst waveform.
22. Select **PULSE AND BARS 100** pattern and adjust **KRV3** to align the output 2T pulse to the input 2T pulse. NOTE: unit must be in **SYNC MODE**.
23. Bounce the unit on the table.
24. Check final levels, in particular, the **BLK REF** drift.
25. Cycle power off/on several times in **COMP** and **D1 INPUT MODE**.
26. Verify **EEPROM** by recalling location 05.

VTR Test

1. Select **AUTO SYNC** mode on the menu and run tape. Observe that the unit switches to TBC when the input is tape feed and SYNC when the input is a test pattern.

DCN Board (843-161)

1. Power the unit down.
2. Remove the jumper from **P7-5, 6** on the SNA board and connect the DCN board. Put jumpers on **BHDR1** and **BHDR2** both **opposite dots**. Tighten **BX2** strap and PCB screws.
3. Power the unit up. Connect the DCN cable from the RC-4000 to the DPS-470/AV's DCN connector.
4. Set **REMOTE CONTROL** to **RS232 IN** and connect RS-232 cable to **CN1**.
5. On the RC-4000, use Port 1 as the RS-232 output and select **"P1:1? DPS-470"** from the **UNIT SELECT** menu. Wait 5 seconds before pressing **ENTER**.
6. If **"Communication trouble…"** message appears, try turning the DPS-470 off/on a few times.
7. Adjust one of the proc. amp controls from RC-4000 to verify communication.
8. Connect the RS-422 cable to **CN1** and set **REMOTE CONTROL** to **RS-422 IN**.
9. On the RC-4000, use Port 2 as the RS-422 output and select **"P2:1? DPS-470"** from the **UNIT SELECT** menu.
10. Adjust one of the proc. amp controls from RC-4000 to verify communication.
11. Connect the DCN cable from the RC-4000 to the DCN connection and set **REMOTE CONTROL** to **DCN**.
12. From the RC-4000 panel, press **DEVICE** key, then select **"Search for devices"** from its menu.
13. Select **"Find new devices"**. Check for the result. The panel will display whether a DCN was found.

14. Adjust one of the proc. amp controls from the RC-4000 to verify communication.

Audio Option Board (DPS-470AV)

Test Equipment

- Audio Precision SYS 2022
- PC Card from Audio Precision Installed on the PC
- 1x4 or 2x2 Channel Oscilloscope in addition to a regular Oscilloscope
- Reference DSP-470AV, fully calibrated
- Various Cables

Procedure

1. Connect the Audio Board (843-163) to **DCN1**, **FCN1** and **P6** of the SNA board and tighten all screws. This will be called the **Unit Under Test (UUT)**. The reference 470AV is called the **REF**.

2. Put headers on jumpers **DJP1** 1,2,3,4
   DJP2 1,2,3,4
   DJP3 1,2,3,4
   DJP4 1,2,3,4

3. Connect audio input and output to Audio Precision Instrument **(API)**. This might be a good time to make all the necessary cable, wiring and scope connections between the API, the 2x2 channel scopes (one displays the REF's output while the other displays the API's output) and the Reference 470AV and the UUT.

4. Double click on **DPS-470 Audio** icon to start the **APWIN** audio test program. Two windows labeled **ANALOG GENERATOR** and **ANALOG ANALYZER** should appear on screen. Click **OUTPUT** box of generator **ON**.

5. Go to the **AUDIO** menu and set all input levels and output gains to **0.0dB** for both channels.

6. Start on **CH1** of UUT. Turn on 1Khz tone pattern from REF 470AV. On the UUT, select D1 input, Menu: **AUDIO INPUT SOURCE – CH1:SD1**.

7. Check that the reading on Analyzer **FREQUENCY** box is 0.99998Khz to 1Khz.

8. Check all scopes' outputs for stable 1Khz sinewaves.

9. On UUT, select **AUDIO INPUT SOURCE – CH1:AES**.

10. Check that the reading on Analyzer **FREQUENCY** box is 0.99998Khz to 1Khz.

11. Check all scopes' outputs for stable 1Khz sinewaves.

12. Turn off REF's 1Khz tone.

13. On UUT, select **AUDIO INPUT SOURCE – CH1:ANLG**.

14. On the PC, click on **PROCEDURE - RUN** (ignore message box). A list of tests should appear on the screen.

15. Click on **CALIBRATION**. Turn on 1Khz tone from UUT.

16. Adjust **GRV1** (left CH1) and **GRV2** (right CH1) for 23.000dB as displayed on CH A level box and on CH B level box of the Analyzer.

17. Press **ENTER** for levels to be verified by API. If it fails, the audio testing is halted. If it passes, enter **CONTINUE**.

18. Turn off UUT's 1Khz tone.

19. Adjust **ERV1** (left CH1) and **ERV2** (right CH1) for 23.000dB as displayed on CH A level box and on CH B level box of the Analyzer. NOTE: UUT tone must be off for this step.

20. Press **ENTER** for levels to be verified by API. If it fails, the audio testing is halted. If it passes, enter **CONTINUE**.

21. Click on **FREQUENCY RESPONSE TEST**. A frequency response chart will appear on the screen for both left and right signals. It should be 23.0dB from 20hz to 20Khz. If it passes, continue with the procedure.

22. Run the **THD+N TEST** (Total Harmonic Distortion and Noise). A chart should now appear showing the percentage of THD+N from 0 to 20Khz. It should never be more than 0.0075%.

23. Run the **ANALOG BYPASS TEST**. Turn on the UUT 1Khz tone and set **ANALOG AUDIO MODE – CH1:BYPS** (bypass). Observe that the UUT's output sinewaves on the scope doubles its frequency to 2Khz.

24. Set **ANALOG AUDIO MODE – CH1:PRCS** (process) and turn off the 1Khz toe. Continue the procedure. It is normal for the sinewaves on the scope to remain at 2Khz.

25. Run **ANALOG BAL/UNBAL TEST** (balanced/unbalanced). Set **ANALOG INPUT TYPE – CH1:UNBAL**. Press **ENTER**. When done, select **CH1:BAL.**

26. Run **ANALOG TERMINATION TEST**. Set **ANALOG INPUT TERM – CH1:600R** and continue. Then set **CH1:HIGHZ** and observe that the sinewave's signal on the scope is clipped. Press **CONTINUE** to test. When done, select **CH1L600R**.

27. Run **ANALOG DELAY TEST**. Ignore **"Turn Autotrack Off"** command and set Audio menu to **FIXED DELAY – CH1:000MS**. Press **ENTER** to test. Then set delay to **CH1:004MS**. Press **ENTER** to run the test. If the test fails, repeat (s/w error). When done, set the delay to 0ms.

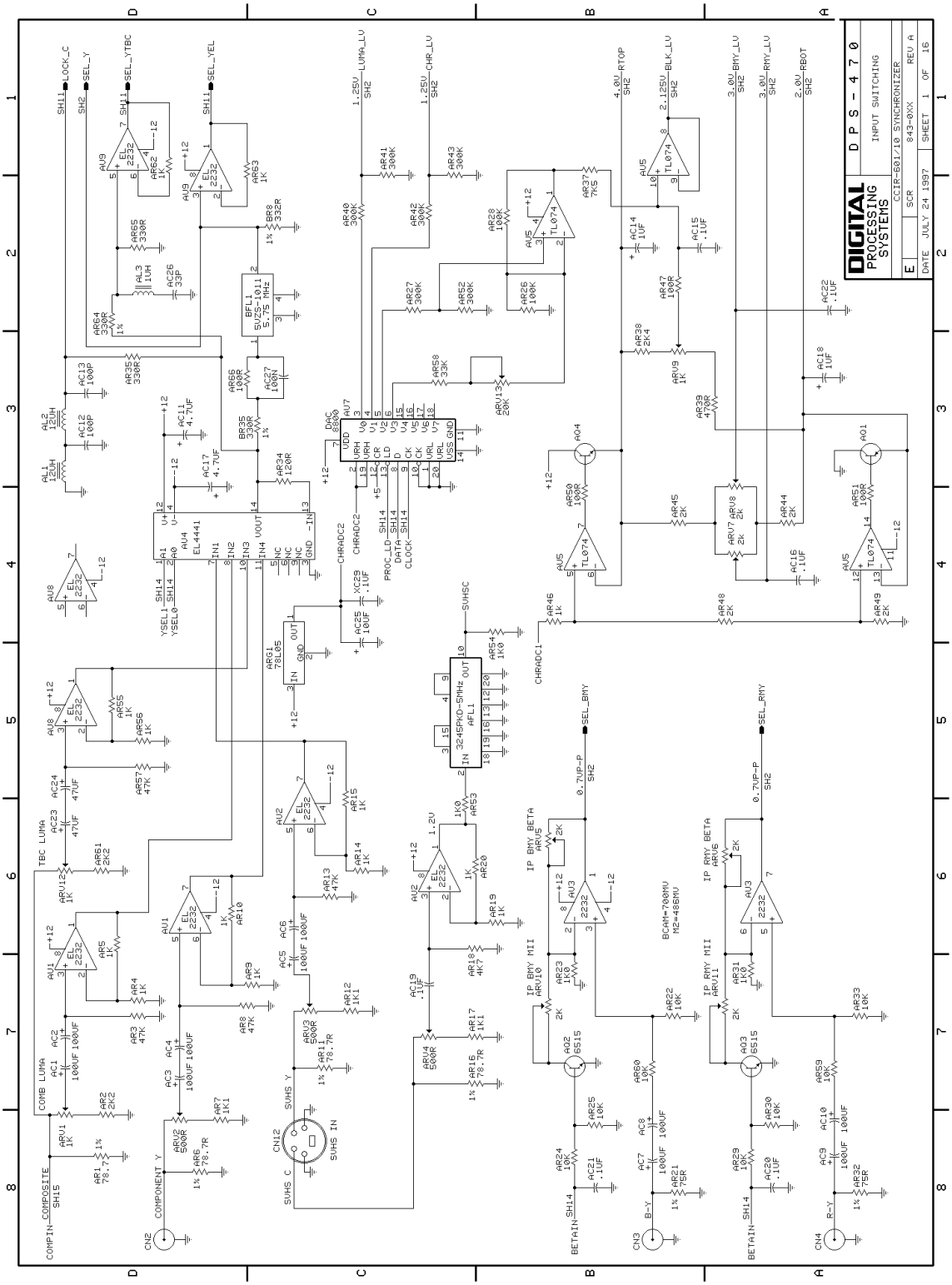
28. Press **CANCEL** to finish testing CH1. This loads the wrong defaults to the generator and analyzer portions. Re-enter **1Khz** to the **FREQUENCY** field on the generator and change **CH B** to **XLR-BAL** in the analyzer.

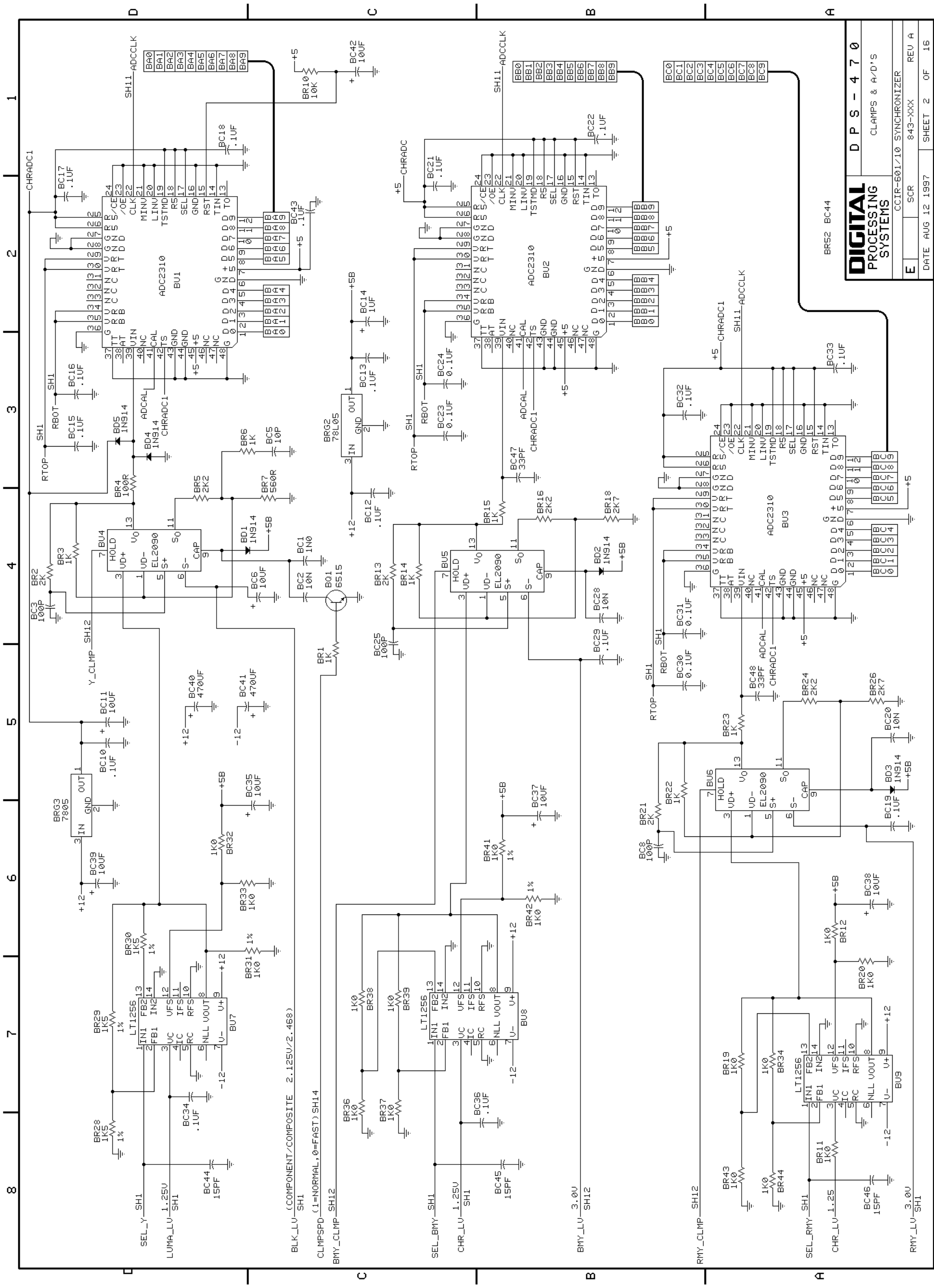
29. Test **CH2** by repeating steps 6 to 28. Replace all references of CH1 to CH2. Remember to change the wiring connections for CH2. **GRV3** is CH2 left output, **GRV4** is CH2 right output, **ERV3** is CH2 left input and **ERV4** is CH2 right input.

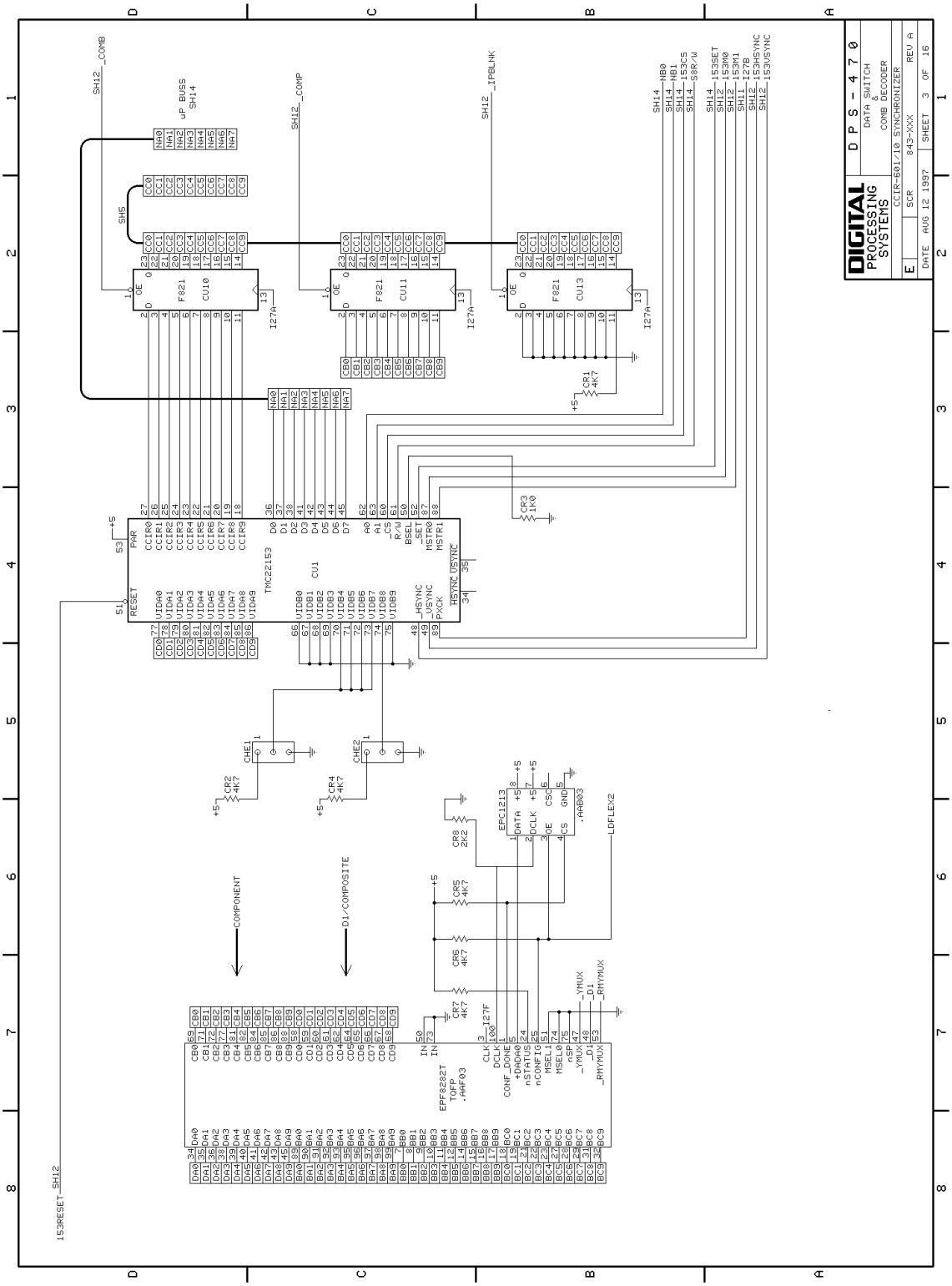
Chapter 6: Schematics

DPS-470

Main Board




DIGITAL PROCESSING SYSTEMS
D P S - 4 7 0
CLAMPS & A/D'S
CCIR-601/10 SYNCHRONIZER
SCR
843-XXX
REV A
SHEET 2 OF 16
DATE AUG 12 1997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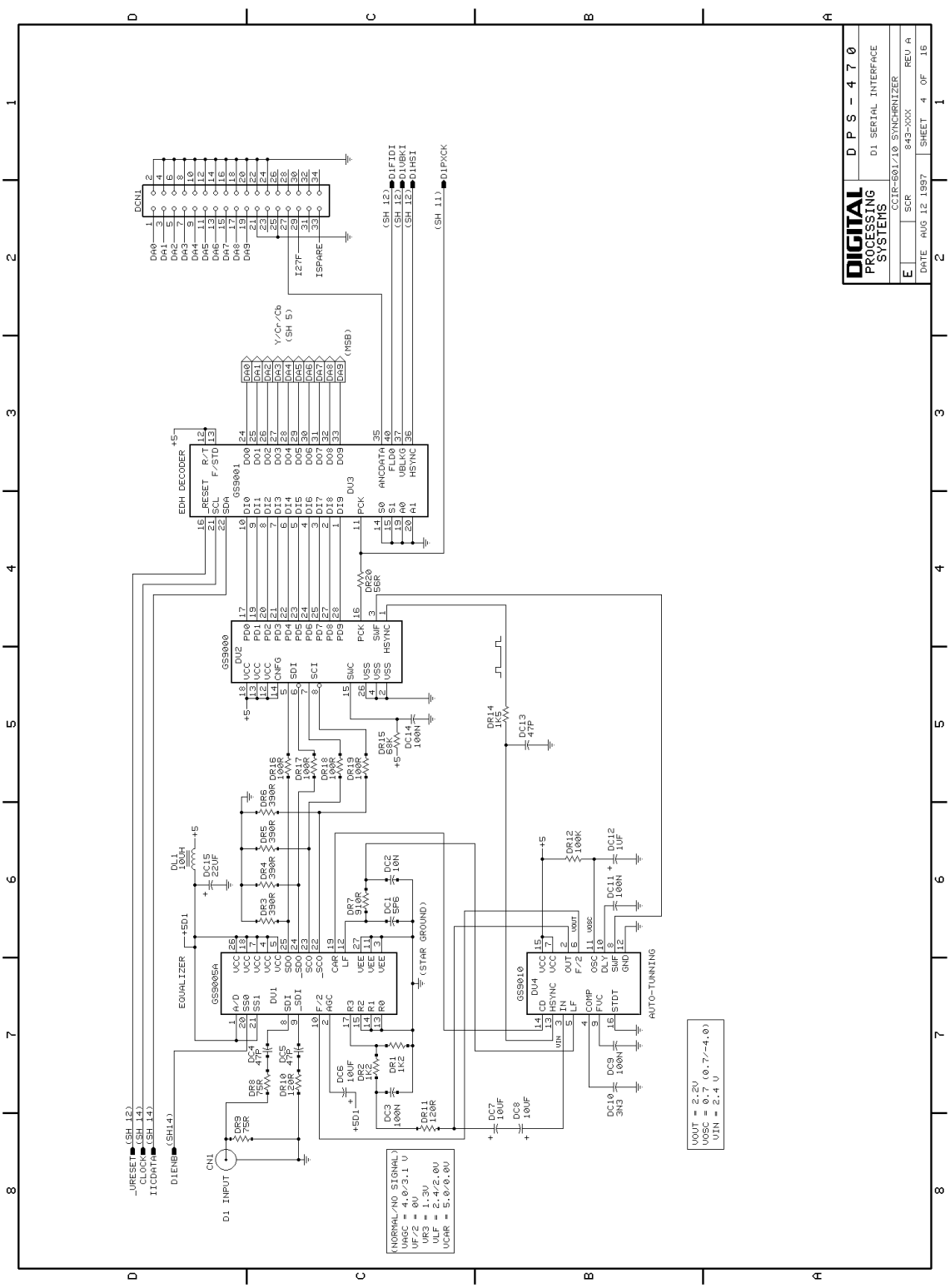
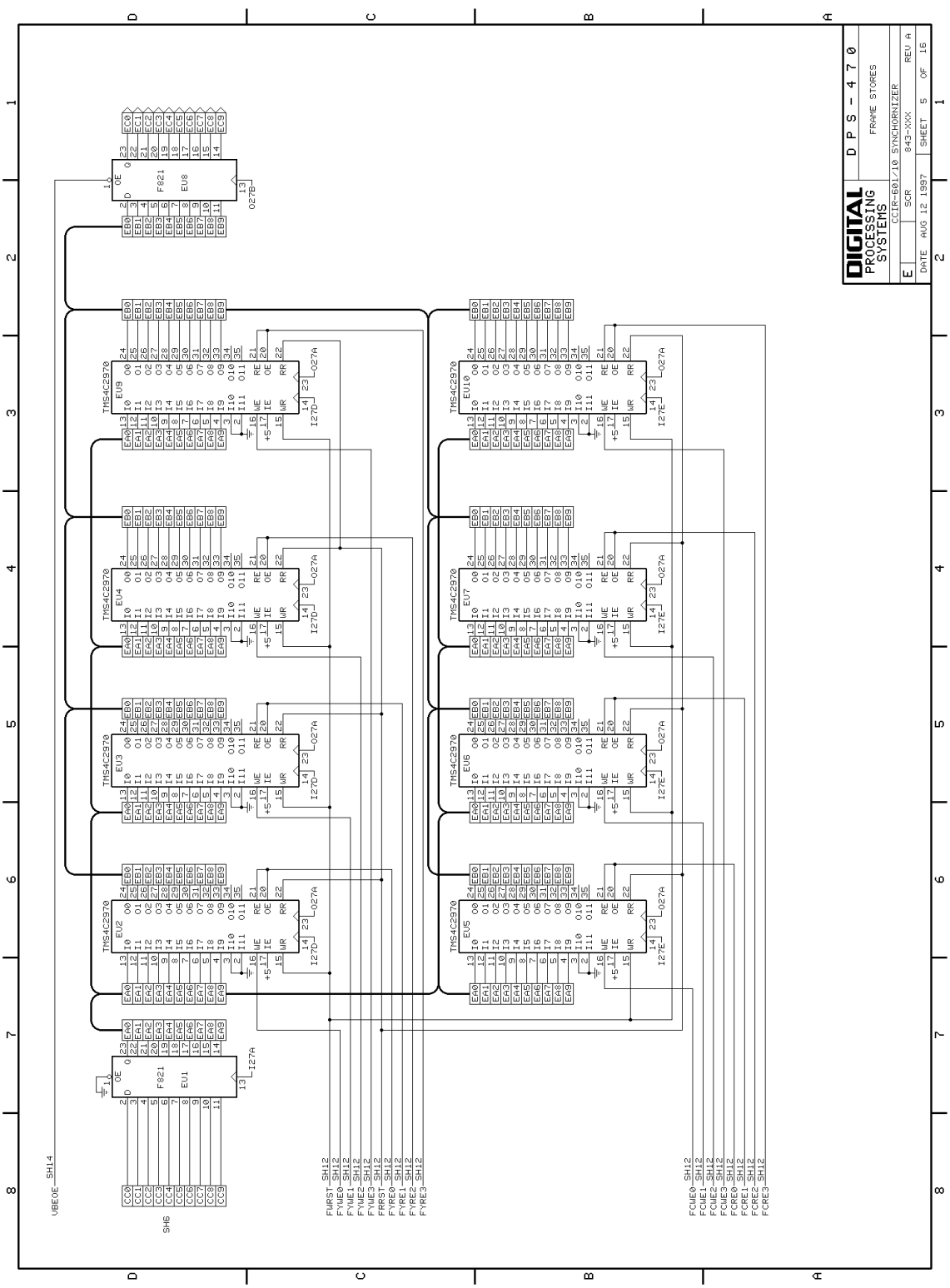
PROCESSING SYSTEMS
DPS-470
DATA SWITCH & COMB DECODER
CCIR-601/10 SYNCHRONIZER
SCR 843-XXX REV A
DATE AUG 12 1997 SHEET 3 OF 16
TMC22153
EPC1213
EPF8282I
SH12_COMB
SH12_COMP
SH12_IPBLNK
uP BUSS SH14
SH5
CU10
CU11
CU13
CU1
F821
I27A
CR1 4K7
CR2 4K7
CR3 1K0
CR4 4K7
CR5 4K7
CR6 4K7
CR7 4K7
CR8 2K2
CHE1
CHE2
COMPONENT
D1/COMPOSITE
153RESET_SH12
LDFLEX2


