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MOTOROLA COMMANDSTAR LITE™ INSTALLATION AND TROUBLESHOOTING MANUAL

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SEPTEMBER 2005

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ABOUT THIS MANUAL

The purpose of this manual is to help you install and troubleshoot the CommandSTAR Lite™. It is written for technicians who are responsible for the installation and troubleshooting of a CommandSTAR Lite system. It provides reference information for technicians and Motorola field support engineers and technicians.

This manual details generic installation techniques to assemble a CommandSTAR Lite and troubleshoot rapidly. This manual assumes that you are familiar with the tools, test equipment, the system architecture, and the configuration of your CommandSTAR Lite system.

UPDATES

This manual will be updated as new installation techniques are developed. If you can contribute to any technique that you feel should be included in this manual for the benefit of other users, please contact Motorola.

RELATED INFORMATION

Related manuals and reference material include:

- CommandSTAR Lite System Planner (R4-8-2000)
- *CommandSTAR Lite Operator Manual* (6880309J99)
- *CommandSTAR Lite System Database Manager Manual* (6880309K01)
- *Motorola R56—Standards and Guidelines for Communication Sites* (6881089E50); also available on CD-ROM (9882904Y01)

SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the product. Motorola assumes no liability for the customer's failure to comply with these requirements.

To minimize shock hazard, the console must be connected to an electrical ground. The equipment is supplied with a three-conductor AC power cable. This power cable must be plugged into an approved three-contact electrical outlet with the grounding wire (green) firmly connected to an electrical ground at the power outlet. The power cables meet International Electrotechnical Commission (IEC) safety standards. The chassis ground lead must be connected to the site ground.

Operating personnel must not open the console. Component replacement and internal adjustments required must be made by qualified maintenance personnel. Do not replace components with power cable connected. To avoid injuries, always disconnect power and discharge circuits before removing equipment shelves or making major modifications.

Do not attempt major component replacement or internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

Replacement of plug-in circuit modules in the console may be made without powering down of the system. However, this should only be done by qualified maintenance personnel.

This product contains CMOS and other circuit components which may be damaged by electrostatic discharge. Proper precaution must be taken when handling circuit modules. As a minimum, grounded wrist straps should be used at all times when handling circuit modules.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Contact an authorized Sales and Service Office for service and repair to ensure that safety features are maintained.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

The voltages employed in this equipment are sufficiently high to endanger human life. Every reasonable precaution has been observed in design to safeguard the operating personnel. Operating personnel should be prohibited from tampering with protective devices such as door switches. The power should be removed completely and the high voltage capacitors in power supplies discharged manually with a shorting bar before making internal adjustments.

GENERAL

CAUTION

This equipment complies with part 68 of the FCC rules. Under the console there is a label that contains, among other information, the FCC registration number and the ringer equivalence number (ren) for this equipment. If requested, this information must be provided to the telephone company.

The ring equivalent number (REN) is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

The REN of this unit is: 1.0 B for AC operation and 0.25 B for DC operation

Connector types used with this equipment:RJ11C/W

An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment has two lines that are designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant. See Installation Instructions for details. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of certified connector assembly (telephone extension cord).

If the terminal equipment (CommandSTAR Lite) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in it's facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Before installing this equipment, the user should ensure that it is permissible to be connected to the facilities of the local telecommunications company. This equipment cannot be used on public coin service provided by the telephone company. Connection to party line service is subject to state tariffs. (Contact the state public utility commission, public service commission, or corporation commission for information.)

If trouble is experienced with this equipment (CommandSTAR Lite), for repairs or warranty information, please contact:

Motorola Inc.
System Support Center
2214 Galvin Dr.
Elgin, IL 60123

800-221-7144
847-576-7300 (International calls)

The risk of electrical surges, like those produced by lightning transients, are very destructive to customer terminal equipment that is connected to AC power sources. For this reason, we recommend that the customer install an AC surge arrestor in the AC outlet to which an CommandSTAR Lite™ is connected.

This symbol on a Motorola product means the product should not be disposed of with household or business waste.