DIGITAL PROCESSING SYSTEMS
DPS-470
D1 SERIAL INTERFACE
CCIR-601/10 SYNCHRNIZER
SCR 843-XXX REV A
DATE AUG 12 1997 SHEET 4 OF 16
EQUALIZER
GS9005A
GS9001
GS9000
GS9010
EDH DECODER
AUTO-TUNNING
D1 INPUT
(STAR GROUND)
(NORMAL/NO SIGNAL)
VOUT = 2.2V
VOSC = 0.7 (0.7/-4.0)
VIN = 2.4 V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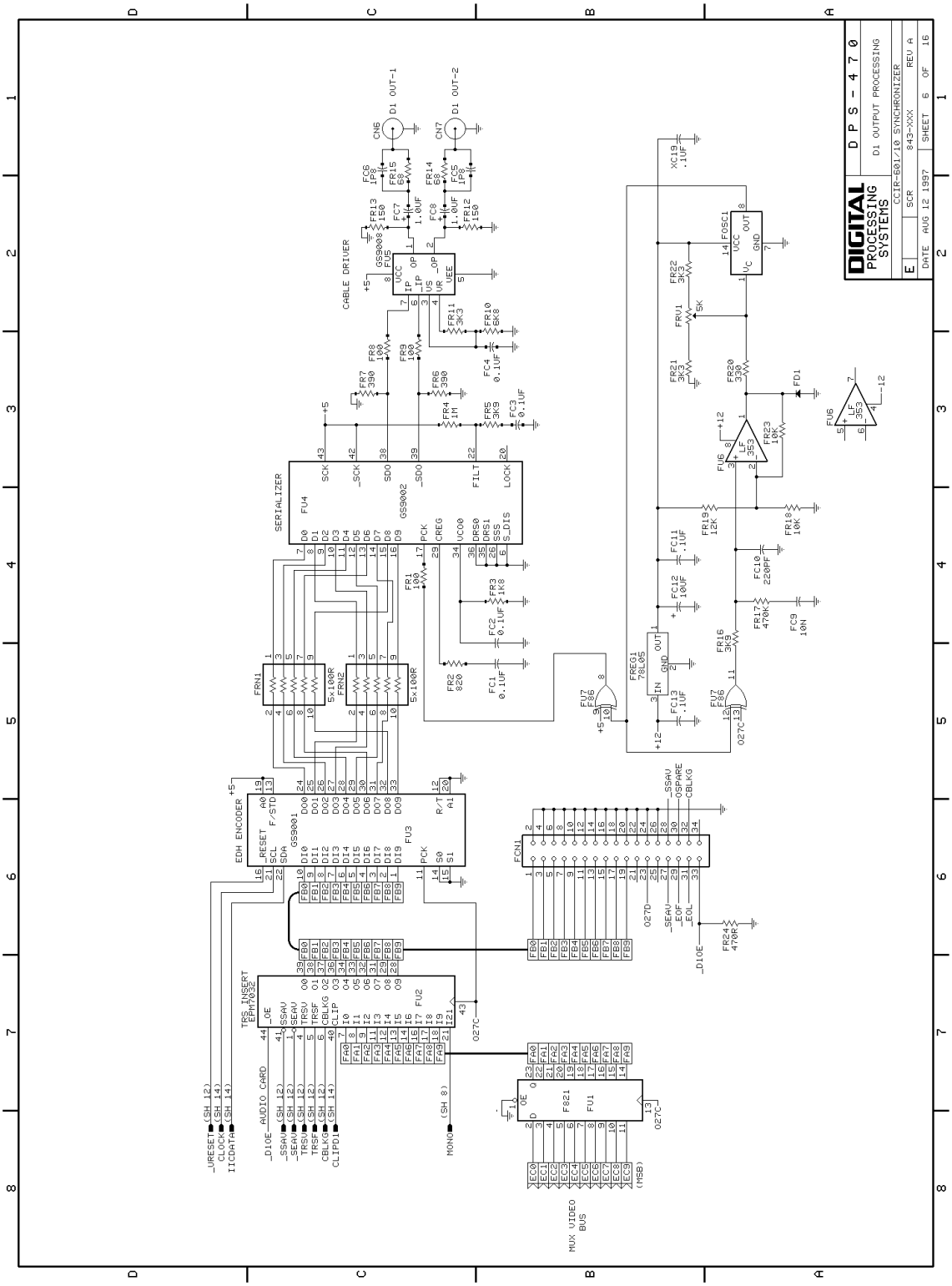
DPS-470
FRAME STORES
CCIR-601/10 SYNCHRONIZER
843-XXX
REV A
SCR
E
DATE AUG 12 1997
SHEET 5 OF 16
TMS4C2970
F821
VBEOE
FWRST
FYWE0
FYWE1
FYWE2
FYWE3
FRRST
FYRE0
FYRE1
FYRE2
FYRE3
FCWE0
FCWE1
FCWE2
FCWE3
FCRE0
FCRE1
FCRE2
FCRE3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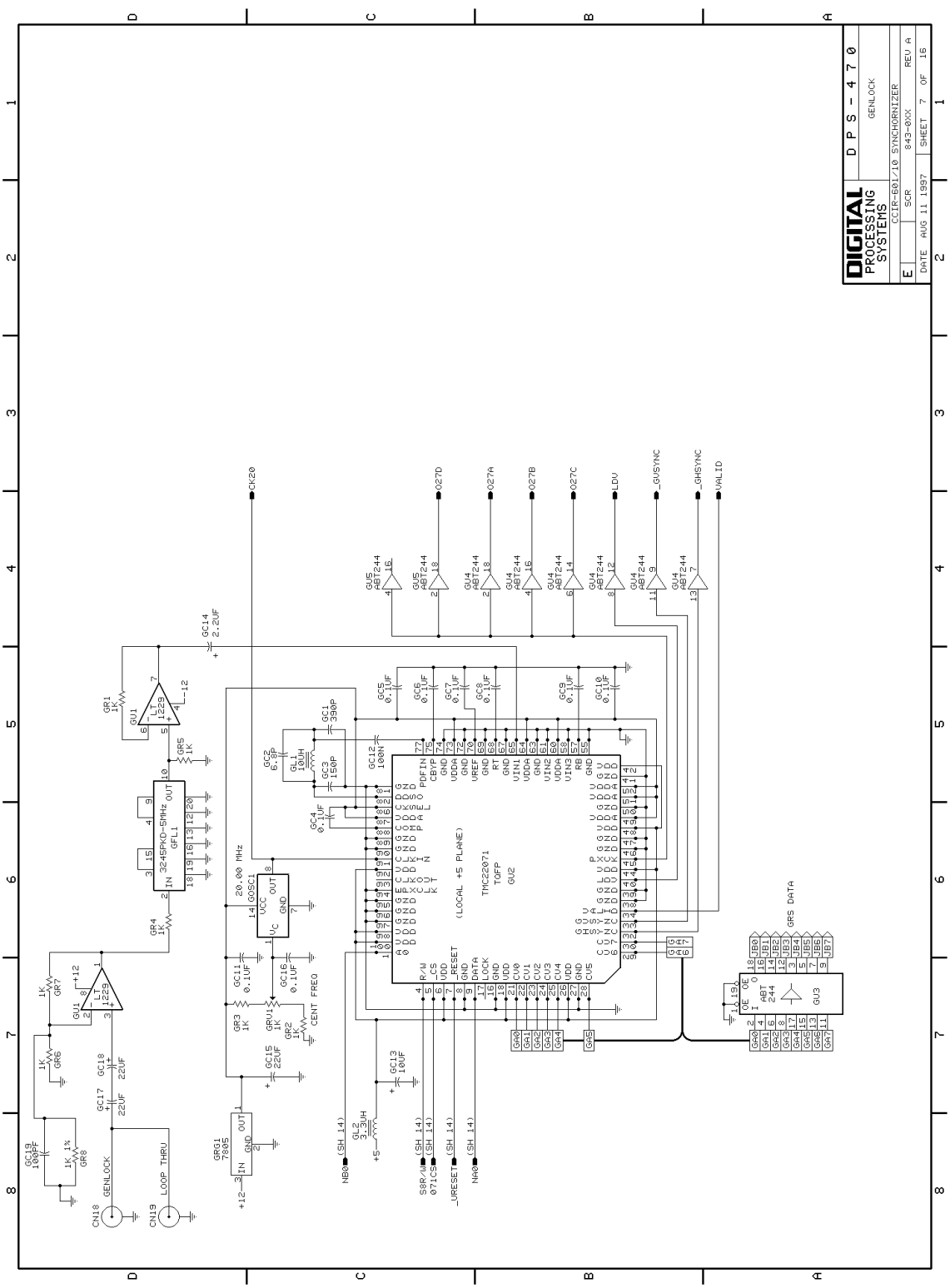
PROCESSING SYSTEMS
DPS-470
D1 OUTPUT PROCESSING
CCIR-601/10 SYNCHRONIZER
843-XXX
REV A
SHEET 6 OF 16
DATE AUG 12 1997
SCR
SERIALIZER
EDH ENCODER
TRS INSERT
AUDIO CARD
CABLE DRIVER
D1 OUT-1
D1 OUT-2
MUX VIDEO BUS
FOSC1
FREG1 78L05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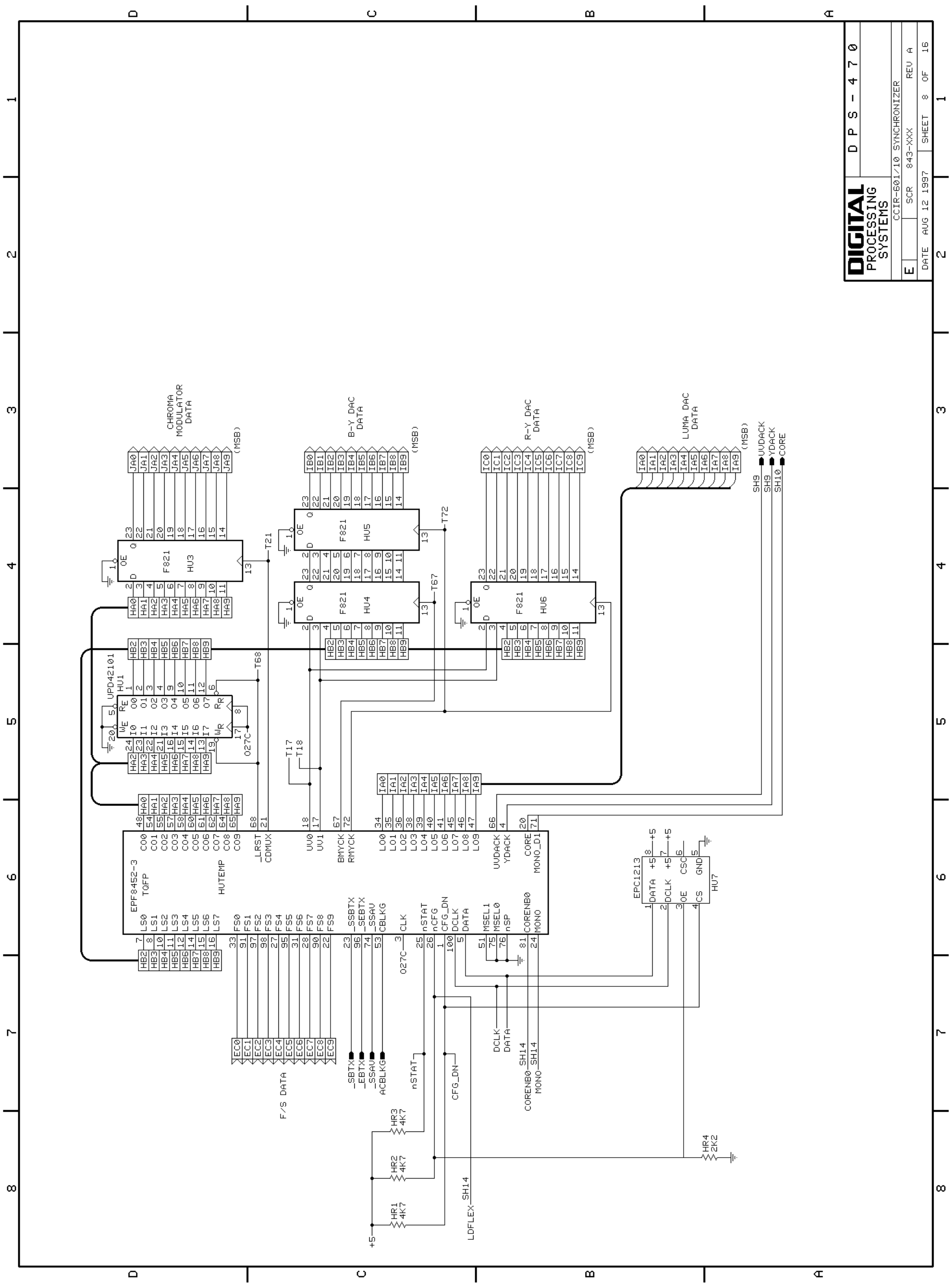
DPS-470
GENLOCK
CCIR-601/10 SYNCHORNIZER
843-0XX
REV A
SHEET 7 OF 16
DATE AUG 11 1997
SCR
E
TMC22071
(LOCAL +5 PLANE)
GENLOCK
LOOP THRU
GRS DATA
CK20
LDV
_GVSYNC
_GHSYNC
VALID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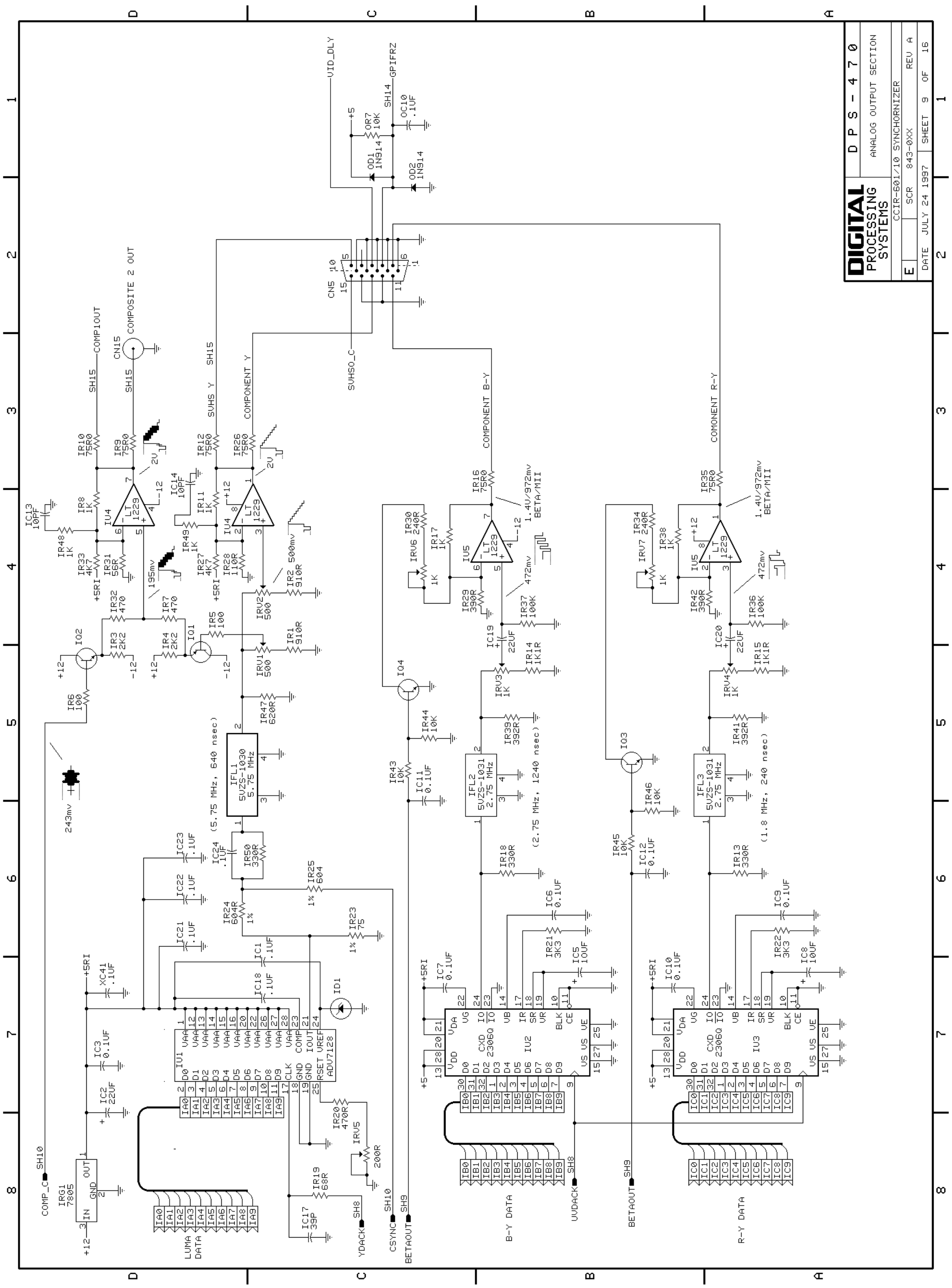
CCIR-601/10 SYNCHRONIZER
E
SCR 843-XXX
REV A
DATE AUG 12 1997
SHEET 8 OF 16
CHROMA MODULATOR DATA
B-Y DAC DATA
R-Y DAC DATA
LUMA DAC DATA
F/S DATA
EPF8452-3 TQFP
HUTEMP
UPD42101 HU1
F821 HU3
F821 HU4
F821 HU5
F821 HU6
EPC1213 HU7
HR1 4K7
HR2 4K7
HR3 4K7
HR4 2K2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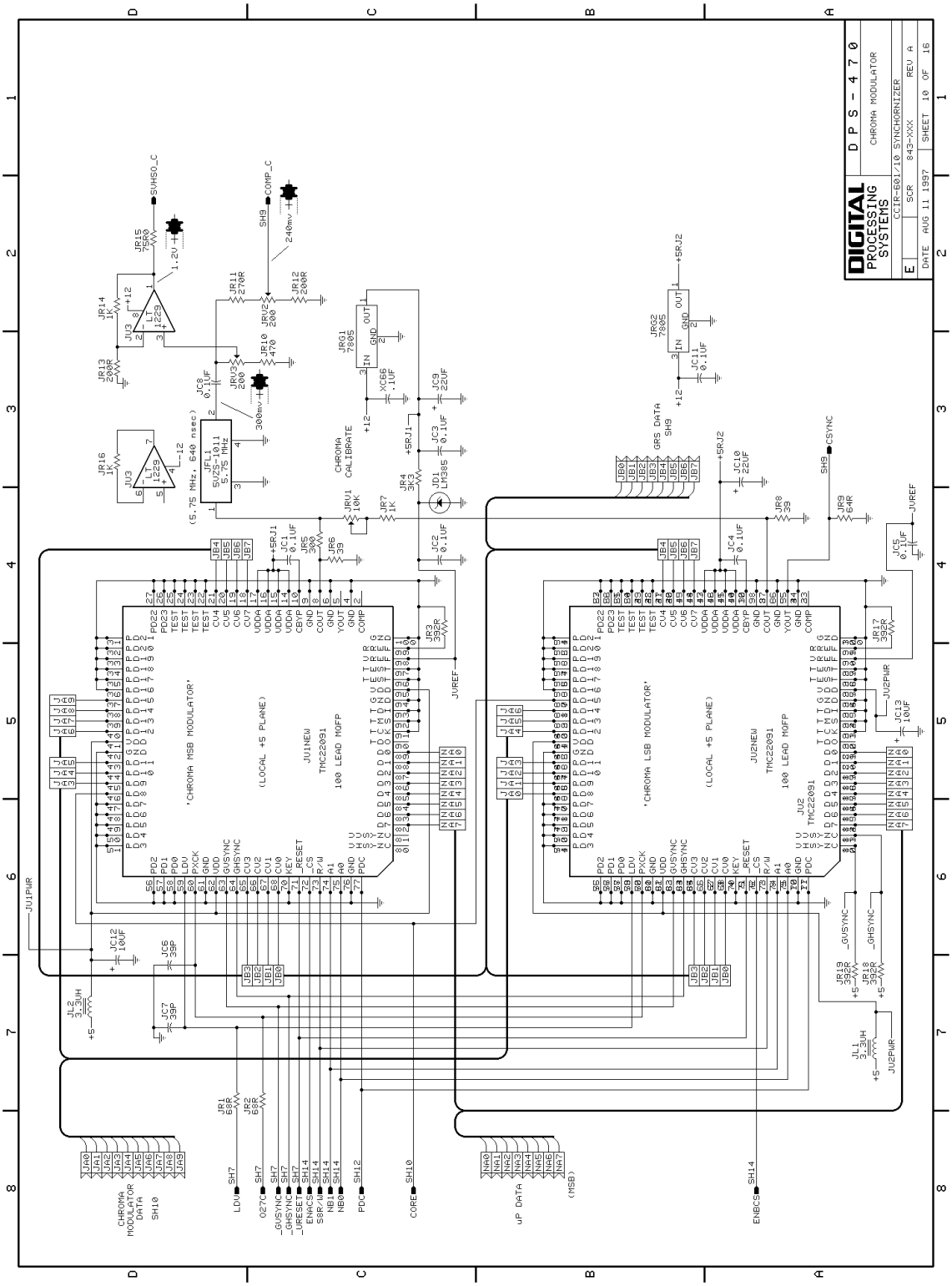
SCR 843-0XX
REV A
DATE JULY 24 1997
SHEET 9 OF 16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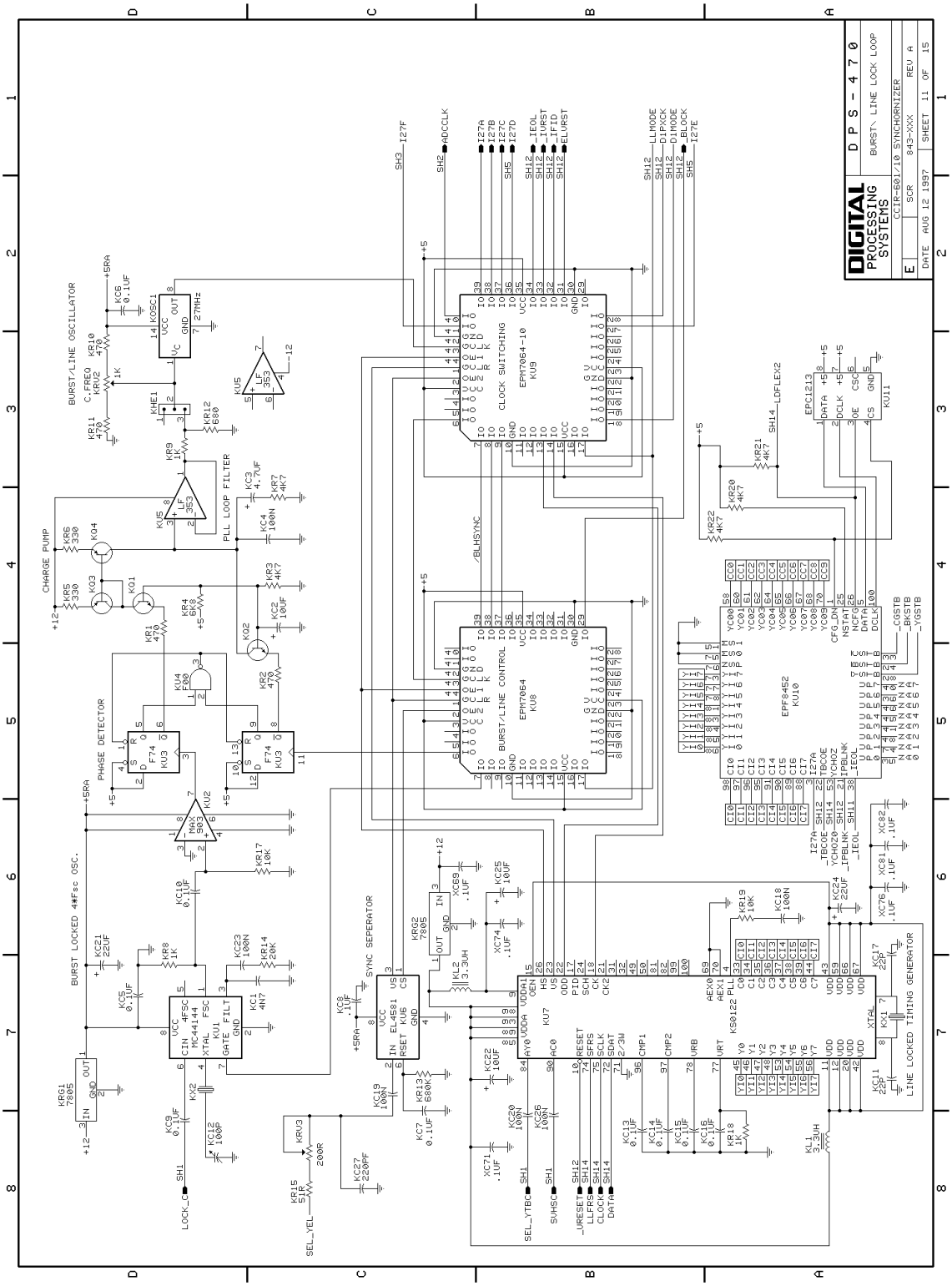
DPS-470
CHROMA MODULATOR
CCIR-601/10 SYNCHRONIZER
843-XXX
REV A
DATE AUG 11 1997
SHEET 10 OF 16
'CHROMA MSB MODULATOR'
'CHROMA LSB MODULATOR'
(LOCAL +5 PLANE)
100 LEAD MQFP
TMC22091
CHROMA CALIBRATE
(5.75 MHz, 640 nsec)
CHROMA MODULATOR DATA
uP DATA
(MSB)
LDV
_GVSYNC
_GHSYNC
ENBCS
CORE
PDC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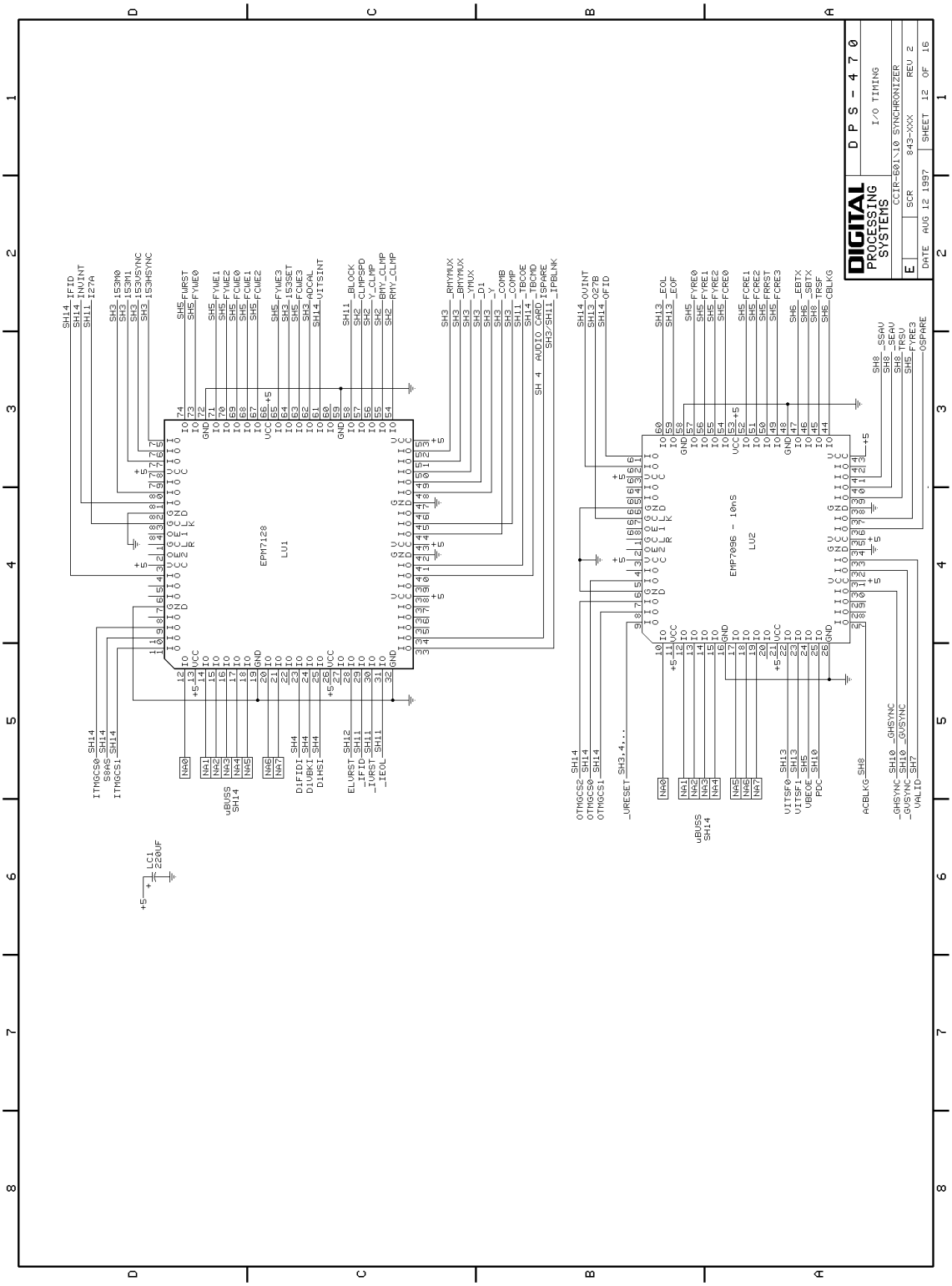
DPS-470
BURST\ LINE LOCK LOOP
CCIR-601/10 SYNCHRONIZER
SCR 843-XXX REV A
DATE AUG 12 1997 SHEET 11 OF 15
BURST/LINE OSCILLATOR
PHASE DETECTOR
CHARGE PUMP
PLL LOOP FILTER
CLOCK SWITCHING
BURST/LINE CONTROL
BURST LOCKED 4*Fsc OSC.
SYNC SEPERATOR
LINE LOCKED TIMING GENERATOR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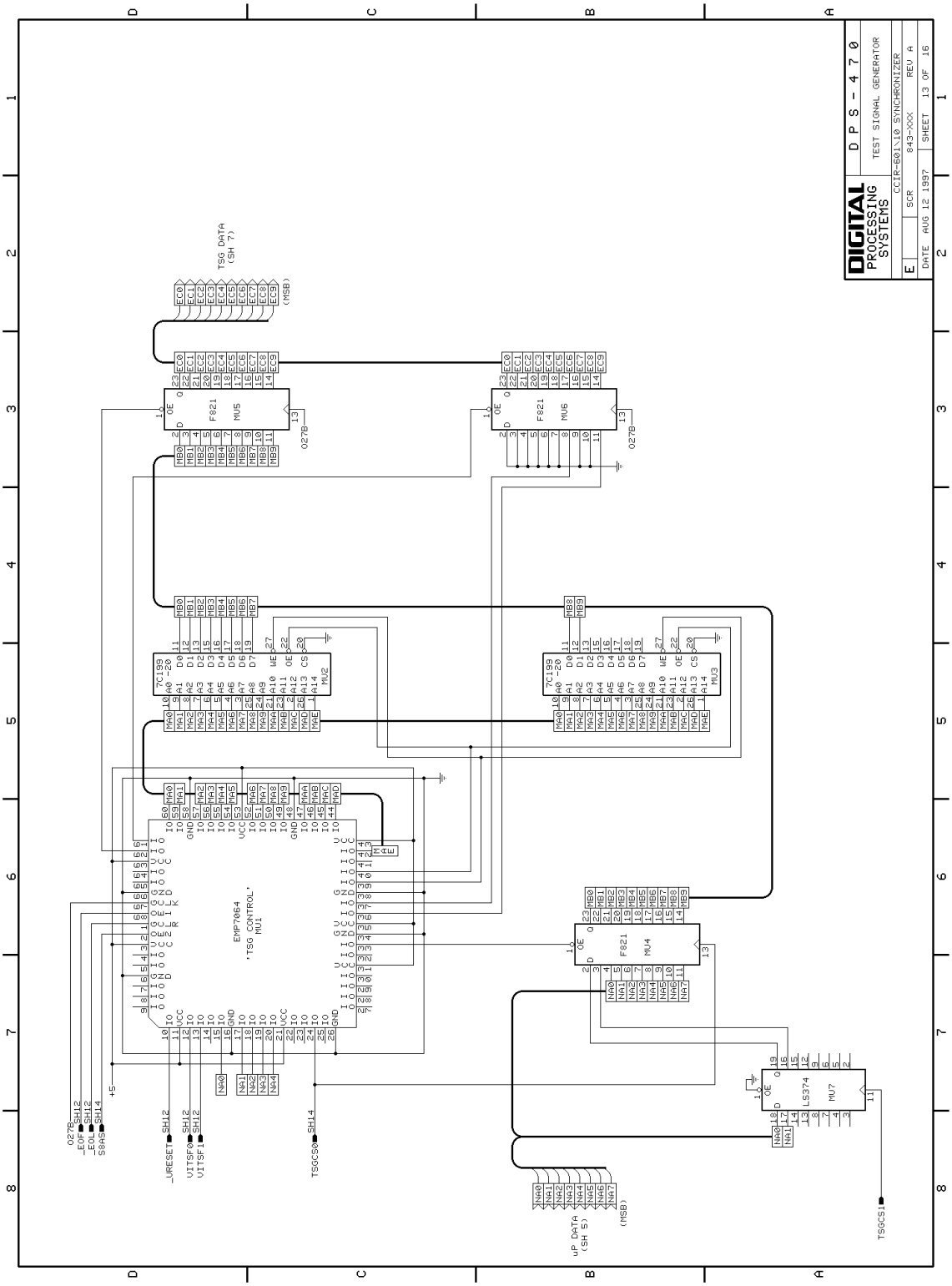
I/O TIMING
CCIR-601\10 SYNCHRONIZER
843-XXX
REV 2
SCR
DATE AUG 12 1997
SHEET 12 OF 16
EPM7128
LU1
EMP7096 - 10nS
LU2
LC1
220UF


DIGITAL
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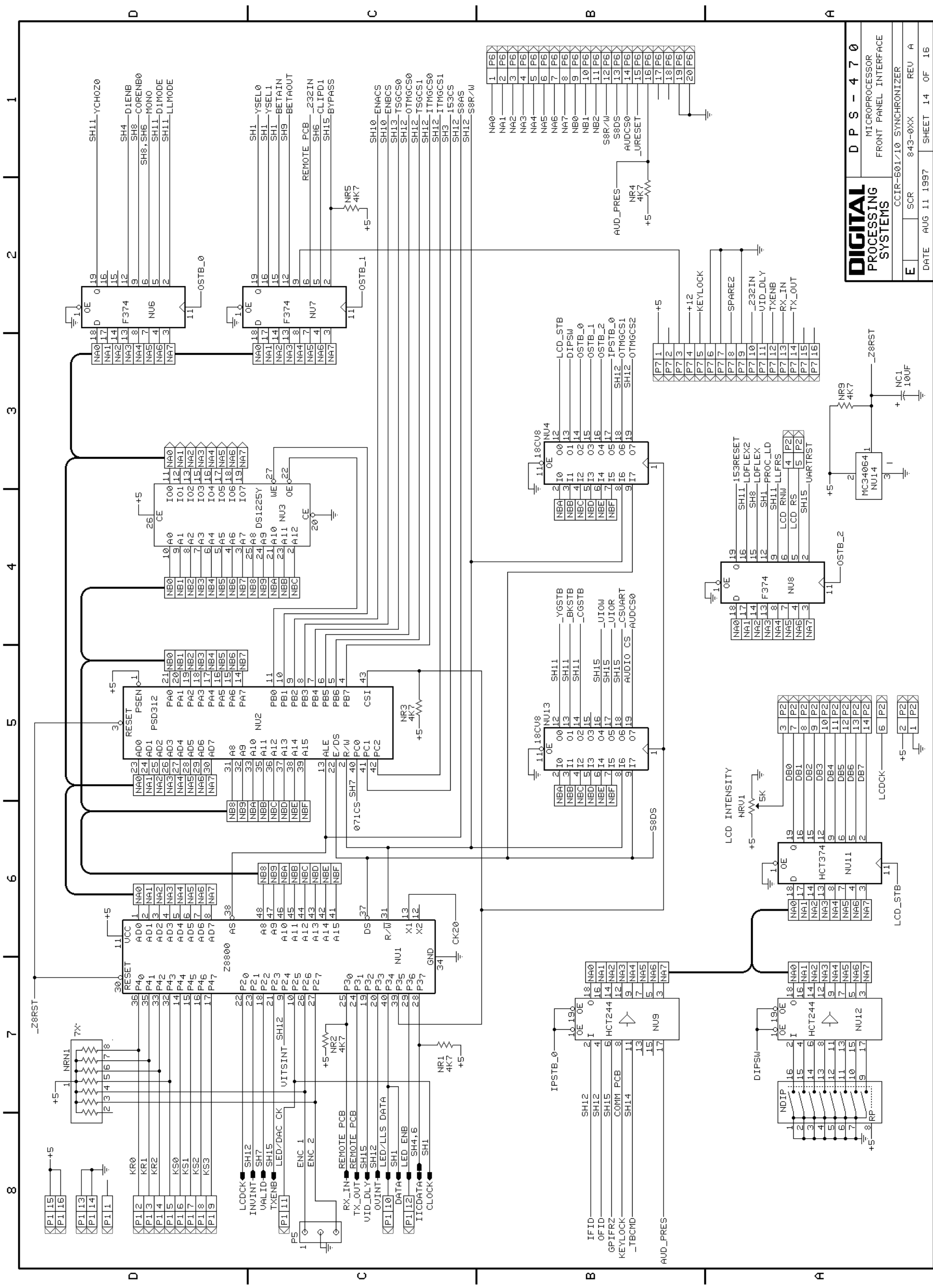
SYSTEMS
DPS-470
TEST SIGNAL GENERATOR
CCIR-601\10 SYNCHRONIZER
SCR 843-XXX REV A
DATE AUG 12 1997 SHEET 13 OF 16
TSG DATA
(SH 7)
(MSB)
F821
MU5
MU6
MU4
MU2
MU3
MU1
'TSG CONTROL'
EMP7064
7C199
LS374
MU7
uP DATA
(SH 5)
TSGCS0
TSGCS1
_URESET
VITSF0
VITSF1
_EOF
_EOL
SHS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MICROPROCESSOR
FRONT PANEL INTERFACE
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CCIR-601/10 SYNCHRONIZER
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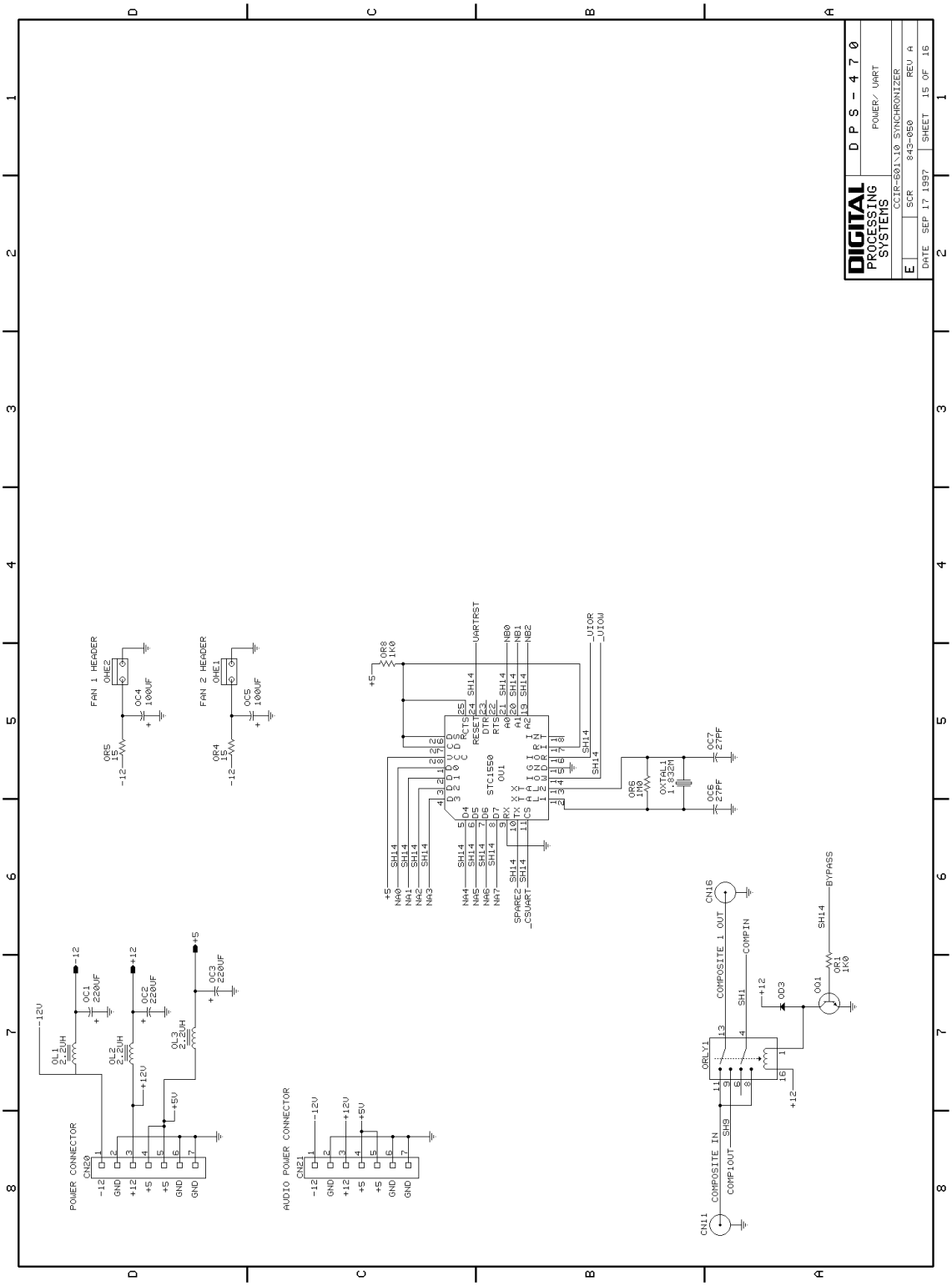
843-0XX
REV A
DATE AUG 11 1997
SHEET 14 OF 16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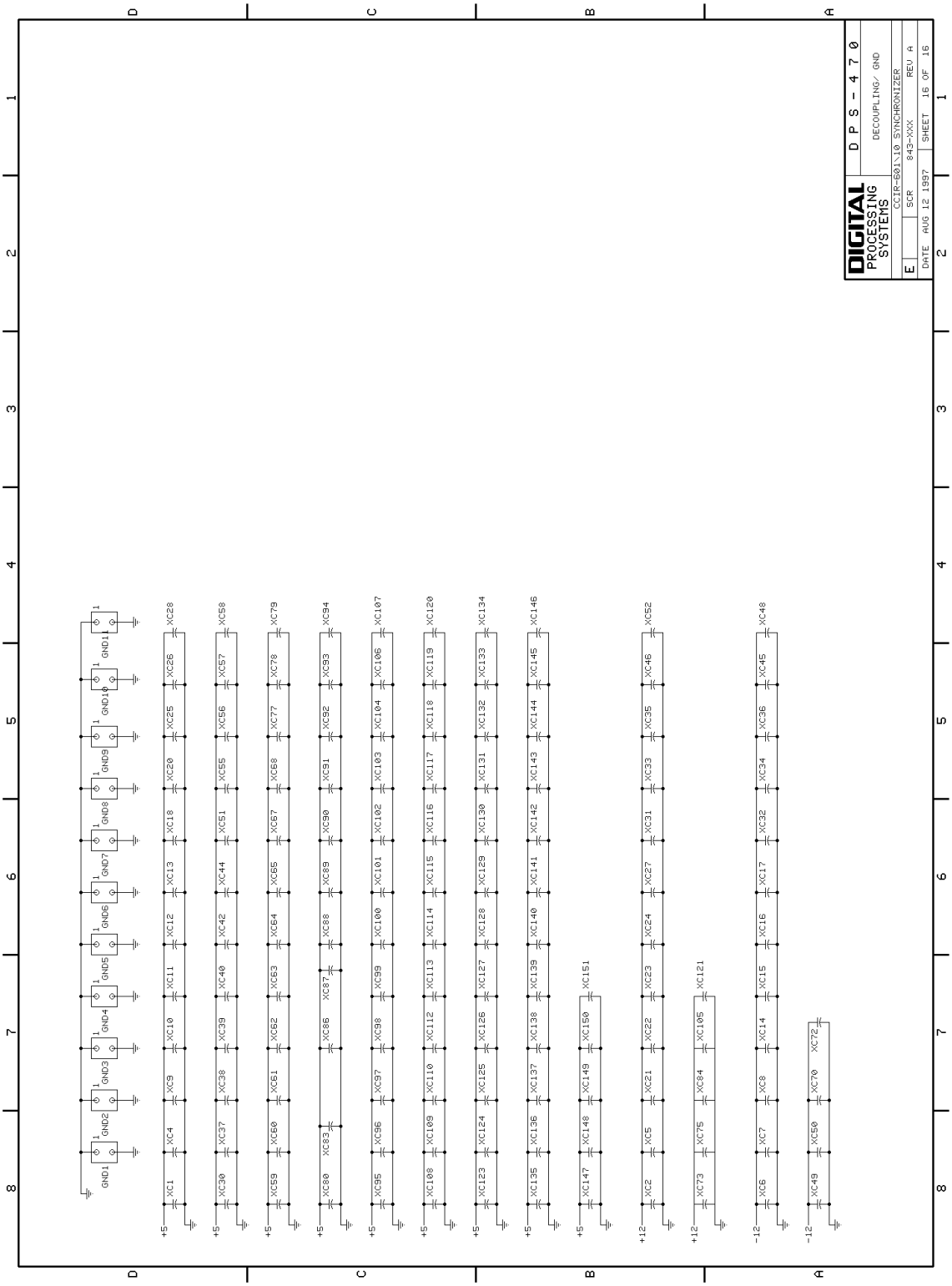
POWER/ UART
CCIR-601\10 SYNCHRONIZER
E
SCR 843-950 REV A
DATE SEP 17 1997 SHEET 15 OF 16
FAN 1 HEADER
FAN 2 HEADER
POWER CONNECTOR
AUDIO POWER CONNECTOR
COMPOSITE IN
COMPOSITE 1 OUT
BYPASS
STC1550
UART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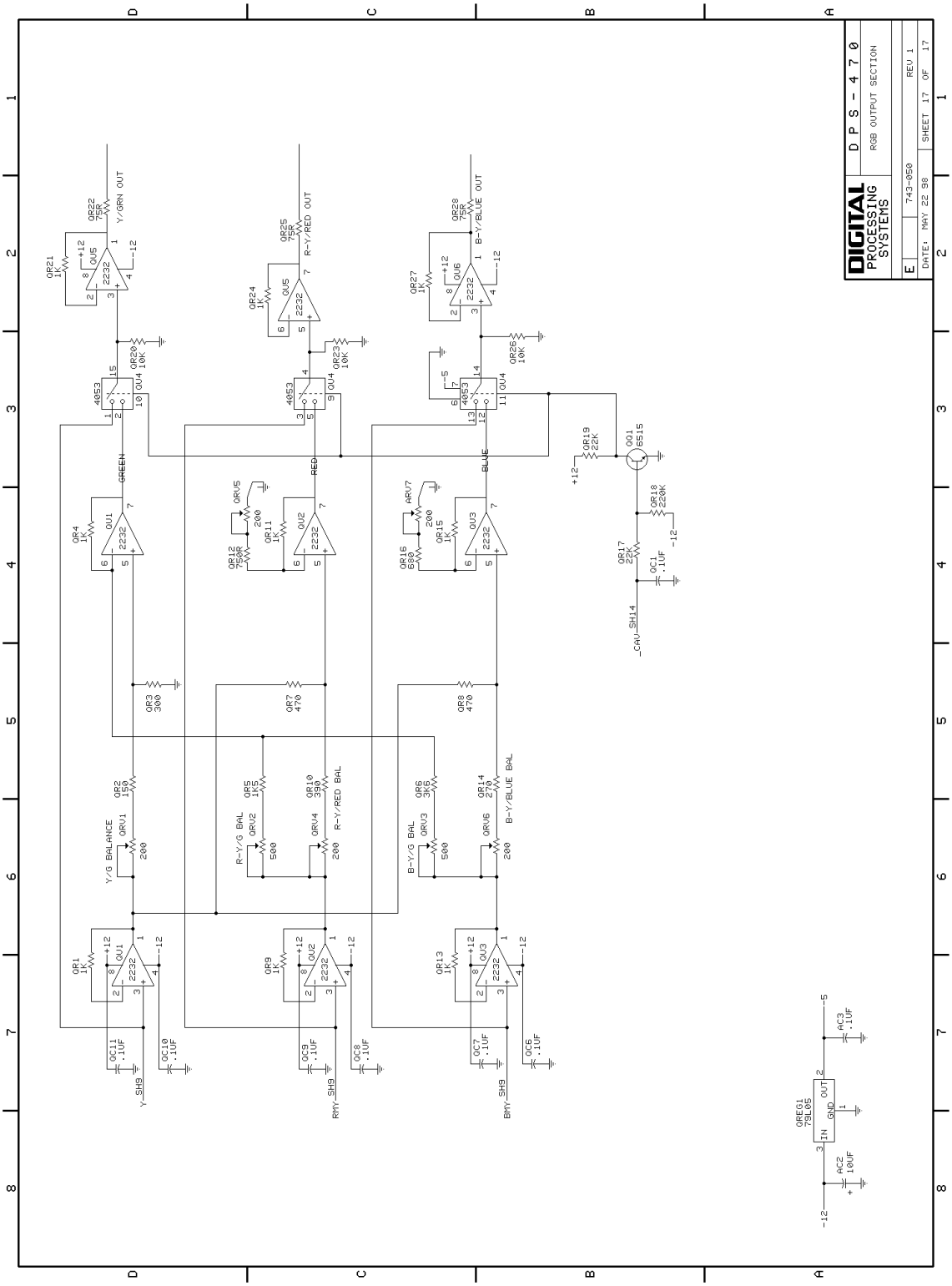
DATE AUG 12 1997 SHEET 16 OF 16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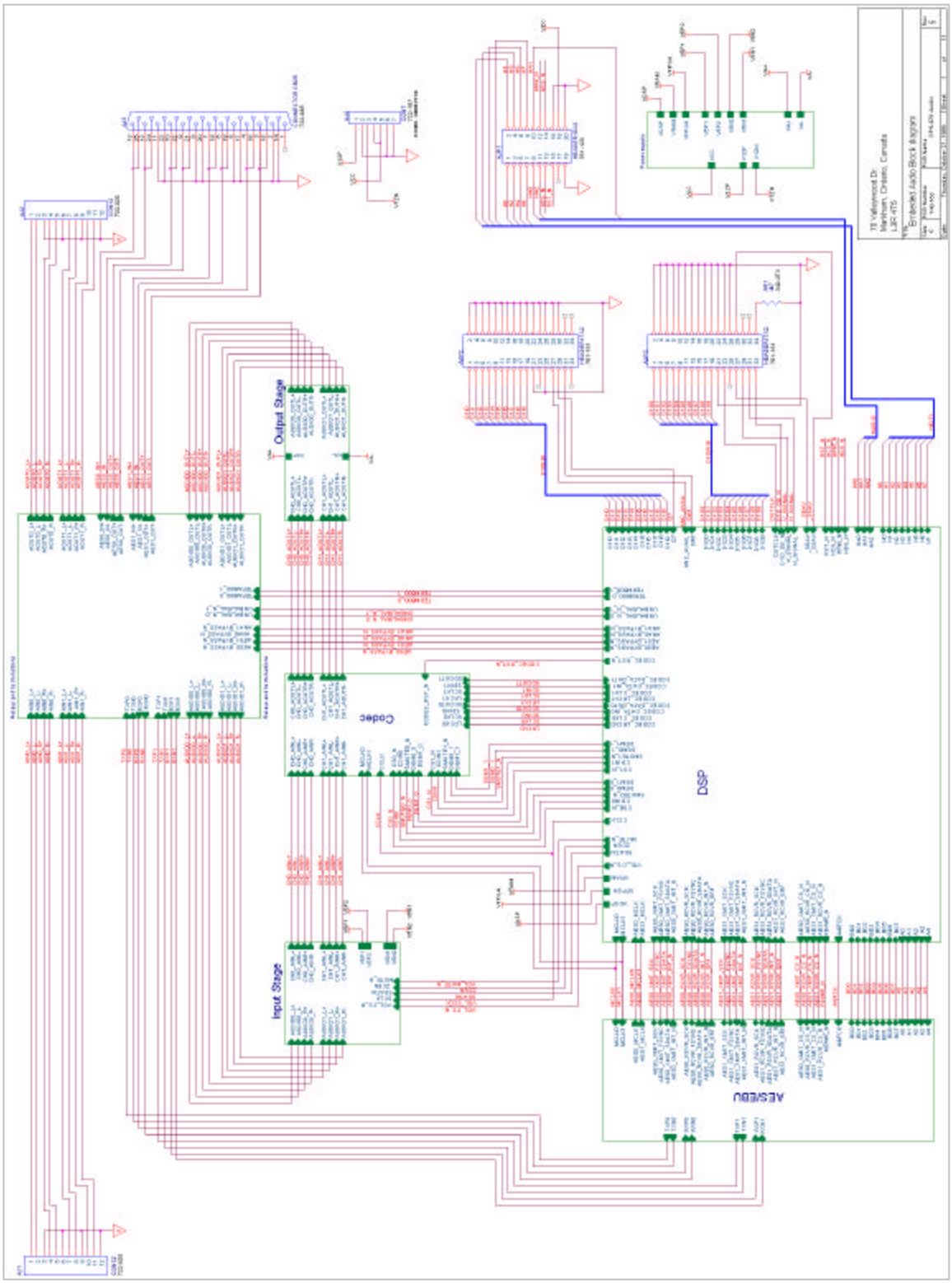
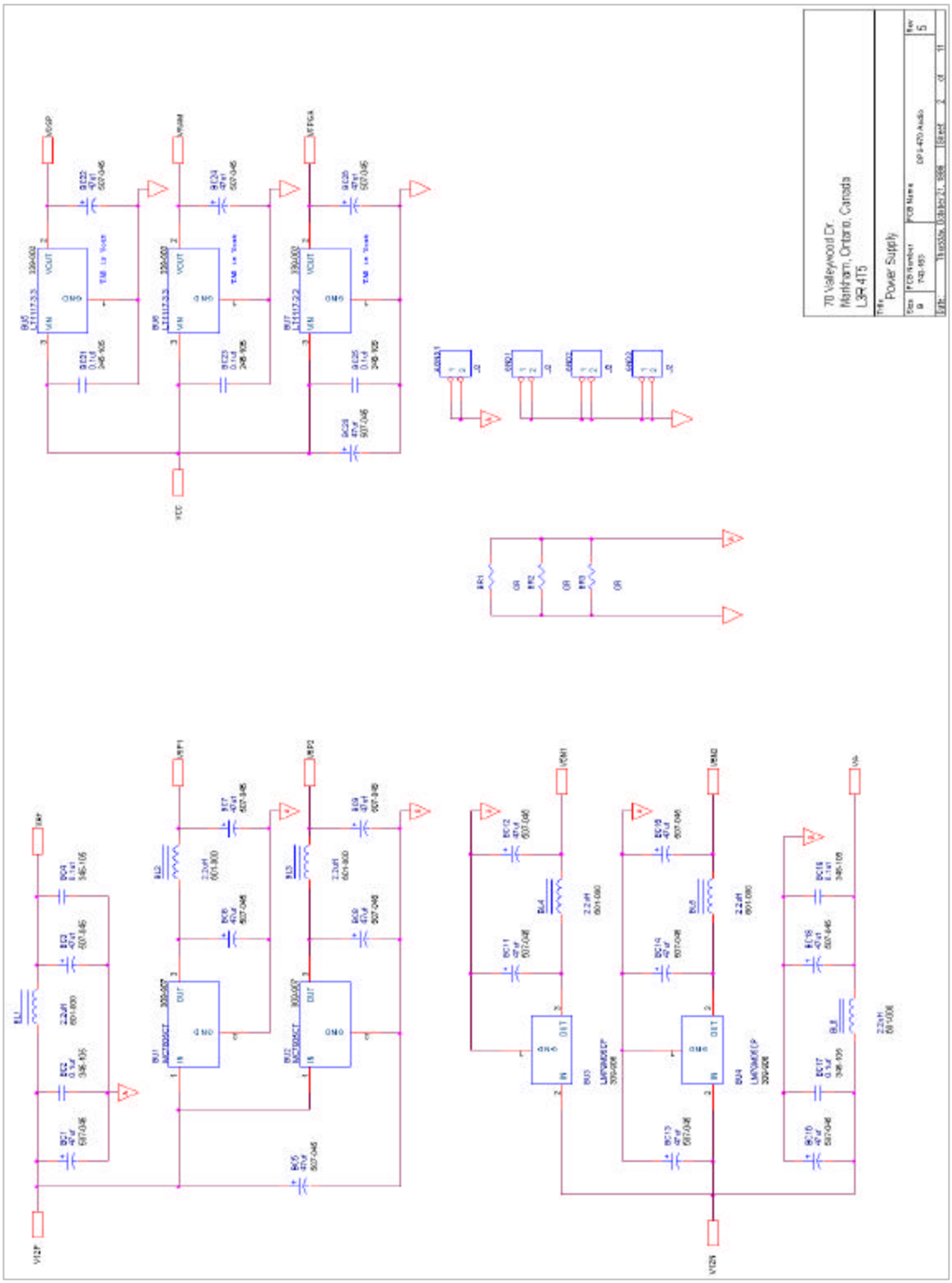
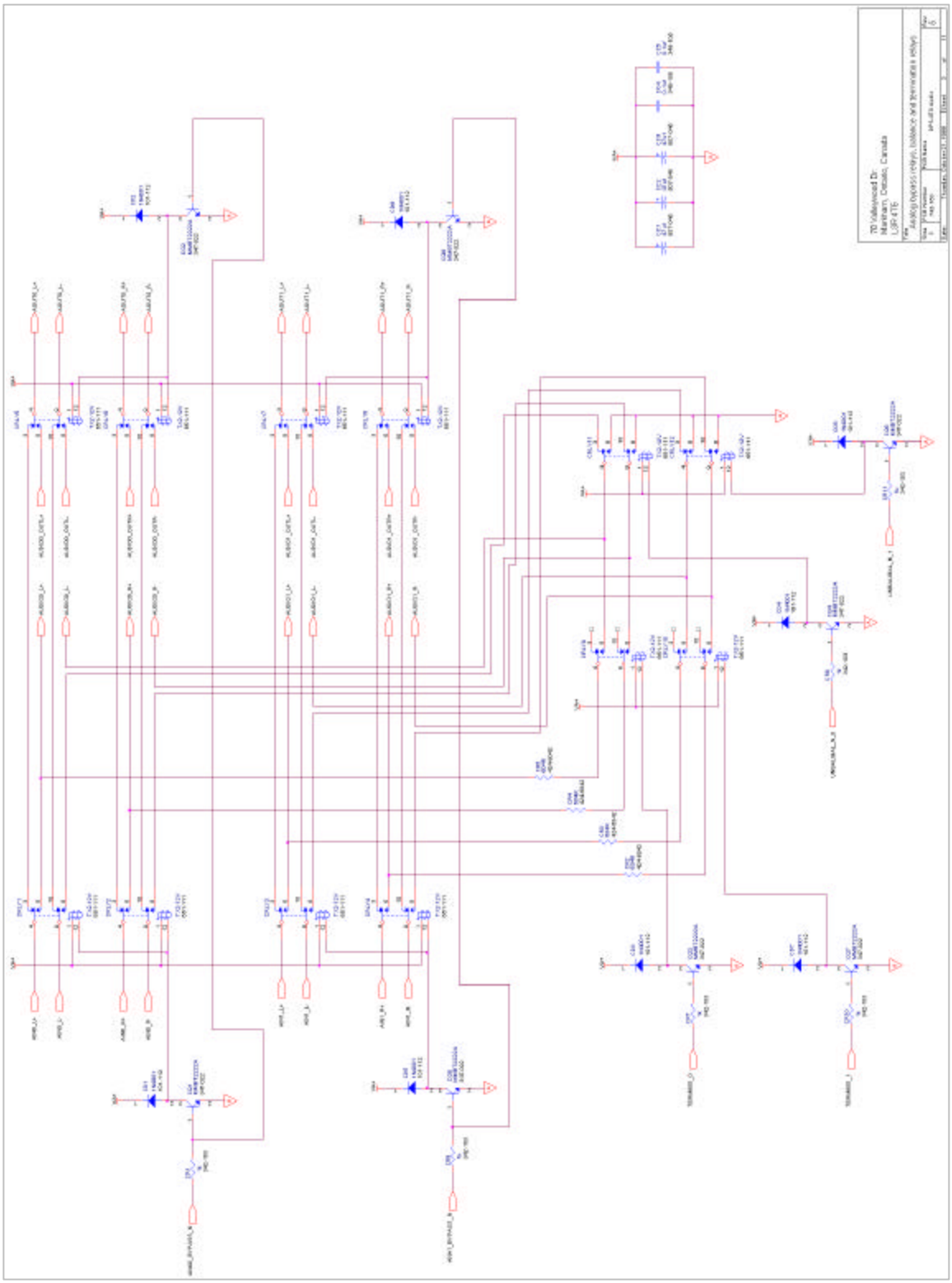
SYSTEMS
DPS-470
RGB OUTPUT SECTION
743-050
REV 1
DATE: MAY 22 98
SHEET 17 OF 17
Y/GRN OUT
R-Y/RED OUT
B-Y/BLUE OUT
Y/G BALANCE
R-Y/G BAL
R-Y/RED BAL
B-Y/G BAL
B-Y/BLUE BAL
GREEN
RED
BLUE
+12
-12
-5