Do not dispose of any CommandSTAR Lite components or electrical accessories, such as microphones or headsets, with household or business waste. In some countries or regions, collection systems have been set up to handle waste electrical and electronic items. Please contact your regional authorities for more details. If no suitable scheme exists, you may return unwanted console components and electrical accessories to any Motorola Approved Service Centre in your region.

FOR CANADIAN USERS

NOTICE: The Industry Canada (IC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: You should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

The Load Number for the CommandSTAR Lite console is 4.6.

AVIS : L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. Toutefois, le Ministère n'assure pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il soit permis de le raccorder aux installations de l'entreprise locale de télécommunications. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. Dans certains cas, les fils intérieurs de l'entreprise utilisés pour un service individuel à ligne unique peuvent être prolongés au moyen d'un dispositif de raccordement homologué (cordon rallonge téléphonique interne). L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations. Actuellement, les entreprises de télécommunication ne permettent pas que l'on raccorde leur matériel à des jacks d'abonné, sauf dans les cas précis prévus par les tarifs particuliers de ces entreprises.

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur, ou à cause de mauvais fonctionnement.

Pour se protéger, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique d'es lignes téléphoniques et des canalisations d'eau métalliques (s'il y en a) soient raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

AVERTISSEMENT : L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours aux services d'un électricien.

L'indice de charge (IC) assigné à chaque dispositif terminal indique, pour éviter toute surcharge, le pourcentage de la charge totale qui peut être raccordée à un circuit téléphonique bouclé utilisé par ce dispositif. La terminaison du circuit bouclé peut être constituées de n'importe quelle combinaison de dispositifs, pourvu que la somme des indices de charge de l'ensemble des dispositifs ne dépasse pas 100.

L'indice de charge de la console CommandSTAR Lite est 4,6.

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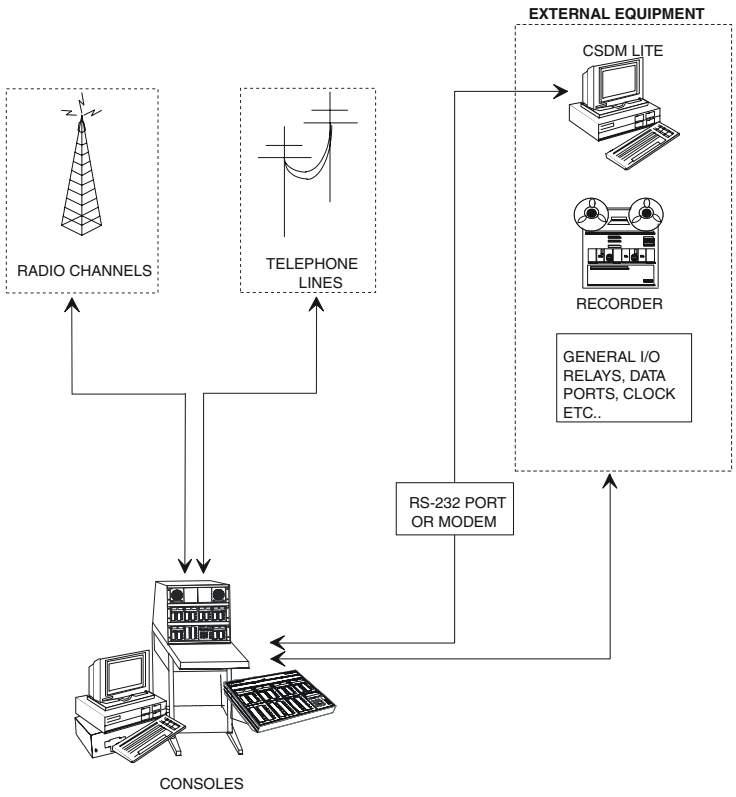
CHAPTER 1

SYSTEM OVERVIEW

THE COMMANDSTAR LITE

The CommandSTAR Lite is a digital, modular radio dispatch console that is entirely contained within a desktop unit (also available in rack-mountable form). It is designed to interface to up to eight channels and two telephone lines.

FIGURE 1-1 COMMANDSTAR LITE BLOCK DIAGRAM



Provision exists to connect an on-line CommandSTAR Lite System Database Manager (CSDM Lite) position that can be operated either locally or remotely over telephone lines.

The console electronic unit consists of processor modules to interface external analog circuits. The modules facilitate communications between console operators, radio channels, telephone lines, legal recorders, and any other external devices connected to the console.

The console equipment is entirely modular and configurable from the CommandSTAR Lite System Database Manager (CSDM Lite). The desktop and rack-mountable models include control modules equipped with push-buttons and LED indicators to provide user-friendly controls and indicators designed for high degree of operational ease and ergonomics.

CONSOLE ARCHITECTURE

The console architecture is such that the failure of one module does not result in a total failure, but only in the loss of use of the equipment associated with the defective module.

REFERENCE PART NUMBERS

TABLE 1-1 COMMANDSTAR LITE PARTS

MANUFACTURER PART NUMBER	MOTOROLA ORDER NUMBER	DESCRIPTION
3210739	DDN6125	110/220 VAC 50-60hz Power Supply for “A” version of Desktop model
3210820	DDN7243	110/220 50-60hz Power Supply for “A+B” version of Rackmount model and for “B+C” version of Desktop model
2260375	DDN6126	CommandSTAR Lite Main Board “A” version of Desktop model
2260411-4	DDN7457	CommandSTAR Lite Main Board “A” version of Rackmount model and for “B” version of Desktop model
2260411-20	DNN8362	CommandSTAR Lite Main Board “B” version of Rackmount model and for “C” version of Desktop model
3210718	DDN6127	Four-channel Expansion Module
3210725	DDN6137	Digital Radio Interface Module
3210537	TDN9897	DC Control Module for Four Channels
3210547	CDN6275	Two-CO (telephone) Line Module
3210502	CDN6179	I/O Box Module
3210709	DDN6128	I/O Box Module to CommandSTAR Lite Cable
3210592	CDN1304	I/O Box Module Expansion Cable (For 2-4 Modules)
3210337	DDN7130	I/O Box Module Power Suply Unit
3210868	DDN8250	I/O Shelf (Without Cable)
3210874	DDN8251	I/O Shelf Controller
3210875	DDN8252	I/O Shelf Module
3210709	DDN6923	I/O Shelf Cable
3210713	DDN6129	Keypad Control Module (KCM)
3210714	DDN6131	Dual Channel Control Module (DCCM) with Display
3210715	DDN6130	Dual Channel Control Module (DCCM) without Display
3210717	DDN6138	Digital Radio Control Module (DRCM)
3210716	DDN6132	Auxiliary Control Module (ACM)
3210556	TDN9894	Blank Cover Module
3210724	DDN6134	Select/unselect Speaker Module (Desktop)
3210779	DDN6696	Single Display Channel Control Module (SDCCM)

TABLE 1-1 COMMANDSTAR LITE PARTS

MANUFACTURER PART NUMBER	MOTOROLA ORDER NUMBER	DESCRIPTION
3220280	DDN6133	Speaker Module to Main Board Cable (Desktop)
3220316	DDN6135	Operator Control Modules Cable
3210564	CDN6181	25 Ft. Computer to CSDM Lite Cable (DB25 On PC)
3210565	CDN6182	25 Ft. Computer to CSDM Lite Cable (DB9 On PC)
3210774	DDN6697	Lite Rackmount Select Speaker Module
3210575	CDN1306	Lite Rackmount Unselect Speaker Module
2210244	DDN6698	Audio/Data Cable for Lite Rackmount Shelf
3210751	DDN6481	Protected Punch Block
3210577	CDN1299	Additional 19″ Lite Rackmount Frame

OPTIONAL CONSOLE ACCESSORIES

TABLE 1-2 CPTIONAL CONSOLE ACCESSORIES

Motorola Part Number	Description
HMN3000	Deskmic
TDN9941	Gooseneck Microphone
DDN6516	Headset Jackbox, 6-wire (black)
BLN7074	Headset Jackbox, 6-wire (gray)
CDN6282	Amplifier Module Base
CDN6297	Supra Monaural Headset
CDN6290	Supra Monaural Headset Noise Canceling
CDN6286	Encore Monaural Headset
CDN6293	Encore Monaural Headset-Noise Canceling
CDN6287	Encore Binaural Headset
CDN6294	Encore Binaural Headset-Noise Canceling
CDN6285	TriStar Headset
CDN6292	TriStar Headset-Noise Canceling
CDN6295	StarSet Headset
CDN6288	StarSet Headset-Noise Canceling