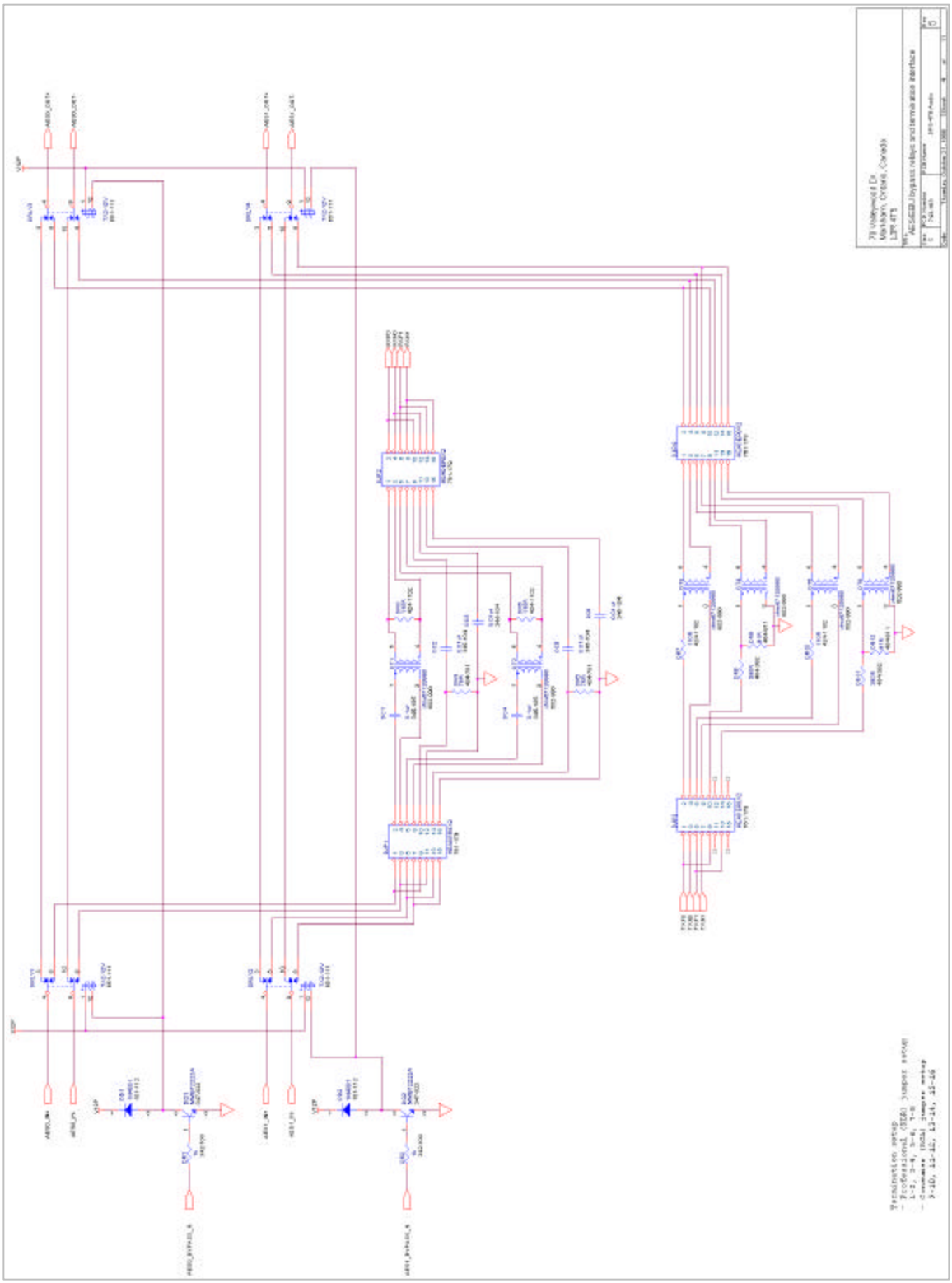
DPS-470

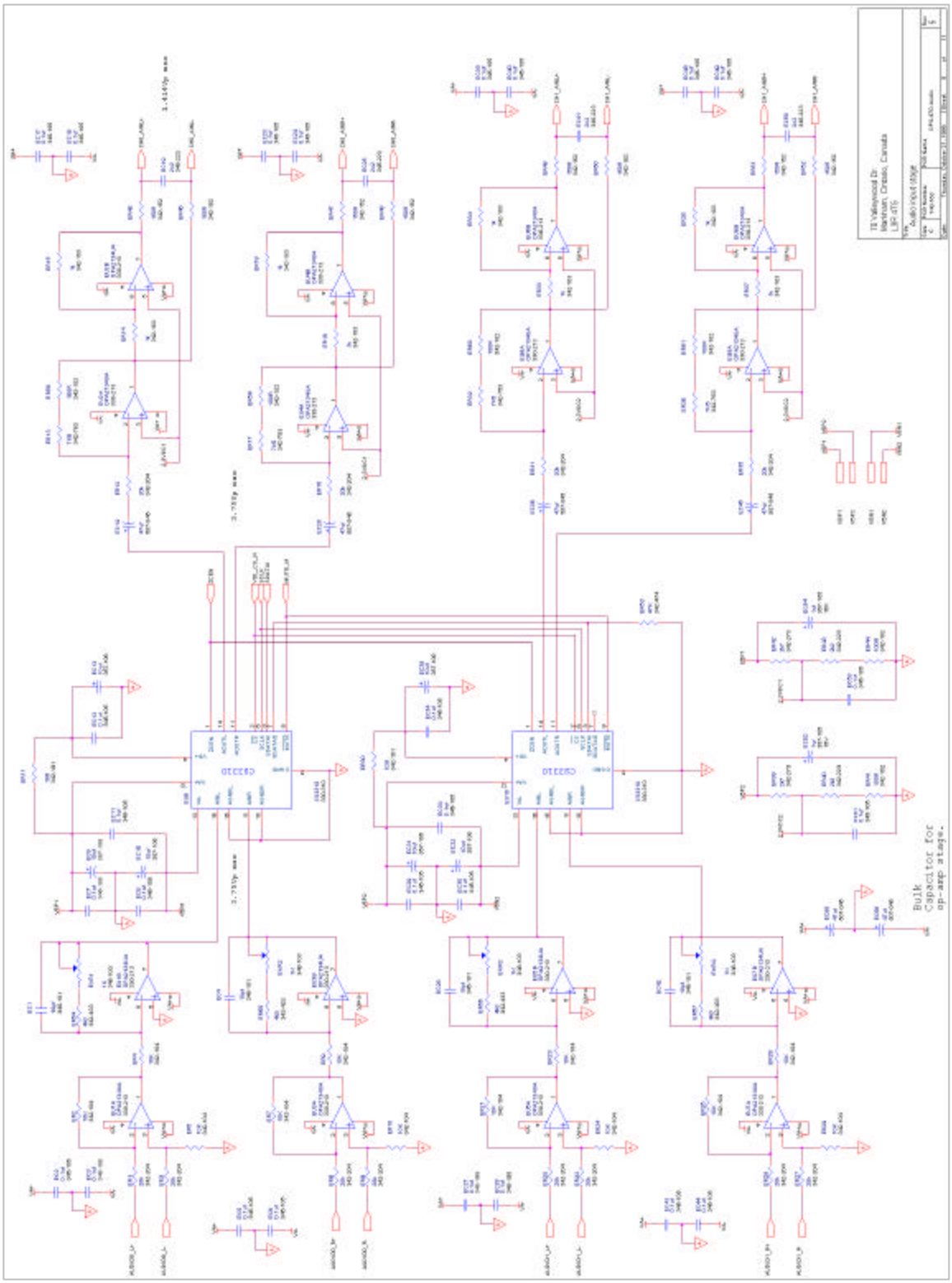
Audio Board

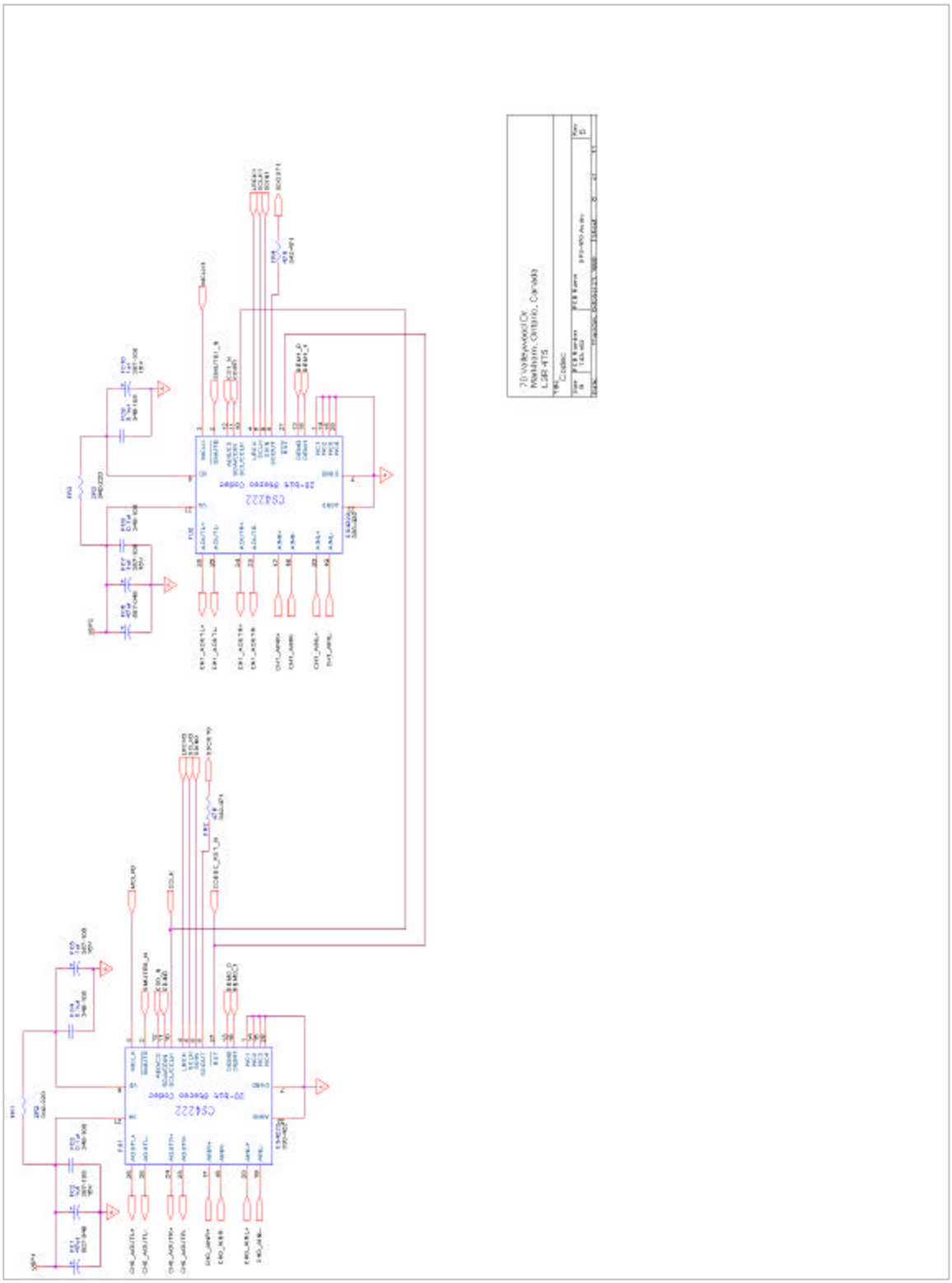


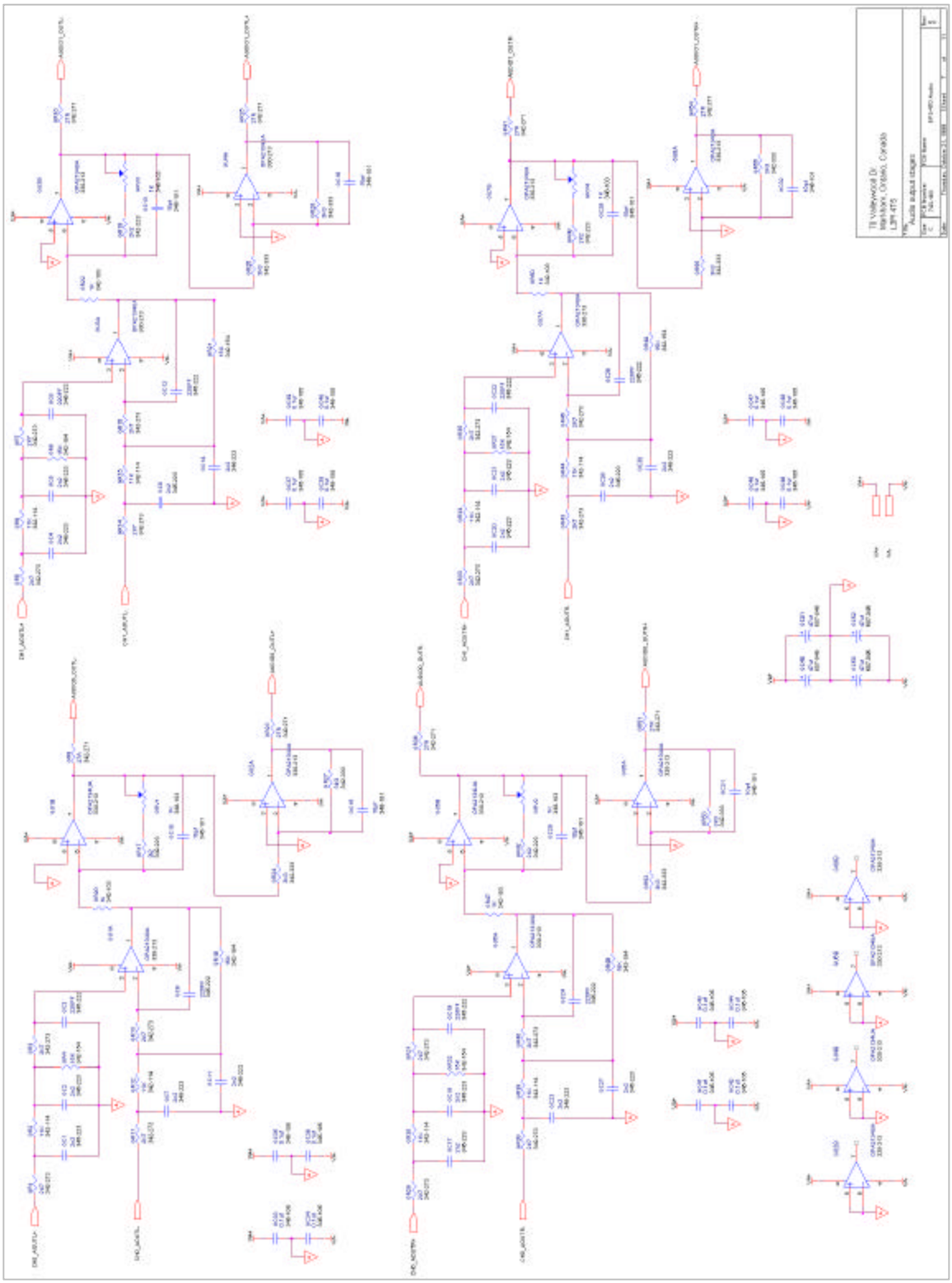

70 Valleywood Dr.
Markham, Ontario, Canada
L3R 4T5
Power Supply

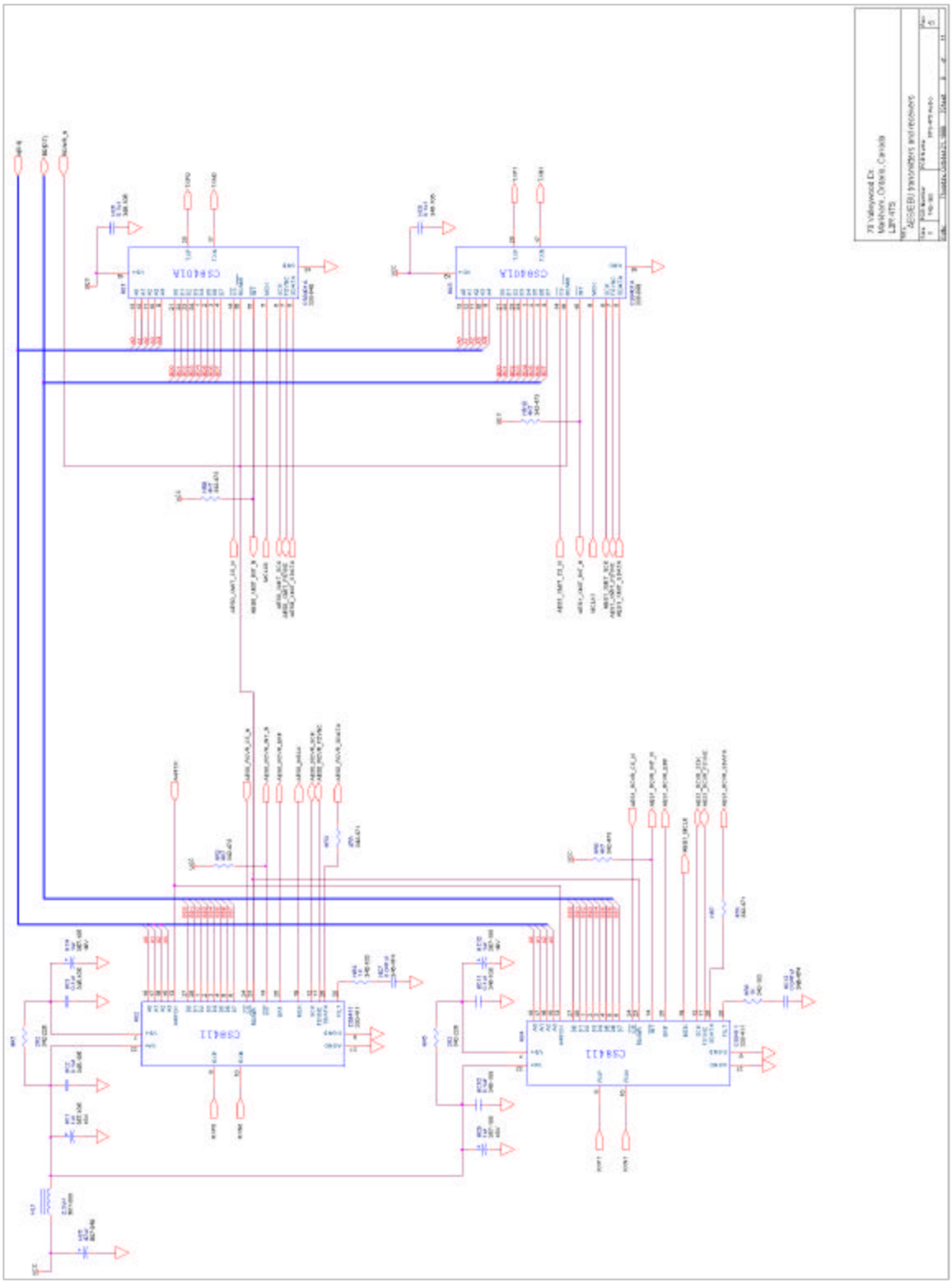


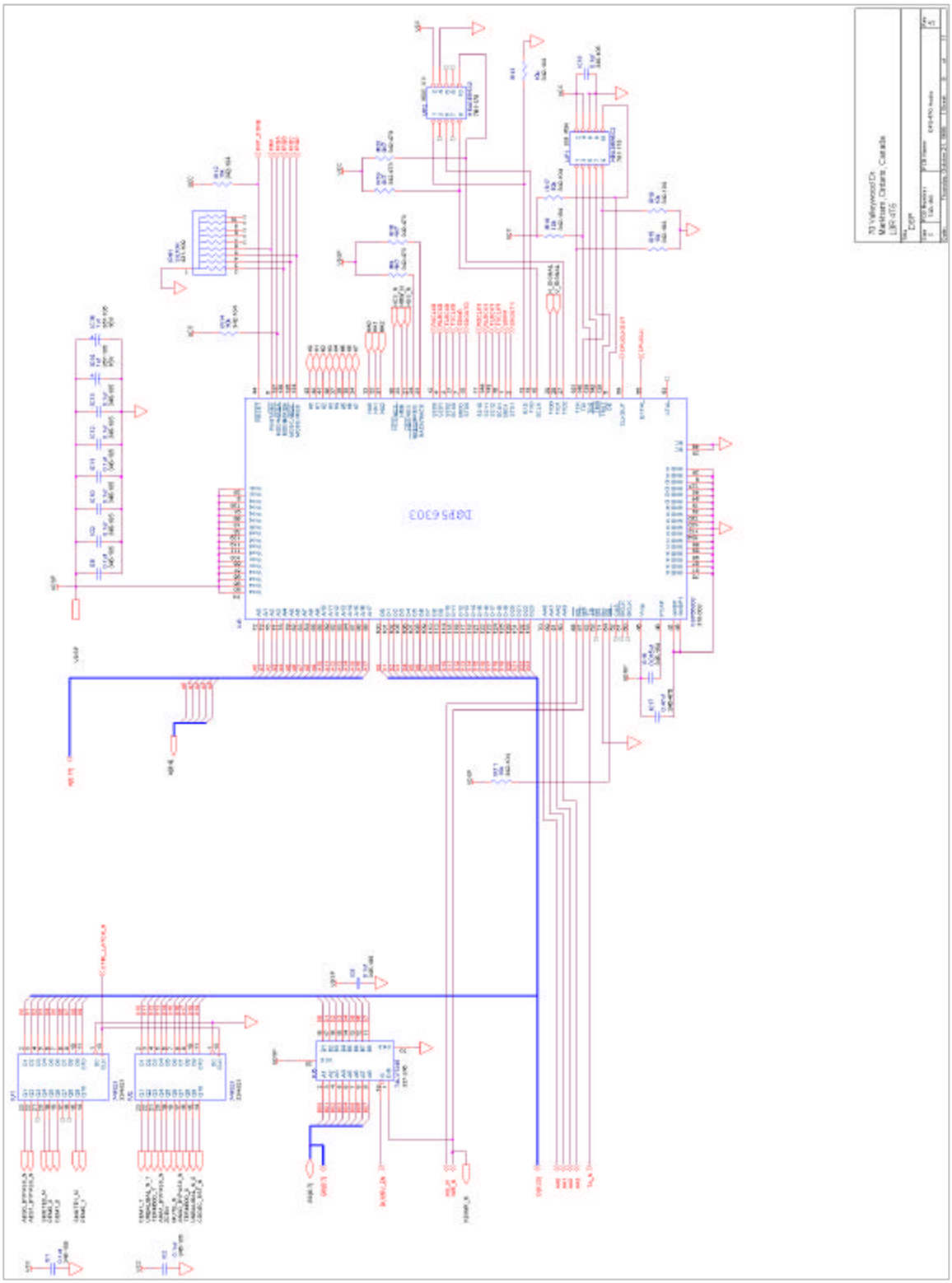


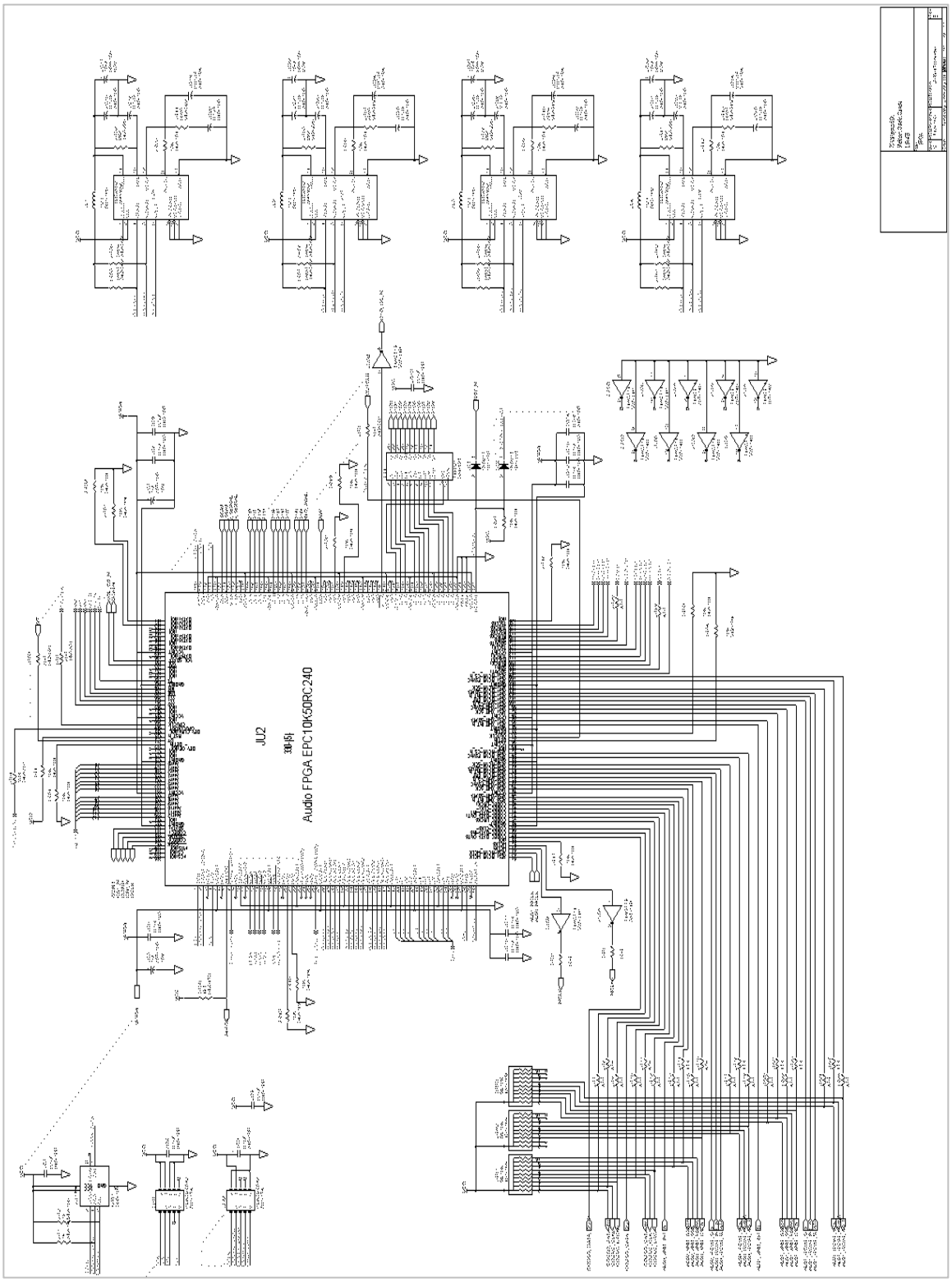








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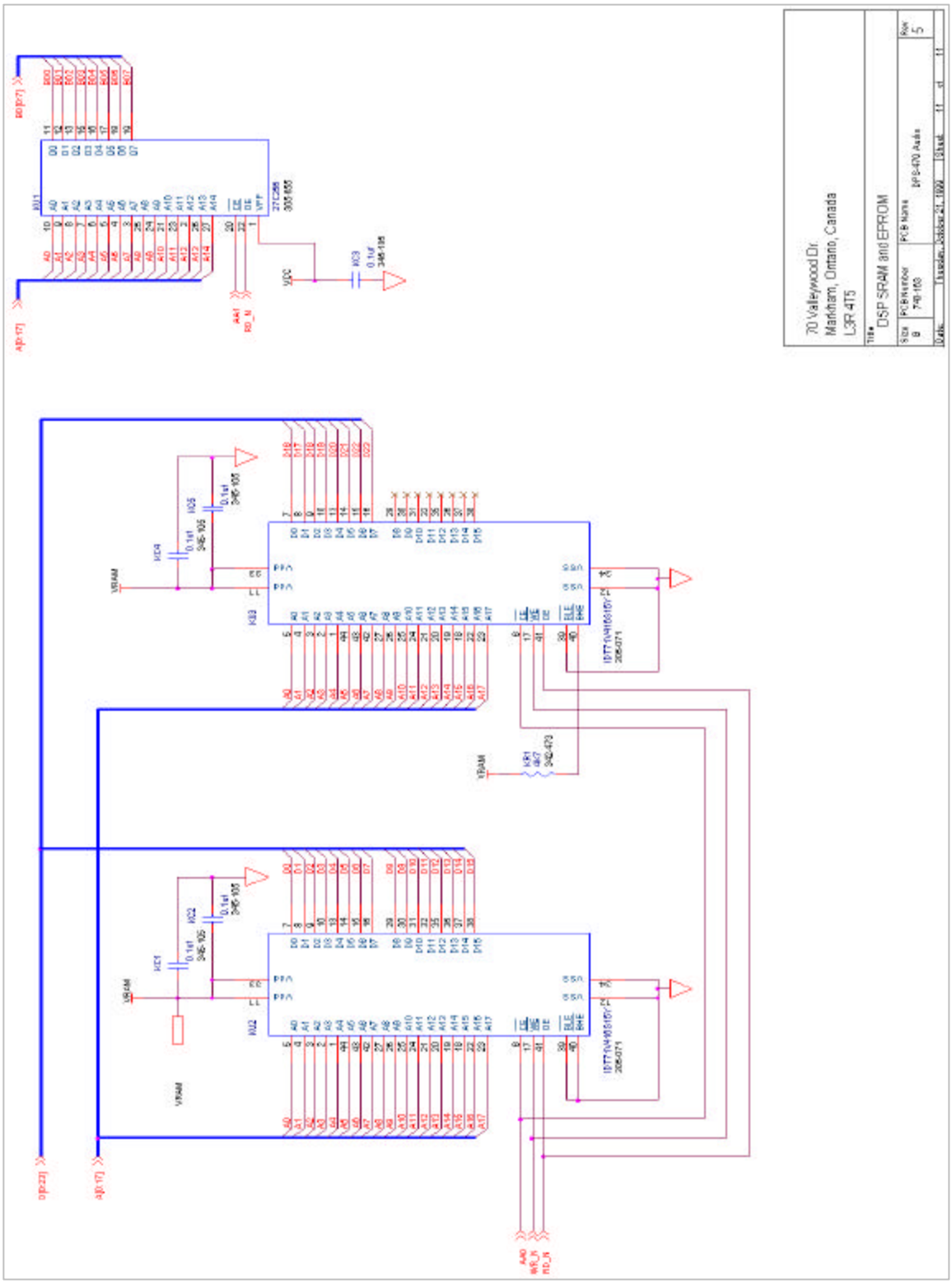
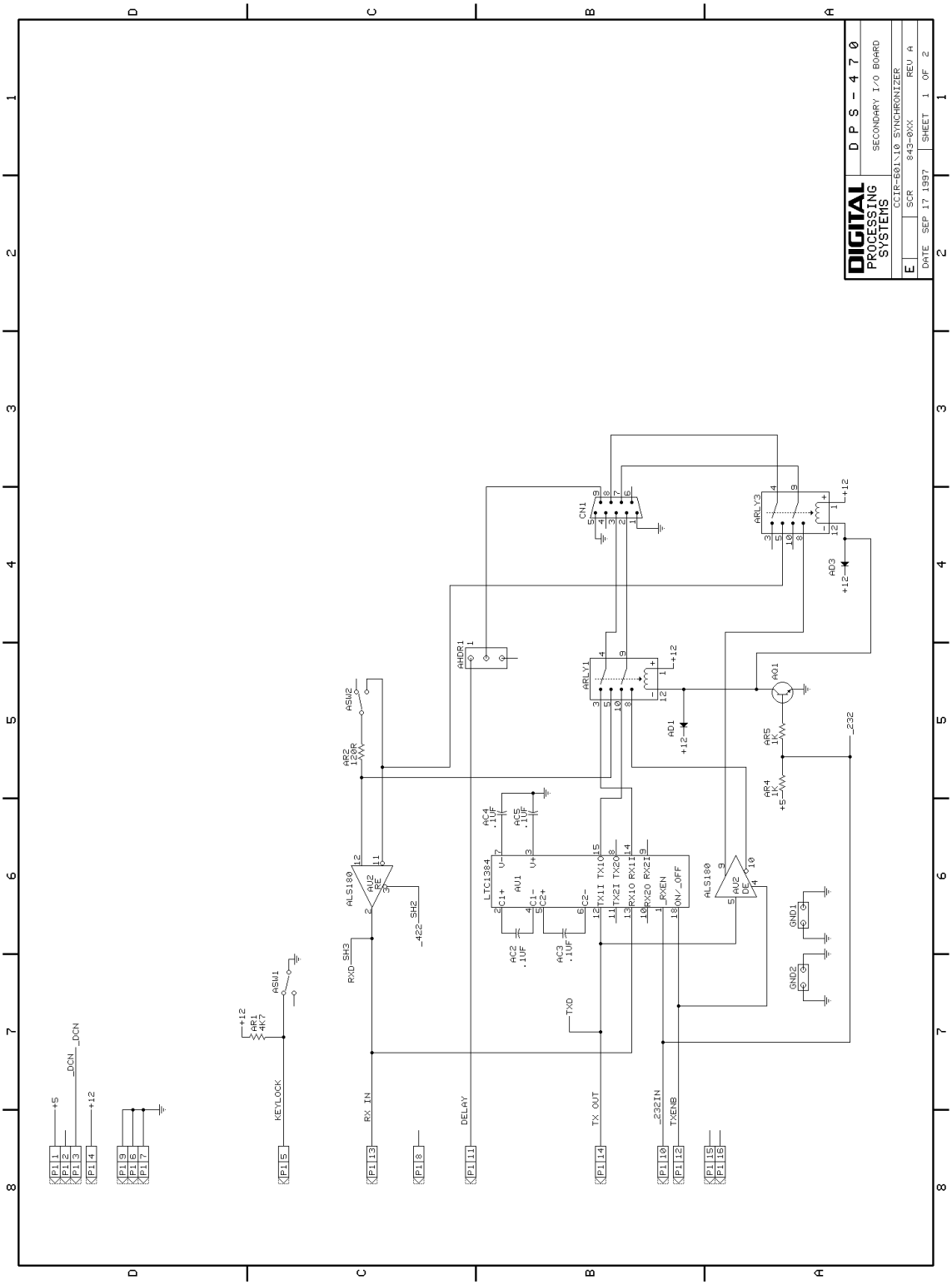
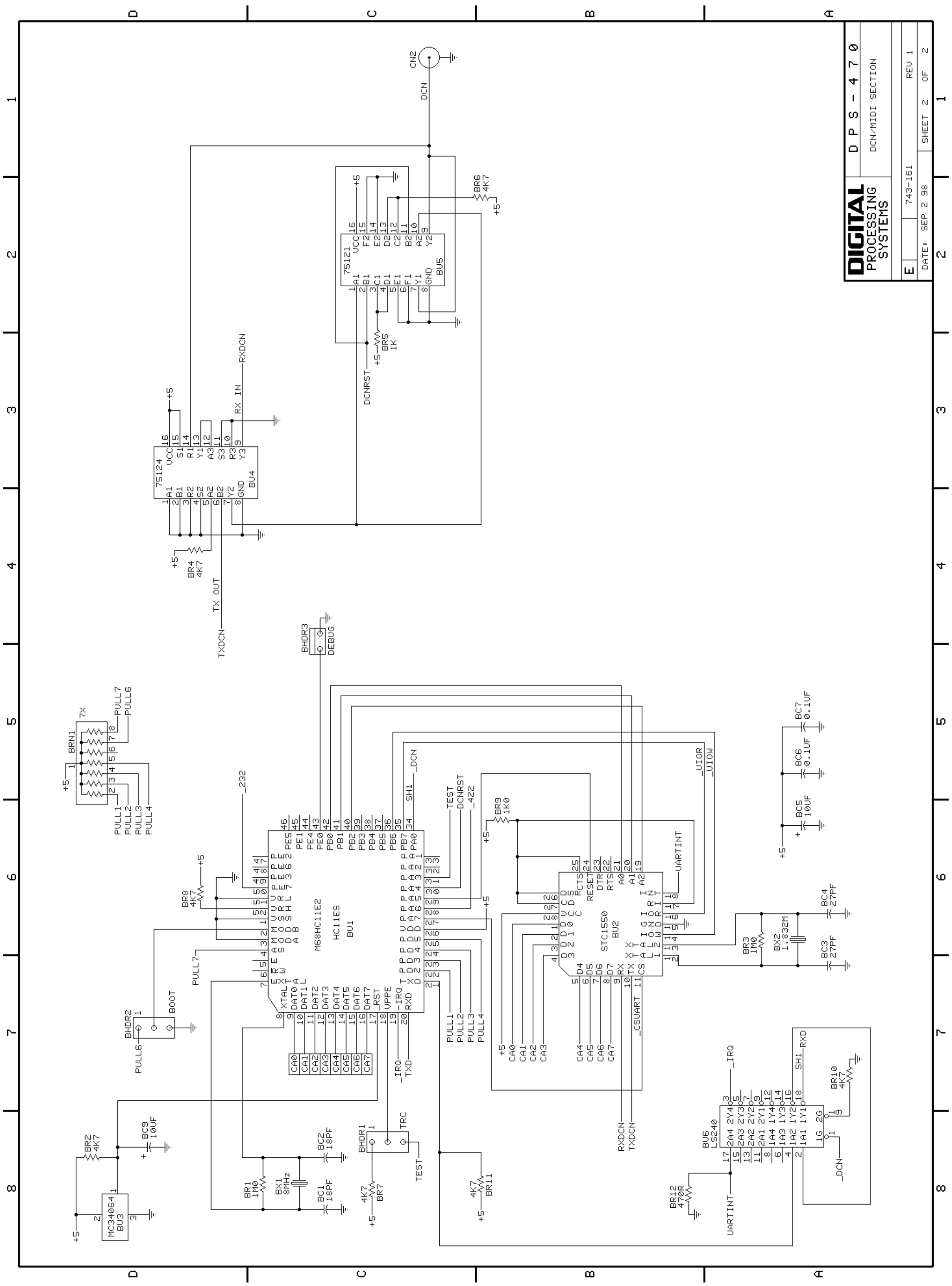