FIELD REPLACEMENT KITS

TABLE 1-3 FIELD REPLACEMENT KITS

Motorola Part Number	Description
DDN6249	Numbered Keypad Set
DDN6250	Removable Grey Keycap “SHIFT”
DDN6251	Elastomer for CCM
DDN6252	Elastomer for ACM
DDN6253	Elastomer for Keypad Module
DDN6254	Button Kit
DDN6255	Keypad Red Transmit Button
DDN6256	Channel Module Volume Knob
DDN6257	Speaker Volume Knob
DDN6258	Select/Unselect Speaker
DDN6259	Condenser Microphone with Cable
DDN6260	Fuse Kit

REPLACEMENT PART ORDERING

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part and sufficient description of the desired component to identify it.

Order parts from:

Parts Service Manager
Motorola Accessories and Aftermarket Division
2200 Galvin Dr.
Elgin, IL 60123

800-422-4210
847-538-8023 (International calls)

COMMANDSTAR LITE SPECIFICATIONS

TABLE 1-4 COMMANDSTAR LITE SPECIFICATIONS

GENERAL SPECIFICATIONS	
Dimensions:	Desktop = 7″ (18 cm) H x 18″ (46 cm) W x 13″ (33 cm) D [+ 4″(10 cm) for cabling] Rackmount console box = 3″ (8 cm) H x 17″ (43 cm) W x 11″ (28 cm) D [+ 4″(10 cm) for cabling]
Weight:	Max. 17 lb. (7.7kg)
Temperature Range:	32° to 122° F (0° C to +50° C)
Humidity:	95% at 122° F (50° C) (non-condensing)
Control Type:	16-bit Microprocessor
Audio Switch Type:	Time Division Multiplexing
Voice Digitization:	64 Kb µLAW PCM
Electrostatic Discharge Immunity:	15,000 volts on all exposed operator control areas. At 4kV no operation is disturbed and at 15kV no permanent failures.
Flammability:	All plastic parts used in operator controls comply with UL 94V-0 flammability standards.

TABLE 1-4 COMMANDSTAR LITE SPECIFICATIONS (CONTINUED)

Line Protection:	Fast-acting solid-state surge protection.
Memory Protection:	Settings preserved in non-volatile memory.
Maximum number of remote:	10 parallel units
END-TO-END SPECIFICATION	
Frequency Response:	300 to 3300 Hz +1, -3 dB @ less than 2% distortion.
Hum and Noise:	65 dB below rated output at any port.
Cross Talk:	Less than -65 dB at 0 dBm transmit level.
Level Control:	Digital Automatic Gain Control (AGC)-Gain adjustment performed through Digital Signal Processors (DSPs). Gain will not increase in the presence of noise or the absence of voice. Constant output (less than 3 dB change) for all voice input levels over the rated range: Microphone: -60 to -22 dBm; Receive line: -40 to +11 dBm
BASE STATION CONTROLS	
Channel Control:	Each channel can be separately configured for Local, E&M, Tone, or DC control.
Tone Control:	Guard tone and one function tone in the 300 to 3300 Hz range, frequency adjustable in 0.1 Hz increments. Total tone duration adjustable from 0 to 60000 ms in 1 ms increments. Parallel status update on function tones (550 to 2050 Hz in 100 Hz increments). Guard tone configurable for 2100 Hz, 2175 Hz, 2300 Hz, or 2325 Hz.
DC Control:	125 VDC. Positive and negative currents (0.5 to 12.5 mA in 0.5 mA increments). Maximum loop resistance including base station termination: 10K ohms.
TRANSMIT LINE OUTPUTS	
Line Output:	Adjustable from -40 to +11 dBm.
Output Impedance:	600 ohm or 10K ohm
RECEIVER LINE INPUTS	
Receive Sensitivity:	Adjustable from -40 to +11 dBm.
Call Light Sensitivity:	Adjustable from -5 to –32 dB, per receive sensitivity.
Line Balance:	60 dB @ 1004 Hz.
Input Impedance:	600 ohm or 10K ohm.
Line Input (for IRR)	High impedance (>10K ohm)

TABLE 1-4 COMMANDSTAR LITE SPECIFICATIONS (CONTINUED)

OTHER AUDIO PORTS	
Recorder Port (per channel):	The output shall consist of summed transmit/ receive audio of the channel with a 2175 Hz filter. The output level shall be programmable from -40 to +11 dBm into 600 ohm.
Recorder Port (per console):	The output shall consist of mixed selected receive audio (telephone and radio) and the operator's transmit audio. A fix nominal output of –10dBm into 600 ohm.
Aux./Paging Input:	Adjustable from -40 to +11 dBm, balanced 600-ohm input.
AUDIO CONTROLS	
Individual Volume:	0 to -21 dB in 8 discrete 3 dB steps. Muting configurable for -24 dB or full mute.
All Mute:	24 dB or full muting of unselected channels with timer programmable from 1 to 120 seconds or for infinite duration.
STATUS OUTPUTS AND INPUTS	
Panel Indicators:	Solid state LED indicators. Red, yellow, green depending on function.
PTT relay:	Form A dry closure. 150 mA max. or 60 VDC max. Switching power 3 watts max.
Auxiliary Outputs (I/O Module):	Form C dry closures. 150 mA max. or 60 VDC max. Switching power 3 watts max.
Auxiliary Inputs (I/O Module):	Opto-coupled inputs, 5K ohm impedance, 5 to 20 mA input current, unbalanced.
POWER SUPPLY	
AC Input Voltage:	110-240 VAC, 6A max.
Input Frequency:	50/60 Hz, +/- 3Hz
Power Output:	110 watts max.
DC Outputs:	V1 +5 VDC @ 10 amps V2 -5VDC @ 1.0 amp V3 +12 VDC @ 5.0 amps V4 -12VDC @ 1.0 amp
Agency Approvals	UL (Underwriters Laboratories) CSA (Canadian Standards Association) CE Mark (Conformité Européenne)

Specifications subject to change without notice.

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CHAPTER 2

SITE PREPARATION

For the equipment to perform reliably and safely, certain requirements regarding the site preparation must be met according to the equipment specifications. These requirements may affect new construction or require modification of an existing site. This chapter is a review of site related topics to minimize the problems at the time of installation and with the future operation of the system.

ENVIRONMENTAL PREPARATION

The equipment specification states a minimum requirement for the control of operating ambient temperature and humidity. Confirm with the site architect that the additional air conditioning load is accommodated.

- Operating temperature: 32º to 122º F (0º to 50º C)
- Operating humidity: 95% relative humidity, without condensation

Do not install the system under the following conditions:

- Extremely high or low temperature or extremely high or low humidity
- Areas of high dust concentration
- Areas of extreme vibration
- Areas of high Electromagnetic Interference (see “Electromagnetic Interference (EMI) and Shielding” on page 2-4) and Radio Frequency Interference (RFI)

POWER SUPPLY

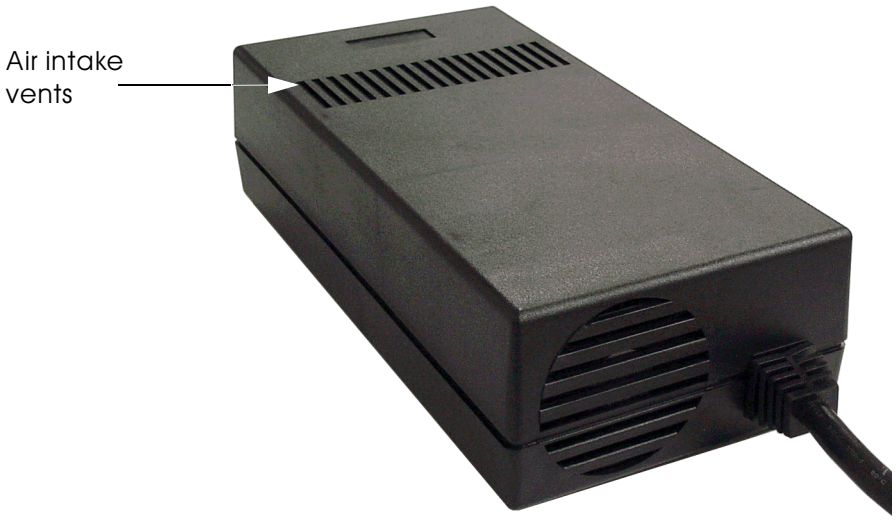
The power to each console is supplied through a single 115 or 220 VAC power supply. The total power requirements for the system components depend largely on the specific configuration.