70 Valleywood Dr.
Markham, Ontario, Canada
L3R 4T5
DSP SRAM and EPROM
DPS-470 Axis
VRAM

DPS-470

DCN Board




DIGITAL PROCESSING SYSTEMS
D P S - 4 7 0
DCN/MIDI SECTION
E
743-161
REV 1
DATE: SEP 2 98
SHEET 2 OF 2

Chapter 7: Bill of Materials

843-160: Main Board Assembly

Designation	Description		DPS Part Number
AC1	CAP ELEC 100uF	506-005	
AC2	CAP ELEC 100uF	506-005	
AC3	CAP ELEC 100uF	506-005	
AC4	CAP ELEC 100uF	506-005	
AC5	CAP ELEC 100uF	506-005	
AC6	CAP ELEC 100uF	506-005	
AC7	CAP ELEC 100uF	506-005	
AC8	CAP ELEC 100uF	506-005	
AC9	CAP ELEC 100uF	506-005	
AC10	CAP ELEC 100uF	506-005	
AC11	CAP TANT 4.7uF 25V		507-023
AC12	CAP CER 100pF 2%		503-100
AC13	CAP CER 100pF 2%		503-100
AC14	CAP TANT 1uF 35V		507-020
AC15	CAP CER 0.1uF 50 20%		502-006
AC16	CAP CER 0.1uF 50 20%		502-006
AC17	CAP TANT 4.7uF 25V		507-023
AC18	CAP TANT 1uF 35V		507-020
AC19	CAP CER 560pF 5%		503-560
AC20	CAP CER 0.1uF 50 20%		502-006
AC21	CAP CER 0.1uF 50 20%		502-006
AC22	CAP CER 0.1uF 50 20%		502-006
AC23	CAP ELEC 100uF	506-005	
AC24	CAP ELEC 100uF	506-005	
AC25	CAP TANT 1uF 35V		507-020
AC26	CAP CER 33pF 2%		503-033
AC27	CAP WIMA 100n 5% MKS-2		505-083
AFL1	COIL TOKO H288LSMS-3245PKD	601-245	
AL1	COIL 12UH Q75 R2.50 10%		601-024
AL2	COIL 12UH Q75 R2.50 10%		601-024
AL3	COIL 1UH 1M2-1UH		601-002
AQ1	TRANS PNP 2N3906		202-005
AQ2	TRANS NPN MPS6515/MPS6521		201-515
AQ3	TRANS NPN MPS6515/MPS6521		201-515
AQ4	TRANS NPN 2N3904		201-020
AR1	RES SOL 78R7 1%		424-7871
AR2	RES SOL 1K1 1/4W 5%		404-113
AR3	RES SOL 47K 1/4W 5%		404-474
AR4	RES SOL 1K 1/4W 5%		404-103
AR5	RES SOL 1K2 1/4W 5%		404-123
AR6	RES SOL 78R7 1%		424-7871
AR7	RES SOL 1K1 1/4W 5%		404-113

AR8	RES SOL 47K 1/4W 5%	404-474
Designation	**Description**	**DPS Part Number**
AR9	RES SOL 1K 1/4W 5%	404-103
AR10	RES SOL 1K5 1/4W 5%	404-153
AR11	RES SOL 78R7 1%	424-7871
AR12	RES SOL 1K1 1/4W 5%	404-113
AR13	RES SOL 47K 1/4W 5%	404-474
AR14	RES SOL 680R 1/4W 5%	404-682
AR15	RES SOL 1K 1/4W 5%	404-103
AR16	RES SOL 78R7 1%	424-7871
AR17	RES SOL 390R 1/4W 5%	404-392
AR18	RES SOL 4K7 1/4W 5%	404-473
AR19	RES SOL 1K 1/4W 5%	404-103
AR20	RES SOL 2K7 1/4W 5%	404-273
AR21	RES SOL 75R 1%	424-7501
AR22	RES SOL 10K 1/4W 5%	404-104
AR23	RES SOL 1K 1/4W 1%	424-1003
AR24	RES SOL 10K 1/4W 5%	404-104
AR25	RES SOL 10K 1/4W 5%	404-104
AR26	RES SOL 100K 1/4W 5%	404-105
AR27	RES SOL 300K 1/4W 5%	404-305
AR28	RES SOL 100K 1/4W 5%	404-105
AR29	RES SOL 10K 1/4W 5%	404-104
AR30	RES SOL 10K 1/4W 5%	404-104
AR31	RES SOL 1K 1/4W 1%	424-1003
AR32	RES SOL 75R 1%	424-7501
AR33	RES SOL 10K 1/4W 5%	404-104
AR34	RES SOL 120R 1/4W 5%	404-122
AR35	RES SOL 330R 1/4W 5%	404-332
AR37	RES SOL 7K5 1/4W 5%	404-753
AR38	RES SOL 2K4 1/4W 5%	404-243
AR39	RES SOL 470R 1/4W 5%	404-472
AR40	RES SOL 300K 1/4W 5%	404-305
AR41	RES SOL 300K 1/4W 5%	404-305
AR42	RES SOL 300K 1/4W 5%	404-305
AR43	RES SOL 300K 1/4W 5%	404-305
AR44	RES SOL 2K 1/4W 5%	404-203
AR45	RES SOL 2K 1/4W 5%	404-203
AR46	RES SOL 1K 1/4W 5%	404-103
AR47	RES SOL 100R 1/4W 5%	404-102
AR48	RES SOL 2K 1/4W 5%	404-203
AR49	RES SOL 2K 1/4W 5%	404-203
AR50	RES SOL 100R 1/4W 5%	404-102
AR51	RES SOL 100R 1/4W 5%	404-102
AR52	RES SOL 300K 1/4W 5%	404-305
AR53	RES SOL 1K 1/4W 1%	424-1003
AR54	RES SOL 1K 1/4W 1%	424-1003
AR55	RES SOL 2K2 1/4W 5%	404-223
AR56	RES SOL 1K5 1/4W 5%	404-153
AR57	RES SOL 47K 1/4W 5%	404-474
AR58	RES SOL 39K 1/4W 5%	404-394
AR59	RES SOL 10K 1/4W 5%	404-104
AR60	RES SOL 10K 1/4W 5%	404-104

AR61	RES SOL 2K2 1/4W 5%	404-223

Designation	Description	DPS Part Number
AR62	RES SOL 1K 1/4W 5%	404-103
AR63	RES SOL 1K 1/4W 5%	404-103
AR64	RES SOL 332R 1%	424-3322
AR65	RES SOL 332R 1%	424-3322
AR66	RES SOL 10R 1/4W 5%	404-101
ARG1	IC 78L05	308-005
ARV1	POT 1K SGL TRN	410-015
ARV2	POT 500R SGL TRN	410-500
ARV3	POT 500R SGL TRN	410-500
ARV4	POT 500R SGL TRN	410-500
ARV5	POT 2K SGL TRN	410-016
ARV6	POT 2K SGL TRN	410-016
ARV7	POT 2K SGL TRN	410-016
ARV8	POT 2K SGL TRN	410-016
ARV9	POT 1K SGL TRN	410-015
ARV10	POT 2K SGL TRN	410-016
ARV11	POT 2K SGL TRN	410-016
ARV12	POT 1K SGL TRN	410-015
ARV13	POT 20K SGL TRN	410-030
ASSY	PCB ASSY	843-160EX
AU1	IC EL2260CJ or LT1229CN8	308-232
AU2	IC EL2260CJ or LT1229CN8	308-232
AU3	IC EL2260CJ or LT1229CN8	308-232
AU4	IC EL4441CS	330-441
AU5	IC TLO74	308-074
AU7	IC DAC-8800 OCTAL	308-800
AU8	IC EL2260CJ or LT1229CN8	308-232
AU9	IC EL2260CJ or LT1229CN8	308-232
BC1	CAP WIMA 1n0 FKS-2	505-085
BC2	CAP WIMA 10N 5% MKS-2	505-084
BC3	CAP CER 100pF 2%	503-100
BC5	CAP CER 12P	503-012
BC6	CAP TANT 10uF 25V	507-035
BC8	CAP CER 100pF 2%	503-100
BC10	CAP CER 0.1uF 50 20%	502-006
BC11	CAP TANT 10uF 25V	507-035
BC12	CAP CER 0.1uF 50 20%	502-006
BC13	CAP CER 0.1uF 50 20%	502-006
BC14	CAP TANT 1uF 35V	507-020
BC15	CAP CER 0.1uF 50 20%	502-006
BC16	CAP CER 0.1uF 50 20%	502-006
BC17	CAP CER 0.1uF 50 20%	502-006
BC18	CAP CER 0.1uF 50 20%	502-006
BC19	CAP CER 0.1uF 50 20%	502-006
BC20	CAP WIMA 1n0 FKS-2	505-085
BC21	CAP CER 0.1uF 50 20%	502-006
BC22	CAP CER 0.1uF 50 20%	502-006

BC23	CAP CER 0.1uF 50 20%		502-006
Designation	**Description**		**DPS Part Number**
BC24	CAP CER 0.1uF 50 20%		502-006
BC25	CAP CER 100pF 2%		503-100
BC28	CAP WIMA 10N 5% MKS-2		505-084
BC29	CAP CER 0.1uF 50 20%		502-006
BC30	CAP CER 0.1uF 50 20%		502-006
BC31	CAP CER 0.1uF 50 20%		502-006
BC32	CAP CER 0.1uF 50 20%		502-006
BC33	CAP CER 0.1uF 50 20%		502-006
BC34	CAP CER 0.1uF 50 20%		502-006
BC35	CAP TANT 10uF 25V		507-035
BC36	CAP CER 0.1uF 50 20%		502-006
BC37	CAP TANT 10uF 25V		507-035
BC38	CAP TANT 10uF 25V		507-035
BC39	CAP TANT 10uF 25V		507-035
BC42	CAP TANT 10uF 25V		507-035
BC43	CAP CER 0.1uF 50 20%		502-006
BC44	CAP CER 22pF 2%		503-022
BC45	CAP CER 15pF		503-001
BC46	CAP CER 15pF		503-001
BC47	CAP CER 33pF 2%		503-033
BC48	CAP CER 33pF 2%		503-033
BC49	CAP TANT 1uF 35V		507-020
BD1	DIODE 1N914 SIL SIGNAL		101-110
BD2	DIODE 1N914 SIL SIGNAL		101-110
BD3	DIODE 1N914 SIL SIGNAL		101-110
BD4	DIODE 1N914 SIL SIGNAL		101-110
BD5	DIODE 1N914 SIL SIGNAL		101-110
BFL1	COIL 5.75MHZ 603F-1011	601-211	
BQ1	TRANS NPN MPS6515/MPS6521		201-515
BR1	RES SOL 1K 1/4W 5%		404-103
BR2	RES SOL 2K 1/4W 5%		404-203
BR3	RES SOL 1K 1/4W 5%		404-103
BR4	RES SOL 100R 1/4W 5%		404-102
BR5	RES SOL 2K2 1/4W 5%		404-223
BR6	RES SOL 1K 1/4W 5%		404-103
BR7	RES SOL 560R 1/4W 5%		404-562
BR8	RES SOL 330R 1/4W 5%		404-332
BR10	RES SOL 10K 1/4W 5%		404-104
BR11	RES SOL 1K 1/4W 1%		424-1003
BR12	RES SOL 1K 1/4W 5%		404-103
BR13	RES SOL 2K 1/4W 5%		404-203
BR14	RES SOL 1K 1/4W 5%		404-103
BR15	RES SOL 1K 1/4W 5%		404-103
BR16	RES SOL 2K2 1/4W 5%		404-223
BR18	RES SOL 2K7 1/4W 5%		404-273
BR19	RES SOL 1K 1/4W 1%		424-1003
BR20	RES SOL 1K 1/4W 1%		424-1003

BR21	RES SOL 2K 1/4W 5%		404-203
BR22	RES SOL 1K 1/4W 5%		404-103
Designation	**Description**		**DPS Part Number**
BR23	RES SOL 1K 1/4W 5%		404-103
BR24	RES SOL 2K2 1/4W 5%		404-223
BR26	RES SOL 2K7 1/4W 5%		404-273
BR28	RES SOL 1K5 1/4W 5%		404-153
BR29	RES SOL 1K5 1/4W 5%		404-153
BR30	RES SOL 1K5 1/4W 5%		404-153
BR31	RES SOL 1K 1/4W 1%		424-1003
BR32	RES SOL 1K 1/4W 1%		424-1003
BR33	RES SOL 1K 1/4W 1%		424-1003
BR34	RES SOL 1K 1/4W 1%		424-1003
BR35	RES SOL 332R 1%		424-3322
BR36	RES SOL 1K 1/4W 1%		424-1003
BR37	RES SOL 1K 1/4W 1%		424-1003
BR38	RES SOL 1K 1/4W 1%		424-1003
BR39	RES SOL 1K 1/4W 1%		424-1003
BR41	RES SOL 1K 1/4W 1%		424-1003
BR42	RES SOL 1K 1/4W 1%		424-1003
BR43	RES SOL 1K 1/4W 1%		424-1003
BR44	RES SOL 1K 1/4W 1%		424-1003
BRG2	IC 78L05	308-005	
BRG3	IC MC7805 3 TERM REG	309-907	
BU1	IC CXD2310AR VQFP		631-010
BU2	IC CXD2310AR VQFP		631-010
BU3	IC CXD2310AR VQFP		631-010
BU4	IC EL2090CN		308-090
BU5	IC EL2090CN		308-090
BU6	IC EL2090CN		308-090
BU7	IC LT1256 SOIC SMT		308-256
BU8	IC LT1256 SOIC SMT		308-256
BU9	IC LT1256 SOIC SMT		308-256
CHE1	HEADER 3 PIN OF 761-141		761-153
CHE1_P	PLUG SHORTING 0.1 X 2	761-143	
CHE2	HEADER 3 PIN OF 761-141		761-153
CHE2_P	PLUG SHORTING 0.1 X 2	761-143	
CN1	CONN LOW PROFILE AMP#413879-1		722-369
CN2	CONN LOW PROFILE AMP#413879-1		722-369
CN3	CONN LOW PROFILE AMP#413879-1		722-369
CN4	CONN LOW PROFILE AMP#413879-1		722-369
CN5	CONN 15P DSUB DB15HDRF		722-015
CN6	CONN LOW PROFILE AMP#413879-1		722-369
CN7	CONN LOW PROFILE AMP#413879-1		722-369
CN11	CONN LOW PROFILE AMP#413879-1		722-369
CN12	CONN 4 PIN RT ANG W/O TAB SVHS		722-490
CN15	CONN LOW PROFILE AMP#413879-1		722-369
CN16	CONN LOW PROFILE AMP#413879-1		722-369
CN18	CONN LOW PROFILE AMP#413879-1		722-369

CN19	CONN LOW PROFILE AMP#413879-1		722-369
CN20	CONN JST B7P-VH		722-176
CN21	CONN JST B7P-VH		722-176
Designation	**Description**		**DPS Part Number**
CR1	RES SOL 4K7 1/4W 5%		404-473
CR2	RES SOL 4K7 1/4W 5%		404-473
CR3	RES SOL 0R 1/4W 5%		404-000
CR4	RES SOL 4K7 1/4W 5%		404-473
CR5	RES SOL 4K7 1/4W 5%		404-473
CR6	RES SOL 4K7 1/4W 5%		404-473
CR7	RES SOL 4K7 1/4W 5%		404-473
CR8	RES SOL 2K4 1/4W 5%		404-243
CU1	IC TMC22153AKHC-Rev.B		631-153
CU2	IC EPF8282ATC100-3		330-450
CU3	IC EPC1064PC8		305-342
CU3_S	SOCKET 8 PIN MACHINE	721-440	
CU10	IC 74F821		304-821
CU11	IC 74F821		304-821
CU13	IC 74F821		304-821
DC1	CAP SMT 5P6 CER		345-560
DC2	CAP SMT 0.01UF CER		345-104
DC3	CAP SMT 0.1UF CER		345-105
DC4	CAP SMT 47PF CER		345-471
DC5	CAP SMT 47PF CER		345-471
DC6	CAP TANT 10uF 25V		507-035
DC7	CAP TANT 10uF 25V		507-035
DC8	CAP TANT 10uF 25V		507-035
DC9	CAP WIMA 100n 5% MKS-2		505-083
DC10	CAP WIMA FKP-2 3N3		505-087
DC11	CAP WIMA 100n 5% MKS-2		505-083
DC12	CAP TANT 1uF 35V		507-020
DC13	CAP CER 47pF 2%		503-047
DC14	CAP CER 0.1uF 50 20%		502-006
DC15	CAP TANT 47uF 25V		507-045
DC16	CAP TANT 10uF 25V		507-035
DC17	CAP CER 0.1uF 50 20%		502-006
DC18	CAP CER 0.1uF 50 20%		502-006
DC19	CAP TANT 10uF 25V		507-035
DCN1	HEADER 2X17 34 PINS (761-170)	761-181	
DL2	FERRITE BEAD		601-078
DR1	RES SMT 1K2 5% 0805		342-123
DR2	RES SMT 1K2 5% 0805		342-123
DR3	RES SMT 390R 5% 0805		342-392
DR4	RES SMT 390R 5% 0805		342-392
DR5	RES SMT 390R 5% 0805		342-392
DR6	RES SMT 390R 5% 0805		342-392
DR7	RES SMT 910R 5% 0805		342-912
DR8	RES SMT 75R 5% 0805		342-751

DR9	RES SMT 75R 5% 0805	342-751
DR10	RES SMT 120R 5% 0805	342-122
DR11	RES SMT 120R 5% 0805	342-122
DR12	RES SOL 100K 1/4W 5%	404-105
Designation	**Description**	**DPS Part Number**
DR14	RES SOL 1K5 1/4W 5%	404-153
DR15	RES SOL 68K 1/4W 5%	404-684
DR16	RES SMT 100R 5% 0805	342-102
DR17	RES SMT 100R 5% 0805	342-102
DR18	RES SMT 100R 5% 0805	342-102
DR19	RES SMT 100R 5% 0805	342-102
DR20	RES SOL 56R 1/4W 5%	404-561
DREG1	REG MC78MO5CDT	339-006
DU1	IC GS9005A	641-905
DU2	IC GS9000	641-900
DU3	IC GS9001	641-901
DU4	IC GS9010A	641-910
EU1	IC 74F821	304-821
EU2	IC TMS4C2972DT-26 ONLY	310-970
EU3	IC TMS4C2972DT-26 ONLY	310-970
EU4	IC TMS4C2972DT-26 ONLY	310-970
EU5	IC TMS4C2972DT-26 ONLY	310-970
EU6	IC TMS4C2972DT-26 ONLY	310-970
EU7	IC TMS4C2972DT-26 ONLY	310-970
EU8	IC 74F821	304-821
EU9	IC TMS4C2972DT-26 ONLY	310-970
EU10	IC TMS4C2972DT-26 ONLY	310-970
FC1	CAP CER 0.1uF 50 20%	502-006
FC2	CAP CER 0.1uF 50 20%	502-006
FC3	CAP SMT 0.1UF CER	345-105
FC4	CAP SMT 0.1UF CER	345-105
FC5	CAP SMT 1P8 CER	345-180
FC6	CAP SMT 1P8 CER	345-180
FC7	CAP SMT 1UF TANT	357-105
FC8	CAP SMT 1UF TANT	357-105
FC9	CAP WIMA 10N 5% MKS-2	505-084
FC10	CAP CER 220pF 5%	503-220
FC11	CAP CER 0.1uF 50 20%	502-006
FC12	CAP TANT 10uF 25V	507-035
FC13	CAP CER 0.1uF 50 20%	502-006
FC14	CAP CER 0.1uF 50 20%	502-006
FCN1	HEADER 2X17 34 PINS (761-170)	761-181
FD1	DIODE 1N914 SIL SIGNAL	101-110
FOSC1	XTAL VCXO 27.000	521-427
FR1	RES SMT 100R 5% 0805	342-102

FR2	RES SMT 820R 5% 0805		342-822
FR3	RES SMT 1K8 5% 0805		342-183
FR4	RES SMT 1M 5% 0805		342-106
FR5	RES SMT 3K9 5% 0805		342-393
FR6	RES SMT 390R 5% 0805		342-392
Designation	**Description**		**DPS Part Number**
FR7	RES SMT 390R 5% 0805		342-392
FR8	RES SMT 100R 5% 0805		342-102
FR9	RES SMT 100R 5% 0805		342-102
FR10	RES SMT 6K8 5% 0805		342-683
FR11	RES SMT 3K3 5% 0805		342-333
FR12	RES SMT 150R 5% 0805		342-152
FR13	RES SMT 150R 5% 0805		342-152
FR14	RES SMT 68R 5% 0805		342-681
FR15	RES SMT 68R 5% 0805		342-681
FR16	RES SOL 3K9 1/4W 5%		404-393
FR17	RES SOL 470K 1/4W 5%		404-475
FR18	RES SOL 10K 1/4W 5%		404-104
FR19	RES SOL 12K 1/4W 5%		404-124
FR20	RES SOL 330R 1/4W 5%		404-332
FR21	RES SOL 3K3 1/4W 5%		404-333
FR22	RES SOL 3K3 1/4W 5%		404-333
FR23	RES SOL 10K 1/4W 5%		404-104
FR24	RES SOL 470R 1/4W 5%		404-472
FREG1	IC MC7805 3 TERM REG	309-907	
FRN1	RES NET 100R		431-001
FRN2	RES NET 100R		431-001
FRV1	POT 5K SGL TRN		410-020
FU1	IC 74F821		304-821
FU2	IC EPM7064LC44-10		305-338
FU2_S	SOCKET PLCC AMP#3-822437-3		721-448
FU3	IC GS9001		641-901
FU4	IC GS9002		641-902
FU5	IC GS9008		641-908
FU6	IC LF353 OP AMP		308-353
FU7	IC SN74F86D SOIC		334-086
GC1	CAP CER 390pF 5%		503-390
GC2	CAP CER 6p8		503-007
GC3	CAP CER 150pF 5%		503-150
GC4	CAP CER 0.1uF 50 20%		502-006
GC5	CAP CER 0.1uF 50 20%		502-006
GC6	CAP CER 0.1uF 50 20%		502-006
GC7	CAP CER 0.1uF 50 20%		502-006
GC8	CAP CER 0.1uF 50 20%		502-006
GC9	CAP CER 0.1uF 50 20%		502-006
GC10	CAP CER 0.1uF 50 20%		502-006
GC11	CAP CER 0.1uF 50 20%		502-006
GC12	CAP WIMA 100n 5% MKS-2		505-083

GC13	CAP TANT 10uF 25V		507-035
GC14	CAP TANT 2.2uF 35V		507-002
GC15	CAP ELEC 22UF 16V		506-040
GC16	CAP CER 0.1uF 50 20%		502-006
GC17	CAP TANT 22uF 25V		507-039
GC18	CAP TANT 22uF 25V		507-039
Designation	**Description**		**DPS Part Number**
GC19	CAP CER 100pF 2%		503-100
GFL1	COIL TOKO H288LSMS-3245PKD	601-245	
GL1	COIL 1M2-10UH	601-010	
GL2	FERRITE BEAD		601-078
GND1	HEADER 2 PIN OF 761-141		761-152
GND2	HEADER 2 PIN OF 761-141		761-152
GND3	HEADER 2 PIN OF 761-141		761-152
GND4	HEADER 2 PIN OF 761-141		761-152
GND5	HEADER 2 PIN OF 761-141		761-152
GND6	HEADER 2 PIN OF 761-141		761-152
GND7	HEADER 2 PIN OF 761-141		761-152
GND8	HEADER 2 PIN OF 761-141		761-152
GND9	HEADER 2 PIN OF 761-141		761-152
GND10	HEADER 2 PIN OF 761-141		761-152
GND11	HEADER 2 PIN OF 761-141		761-152
GOSC1	XTAL VCXO 20.00MHZ		521-462
GR1	RES SOL 1K 1/4W 5%		404-103
GR2	RES SOL 1K5 1/4W 5%		404-153
GR3	RES SOL 1K 1/4W 5%		404-103
GR4	RES SOL 1K 1/4W 5%		404-103
GR5	RES SOL 1K 1/4W 5%		404-103
GR6	RES SOL 1K 1/4W 5%		404-103
GR7	RES SOL 1K 1/4W 5%		404-103
GR8	RES SOL 1K 1/4W 5%		404-103
GR9	RES SOL 100K 1/4W 5%		404-105
GRG1	IC MC7805 3 TERM REG	309-907	
GRV1	POT 1K SGL TRN		410-015
GU1	IC EL2260CJ or LT1229CN8		308-232
GU2	IC TMC22071AKH SOIC	631-270	
GU3	IC SN74ABT244DW		337-244
GU4	IC SN74ABT244DW		337-244
GU6	IC EL2260CJ or LT1229CN8		308-232
HR1	RES SOL 4K7 1/4W 5%		404-473
HR2	RES SOL 4K7 1/4W 5%		404-473
HR3	RES SOL 4K7 1/4W 5%		404-473
HR4	RES SOL 2K4 1/4W 5%		404-243
HU1	IC UPD42101C-1,2,3		305-101

HU2	IC EPF8452ATC100-3 SMT		330-453
HU3	IC 74F821		304-821
HU4	IC 74F821		304-821
HU5	IC 74F821		304-821
HU6	IC 74F821		304-821
HU7	IC EPC1064PC8		305-342
HU7_S	SOCKET 8 PIN MACHINE	721-440	

Designation	**Description**		**DPS Part Number**
IC1	CAP CER 0.1uF 50 20%		502-006
IC2	CAP ELEC 22UF 16V		506-040
IC3	CAP CER 0.1uF 50 20%		502-006
IC5	CAP TANT 10uF 25V		507-035
IC6	CAP CER 0.1uF 50 20%		502-006
IC7	CAP CER 0.1uF 50 20%		502-006
IC8	CAP TANT 10uF 25V		507-035
IC9	CAP CER 0.1uF 50 20%		502-006
IC10	CAP CER 0.1uF 50 20%		502-006
IC11	CAP CER 0.1uF 50 20%		502-006
IC12	CAP CER 0.1uF 50 20%		502-006
IC13	CAP CER 47pF 2%		503-047
IC14	CAP CER 33pF 2%		503-033
IC17	CAP CER 39pF 2%		503-039
IC18	CAP CER 0.1uF 50 20%		502-006
IC19	CAP ELEC 22UF 16V		506-040
IC20	CAP ELEC 22UF 16V		506-040
IC21	CAP CER 0.1uF 50 20%		502-006
IC22	CAP CER 0.1uF 50 20%		502-006
IC23	CAP CER 0.1uF 50 20%		502-006
IC24	CAP WIMA 470n MKS-2	505-080	
ID1	DIODE LM385BZ-1.2		101-385
IFL1	COIL 5.75MHZ 603F-1030	601-230	
IFL2	COIL 2.75mhz 603GN1031	601-231	
IFL3	COIL 2.75mhz 603GN1031	601-231	
IQ1	TRANS PNP 2N3905		202-003
IQ2	TRANS NPN 2N3904		201-020
IQ3	TRANS NPN 2N3904		201-020
IQ4	TRANS NPN 2N3904		201-020
IR1	RES SOL 910R 1/4W 5%		404-912
IR2	RES SOL 910R 1/4W 5%		404-912
IR3	RES SOL 2K2 1/4W 5%		404-223
IR4	RES SOL 2K2 1/4W 5%		404-223
IR5	RES SOL 100R 1/4W 5%		404-102
IR6	RES SOL 100R 1/4W 5%		404-102
IR7	RES SOL 470R 1/4W 5%		404-472
IR8	RES SOL 1K 1/4W 5%		404-103
IR9	RES SOL 75R 1%	424-7501	
IR10	RES SOL 75R 1%	424-7501	
IR11	RES SOL 1K 1/4W 5%		404-103
IR12	RES SOL 75R 1%	424-7501	