If an Uninterruptable Power Supply (UPS) is used with the system, confirm with the site architect that the power required by the system, when added to all the other systems to be connected, does not exceed the rated capacity of the UPS. In general, the CommandSTAR Lite system does not require more than 720 Watts. Refer to the configuration report produced by the CSDM Lite to obtain the site-specific power requirements.

The power supplies of all CommandSTAR Lite equipment are electrically isolated between input and output; however, for safety reasons, the chassis ground is connected to the ground wire in the AC power cable.

The power supply unit has air intake vents on the top for cooling, as shown in Figure 2-1. It is important that air is able to circulate freely around these vents.

FIGURE 2-1 COMMANDSTAR LITE POWER SUPPLY UNIT



CAUTION

When installing the CommandSTAR Lite console, care must be taken to ensure that the air intake vents of the power supply unit do not become blocked. Failure to do so could result in overheating.

GROUNDING

Proper grounding of the system is important for human safety, equipment protection and quality of system performance. Ground lugs are provided on all CommandSTAR Lite systems to ensure adequate protection.

The potential hazards of human and equipment damage require that the ground system provide protection from electrostatic discharge (ESD), lightning strikes and power failures.

The quality of system performance is enhanced by minimizing noise and crosstalk due to power, and ground voltages added to the signals.

See Sections 6 and 7 of the *Motorola R56—Standards and Guidelines for Communications Sites* for internal and external grounding specifications.

POWER GROUND WIRING

The voltage and current capacity of power systems make human contact dangerous. Power system wiring and components can fail in such a manner that the cabinets housing the equipment become live and dangerous to touch. For safety reasons, all equipment cabinets are connected to a power system ground.

Signal cable shields are connected to ground at only one end of the cable for safety, to decrease chances of creating ground loops, thereby preventing current flow in the shield. The end that should be grounded will be specified in the site specific wiring details in the appendix.

See Sections 6, 7 and 8 of the *Motorola R56—Standards and Guidelines for Communications Sites* for internal and external grounding specifications, and AC power distribution.

ELECTROSTATIC DISCHARGE (ESD)

All objects, including the human body, collect charge due to air movement, friction or electrical fields. The charge collected results in a voltage difference between itself and other objects from which it is insulated. Connecting charged objects together may result in a flow of current between the objects until they are all at the same voltage. This process is referred to as electrostatic discharge (ESD).

ESD currents can damage electronic components. With large structures and charges, ESD can be dangerous for humans. A charge build-up is prevented by connecting objects together with a conducting path, keeping all the objects at the same voltage potential. The conducting path is usually a ground path. When packaging, installing or when handling electronic modules, the personnel involved must be connected to ground with an ESD strap.

See Section 11.9 of the *Motorola R56—Standards and Guidelines for Communications Sites* for more detailed information.

ELECTROMAGNETIC INTERFERENCE (EMI) AND SHIELDING

The presence of electromagnetic fields will induce unwanted signals and noise into the equipment wiring and electronics. This phenomenon is called Electromagnetic Interference (EMI). Possible sources include power transmission lines; radio transmitters, television, radar and microwave communication sites; hospital X-rays and other imaging or treatment equipment and even elements of the radio system itself.

Non-linear devices used in electronics are capable of rectifying or demodulating strong pickups in the analog portions of the system. The result of this interference is audio noise, hum or unwanted external audio.

The proximity of the system installation to sources of interference should be investigated prior to installation.

Shielding of external audio circuits twisted pairs is usually not required in balanced applications. Digital data circuits are usually shielded for regulatory and/or performance reasons. These special shielding requirements apply to RS-232, RS-422, Ethernet and other equipment of similar applications. Consult Motorola engineering for application requirements.

See Section E-1 of the *Motorola R56—Standards and Guidelines for Communications Sites* for more detailed information.

INTERFACE PROTECTION

The engineering design of the CommandSTAR Lite equipment employs several methods for minimizing problems due to grounding and other faults in equipment connected externally.

All analog audio circuits such as telephone inputs/outputs and CommandSTAR Lite equipment uses transformer coupling. Transformer coupling disconnects any external audio ground, eliminating common mode noise due to ground loops. It also minimizes the risk of equipment damage from common mode (between wire and ground) high voltage transients. Differential transients (between two wires) are also inhibited from doing damage by using transient suppressors connected across the secondary of the transformer.

All discrete (ON/OFF switch) inputs to CommandSTAR Lite use optical couplers. These devices convert current to light that is detected by a light sensitive diode without electrical contact with the input circuit. This device similarly disconnects any source ground.

All analog audio inputs to the system are converted to digital format for processing and switching. This method of handling audio minimizes crosstalk due to ground loops and other mechanisms within the electronic equipment.

INTERFACE WIRING

Wiring connections between the Motorola system and customer equipment are made via a cross-connect block. Typically, a cross-connect block is an equipment frame or cabinet that houses terminal strips, connectors and jack fields as required.

As an alternative, the system can be wired first to an intermediate surge-protected cross-connect or local surge-protected cross-connect block, that is then wired to a main cross-connect. All external equipment are usually wired to their own intermediate cross-connect block, then to the same main cross-connect clock. Systems are interconnected at the main cross-connect. Bridging clips and jack fields may be provided at the main cross-connect to allow for the easy separation of systems for troubleshooting and maintenance.

Planning for the installation must include additional space requirements for cross-connect facilities, cable trays, conduits, floor and wall passages and worker access. A drawing should be prepared to show and label all locations of equipment, cable trays, cable routes, cross-connects, power supplies and grounding. The wiring tables describe the detailed connections of all circuits installed.

See Section 5 of the *Motorola R56—Standards and Guidelines for Communications Sites* for site design information.

FIRE PROTECTION

Lightning or power transients can cause fires not preventable by circuit breakers and fuses. Clean agent fire extinguishing systems are preferred for the protection of fires caused by electrical equipment failures. The instant and dry operation of these systems confines damage to the faulted equipment. Sprinklers, though required in most buildings, will cause considerable damage to the equipment installation. Clean agent extinguishing systems will respond before sprinklers and usually prevent any equipment fire from reaching a magnitude otherwise possible with other systems.

See Section 5 of the *Motorola R56—Standards and Guidelines for Communications Sites* for fire protection information.

LIGHTNING PROTECTION

Lightning protection should be implemented at the point of entry of the building. Severe damage can result to a building and electronic equipment if lightning protection is done only at the equipment level.

See Section 6 of the *Motorola R56—Standards and Guidelines for Communications Sites* for more detailed information.

CHAPTER 3

INSTALLING THE COMMANDSTAR LITE CONSOLE

This chapter describes the installation procedures for the CommandSTAR Lite consoles. Before installing the system, you must read the handling instructions regarding protection against ESD and the site preparation described in Chapter 2, “Site Preparation.”

INTRODUCTION

The site-specific CommandSTAR Lite Configuration Manual should be used with this chapter as it specifies the quantity of hardware supplied, defines the console layouts, provides the cross-connection details from the CommandSTAR Lite to the customer cross-connect block, identifies the software package version and more.

DESKTOP INSTALLATION

The Desktop installation is much simplified in the fact that the Desktop console is shipped completely assembled as ordered by the customer. The Desktop installation consists of:

- Placing the Desktop consoles on a desk or a table
- Connecting to the peripheral equipment (jackboxes, microphone, operator headset and others) to the consoles