IR13	RES SOL 330R 1/4W 5%	404-332
IR14	RES SOL 1K1 1/4W 5%	404-113
IR15	RES SOL 1K1 1/4W 5%	404-113
IR16	RES SOL 75R 1%	424-7501
IR17	RES SOL 1K 1/4W 5%	404-103
IR18	RES SOL 330R 1/4W 5%	404-332
IR19	RES SOL 68R 1/4W 5%	404-681
IR20	RES SOL 330R 1/4W 5%	404-332
Designation	**Description**	**DPS Part Number**
IR21	RES SOL 3K3 1/4W 5%	404-333
IR22	RES SOL 3K3 1/4W 5%	404-333
IR23	RES SOL 100R 1%	424-1002
IR24	RES 560R 1/4W 1%	424-5622
IR25	RES 560R 1/4W 1%	424-5622
IR26	RES SOL 75R 1%	424-7501
IR27	RES SOL 8K2 1/4W 5%	404-823
IR28	RES SOL 200R 1/4 5%	404-202
IR29	RES SOL 390R 1/4W 5%	404-392
IR30	RES SOL 240R 1/4W 5%	404-242
IR31	RES SOL 100R 1/4W 5%	404-102
IR32	RES SOL 470R 1/4W 5%	404-472
IR33	RES SOL 8K2 1/4W 5%	404-823
IR34	RES SOL 240R 1/4W 5%	404-242
IR35	RES SOL 75R 1%	424-7501
IR36	RES SOL 100K 1/4W 5%	404-105
IR37	RES SOL 100K 1/4W 5%	404-105
IR38	RES SOL 1K 1/4W 5%	404-103
IR39	RES SOL 392R 1%	424-3922
IR41	RES SOL 392R 1%	424-3922
IR42	RES SOL 390R 1/4W 5%	404-392
IR43	RES SOL 5K6 1/4W 5%	404-563
IR44	RES SOL 10K 1/4W 5%	404-104
IR45	RES SOL 5K6 1/4W 5%	404-563
IR46	RES SOL 10K 1/4W 5%	404-104
IR47	RES SOL 620R 1/4W 5%	404-622
IR48	RES SOL 200R 1/4 5%	404-202
IR49	RES SOL 2K 1/4W 5%	404-203
IR50	RES SOL 5R1 1/4W 5%	404-510
IRG1	IC MC7805 3 TERM REG	309-907
IRV1	POT 500R SGL TRN	410-500
IRV2	POT 500R SGL TRN	410-500
IRV3	POT 1K SGL TRN	410-015
IRV4	POT 1K SGL TRN	410-015
IRV5	POT 200R SGL TRN	410-006
IRV6	POT 1K SGL TRN	410-015
IRV7	POT 1K SGL TRN	410-015
IU1	IC ADV7128-30	641-128
IU2	IC CXD2306QD/A	631-306
IU3	IC CXD2306QD/A	631-306
IU4	IC EL2260CJ or LT1229CN8	308-232

IU5	IC EL2260CJ or LT1229CN8		308-232
JC1	CAP CER 0.1uF 50 20%		502-006
JC2	CAP CER 0.1uF 50 20%		502-006
JC3	CAP CER 0.1uF 50 20%		502-006
JC4	CAP CER 0.1uF 50 20%		502-006
JC5	CAP CER 0.1uF 50 20%		502-006
JC6	CAP CER 39pF 2%		503-039
JC7	CAP CER 39pF 2%		503-039
Designation	**Description**		**DPS Part Number**
JC8	CAP CER 0.1uF 50 20%		502-006
JC9	CAP ELEC 22UF 16V		506-040
JC10	CAP ELEC 22UF 16V		506-040
JC11	CAP CER 0.1uF 50 20%		502-006
JC12	CAP TANT 10uF 25V		507-035
JC13	CAP TANT 10uF 25V		507-035
JD1	DIODE LM385BZ-1.2		101-385
JD3	DIODE 1N4001 SI RECT 1A 50V		101-112
JD5	DIODE 1N4001 SI RECT 1A 50V		101-112
JFL1	COIL 5.75MHZ 603F-1011	601-211	
JL1	FERRITE BEAD		601-078
JL2	FERRITE BEAD		601-078
JR1	RES SOL 68R 1/4W 5%		404-681
JR2	RES SOL 68R 1/4W 5%		404-681
JR3	RES SOL 392R 1%		424-3922
JR4	RES SOL 3K3 1/4W 5%		404-333
JR5	RES SOL 300R 1/4W 5%		404-302
JR6	RES SOL 39R 1/4W 5%		404-391
JR7	RES SOL 1K 1/4W 5%		404-103
JR8	RES SOL 39R 1/4W 5%		404-391
JR9	RES SOL 100R 1%		424-1002
JR10	RES SOL 470R 1/4W 5%		404-472
JR11	RES SOL 0R 1/4W 5%		404-000
JR12	RES SOL 470R 1/4W 5%		404-472
JR13	RES SOL 200R 1/4 5%		404-202
JR14	RES SOL 1K 1/4W 5%		404-103
JR15	RES SOL 75R 1%	424-7501	
JR16	RES SOL 1K 1/4W 5%		404-103
JR17	RES SOL 392R 1%		424-3922
JR18	RES SOL 4K7 1/4W 5%		404-473
JR19	RES SOL 4K7 1/4W 5%		404-473
JRG1	IC MC7805 3 TERM REG	309-907	
JRG2	IC MC7805 3 TERM REG	309-907	
JRV1	POT 10K SGL TRN		410-025
JRV2	POT 200R SGL TRN		410-006
JRV3	POT 200R SGL TRN		410-006

JU1	IC TMC22191KHC SOIC	631-221	
JU2	IC TMC22191KHC SOIC	631-221	
JU3	IC EL2260CJ or LT1229CN8		308-232
KC1	CAP CER 470pF 5%		503-470
KC2	CAP TANT 10uF 25V		507-035
KC3	CAP TANT 4.7uF 25V		507-023
KC4	CAP WIMA 100n 5% MKS-2		505-083
KC5	CAP CER 0.1uF 50 20%		502-006
KC6	CAP CER 0.1uF 50 20%		502-006
Designation	**Description**		**DPS Part Number**
KC7	CAP CER 0.1uF 50 20%		502-006
KC8	CAP CER 0.1uF 50 20%		502-006
KC9	CAP CER 0.1uF 50 20%		502-006
KC10	CAP CER 0.1uF 50 20%		502-006
KC11	CAP CER 27pF 2%		503-027
KC12	CAP VARIABLE 8-40pF		509-090
KC13	CAP CER 0.1uF 50 20%		502-006
KC14	CAP CER 0.1uF 50 20%		502-006
KC15	CAP CER 0.1uF 50 20%		502-006
KC16	CAP CER 0.1uF 50 20%		502-006
KC17	CAP CER 27pF 2%		503-027
KC18	CAP WIMA 100n 5% MKS-2		505-083
KC19	CAP WIMA 100n 5% MKS-2		505-083
KC20	CAP WIMA 100n 5% MKS-2		505-083
KC21	CAP ELEC 22UF 16V		506-040
KC22	CAP TANT 10uF 25V		507-035
KC23	CAP WIMA 100n 5% MKS-2		505-083
KC24	CAP TANT 10uF 25V		507-035
KC25	CAP TANT 10uF 25V		507-035
KC26	CAP WIMA 100n 5% MKS-2		505-083
KC27	CAP CER 470pF 5%		503-470
KC28	CAP CER 100pF 2%		503-100
KHE1	HEADER 3 PIN OF 761-141		761-153
KHE1_P	PLUG SHORTING 0.1 X 2	761-143	
KL1	FERRITE BEAD		601-078
KL2	FERRITE BEAD		601-078
KOSC1	XTAL VCXO 27.000		521-427
KQ1	TRANS NPN 2N3904		201-020
KQ2	TRANS NPN 2N3904		201-020
KQ3	TRANS PNP 2N3905		202-003
KQ4	TRANS PNP 2N3905		202-003
KR1	RES SOL 470R 1/4W 5%		404-472
KR2	RES SOL 470R 1/4W 5%		404-472
KR3	RES SOL 4K7 1/4W 5%		404-473
KR4	RES SOL 6K8 1/4W 5%		404-683
KR5	RES SOL 330R 1/4W 5%		404-332
KR6	RES SOL 330R 1/4W 5%		404-332

KR7	RES SOL 1K 1/4W 5%		404-103
KR8	RES SOL 1K 1/4W 5%		404-103
KR9	RES SOL 1K 1/4W 5%		404-103
KR10	RES SOL 470R 1/4W 5%		404-472
KR11	RES SOL 470R 1/4W 5%		404-472
KR12	RES SOL 680R 1/4W 5%		404-682
KR13	RES SOL 680K 1/4W 5%		404-685
KR14	RES SOL 47K 1/4W 5%		404-474
KR15	RES SOL 51R 1/4W 5%		404-511
KR17	RES SOL 10K 1/4W 5%		404-104
KR18	RES SOL 1K 1/4W 5%		404-103
Designation	**Description**		**DPS Part Number**
KR19	RES SOL 10K 1/4W 5%		404-104
KR20	RES SOL 4K7 1/4W 5%		404-473
KR21	RES SOL 4K7 1/4W 5%		404-473
KR22	RES SOL 4K7 1/4W 5%		404-473
KR24	RES SOL 2K4 1/4W 5%		404-243
KRG1	IC MC7805 3 TERM REG	309-907	
KRG2	IC MC7805 3 TERM REG	309-907	
KRV2	POT 1K SGL TRN		410-015
KRV3	POT 200R SGL TRN		410-006
KU1	IC MC44144 4FSC PLL		305-144
KU2	IC MAX903 H/S COMPARATOR		308-903
KU3	IC 74F74	304-074	
KU4	IC 74F00	304-000	
KU5	IC LF353 OP AMP		308-353
KU6	IC EL4581 SYNC SEP		308-581
KU7	IC KS0122Q PQFP DECODER		310-122
KU8	IC EPM7064LC44-10		305-338
KU8_S	SOCKET PLCC AMP#3-822437-3		721-448
KU9	IC EPM7064LC44-10		305-338
KU9_S	SOCKET PLCC AMP#3-822437-3		721-448
KU10	IC EPF8452ATC100-3 SMT		330-453
KU11	IC EPC1064PC8		305-342
KU11_S	SOCKET 8 PIN MACHINE	721-440	
KX1	XTAL 24.576MHZ HC49U	521-024	
KX2	XTAL 14.31818MHZ		521-107
LU1	IC EPM7160ELC84-15		305-336
LU1_S	SOCKET PCS084A-1		721-084
LU2	IC EPM7096LC68-15		305-345
LU2_S	SOCKET PLCC 68PIN		721-064
MU1	IC EPM7064LC68-10		305-340
MU1_S	SOCKET PLCC 68PIN		721-064
MU2	IC CY7C199-20PC/PDM41256SA15P		305-199
MU3	IC CY7C199-20PC/PDM41256SA15P		305-199
MU4	IC 74F821		304-821
MU5	IC 74F821		304-821

MU6	IC 74F821	304-821
MU7	IC 74LS374N	302-374
NC1	CAP TANT 1uF 35V	507-020
ND1	SWITCH DIP PROG ALCO ARPA-08	733-026
NR1	RES SOL 4K7 1/4W 5%	404-473
NR2	RES SOL 4K7 1/4W 5%	404-473
NR3	RES SOL 4K7 1/4W 5%	404-473
NR4	RES SOL 4K7 1/4W 5%	404-473
NR5	RES SOL 4K7 1/4W 5%	404-473
Designation	**Description**	**DPS Part Number**
NR8	RES SOL 1K 1/4W 5%	404-103
NR9	RES SOL 1K 1/4W 5%	404-103
NRN1	RES NET 1K 1/4W 5% 8 PINS	431-110
NRV1	POT 2K SGL TRN	410-016
NU1	IC Z8800/Z88COO MICROPROCESS	310-880
NU2	IC PSD312B-70J (NEW#) WSI	305-312
NU2_S	SOCKET PLCC AMP#3-822437-3	721-448
NU3	IC DS1225Y 8Kx8 RAM+BAT MODULE	305-225
NU4	IC PAL18CV8-P25 ICT	311-176
NU4_S	SOCKET 20 PIN MACH TOOL 300M	721-441
NU6	IC 74F374	304-374
NU7	IC 74F374	304-374
NU8	IC 74F374	304-374
NU9	IC 74HCT244	315-244
NU11	IC 74HCT374	315-374
NU12	IC 74HCT244	315-244
NU13	IC PAL18CV8-P25 ICT	311-176
NU13_S	SOCKET 20 PIN MACH TOOL 300M	721-441
NU14	IC MC34064P-5 UNDERVOLT SENS	308-064
OC1	CAP ELEC 220uF 16V	506-035
OC2	CAP ELEC 220uF 16V	506-035
OC3	CAP ELEC 220uF 16V	506-035
OC4	CAP ELEC 100uF	506-005
OC5	CAP ELEC 100uF	506-005
OC6	CAP CER 27pF 2%	503-027
OC7	CAP CER 27pF 2%	503-027
OC10	CAP CER 0.1uF 50 20%	502-006
OD1	DIODE 1N914 SIL SIGNAL	101-110
OD2	DIODE 1N914 SIL SIGNAL	101-110
OD3	DIODE 1N914 SIL SIGNAL	101-110
OHE1	CONN RIGHT ANGLE LOCKING 2 PIN	722-002
OHE2	CONN 2PIN .06 OF 722-480	722-482
OL1	COIL 2.2UH	601-000

OL2	COIL 2.2UH		601-000
OL3	COIL 2.2UH		601-000
OQ1	TRANS NPN 2N3904		201-020
OR1	RES SOL 470R 1/4W 5%		404-472
OR4	RES SOL 15R 1/4W 5%		404-151
OR5	RES SOL 15R 1/4W 5%		404-151
OR6	RES SOL 1M 1/4W 5%		404-106
OR7	RES SOL 10K 1/4W 5%		404-104
OR8	RES SOL 1K 1/4W 5%		404-103
ORLY1	RELAY 1A DPDT PC MTG		651-109

Designation	**Description**		**DPS Part Number**
OU1	IC ST16C1550CJ28 PLCC	305-155	
OU1_S	SOCKET 28PINSPCS-028A-1		721-028
OXTAL1	XTAL 1.8432MHZ CRYSTAL		521-183
P1	CONN. 050-016-153APANDUIT		722-458
P2	HEADER 7x2x0.1 14PIN (761-170		761-176
P5	CONN HDR 3 PIN R/A LKG DUPONT		722-005
P6	HEADER 2X10 20 PINS (761-170)	761-120	
P7	HEADER 8X2X0.1 16PIN (761-170)	761-178	
P8	HEADER 8X2X0.1 16PIN (761-170)	761-178	
P8_P	PLUG SHORTING 0.1 X 2	761-143	
PCB	PCB DPS-470		743-160
XC1	CAP CER 0.1uF 50 20%		502-006
XC2	CAP CER 0.1uF 50 20%		502-006
XC3	CAP CER 0.1uF 50 20%		502-006
XC4	CAP CER 0.1uF 50 20%		502-006
XC5	CAP CER 0.1uF 50 20%		502-006
XC6	CAP CER 0.1uF 50 20%		502-006
XC7	CAP CER 0.1uF 50 20%		502-006
XC8	CAP CER 0.1uF 50 20%		502-006
XC9	CAP TANT 10uF 25V		507-035
XC10	CAP CER 0.1uF 50 20%		502-006
XC11	CAP CER 0.1uF 50 20%		502-006
XC12	CAP CER 0.1uF 50 20%		502-006
XC13	CAP CER 0.1uF 50 20%		502-006
XC14	CAP CER 0.1uF 50 20%		502-006
XC15	CAP CER 0.1uF 50 20%		502-006
XC16	CAP CER 0.1uF 50 20%		502-006
XC17	CAP CER 0.1uF 50 20%		502-006
XC18	CAP CER 0.1uF 50 20%		502-006
XC19	CAP CER 0.1uF 50 20%		502-006
XC20	CAP CER 0.1uF 50 20%		502-006
XC21	CAP CER 0.1uF 50 20%		502-006
XC22	CAP CER 0.1uF 50 20%		502-006
XC23	CAP CER 0.1uF 50 20%		502-006
XC24	CAP CER 0.1uF 50 20%		502-006

XC25	CAP CER 0.1uF 50 20%	502-006
XC26	CAP CER 0.1uF 50 20%	502-006
XC27	CAP CER 0.1uF 50 20%	502-006
XC28	CAP CER 0.1uF 50 20%	502-006
XC29	CAP CER 0.1uF 50 20%	502-006
XC30	CAP CER 0.1uF 50 20%	502-006
XC31	CAP CER 0.1uF 50 20%	502-006
XC32	CAP CER 0.1uF 50 20%	502-006
XC33	CAP CER 0.1uF 50 20%	502-006
XC34	CAP CER 0.1uF 50 20%	502-006
XC35	CAP CER 0.1uF 50 20%	502-006
XC36	CAP CER 0.1uF 50 20%	502-006
XC37	CAP CER 0.1uF 50 20%	502-006
XC38	CAP CER 0.1uF 50 20%	502-006
Designation	**Description**	**DPS Part Number**
XC39	CAP CER 0.1uF 50 20%	502-006
XC40	CAP CER 0.1uF 50 20%	502-006
XC41	CAP CER 0.1uF 50 20%	502-006
XC42	CAP CER 0.1uF 50 20%	502-006
XC43	CAP CER 0.1uF 50 20%	502-006
XC44	CAP CER 0.1uF 50 20%	502-006
XC45	CAP CER 0.1uF 50 20%	502-006
XC46	CAP CER 0.1uF 50 20%	502-006
XC47	CAP CER 0.1uF 50 20%	502-006
XC48	CAP CER 0.1uF 50 20%	502-006
XC49	CAP CER 0.1uF 50 20%	502-006
XC50	CAP CER 0.1uF 50 20%	502-006
XC51	CAP CER 0.1uF 50 20%	502-006
XC52	CAP CER 0.1uF 50 20%	502-006
XC53	CAP CER 0.1uF 50 20%	502-006
XC54	CAP CER 0.1uF 50 20%	502-006
XC55	CAP CER 0.1uF 50 20%	502-006
XC56	CAP CER 0.1uF 50 20%	502-006
XC57	CAP CER 0.1uF 50 20%	502-006
XC58	CAP CER 0.1uF 50 20%	502-006
XC59	CAP CER 0.1uF 50 20%	502-006
XC60	CAP CER 0.1uF 50 20%	502-006
XC61	CAP CER 0.1uF 50 20%	502-006
XC62	CAP CER 0.1uF 50 20%	502-006
XC63	CAP CER 0.1uF 50 20%	502-006
XC64	CAP CER 0.1uF 50 20%	502-006
XC65	CAP CER 0.1uF 50 20%	502-006
XC66	CAP CER 0.1uF 50 20%	502-006
XC67	CAP CER 0.1uF 50 20%	502-006
XC68	CAP CER 0.1uF 50 20%	502-006
XC69	CAP CER 0.1uF 50 20%	502-006
XC70	CAP CER 0.1uF 50 20%	502-006
XC71	CAP CER 0.1uF 50 20%	502-006
XC72	CAP CER 0.1uF 50 20%	502-006
XC73	CAP CER 0.1uF 50 20%	502-006
XC74	CAP CER 0.1uF 50 20%	502-006
XC75	CAP CER 0.1uF 50 20%	502-006
XC76	CAP CER 0.1uF 50 20%	502-006

XC77	CAP CER 0.1uF 50 20%	502-006
XC78	CAP CER 0.1uF 50 20%	502-006
XC79	CAP CER 0.1uF 50 20%	502-006
XC80	CAP CER 0.1uF 50 20%	502-006
XC81	CAP CER 0.1uF 50 20%	502-006
XC82	CAP CER 0.1uF 50 20%	502-006
XC83	CAP CER 0.1uF 50 20%	502-006
XC84	CAP CER 0.1uF 50 20%	502-006
XC85	CAP CER 0.1uF 50 20%	502-006
XC86	CAP CER 0.1uF 50 20%	502-006
XC87	CAP CER 0.1uF 50 20%	502-006
XC88	CAP CER 0.1uF 50 20%	502-006
XC89	CAP CER 0.1uF 50 20%	502-006
XC90	CAP CER 0.1uF 50 20%	502-006
XC91	CAP CER 0.1uF 50 20%	502-006
Designation	**Description**	**DPS Part Number**
XC92	CAP CER 0.1uF 50 20%	502-006
XC93	CAP CER 0.1uF 50 20%	502-006
XC94	CAP CER 0.1uF 50 20%	502-006
XC95	CAP CER 0.1uF 50 20%	502-006
XC96	CAP CER 0.1uF 50 20%	502-006
XC97	CAP CER 0.1uF 50 20%	502-006
XC98	CAP CER 0.1uF 50 20%	502-006
XC99	CAP CER 0.1uF 50 20%	502-006
XC100	CAP CER 0.1uF 50 20%	502-006
XC101	CAP CER 0.1uF 50 20%	502-006
XC102	CAP CER 0.1uF 50 20%	502-006
XC103	CAP CER 0.1uF 50 20%	502-006
XC104	CAP CER 0.1uF 50 20%	502-006
XC105	CAP CER 0.1uF 50 20%	502-006
XC106	CAP CER 0.1uF 50 20%	502-006
XC107	CAP CER 0.1uF 50 20%	502-006
XC108	CAP CER 0.1uF 50 20%	502-006
XC109	CAP CER 0.1uF 50 20%	502-006
XC110	CAP CER 0.1uF 50 20%	502-006
XC111	CAP CER 0.1uF 50 20%	502-006
XC112	CAP CER 0.1uF 50 20%	502-006
XC113	CAP CER 0.1uF 50 20%	502-006
XC114	CAP CER 0.1uF 50 20%	502-006
XC115	CAP CER 0.1uF 50 20%	502-006
XC116	CAP CER 0.1uF 50 20%	502-006
XC117	CAP CER 0.1uF 50 20%	502-006
XC118	CAP CER 0.1uF 50 20%	502-006
XC119	CAP CER 0.1uF 50 20%	502-006
XC120	CAP CER 0.1uF 50 20%	502-006
XC121	CAP CER 0.1uF 50 20%	502-006
XC122	CAP CER 0.1uF 50 20%	502-006
XC123	CAP CER 0.1uF 50 20%	502-006
XC124	CAP CER 0.1uF 50 20%	502-006
XC125	CAP CER 0.1uF 50 20%	502-006
XC126	CAP CER 0.1uF 50 20%	502-006
XC127	CAP CER 0.1uF 50 20%	502-006
XC128	CAP CER 0.1uF 50 20%	502-006

XC129	CAP CER 0.1uF 50 20%	502-006
XC130	CAP CER 0.1uF 50 20%	502-006
XC131	CAP CER 0.1uF 50 20%	502-006
XC132	CAP CER 0.1uF 50 20%	502-006
XC133	CAP CER 0.1uF 50 20%	502-006
XC134	CAP CER 0.1uF 50 20%	502-006
XC135	CAP CER 0.1uF 50 20%	502-006
XC136	CAP CER 0.1uF 50 20%	502-006
XC137	CAP CER 0.1uF 50 20%	502-006
XC138	CAP CER 0.1uF 50 20%	502-006
XC139	CAP CER 0.1uF 50 20%	502-006
XC140	CAP CER 0.1uF 50 20%	502-006
XC141	CAP CER 0.1uF 50 20%	502-006
XC142	CAP CER 0.1uF 50 20%	502-006
XC143	CAP CER 0.1uF 50 20%	502-006
XC144	CAP CER 0.1uF 50 20%	502-006

Designation	**Description**	**DPS Part Number**
XC145	CAP CER 0.1uF 50 20%	502-006
XC146	CAP CER 0.1uF 50 20%	502-006
XC147	CAP CER 0.1uF 50 20%	502-006
XC148	CAP CER 0.1uF 50 20%	502-006
XC149	CAP CER 0.1uF 50 20%	502-006
XC150	CAP CER 0.1uF 50 20%	502-006
XC151	CAP CER 0.1uF 50 20%	502-006
XC152	CAP CER 0.1uF 50 20%	502-006
XC153	CAP CER 0.1uF 50 20%	502-006

843-161: DCN Board Assembly

Designation	Description		DPS Part Number
AC1	CAP CER 0.1uF 50 20%		502-006
AC2	CAP CER 0.1uF 50 20%		502-006
AC3	CAP CER 0.1uF 50 20%		502-006
AC4	CAP CER 0.1uF 50 20%		502-006
AC5	CAP CER 0.1uF 50 20%		502-006
AC6	CAP CER 0.1uF 50 20%		502-006
AC7	CAP CER 0.1uF 50 20%		502-006
AD1	DIODE 1N914 SIL SIGNAL		101-110
AD3	DIODE 1N914 SIL SIGNAL		101-110
AHDR1	HEADER 3 PIN OF 761-141		761-153
AQ1	TRANS NPN 2N3904		201-020
AR1	RES SOL 4K7 1/4W 5%		404-473
AR2	RES SOL 4K7 1/4W 5%		404-473
AR4	RES SOL 1K 1/4W 5%		404-103
AR5	RES SOL 1K 1/4W 5%		404-103
ARLY1	RELAY TX2-12VAROMAT		651-111
ARLY3	RELAY TX2-12VAROMAT		651-111
ASSY	PCB ASSY		843-161EX
ASW1	SWITCH SPDT TT1DGVRA1		731-019
ASW2	SWITCH SPDT TT1DGVRA1		731-019
AU1	IC LTC1384 DIP		330-384
AU2	IC SN75ALS180N	314-180	
BC1	CAP CER 18pF 2%		503-018
BC2	CAP CER 18pF 2%		503-018
BC3	CAP CER 27pF 2%		503-027
BC4	CAP CER 27pF 2%		503-027
BC5	CAP TANT 10uF 25V		507-035
BC6	CAP CER 0.1uF 50 20%		502-006
BC7	CAP CER 0.1uF 50 20%		502-006
BC10	CAP CER 0.1uF 50 20%		502-006
BC11	CAP CER 0.1uF 50 20%		502-006
BC12	CAP CER 0.1uF 50 20%		502-006
BC13	CAP CER 0.1uF 50 20%		502-006
BHDR1	HEADER 3 PIN OF 761-141		761-153
BHDR1_P	PLUG SHORTING 0.1 X 2	761-143	
BHDR2	HEADER 3 PIN OF 761-141		761-153
BHDR2_P	PLUG SHORTING 0.1 X 2	761-143	
BHDR3	HEADER 2 PIN OF 761-141		761-152
BR1	RES SOL 1M 1/4W 5%		404-106

Designation	Description	DPS Part Number
BR2	RES SOL 4K7 1/4W 5%	404-473
BR3	RES SOL 1M 1/4W 5%	404-106
BR4	RES SOL 4K7 1/4W 5%	404-473
BR5	RES SOL 1K 1/4W 5%	404-103
BR6	RES SOL 4K7 1/4W 5%	404-473
BR7	RES SOL 4K7 1/4W 5%	404-473
BR8	RES SOL 4K7 1/4W 5%	404-473
BR9	RES SOL 1K 1/4W 5%	404-103
BR10	RES SOL 0R 1/4W 5%	404-000
BR11	RES SOL 4K7 1/4W 5%	404-473
BR12	RES SOL 4K7 1/4W 5%	404-473
BRN1	RES NET 1K 1/4W 5% 8 PINS	431-110
BU1	IC MC68HC811E2CFN2	310-012
BU1_S	SOCKET 52 PIN PLCC-52P-T	721-053
BU2	IC ST16C1550CJ28 PLCC 305-155	
BU2_S	SOCKET 28PINSPCS-028A-1	721-028
BU3	IC MC34064P-5 UNDERVOLT SENS	308-064
BU4	IC SN75124N DIP16	304-124
BU5	IC SN75121N DIP 16	304-121
BU6	IC 74LS240	302-240
BX1	XTAL 8MHZ	521-008
BX2	XTAL 1.8432MHZ CRYSTAL	521-183
CN1	CONN R/A9F 626-009-262-042EDAC	722-441
CN2	CONN LOW PROFILE AMP#413879-1	722-369
GND1	HEADER 2 PIN OF 761-141	761-152
GND2	HEADER 2 PIN OF 761-141	761-152
P1	HEADER 8X2X0.1 16PIN (761-170) 761-178	

843-163: Audio Board Assembly

Designation	Description		DPS Part Number
AGND1	HEADER 2 PIN OF 761-141		761-152
AJ1	CONN AUDIO 2EHDR-12-481 AGT	722-020	
AJ2	CONN AUDIO 2EHDR-12-481 AGT	722-020	
AJ3	CONN D-SUB RT ANGLE/FEM. RECEP		722-445
AJ4	CONN 7 PIN 156 RT ANGLE PAND	722-167	
AJP1	HEADER 2X10 20 PINS (761-170)	761-120	
AJP2	HEADER 2X17 34 PINS (761-170)	761-181	
AJP3	HEADER 2X17 34 PINS (761-170)	761-181	
AR1	RES SMT 4K7 5% 0805		342-473
BC1	CAP TANT 47uF 25V		507-045
BC2	CAP SMT 0.1UF CER		345-105
BC3	CAP TANT 47uF 25V		507-045
BC4	CAP SMT 0.1UF CER		345-105
BC5	CAP TANT 47uF 25V		507-045
BC6	CAP TANT 47uF 25V		507-045
BC7	CAP TANT 47uF 25V		507-045
BC8	CAP TANT 47uF 25V		507-045
BC9	CAP TANT 47uF 25V		507-045
BC11	CAP TANT 47uF 25V		507-045
BC12	CAP TANT 47uF 25V		507-045
BC13	CAP TANT 47uF 25V		507-045
BC14	CAP TANT 47uF 25V		507-045
BC15	CAP TANT 47uF 25V		507-045
BC16	CAP TANT 47uF 25V		507-045
BC17	CAP SMT 0.1UF CER		345-105
BC18	CAP TANT 47uF 25V		507-045
BC19	CAP SMT 0.1UF CER		345-105
BC20	CAP TANT 47uF 25V		507-045
BC21	CAP SMT 0.1UF CER		345-105
BC22	CAP TANT 47uF 25V		507-045
BC23	CAP SMT 0.1UF CER		345-105
BC24	CAP TANT 47uF 25V		507-045
BC25	CAP SMT 0.1UF CER		345-105
BC26	CAP TANT 47uF 25V		507-045
BL1	COIL 2.2UH		601-000
BL2	COIL 2.2UH		601-000
BL3	COIL 2.2UH		601-000
BL4	COIL 2.2UH		601-000
BL5	COIL 2.2UH		601-000
BL6	COIL 2.2UH		601-000
BL7	FERRITE BEAD		601-078
BL8	FERRITE BEAD		601-078
BL9	FERRITE BEAD		601-078
BU1	IC MC7805 3 TERM REG	309-907	

Designation	Description		DPS Part Number
BU2	IC MC7805 3 TERM REG	309-907	
BU3	IC 7905 REG		309-906
BU4	IC 7905 REG		309-906
BU5	REG 1117-3.3 SOT223 SMT		339-002
BU6	REG 1117-3.3 SOT223 SMT		339-002
BU7	REG 1117-3.3 SOT223 SMT		339-002
CC1	CAP TANT 47uF 25V		507-045
CC2	CAP TANT 47uF 25V		507-045
CC3	CAP TANT 47uF 25V		507-045
CC4	CAP SMT 0.1UF CER		345-105
CC5	CAP SMT 0.1UF CER		345-105
CD1	DIODE 1N4001 SI RECT 1A 50V		101-112
CD2	DIODE 1N4001 SI RECT 1A 50V		101-112
CD3	DIODE 1N4001 SI RECT 1A 50V		101-112
CD4	DIODE 1N4001 SI RECT 1A 50V		101-112
CD5	DIODE 1N4001 SI RECT 1A 50V		101-112
CD6	DIODE 1N4001 SI RECT 1A 50V		101-112
CD7	DIODE 1N4001 SI RECT 1A 50V		101-112
CD8	DIODE 1N4001 SI RECT 1A 50V		101-112
CQ1	TRANS SMT MMBT2222A SOT223		347-022
CQ2	TRANS SMT MMBT2222A SOT223		347-022
CQ3	TRANS SMT MMBT2222A SOT223		347-022
CQ4	TRANS SMT MMBT2222A SOT223		347-022
CQ5	TRANS SMT MMBT2222A SOT223		347-022
CQ6	TRANS SMT MMBT2222A SOT223		347-022
CQ7	TRANS SMT MMBT2222A SOT223		347-022
CQ8	TRANS SMT MMBT2222A SOT223		347-022
CR1	RES SMT 1K 5% 0805		342-103
CR2	RES SOL 604R 1%		424-6042
CR3	RES SOL 604R 1%		424-6042
CR4	RES SOL 604R 1%		424-6042
CR5	RES SOL 604R 1%		424-6042
CR7	RES SMT 1K 5% 0805		342-103
CR8	RES SMT 1K 5% 0805		342-103
CR9	RES SMT 1K 5% 0805		342-103
CR10	RES SMT 1K 5% 0805		342-103
CR11	RES SMT 1K 5% 0805		342-103
CRLY1	RELAY TX2-12VAROMAT		651-111
CRLY2	RELAY TX2-12VAROMAT		651-111
CRLY3	RELAY TX2-12VAROMAT		651-111
CRLY4	RELAY TX2-12VAROMAT		651-111
CRLY5	RELAY TX2-12VAROMAT		651-111
CRLY6	RELAY TX2-12VAROMAT		651-111
CRLY7	RELAY TX2-12VAROMAT		651-111
CRLY8	RELAY TX2-12VAROMAT		651-111
CRLY9	RELAY TX2-12VAROMAT		651-111

CRLY10	RELAY TX2-12VAROMAT	651-111	
Designation	**Description**		**DPS Part Number**
CRLY11	RELAY TX2-12VAROMAT	651-111	
CRLY12	RELAY TX2-12VAROMAT	651-111	
DC1	CAP SMT 0.1UF CER		345-105
DC2	CAP SMT 0.01UF CER		345-104
DC3	CAP SMT 0.01UF CER		345-104
DC4	CAP SMT 0.1UF CER		345-105
DC5	CAP SMT 0.01UF CER		345-104
DC6	CAP SMT 0.01UF CER		345-104
DD1	DIODE 1N4001 SI RECT 1A 50V		101-112
DD2	DIODE 1N4001 SI RECT 1A 50V		101-112
DJP1	HEADER 8X2X0.1 16PIN (761-170)	761-178	
DJP1_P	PLUG SHORTING 0.1 X 2	761-143	
DJP2	HEADER 8X2X0.1 16PIN (761-170)	761-178	
DJP2_P	PLUG SHORTING 0.1 X 2	761-143	
DJP3	HEADER 8X2X0.1 16PIN (761-170)	761-178	
DJP3_P	PLUG SHORTING 0.1 X 2	761-143	
DJP4	HEADER 8X2X0.1 16PIN (761-170)	761-178	
DJP4_P	PLUG SHORTING 0.1 X 2	761-143	
DQ1	TRANS SMT MMBT2222A SOT223		347-022
DQ2	TRANS SMT MMBT2222A SOT223		347-022
DR1	RES SMT 1K 5% 0805		342-103
DR2	RES SMT 1K 5% 0805		342-103
DR3	RES SOL 110R 1/4W 1%		424-1102
DR4	RES SOL 75R 1/4W 5%		404-751
DR5	RES SOL 110R 1/4W 1%		424-1102
DR6	RES SOL 75R 1/4W 5%		404-751
DR7	RES SOL 110R 1/4W 1%		424-1102
DR8	RES SOL 390R 1/4W 5%		404-392
DR9	RES SOL 91R 1/4W 5%		404-911
DR10	RES SOL 110R 1/4W 1%		424-1102
DR11	RES SOL 390R 1/4W 5%		404-392
DR12	RES SOL 91R 1/4W 5%		404-911
DRLY1	RELAY TX2-12VAROMAT		651-111
DRLY2	RELAY TX2-12VAROMAT		651-111
DRLY3	RELAY TX2-12VAROMAT		651-111
DRLY4	RELAY TX2-12VAROMAT		651-111
DT1	XFRMR XFNR67128990		602-990
DT2	XFRMR XFNR67128990		602-990
DT3	XFRMR XFNR67128990		602-990
DT4	XFRMR XFNR67128990		602-990
DT5	XFRMR XFNR67128990		602-990
DT6	XFRMR XFNR67128990		602-990

EC1	CAP SMT 10PF CER	345-101
EC2	CAP SMT 0.1UF CER	345-105
Designation	**Description**	**DPS Part Number**
EC3	CAP SMT 0.1UF CER	345-105
EC4	CAP SMT 10PF CER	345-101
EC5	CAP SMT 0.1UF CER	345-105
EC6	CAP SMT 0.1UF CER	345-105
EC7	CAP SMT 0.1UF CER	345-105
EC8	CAP SMT 0.1UF CER	345-105
EC9	CAP SMT 10UF TANT 25V	357-106
EC10	CAP SMT 10UF TANT 25V	357-106
EC11	CAP SMT 0.1UF CER	345-105
EC12	CAP SMT 0.1UF CER	345-105
EC13	CAP SMT 10UF TANT 25V	357-106
EC14	CAP TANT 47uF 25V	507-045
EC17	CAP SMT 0.1UF CER	345-105
EC18	CAP SMT 0.1UF CER	345-105
EC19	CAP SMT 2N2 CER	345-223
EC20	CAP TANT 47uF 25V	507-045
EC23	CAP SMT 0.1UF CER	345-105
EC24	CAP SMT 0.1UF CER	345-105
EC25	CAP SMT 2N2 CER	345-223
EC26	CAP SMT 10PF CER	345-101
EC27	CAP SMT 0.1UF CER	345-105
EC28	CAP SMT 0.1UF CER	345-105
EC29	CAP SMT 0.1UF CER	345-105
EC30	CAP SMT 0.1UF CER	345-105
EC31	CAP SMT 10UF TANT 25V	357-106
EC32	CAP SMT 10UF TANT 25V	357-106
EC33	CAP SMT 0.1UF CER	345-105
EC34	CAP SMT 0.1UF CER	345-105
EC35	CAP SMT 10UF TANT 25V	357-106
EC36	CAP TANT 47uF 25V	507-045
EC39	CAP SMT 0.1UF CER	345-105
EC40	CAP SMT 0.1UF CER	345-105
EC41	CAP SMT 2N2 CER	345-223
EC42	CAP SMT 10PF CER	345-101
EC43	CAP SMT 0.1UF CER	345-105
EC44	CAP SMT 0.1UF CER	345-105
EC45	CAP TANT 47uF 25V	507-045
EC48	CAP SMT 0.1UF CER	345-105
EC49	CAP SMT 0.1UF CER	345-105
EC50	CAP SMT 2N2 CER	345-223
EC51	CAP SMT 0.1UF CER	345-105
EC52	CAP SMT 1UF TANT	357-105
EC53	CAP SMT 0.1UF CER	345-105
EC54	CAP SMT 1UF TANT	357-105
EC55	CAP TANT 47uF 25V	507-045
EC56	CAP TANT 47uF 25V	507-045
EMIBKT	EMI/RFI SHIELD FOR 163 BD	741-942
ER1	RES SMT 20K 5% 0805	342-204

ER2	RES SMT 10K 5% 0805	342-104
ER3	RES SMT 20K 5% 0805	342-204
ER4	RES SMT 10K 5% 0805	342-104
Designation	**Description**	**DPS Part Number**
ER5	RES SMT 10K 5% 0805	342-104
ER6	RES SMT 20K 5% 0805	342-204
ER7	RES SMT 10K 5% 0805	342-104
ER8	RES SMT 20K 5% 0805	342-204
ER9	RES SMT 10K 5% 0805	342-104
ER10	RES SMT 10K 5% 0805	342-104
ER11	RES SMT 10R 5% 0805	342-101
ER12	RES SMT 20K 5% 0805	342-204
ER13	RES SMT 7K5 5% 0805	342-753
ER14	RES SMT 1K 5% 0805	342-103
ER15	RES SMT 1K 5% 0805	342-103
ER16	RES SMT 20K 5% 0805	342-204
ER17	RES SMT 7K5 5% 0805	342-753
ER18	RES SMT 1K 5% 0805	342-103
ER19	RES SMT 1K 5% 0805	342-103
ER20	RES SMT 20K 5% 0805	342-204
ER21	RES SMT 10K 5% 0805	342-104
ER22	RES SMT 20K 5% 0805	342-204
ER23	RES SMT 10K 5% 0805	342-104
ER24	RES SMT 10K 5% 0805	342-104
ER25	RES SMT 20K 5% 0805	342-204
ER26	RES SMT 10K 5% 0805	342-104
ER27	RES SMT 20K 5% 0805	342-204
ER28	RES SMT 10K 5% 0805	342-104
ER29	RES SMT 10K 5% 0805	342-104
ER30	RES SMT 10R 5% 0805	342-101
ER31	RES SMT 20K 5% 0805	342-204
ER32	RES SMT 7K5 5% 0805	342-753
ER33	RES SMT 1K 5% 0805	342-103
ER34	RES SMT 1K 5% 0805	342-103
ER35	RES SMT 20K 5% 0805	342-204
ER36	RES SMT 7K5 5% 0805	342-753
ER37	RES SMT 1K 5% 0805	342-103
ER38	RES SMT 1K 5% 0805	342-103
ER39	RES SMT 2K7 5% 0805	342-273
ER40	RES SMT 2K2 5% 0805	342-223
ER41	RES SMT 100R 5% 0805	342-102
ER42	RES SMT 2K7 5% 0805	342-273
ER43	RES SMT 2K2 5% 0805	342-223
ER44	RES SMT 100R 5% 0805	342-102
ER45	RES SMT 150R 5% 0805	342-152
ER46	RES SMT 150R 5% 0805	342-152
ER47	RES SMT 150R 5% 0805	342-152
ER48	RES SMT 150R 5% 0805	342-152
ER49	RES SMT 150R 5% 0805	342-152
ER50	RES SMT 150R 5% 0805	342-152
ER51	RES SMT 150R 5% 0805	342-152
ER52	RES SMT 150R 5% 0805	342-152
ER53	RES SMT 47K 5% 0805	342-474

ER54	RES SMT 3K9 5% 0805	342-393
ER55	RES SMT 3K9 5% 0805	342-393
ER56	RES SMT 3K9 5% 0805	342-393
ER57	RES SMT 3K9 5% 0805	342-393
Designation	**Description**	**DPS Part Number**
ER58	RES SMT 100R 5% 0805	342-102
ER59	RES SMT 100R 5% 0805	342-102
ER60	RES SMT 100R 5% 0805	342-102
ER61	RES SMT 100R 5% 0805	342-102
EU1	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU2	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU3	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU4	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU5	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU6	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU7	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU8	IC OPA2134 SO8 DUAL LOW DIST	330-213
EU9	IC CS3310-KS SO VCA CTRL	330-310
EU10	IC CS3310-KS SO VCA CTRL	330-310
EVR1	POT SMT 1K 4MM	348-103
EVR2	POT SMT 1K 4MM	348-103
EVR3	POT SMT 1K 4MM	348-103
EVR4	POT SMT 1K 4MM	348-103
FC1	CAP TANT 47uF 25V	507-045
FC2	CAP SMT 1UF TANT	357-105
FC3	CAP SMT 0.1UF CER	345-105
FC4	CAP SMT 0.1UF CER	345-105
FC5	CAP SMT 1UF TANT	357-105
FC6	CAP TANT 47uF 25V	507-045
FC7	CAP SMT 1UF TANT	357-105
FC8	CAP SMT 0.1UF CER	345-105
FC9	CAP SMT 0.1UF CER	345-105
FC10	CAP SMT 1UF TANT	357-105
FR1	RES SMT 2R2 5% 0805	342-220
FR2	RES SMT 47R 5% 0805	342-471
FR3	RES SMT 2R2 5% 0805	342-220
FR4	RES SMT 47R 5% 0805	342-471
FU1	IC CS4222 SO	330-422
FU2	IC CS4222 SO	330-422
GC1	CAP SMT 2N2 CER	345-223
GC2	CAP SMT 2N2 CER	345-223
GC3	CAP SMT 220PF CER	345-222
GC4	CAP SMT 2N2 CER	345-223
GC5	CAP SMT 2N2 CER	345-223
GC6	CAP SMT 220PF CER	345-222
GC7	CAP SMT 2N2 CER	345-223
GC8	CAP SMT 2N2 CER	345-223

GC9	CAP SMT 220PF CER	345-222
GC10	CAP SMT 10PF CER	345-101
GC11	CAP SMT 2N2 CER	345-223
GC12	CAP SMT 220PF CER	345-222
GC13	CAP SMT 10PF CER	345-101
Designation	**Description**	**DPS Part Number**
GC14	CAP SMT 2N2 CER	345-223
GC15	CAP SMT 10PF CER	345-101
GC16	CAP SMT 10PF CER	345-101
GC17	CAP SMT 2N2 CER	345-223
GC18	CAP SMT 2N2 CER	345-223
GC19	CAP SMT 220PF CER	345-222
GC20	CAP SMT 2N2 CER	345-223
GC21	CAP SMT 2N2 CER	345-223
GC22	CAP SMT 220PF CER	345-222
GC23	CAP SMT 2N2 CER	345-223
GC24	CAP SMT 220PF CER	345-222
GC25	CAP SMT 10PF CER	345-101
GC26	CAP SMT 2N2 CER	345-223
GC27	CAP SMT 2N2 CER	345-223
GC28	CAP SMT 220PF CER	345-222
GC29	CAP SMT 10PF CER	345-101
GC30	CAP SMT 2N2 CER	345-223
GC31	CAP SMT 10PF CER	345-101
GC32	CAP SMT 10PF CER	345-101
GC33	CAP SMT 0.1UF CER	345-105
GC34	CAP SMT 0.1UF CER	345-105
GC35	CAP SMT 0.1UF CER	345-105
GC36	CAP SMT 0.1UF CER	345-105
GC37	CAP SMT 0.1UF CER	345-105
GC38	CAP SMT 0.1UF CER	345-105
GC39	CAP SMT 0.1UF CER	345-105
GC40	CAP SMT 0.1UF CER	345-105
GC41	CAP SMT 0.1UF CER	345-105
GC42	CAP SMT 0.1UF CER	345-105
GC43	CAP SMT 0.1UF CER	345-105
GC44	CAP SMT 0.1UF CER	345-105
GC45	CAP SMT 0.1UF CER	345-105
GC46	CAP SMT 0.1UF CER	345-105
GC47	CAP SMT 0.1UF CER	345-105
GC48	CAP SMT 0.1UF CER	345-105
GC49	CAP TANT 47uF 25V	507-045
GC50	CAP TANT 47uF 25V	507-045
GC51	CAP TANT 47uF 25V	507-045
GC52	CAP TANT 47uF 25V	507-045
GND1	HEADER 2 PIN OF 761-141	761-152
GND2	HEADER 2 PIN OF 761-141	761-152
GND3	HEADER 2 PIN OF 761-141	761-152
GR1	RES SMT 2K7 5% 0805	342-273
GR2	RES SMT 11K 5% 0805	342-114
GR3	RES SMT 2K7 5% 0805	342-273

GR4	RES SMT 15K 5% 0805	342-154
GR5	RES SMT 2K7 5% 0805	342-273
GR6	RES SMT 11K 5% 0805	342-114
GR7	RES SMT 2K7 5% 0805	342-273
GR8	RES SMT 15K 5% 0805	342-154
GR9	RES SMT 27R 5% 0805	342-271
Designation	**Description**	**DPS Part Number**
GR10	RES SMT 27R 5% 0805	342-271
GR11	RES SMT 2K7 5% 0805	342-273
GR12	RES SMT 11K 5% 0805	342-114
GR13	RES SMT 2K7 5% 0805	342-273
GR14	RES SMT 2K7 5% 0805	342-273
GR15	RES SMT 11K 5% 0805	342-114
GR16	RES SMT 2K7 5% 0805	342-273
GR17	RES SMT 2K2 5% 0805	342-223
GR18	RES SMT 2K2 5% 0805	342-223
GR19	RES SMT 15K 5% 0805	342-154
GR20	RES SMT 1K 5% 0805	342-103
GR21	RES SMT 15K 5% 0805	342-154
GR22	RES SMT 1K 5% 0805	342-103
GR23	RES SMT 27R 5% 0805	342-271
GR24	RES SMT 3K3 5% 0805	342-333
GR25	RES SMT 27R 5% 0805	342-271
GR26	RES SMT 3K3 5% 0805	342-333
GR27	RES SMT 3K3 5% 0805	342-333
GR28	RES SMT 3K3 5% 0805	342-333
GR29	RES SMT 2K7 5% 0805	342-273
GR30	RES SMT 11K 5% 0805	342-114
GR31	RES SMT 2K7 5% 0805	342-273
GR32	RES SMT 15K 5% 0805	342-154
GR33	RES SMT 2K7 5% 0805	342-273
GR34	RES SMT 11K 5% 0805	342-114
GR35	RES SMT 2K7 5% 0805	342-273
GR36	RES SMT 27R 5% 0805	342-271
GR37	RES SMT 15K 5% 0805	342-154
GR38	RES SMT 2K7 5% 0805	342-273
GR39	RES SMT 11K 5% 0805	342-114
GR40	RES SMT 2K7 5% 0805	342-273
GR41	RES SMT 27R 5% 0805	342-271
GR42	RES SMT 2K2 5% 0805	342-223
GR43	RES SMT 2K7 5% 0805	342-273
GR44	RES SMT 11K 5% 0805	342-114
GR45	RES SMT 2K7 5% 0805	342-273
GR46	RES SMT 15K 5% 0805	342-154
GR47	RES SMT 1K 5% 0805	342-103
GR48	RES SMT 2K2 5% 0805	342-223
GR49	RES SMT 15K 5% 0805	342-154
GR50	RES SMT 1K 5% 0805	342-103
GR51	RES SMT 27R 5% 0805	342-271
GR52	RES SMT 3K3 5% 0805	342-333
GR53	RES SMT 3K3 5% 0805	342-333
GR54	RES SMT 27R 5% 0805	342-271
GR55	RES SMT 3K3 5% 0805	342-333

GR56	RES SMT 3K3 5% 0805	342-333
GRV1	POT SMT 1K 4MM	348-103
GRV2	POT SMT 1K 4MM	348-103
GRV3	POT SMT 1K 4MM	348-103
GRV4	POT SMT 1K 4MM	348-103

Designation	**Description**	**DPS Part Number**
GU1	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU2	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU3	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU4	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU5	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU6	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU7	IC OPA2134 SO8 DUAL LOW DIST	330-213
GU8	IC OPA2134 SO8 DUAL LOW DIST	330-213
HC1	CAP SMT 1UF TANT	357-105
HC2	CAP SMT 0.1UF CER	345-105
HC3	CAP SMT 0.1UF CER	345-105
HC4	CAP SMT 1UF TANT	357-105
HC5	CAP TANT 47uF 25V	507-045
HC6	CAP SMT 0.1UF CER	345-105
HC7	CAP SMT 0.047UF CER	345-474
HC8	CAP SMT 0.1UF CER	345-105
HC9	CAP SMT 1UF TANT	357-105
HC10	CAP SMT 0.1UF CER	345-105
HC11	CAP SMT 0.1UF CER	345-105
HC12	CAP SMT 1UF TANT	357-105
HC13	CAP SMT 0.047UF CER	345-474
HL1	COIL 2.2UH	601-000
HR1	RES SMT 2R2 5% 0805	342-220
HR2	RES SMT 4K7 5% 0805	342-473
HR3	RES SMT 47R 5% 0805	342-471
HR4	RES SMT 1K 5% 0805	342-103
HR5	RES SMT 2R2 5% 0805	342-220
HR6	RES SMT 4K7 5% 0805	342-473
HR7	RES SMT 47R 5% 0805	342-471
HR8	RES SMT 1K 5% 0805	342-103
HR9	RES SMT 4K7 5% 0805	342-473
HR10	RES SMT 4K7 5% 0805	342-473
HU1	IC CS8401A SO	330-840
HU2	IC CS8411 SO	330-411
HU3	IC CS8401A SO	330-840
HU4	IC CS8411 SO	330-411
IC1	CAP SMT 0.1UF CER	345-105
IC2	CAP SMT 0.1UF CER	345-105
IC5	CAP SMT 0.1UF CER	345-105
IC8	CAP SMT 0.1UF CER	345-105

IC9	CAP SMT 0.1UF CER		345-105
IC10	CAP SMT 0.1UF CER		345-105
IC11	CAP SMT 0.1UF CER		345-105
IC12	CAP SMT 0.1UF CER		345-105
IC13	CAP SMT 0.1UF CER		345-105
IC14	CAP SMT 1UF TANT		357-105
IC15	CAP SMT 1UF TANT		357-105
IC16	CAP SMT 0.015UF CER		345-154
Designation	**Description**		**DPS Part Number**
IC17	CAP SMT 0.47UF CER		345-475
IC18	CAP SMT 0.1UF CER		345-105
IJP1	HEADER 5x2x0.1 -10 PIN	761-175	
IJP2	HEADER 5x2x0.1 -10 PIN	761-175	
IR9	RES SMT 4K7 5% 0805		342-473
IR10	RES SMT 4K7 5% 0805		342-473
IR11	RES SMT 10K 5% 0805		342-104
IR12	RES SMT 10K 5% 0805		342-104
IR13	RES SMT 10K 5% 0805		342-104
IR14	RES SMT 10K 5% 0805		342-104
IR15	RES SMT 10K 5% 0805		342-104
IR16	RES SMT 10K 5% 0805		342-104
IR17	RES SMT 10K 5% 0805		342-104
IR18	RES SMT 10K 5% 0805		342-104
IR19	RES SMT 4K7 5% 0805		342-473
IR20	RES SMT 4K7 5% 0805		342-473
IRN1	RES NET L10-1C-103 10PINS		431-109
IU1	IC 74F821D SOIC	334-821	
IU2	IC 74F821D SOIC	334-821	
IU5	IC 74LVT245D SMT		337-245
IU8	IC DSP56303PV80 TQFP-144		310-003
JC1	CAP SMT 0.1UF CER		345-105
JC2	CAP SMT 0.1UF CER		345-105
JC3	CAP SMT 0.1UF CER		345-105
JC4	CAP SMT 0.1UF CER		345-105
JC5	CAP SMT 1UF TANT		357-105
JC6	CAP SMT 0.1UF CER		345-105
JC7	CAP SMT 1UF TANT		357-105
JC8	CAP SMT 0.1UF CER		345-105
JC9	CAP SMT 0.1UF CER		345-105
JC10	CAP SMT 0.1UF CER		345-105
JC11	CAP SMT 0.1UF CER		345-105
JC12	CAP SMT 0.1UF CER		345-105
JC13	CAP SMT 0.1UF CER		345-105
JC14	CAP SMT 0.1UF CER		345-105
JC15	CAP SMT 0.1UF CER		345-105
JC16	CAP SMT 0.1UF CER		345-105
JC17	CAP TANT 15UF 10VSMT 3216		359-156
JC18	CAP SMT 0.1UF CER		345-105

JC19	CAP SMT 0.01UF CER	345-104
JC20	CAP SMT 0.1UF CER	345-105
JC21	CAP SMT 0.1UF CER	345-105
JC22	CAP TANT 15UF 10VSMT 3216	359-156
JC23	CAP SMT 0.1UF CER	345-105
JC24	CAP SMT 0.01UF CER	345-104
JC25	CAP SMT 0.1UF CER	345-105
JC26	CAP SMT 0.1UF CER	345-105
JC27	CAP TANT 15UF 10VSMT 3216	359-156
Designation	**Description**	**DPS Part Number**
JC28	CAP SMT 0.1UF CER	345-105
JC29	CAP SMT 0.01UF CER	345-104
JC30	CAP SMT 0.1UF CER	345-105
JC31	CAP SMT 0.1UF CER	345-105
JC32	CAP TANT 15UF 10VSMT 3216	359-156
JC33	CAP SMT 0.1UF CER	345-105
JC34	CAP SMT 0.01UF CER	345-104
JC35	CAP SMT 0.1UF CER	345-105
JD1	DIODE SCHOTTKY 1N5817 1A	101-101
JD2	DIODE SCHOTTKY 1N5817 1A	101-101
JJP1	HEADER 5x2x0.1 -10 PIN	761-175
JJP2	HEADER 5x2x0.1 -10 PIN	761-175
JL1	COIL 1UH TOKO FSLU2520-1R0J	601-100
JL2	COIL 1UH TOKO FSLU2520-1R0J	601-100
JL3	COIL 1UH TOKO FSLU2520-1R0J	601-100
JL4	COIL 1UH TOKO FSLU2520-1R0J	601-100
JR1	RES SMT 1K 5% 0805	342-103
JR2	RES SMT 1K 5% 0805	342-103
JR3	RES SMT 33R 5% 0805	342-331
JR4	RES SMT 10K 5% 0805	342-104
JR5	RES SMT 33R 5% 0805	342-331
JR6	RES SMT 33R 5% 0805	342-331
JR7	RES SMT 47R 5% 0805	342-471
JR8	RES SMT 47R 5% 0805	342-471
JR9	RES SMT 47R 5% 0805	342-471
JR10	RES SMT 47R 5% 0805	342-471
JR11	RES SMT 47R 5% 0805	342-471
JR12	RES SMT 47R 5% 0805	342-471
JR13	RES SMT 47R 5% 0805	342-471
JR14	RES SMT 47R 5% 0805	342-471
JR15	RES SMT 47R 5% 0805	342-471
JR16	RES SMT 47R 5% 0805	342-471
JR17	RES SMT 47R 5% 0805	342-471
JR18	RES SMT 47R 5% 0805	342-471
JR19	RES SMT 47R 5% 0805	342-471
JR20	RES SMT 47R 5% 0805	342-471
JR21	RES SMT 47R 5% 0805	342-471
JR22	RES SMT 47R 5% 0805	342-471
JR23	RES SMT 47R 5% 0805	342-471

JR24	RES SMT 47R 5% 0805	342-471
JR25	RES SMT 47R 5% 0805	342-471
JR26	RES SMT 47R 5% 0805	342-471
JR27	RES SMT 10K 5% 0805	342-104
JR28	RES SMT 47R 5% 0805	342-471
JR29	RES SMT 47R 5% 0805	342-471
JR30	RES SMT 4K7 5% 0805	342-473
JR31	RES SMT 33R 5% 0805	342-331
JR32	RES SMT 2K2 5% 0805	342-223
JR33	RES SMT 15K 5% 0805	342-154
Designation	**Description**	**DPS Part Number**
JR34	RES SMT 33R 5% 0805	342-331
JR35	RES SMT 2K2 5% 0805	342-223
JR36	RES SMT 15K 5% 0805	342-154
JR37	RES SMT 300R 5% 0805	342-302
JR38	RES SMT 2K2 5% 0805	342-223
JR39	RES SMT 15K 5% 0805	342-154
JR40	RES SMT 300R 5% 0805	342-302
JR41	RES SMT 2K2 5% 0805	342-223
JR42	RES SMT 15K 5% 0805	342-154
JR43	RES SMT 300R 5% 0805	342-302
JR44	RES SMT 300R 5% 0805	342-302
JR45	RES SMT 10K 5% 0805	342-104
JR46	RES SMT 10K 5% 0805	342-104
JR47	RES SMT 10K 5% 0805	342-104
JR48	RES SMT 10K 5% 0805	342-104
JR49	RES SMT 10K 5% 0805	342-104
JR50	RES SMT 10K 5% 0805	342-104
JR51	RES SMT 10K 5% 0805	342-104
JR52	RES SMT 10K 5% 0805	342-104
JR53	RES SMT 33R 5% 0805	342-331
JR54	RES SMT 10K 5% 0805	342-104
JR55	RES SMT 390R 5% 0805	342-392
JR56	RES SMT 390R 5% 0805	342-392
JR57	RES SMT 390R 5% 0805	342-392
JR58	RES SMT 390R 5% 0805	342-392
JR59	RES SMT 390R 5% 0805	342-392
JR60	RES SMT 390R 5% 0805	342-392
JR61	RES SMT 390R 5% 0805	342-392
JR62	RES SMT 390R 5% 0805	342-392
JR63	RES SMT 10K 5% 0805	342-104
JR64	RES SMT 10K 5% 0805	342-104
JRN1	RES NET L10-1C-103 10PINS	431-109
JRN2	RES NET L10-1C-103 10PINS	431-109
JRN3	RES NET L10-1C-103 10PINS	431-109
JU1	IC EPC1PC8	305-109
JU1_S	SOCKET 8 PIN 208AG39DC	721-112
JU2	IC EPF10K50VRC2403AA REV.C	330-454
JU3	IC 74ACT14D SOIC	337-140
JU4	IC 74F821D SOIC	334-821
JU5	IC 74ACT14D SOIC	337-140

JU6	IC TLC2932 IPWLE ANALOGUE PLL	308-932
JU7	IC TLC2932 IPWLE ANALOGUE PLL	308-932
JU8	IC TLC2932 IPWLE ANALOGUE PLL	308-932
JU9	IC TLC2932 IPWLE ANALOGUE PLL	308-932
KC1	CAP SMT 0.1UF CER	345-105
KC2	CAP SMT 0.1UF CER	345-105
KC3	CAP SMT 0.1UF CER	345-105
KC4	CAP SMT 0.1UF CER	345-105
KC5	CAP SMT 0.1UF CER	345-105

Designation	**Description**	**DPS Part Number**
KR1	RES SMT 4K7 5% 0805	342-473
KU1	IC 27C256-55 32KX8 EPROM	305-655
KU1_S	SOCKET 28 PIN 228AG39DC	721-119
KU2	IC DT71V416S15Y SRAM	305-071
KU3	IC DT71V416S15Y SRAM	305-071
PCB	PCB DPS-470 AUDIO D-1	743-163

Appendix A: Specifications

Video Specifications

Signal Processing ..... Component, 10-bit, ITU-R BT.601 (13.5 MHz)

Synchronizing Range ..... Infinite

Frequency Response:

Synchronizer mode.....+/- 0.5 dB (0 - 4.5 MHz)
.....- 1dB (4.5 - 5.5 MHz)
TBC mode.....- 3 dB (4.2 MHz)
(NTSC notch @ 3.58 MHz)

Signal to Noise:

Serial D1 (SDI) I/O.....> 70 dB Luminance Weighted
Component Analog In .....> 66 dB Luminance Weighted
S-Video In .....> 62 dB Luminance Weighted
Composite Video In.....> 60 dB Luminance Weighted

Differential Phase.....< 1% @ 1 Vp-p Modulated Ramp

K-Factor (2T) .....< 0.5%

Luminance Jitter (TBC Mode) .....< 15 ns

Inputs:

Composite Video (BNC) .....1 Vp-p, 75 ohms
Serial Digital SDI (BNC) .....75 ohms Auto EQ to 300M
Component Analog Video
Y (BNC).....1 Vp-p, 75 ohms
R-Y (BNC), B-Y (BNC).....0.7 Vp-p (Betacam), 486 mVp-p (MII), 75 ohms
S-Video (4P Mini-DIN):
Y .....1 Vp-p, 75 ohms
C (Burst Level) .....286 mV NTSC, 75 ohms
Genlock Reference (BNC Loop) .....1 Vp-p, 75 ohms

Outputs:

Composite Video (BNC x2) .....1 Vp-p, 75 ohms
Serial Digital SDI (BNC x2) .....75 ohms
Component Analog Video
Y (BNC) .....1 Vp-p, 75 ohms
R-Y (BNC), B-Y (BNC) .....0.7 Vp-p (Betacam), 486 mVp-p (MII), 75 ohms
S-Video (4P Mini-DIN):
Y .....1 Vp-p, 75 ohms
C (Burst Level) .....286 mV (NTSC), 75 ohms

Processor Controls:

Video Level .....+/- 3 dB
Setup Level .....+/- 20 IRE
Chroma Level .....+/- 6 dB
Hue Phase .....+/- 45 degrees
Horizontal Genlock Timing .....+/- 6 µs
Subcarrier Genlock Timing .....360 degrees
Y/C Horizontal Delay Adjustment .....-592 ns / +518 ns

Y/C Vertical Delay Adjustment .....+1 / -2 Lines

Test Signal Generator Mode (All Outputs) .....Select from 32 10-bit Test Patterns

VITS / VIRS Inserter .....Select any two (line repetitive) test patterns to display on alternate fields of lines 16 - 19.

Remote Control:

Serial Remote Port (DB-9F) .....RS-232/RS-422 Levels @ 9600/38,400 bps
GPI Freeze Trigger (RCA) .....TTL or Contact Closure
Serial Remote (BNC).....DCN

Audio Specifications

Analog Inputs:

Number of Inputs .....2 Stereo Channels (Balanced or Unbalanced)
Operating Levels .....+8, +4, 0, -4 or –8 dBm
Input Impedance.....600 or 20k ohms
Connection.....Removable Barrier Strip

AES / EBU Inputs:

Number.....2 Channels, Type AES3-1992 Balanced
Impedance .....75 or 110 ohms (110 ohms transformer isolated)
Channel Status Format .....AES3-1992 (Professional Mode) or S/PDIF
Connection.....Breakout Cable with BNC and XLR Connectors

SDI Inputs:

Number.....2 Stereo Channels of Embedded Audio
Channel Status Format .....AES3-1992 (Professional Mode) or S/PDIF
Connection.....BNC (via SDI Video Input)

Analog Outputs:

Number.....2 Stereo Channels (Balanced or Unbalanced)
Maximum Output Level.....+23 dBm
Connection.....Removable Barrier Strip

AES / EBU Outputs:

Number.....2 Channels, AES3-1992, balanced
Impedance .....75 or 110 ohms (Transformer Isolated)
Channel Status Format .....AES3-1992 (Professional Mode) or S/PDIF
Connection.....Breakout Cable with BNC and XLR Connectors

SDI Outputs:

Number.....2 Stereo Channels of Embedded Audio
Channel Status Format .....AES3-1992 (Professional Mode) or S/PDIF
Connection.....BNC (via SDI Video Output)

Processing.....20 bits (for all inputs)

Sampling Frequencies.....48 kHz, 44.1 kHz, 32 kHz

Maximum Total Delay.....334 ms (20 Video Fields)

Maximum Fixed Delay.....260 ms

Delay Resolution.....4 ms increments

Frequency Response.....50 Hz to 15 kHz, +/- 0.2 dB
.....20 Hz to 50 Hz, +/- 0.5 dB
.....15 kHz to 20 kHz, +/- 0.5 dB

THD+N (non-weighted).....<0.05% at +23 dBm

THD+N (A-weighted).....<0.02% at +23 dBm

Total Dynamic Range .....>90 dB

Signal-to-Noise Ratio.....>70 dB (Full-Scale Output)

General Specifications

Size (W x H x D).....17" x 1-3/4" x 20" (43.2cm x 4.4cm x 50.8cm)

Power Requirements .....120 Watts, 110-120 VAC, 60 Hz

Appendix B: Test Signals

Following are the test signals available with the DPS-470:

1. SMPTE Bars
2. EIA Bars
3. FF Bars
4. Bars / Luma
5. Bars / Reverse
6. Bars / Red
7. Bars 100 %
8. Super Black
9. Black
10. Gray
11. White
12. Luma Ramp
13. Mod Ramp
14. Luma 5-Step
15. Mod 5-Step
16. Y-Shallow Ramp
17. Shallow Ramp
18. Multiburst-60
19. Luma Sweep
20. Chroma Sweep
21. Pulse & Bar
22. NTC7 Composite
23. NTC7 Combination
24. FCC Composite
25. VIRS
26. Cross Hatch
27. SIN (X) / X
28. Red Field
29. Timing Bowtie
30. Matrix-1
31. Matrix-2
32. FF Bounce
33. 90 % Bounce

Vertical Interval Test Signals (VITS)

1. Full Field Bars
2. Multiburst-60
3. Luma Sweep
4. Chroma Sweep
5. Pulse & Bar
6. NTC7 Composite
7. NTC7 Combination
8. FCC Composite
9. VIRS

Appendix C: Installing the Audio Board

If you purchased the Audio Option board separately from the DPS-470, you will need to install it. Please use the following instructions on installing your audio card safely and correctly.

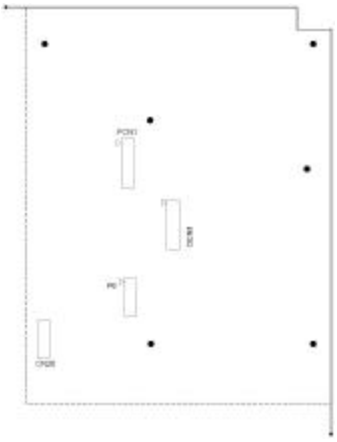
Precautions

WARNING: Static Electricity!
Static electricity from your body can damage your Audio Card or the DPS-470. Even though you may not notice it, static electricity is being generated every time you move. Usually, it is too small to cause a spark, but it can still cause damage to sensitive electronic components.

- To prevent this damage, you should handle the Audio board carefully.
- Do not take it out of its conductive bag until you are ready to install it.
- Do not carry the board around the room unless it is in its conductive bag.
- Avoid wearing wool or polyester clothing while installing the Audio board. These fabrics generate more static electricity than cotton garments.
- Before touching the Audio board, you should discharge any static electricity from your body by first touching the ground metal chassis of the DPS-470.

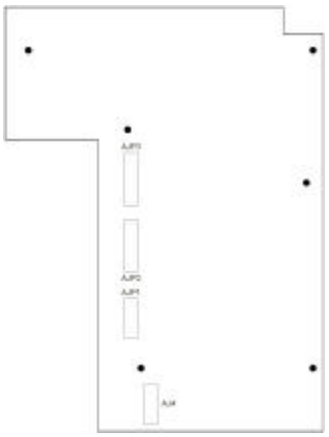
Installing the Audio Board

1. Confirm that the DPS-470 is shut off and that the power cord is disconnected from the rear panel.
2. Remove the top cover from the DPS-470. Use a Phillips screwdriver to remove the fifteen retaining screws and lift off the top cover. Please retain the screws, as they will be used to secure the top cover. Please note that the five front panel screws are different that the other ten screws.
3. There are six screws that must be removed from the main board of the DPS-470 and replaced with the supplied six standoffs. Use the following diagram to determine which screws are to be removed.



4. Once the screws are removed, replace them with the supplied standoffs.
5. Three ribbon cables and a power cable are supplied with the Audio board. These cables are attached from the main board to the Audio board. There are two 34-pin cables and one 20-pin cable. To attach these cables to the main board, make sure that the red line on the ribbon cable is aligned with the arrow on the silkscreen next to the header pins on the board. The power cable is connected from the main board labelled CN20 to the Audio board. (See the above diagram)

6. Remove the Audio board and the metal shield from their conductive bag.
7. Using a hex driver, remove the two hex nuts on the DB25 on the back of the board.
8. Affix the metal shield and the Audio board over the standoffs.
9. Use the supplied screws to secure the Audio board and the metal board to the Main board.



10. Connect the ribbon cables and the power cable to the Audio board.
11. Replace the hex nuts on the DB25 to secure the connector to the chassis of the DPS-470.
12. Replace the top cover and the fifteen screws to secure the top cover. Be sure to replace the five different screws to the front panel.
13. Plug the power cord back in.

Appendix D: Remote Control

This appendix describes the serial data interface to the DPS-470. This information is intended for users and programmers who want to develop their own custom control (driver) software.

Electrical Interface

The electrical interface for the DPS-470 is RS-232, RS-422 and DCN. The bit rate is set to 9600 bps, with 8 data bits, 1 stop bit and no parity. For DCN the bit rate is always 38,400 bps.

Protocol

The software protocol is a MIDI compatible format, using the system exclusive feature of the MIDI interface. Communication with the DPS-470 is initiated when the system exclusive command byte (F0 hex) is received, followed by the ID code (67 hex).

The next byte sent is the address byte, which determines which unit is being addressed by the command. This is followed by a unit function select byte and one or more data bytes. The communication is completed when the MIDI end system exclusive byte is sent (F7 hex).

The following table summarizes the protocol:

Host:

System Exclusive Byte (= F0 hex)
Unit ID Byte (= 67 hex)
Unit Address Byte (= 00-7F hex)
Function Select Byte (= 00-7F hex)
Data Byte 1
Data Byte 2
...
Data Byte N
End System Exclusive (= F7 hex)

Unit Response:

ACK Byte (= 06h) or NACK Byte (= 15h)

System Exclusive Byte

This byte is used in the MIDI protocol to allow manufacturers of MIDI equipment to define messages specific to their own equipment. The system exclusive mode remains in effect until the end system exclusive command is sent.

Unit ID Byte

This byte is the unique code that identifies the exclusive data for the particular unit.

Unit Address Byte

This byte determines to which DPS-470 the following command is directed. The address of each unit can be set using the front panel menu commands. Unit addresses correspond to hex codes as specified in the following table:

DPS-470 Unit Address	Corresponding HEX Value
Unit 1	01h
Unit 2	02h
Unit 3	03h
Unit 4	04h
Unit 5	05h
.....	.....
Unit 126	7Eh
Unit 127	7Fh

Unit Function Select Byte/Data Byte(s)

The Function byte determines which function on the addressed card will be affected by the command. Most commands follow this byte with two characters that represent the new hex value for the selected function. The following table lists each function with the associated data bytes.

NOTE: Parameters for functions are sent in ASCII, i.e., '00' => 30h + 30h, '01' => 30h + 31h, etc. …

Video Remote Commands

Function Byte	#ASCII Data Bytes (Range)	Description
01h	2 (0, 0-F, F)	Set luminance level command 00 = Minimum luminance level FF = Maximum luminance level
02h	2 (0, 0- F, F)	Set black level command 00 = Minimum black level FF = Maximum black level
03h	2 (0, 0-F, F)	Set chroma level command 00 = Minimum chroma level FF = Maximum chroma level

Function Byte	#ASCII Data Bytes (Range)	Description
04h	2 (0, 0-F, F)	Set hue command 00 = -45 degrees FF = +45 degrees
08h	1 (0-3)	Input mode select 0 = Composite input mode 1 = S-Video input mode 2 = Component input mode 3 = D1 input mode
0Ch	1 (0-1)	Freeze/Live Mode select 0 = Live mode 1 = Freeze mode
0Dh	0	Request brief status info.
0Eh	0	Request full status info
12h	2 (0, 0-7, F)	Strobe Rate 00 = Full Motion 7F = 127 Frames
13h	1 (0-2)	Select Freeze Mode 0 = Frame mode 1 = Field mode 2 = Strobe mode
14h	1 (0-3)	Freeze Field Select 0 = Select field 0 1 = Select field 1 2 = Select field 2 3 = Select field 3
16h	1 (0-F)	Y/C Delay horizontal 0 = +518ns 8 = 0 F = -592ns
19h	2 (0, 0-2, 0)	Select TSG Pattern
20h	2 (0, 0-0, 8)	Subcarrier Timing Fine Each Increment = 0.175 degree
21h	2 (0, 0-F, F)	Subcarrier Timing Coarse Each Increment = 1.406 degree
22h	2 (0, 0-7, F)	Horizontal Timing Fine Each Increment = 2.314 ns

Function Byte	# ASCII Data Bytes (Range)	Description
23h	2 (0, 0–7, F)	Horizontal Timing Coarse Each Increment = 74.074 µs
24h	1 (0-3)	Y/C Delay vertical 0 = +1 line 1 = 0 2 = -1 line 3 = -2 lines
25h	1 (0-1)	Monochrome Mode 0 = Normal 1 = Chroma Off
28h	1 (0-2)	Set CAV Input Mode 0 = Beta In 1 = MII In
2Fh	1 (0-1)	Set CAV Output Mode 0 = Beta Out 1 = MII Out
37h	0,1	Function 00 = Process 01 = TSG One 02 = Bypass Mode 03 = Not Allowed
	2,3	Sync Mode 00 = Synchronize 01 = TBC 02 = Auto Switch 03 = Not Allowed
	4,5	Hot Switch 00 = Off 01 = On 02 = Drop To Black
	6	Genlock Mode 0 = Auto Genlock 1 = Internal
	7	Blanking Width 0 = Narrow 1 = Wide

Function Byte	# ASCII Data Bytes (Range)	Description
39h	0	Video Out 0 = Normal 1 = Force All Outputs to Black
	1	Clamp Speed 0 = Normal 1 = Fast
	2	GPI Freeze 0 = Not Enabled 1 = GPI Enabled
	3,4,5,6,7	Not Used

Audio Remote Commands

Function Byte	Data Byte	Description
5D	2	1kHz Sinewave
	00h	Off
	18h	On
5E	2	CH2 O/P Gain Right
	80h	00dB
	58h	-20dB
	A8	+20dB
5F	2	CH2 O/P Gain Left
	80h	00dB
	58h	-20dB
	A8	+20dB
60h	2	Analog Audio Mode Lower Nibble (CH1):
	00	Process
	01	Bypass
		Upper Nibble (CH2):
	00	Process
	01	Bypass
61h	2	AES/EBU Audio Mode Lower Nibble (CH1):
	00	Process
	01	Bypass
		Upper Nibble (CH2):
	00	Process
	01	Bypass

Function Byte	Data Byte	Description
62h	2	Audio Input Source
		Lower Nibble (CH1):
	00	Analog In
	01	SDI In
	02	AES/EBU In
		Upper Nibble (CH2):
	00	Analog In
	01	SDI In
	02	AES/EBU In
63h	2	
		Lower Nibble (Right);
	00	+ 8dBM
	01	+ 4dBM
	02	0dBM
	03	-4dBM
	04	-10dBM
		Upper Nibble (Left):
	00	+ 8dBM
	01	+ 4dBM
	02	0dBM
	03	-4dBM
	04	-10dBM
64h	2	
		Lower Nibble (Right);
	00	+ 8dBM
	01	+ 4dBM
	02	0dBM
	03	- 4dBM
	04	- 10dBM
		Upper Nibble (Left):
	00	+ 8dBM
	01	+ 4dBM
	02	0dBM
	03	- 4dBM
	04	- 10dBM
65h	1	Auto Track
	00	Off
	01	On
66h	1	Tone Oscillator
	00	Off
	01	1 kHz Sine Wave

Function Byte	Data Byte	Description
67h	2	Fixed Delay CH1
	00	0 Field
	01	0.25 Field
	02	0.50 Field
	…	…….…..…
	64h	16 Fields
68h	2	Volume Control CH1 Right
	00	00.0dB
	01	-0.5dB
	02	-1.0dB
	….	….
	74h	-60dB
69h	2	Volume Control CH1 Left
	00	00.0dB
	01	-0.5dB
	02	-1.0dB
	….	…….
	74h	-60dB
6Ah	1	Master Mute Control
	00	Off
	01	On
6Bh	2	Analog Input Type
		Lower Nibble (CH1):
	00	Balanced
	01	Unbalanced
		Upper Nibble (CH2):
	00	CH2 Balanced
	01	CH2 Unbalanced
6Ch	2	AES/EBU Grade
		Lower Nibble (CH1):
	00	Professional
	01	Consumer
		Upper Nibble (CH2):
	00	Professional
	01	Consumer
6Dh	2	Analog Input Termination
		Lower Nibble (CH1):
	00	600R
	01	High Z
		Upper Nibble (CH2):
	00	600R
	01	High Z

Function Byte	Data Byte	Description	
6Eh	2	Output Swap CH1	
		Lower Nibble:	
		RIGHT	*LEFT*
	00 (Stereo)	Right	Left
	01 (Mono Left)	Right	Right
	02 (Mono Right)	Left	Left
	03 (Mono Left + Right)	(R+L)/2	(R+L)/2
	2	Output Swap CH2	
		Upper Nibble:	
		RIGHT	*LEFT*
	00 (Stereo)	Right	Left
	01(Mono Left)	Right	Right
	02 (Mono Right)	Left	Left
	03 (Mono Left + Right)	(R+L)/2	(R+L)/2
6Fh	2	Fixed Delay CH2	
	00	0 Field	
	01	0.25 Field	
	02	0.50 Field	
	…	……..	
	64h	16 Fields	
70h	2	SDI Input	
	00	CH01,CH02,CH03,CH04	
	01	CH05,CH06,CH07,CH08	
	02	CH09,CH10,CH11,CH12	
	03	CH13,CH14,CH15,CH16	
71h	2	SDI Output Position	
	00	CH01,CH02,CH03,CH04	
	01	CH05,CH06,CH07,CH08	
	02	CH09,CH10,CH11,CH12	
	03	CH13,CH14,CH15,CH16	
72h	2	Swap Output Channels	
		(Stereo Pairs)	
		CHANNEL1	*CHANNEL 2*
	00	CH1	CH2
	01	CH1	CH1
	02	CH2	CH2
	03	CH1	CH2
73h	1	Audio Follow Video	
	00	Off	
	01	On	

Function Byte	Data Byte	Description
74h	2	AFV Preset Composite
		Lower Nibble (CH1):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Output
		Upper Nibble (CH2):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Output
75h	2	AFV S-VIDEO
		Lower Nibble (CH1):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Output
		Upper Nibble (CH2):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Output
76h	2	AFV CAV
		Lower Nibble (CH1):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Output
		Upper Nibble (CH2):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Output

Function Byte	Data Byte	Description
77h	2	AFV SDI
		Lower Nibble (CH1):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Control
		Upper Nibble (CH2):
	00	Off
	01	Analog
	02	SDI
	03	AES/EBU
	04	Mute Control
78h	2	Volume Control CH2 Right
	00	00.0bD
	01	-0.5dB
	02	-1.0dB
	….	…….
	74h	60dB
79h	2	Volume Control CH2 Left
	00	00.0dB
	01	-0.5dB
	02	-1.0dB
	….	……..
	74h	-60dB
7A	1	Sampling Rate
	00	48kHz
	01	44.1kHz
	02	32kHz
	03	
7B	1	D1 Embed
	00	Embed Off
	01	Embed On
	02	
7C	1	CH1 O/P Gain Control
	00	+20dB
	01	0dB
	02	–20dB
7D	2	CH2 O/P Gain Control
	00	+20dB
	01	0dB
	02	–20dB
	03	

Read/Write Memory Commands. The following commands allow you to directly read/write from/to the DPS-470 memory and registers (reg). For details of register location and function contact DPS.

30h	2 reg address bytes + 2 reg value bytes	Write register file
31h	2 reg address bytes + 2 reg value bytes	Read register file DPS-470 will send reg contents in binary + ACK (06hex)
1E	4 reg address bytes	Read non-volatile memory DPS-470 will send reg contents in binary + ACK (06hex)
1F	4 reg address bytes + 2 reg value bytes	Write non-volatile memory

NOTE: All register address and value bytes are in ASCII.

Brief Unit Status

Command 0D is used to request status information from the DPS-470. The DPS-470 responds with the following status byte (followed by the normal ACK byte).

Bit 7	Always 0	
Bit 6	(Genlock Status)	1 = Genlocked 0 = Free-running
Bit 5	(Input Video Pres)	1 = Input present 0 = No Input present
Bit 4	(Freeze/Live Mode)	1 = Freeze mode 0 = Live mode

Full DPS-470 Status

Command 0Eh requests a complete status dump from the addressed DPS-470. Please contact DPS for more information.

Programming Example

Some confusion has resulted from the fact that actual data bytes sent to the DPS-470 must be in ASCII. The following is an example of the actual data that would be sent to the DPS-470 to force it into monochrome mode. Please note that the data bytes are always transmitted in ASCII.

0xF0	MIDI Start of Exclusive
0x67	DPS ID
0xAA	AA = Unit Address
0x25	Forced Monochrome Function Select
0x31	= ASCII for "1"
0xF7	MIDI End of Exclusive

NOTE: Upon power-down, all settings are maintained in non-volatile RAM on the DPS-470.

Appendix E: Cable Pinouts

Video Cable

The following is the cable pinouts for the Multi I/O Connector (DB-15M) video cable (Part # 774-565).

Pin Number on the DB-15M	Connection Type	Description
1	BNC	R-Y
2	RCA	GPI Freeze
3	BNC	Video Delay Phase
4	NC	
5	S-Video	Y
6	Gnd	
7	Gnd	
8	Gnd	
9	Gnd	
10	Gnd	
11	Blue	CAV B-Y
12	Gnd	
13	BNC	CAV Y
14	Gnd	
15	S-Video	C

Audio Cable

The following is the cable pinouts for the AES/EBU (DB-25M) audio cable (Part # 774-470).

Pin Number on the DB-25M	Pin on the Connector	Description
1	NC	
2	XLR – 1	Shield
3	XLR – 3	AES2 Out (-)
4	XLR – 2	AES2 Out (+)
5	XLR – 1	Shield
6	XLR – 3	AES2 In (-)
7	XLR – 2	AES2 In (+)
8	XLR – 1	Shield
9	XLR – 3	AES1 Out (-)

Pin Number on the DB-25M	Pin on the Connector	Description
10	XLR – 2	AES1 Out (+)
11	XLR – 1	Shield
12	XLR – 3	AES1 In (-)
13	XLR – 2	AES1 In (+)
14	NC	
15	BNC – Shield	AES2 Out (-)
16	BNC – Center	AES2 Out (+)
17	NC	
18	BNC – Shield	AES2 In (-)
19	BNC – Center	AES2 In (+)
20	NC	
21	BNC – Shield	AES1 Out (-)
22	BNC – Center	AES1 Out (+)
23	NC	
24	BNC – Shield	AES1 In (-)
25	BNC – Center	AES1 In (+)

Appendix F:
Important Addresses and Phone Numbers

Internet

ftp://ftp.dps.com
http://www.dps.com
Support E-mail:

Canada/International	support@dps.com
U.S.	support.us@dps.com
Europe	support.europe@dps.com
Asia-Pacific	support.au@dps.com
Suggestions:	suggestionbox@dps.com

Canada/International

Digital Processing Systems Inc.
70 Valleywood Drive
Markham, Ontario L3R 4T5

Toll-free:	800-775-3314
Voice:	905-944-4000
Fax:	905-944-4200
Customer Service Voice Mail:	905-944-4100

USA

Digital Processing Systems, Inc.
11 Spiral Drive, Suite 10
Florence, KY 41042

Toll-free:	800-775-3314
Voice:	859-371-5533
Fax:	859-371-3729

Europe

Digital Processing Systems, Ltd.
Romans Business Park, Unit 9
East Street, Farnham
Surrey, GU9 7SX
U.K.

Phone numbers are preceded by +44 1252 if calling from outside the U.K., and by 01252 if calling from inside the .:

Voice:	718300
Fax:	718400
BBS:	723790

Asia and the Pacific Rim

DPS Asia Pacific
858 King Georges Road
South Hurstville, Sydney
NSW 2221
Australia

Voice:	61-2-9586-0088
Fax:	61-2-9596-0988

Appendix G: A Brief History of DPS

We were originally founded in 1975 as Digital Video Systems. We were pioneers in the development of time base correctors (TBCs) and synchronizers. Digital Video Systems was acquired by Scientific Atlanta in 1982 and the focus of the division shifted to satellite encryption technologies. In 1988, the studio video product line was spun off into a new employee-owned company called Digital Processing Systems (DPS). In 1996 DPS went public, with a very successful initial public offering (IPO) of over three million shares.

Today, while DPS continues to innovate on and expand its line of traditional broadcast products, the company experiences significant growth in the computer video marketplace. Digital Processing Systems entered the computer video field in 1991 with the introduction of the DPS Personal TBC, the first infinite window TBC on a PC card. The DPS Personal TBC's combination of features, performance and price was unique, and competed with units selling for three times its cost. After the success of this TBC card, DPS followed with the Personal TBC II, III and IV, each of which provided increased features and performance. Another innovation was the DPS Personal VScope, the world's first combination waveform monitor/vectorscope on a PC card.

The DPS Personal Animation Recorder (PAR), a plug-in card which functions as a single-frame recording deck, was introduced soon after the first Personal TBC and quickly became one of our most popular products. Still selling in both PC and Amiga versions — a testament to how far ahead of the rest of the industry it was — the PAR provides component analog video (Betacam, MII), composite and S-Video (Hi8/SVHS) outputs.

The DPS Perception Video Recorder (PVR) is a significant advancement beyond the PAR. First shipped in 1995, the multiple-award-winning PVR is a PCI-bus digital video disk recorder which features 10-bit video encoding with 2X oversampling, ITU-R BT.601 4:2:2 processing and an integrated SCSI-2 hard drive controller. The PVR is also designed to integrate with third-party non-linear editing software.

Fulfilling the promise of the PVR to be "the heart of an advanced digital video workstation," DPS has built a family of products that work with the PVR to create a complete video-audio editing solution. These products include: the AD-2500/3500 Component Video Capture daughtercard; the SD-2500/3500 Serial Digital Video I/O card; the Perception F/X transition effects accelerator card; and the Perception Audio for Video (A4V) board.

Digital Processing Systems 1997 desktop video offerings also became award winners. The DPS Hollywood, an uncompressed digital (D1) video disk recorder, won the "Pick Hit" award at its release during the National Association of Broadcasters (NAB) convention in 1997. The superb resolution-independent compositing and special effects software program, Digital Fusion, brought to market in a strategic partnership between DPS and the creators, eyeon Software, Inc., won the same award at NAB '97.

At NAB '98 we introduced a major new product: the DPS Perception RT, a dual-stream real-time disk recording and editing system. It won an "NAB Prime Time Product" award, and three of our other products also won awards.

In addition to an expanding line of video products that "push the envelope" of price and performance, DPS continues to extend its capabilities in other ways. In the summer of 1997 we purchased the award-winning software company Star Media, creators of the Video Action line of video editing software. They are now "DPS Software." The integration of our traditional hardware strengths with some of the industry's best software should help us maintain our position as a leader in desktop video solutions.

A key contributor to the quality and remarkable capabilities of DPS's computer video products has been our lengthy experience in the broadcast studio field, and our traditional broadcast product line is still going strong. In 1998 we introduced an innovative product, the DPS Whiplash. This is a powerful disk-based slow motion and instant replay system, which uses a proprietary software algorithm to dynamically optimize field and frame data to provide ultra-smooth slow motion playback. Also new for 1998 was the DPS-470 Serial Digital Component Audio-Video Synchronizer, equally suited for work in analog, digital or hybrid broadcast studios (and it won a "Pick Hit" award at NAB '98).

In 1998 DPS combined its proven digital-disk recording technology with sophisticated software tools and networking capability to create Digital Detective, a digital video recorder which marks the company's entry into the security market.

Digital Processing Systems’ corporate headquarters and manufacturing facilities are in Markham, Ontario, Canada, just north of Toronto. Sales, service and distribution facilities for the United States are located in Florence, KY, adjacent to the Greater Cincinnati/Northern Kentucky Airport. A United Kingdom office oversees European operations from London, and Asia and Pacific Rim countries are serviced by our office in Sydney, Australia.

Appendix H: Warranty

Warranty Statement

Unless specifically stated otherwise in writing, Digital Processing Systems Incorporated (DPS) warrants the original purchaser that DPS manufactured products will be will be free from defects in material and workmanship for a period of two years from the date of purchase. Should a product, in DPS' opinion, malfunction within the warranty period, Digital Processing Systems will repair or replace the product without charge for parts or labor. Repaired items may incorporate new or reconditioned replacement parts, at the sole discretion of DPS. All defective parts become the property of DPS. This warranty does not apply to products that have been damaged due to misuse, accident, unauthorized alterations, unauthorized repairs or modifications.

Warranty Limitations

This warranty covers only equipment and software manufactured by Digital Processing Systems, Inc. Certain DPS system products contain vendor items, such as hard disk drives and computer motherboards, which are separately warranted by the original equipment manufacturer.

All warranties, expressed or implied, for DPS Products are limited to two years from the date of purchase and no warranties, expressed or implied, will apply after that period. The distributor, its dealers and customers agree that Digital Processing Systems shall not be liable for any loss of use, revenue or profit.

Digital Processing Systems makes no other representations of warranty as to fitness for purpose of merchantability or otherwise in respect to any of the products sold to the distributor pursuant to this agreement. The liability of Digital Processing Systems in respect of any defective products will be limited to the repair or replacement of such products.

In no event shall Digital Processing Systems be responsible or liable for any damages arising from the use of such defective products whether such damages be direct, indirect, consequential or otherwise and whether such damages are incurred by the distributor or third party.

Warranty Service

Units requiring repair under warranty may be sent directly to Digital Processing Systems. To obtain service under this warranty, the purchaser must first contact the DPS customer service department in order to receive a return for repair authorization number. Purchasers should contact the appropriate repair location from those listed below:

- **Canada and International** (Country code) 905.944.4000
- **USA** (Country code) 859.371.5533
- **Europe** +44 1252 (outside the UK) or 01252 (inside the UK) followed by 718300
- **Asia - Pacific Rim** 61.2.9586.0088

Units returned for repair must display the return authorization number clearly on the packaging. Units shipped without an RMA number will not be accepted. Proof of purchase (including the date of purchase) and a detailed note describing the nature of the problem must be included.

IMPORTANT: When shipping your unit, pack it securely and ship it prepaid and insured. Digital Processing Systems will not be held liable for damage or loss to the product in shipment. Within the continental United States, repaired items will returned to the purchaser prepaid via a surface freight carrier of DPS' choice. If another method of shipping is desired, it must be clearly specified in writing and all priority return freight charges are the responsibility of the purchaser. Outside the U.S., return freight charges for repaired items will be the responsibility of the purchaser.

Appendix I: Compliance

FCC Compliance Statement

This device complies with Part 15 of the FCC rules.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received,

including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules provided that the ferrite beads accompanying this product are installed on the analog input and output audio connections. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

NOTE: In order for this equipment to comply with FCC regulations, the ferrite beads provided with this unit must be installed on the analog input and output audio connections.