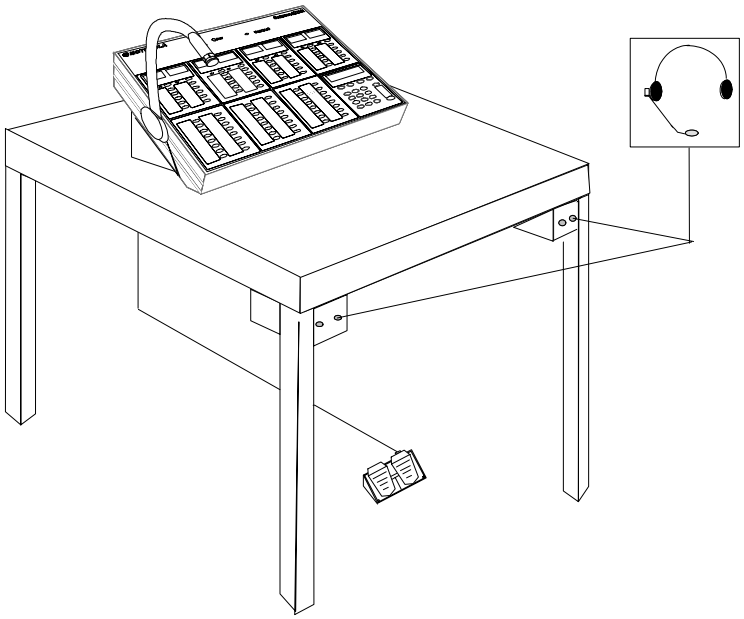


FIGURE 3-1 TYPICAL DESKTOP CONSOLE LAYOUT

RACKMOUNT INSTALLATION

The Rackmount console is characterized by rack-mounted control modules installed on a standard 19-inch EIA-size cabinet as shown in Figure 3-2. The CommandSTAR Lite main board and any optional modules are located in a rackmount box, typically located either horizontally beneath the Master frame or at the bottom of the console on end as a free-standing tower.

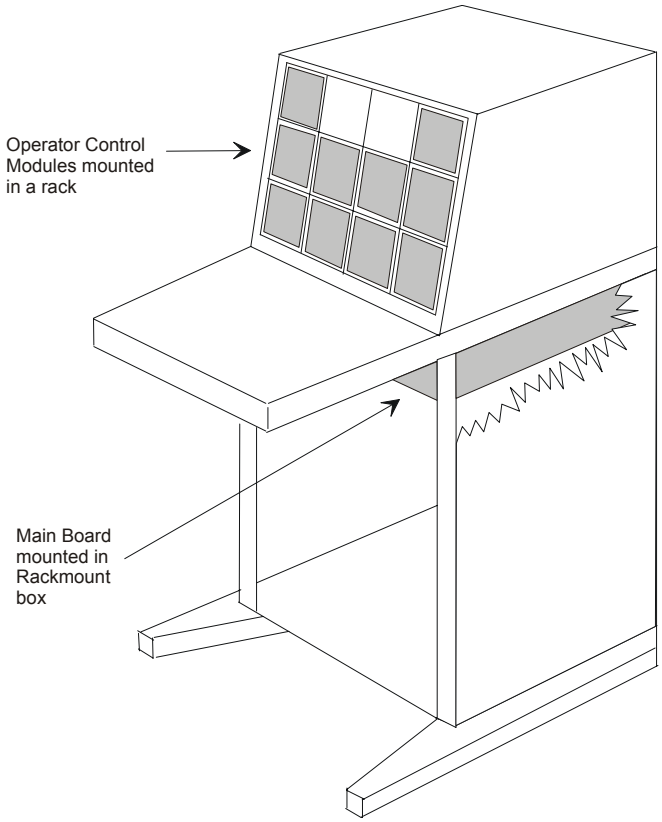


FIGURE 3-2 TYPICAL RACKMOUNT CONSOLE

MODULE INSTALLATION

The modules are shipped already mounted as part of a Master frame (3210775) or an Additional frame (3210577). Figure 3-3 shows a typical fully configured Rackmount using different frames.

WARNING

Before removing or replacing an operator module in a desktop or a rackmount, make sure the power is turned off. Failure to shut down the power may result in permanent damage to the modules.

NOTE

Constraints of power distribution and cable length limit the placement of operator control modules to the Master frame and the first Additional frame only. The second Additional frame is reserved for speakers, although the speakers can be moved to the Master frame or the first Additional frame if there are fewer than eight (8) operator control modules.

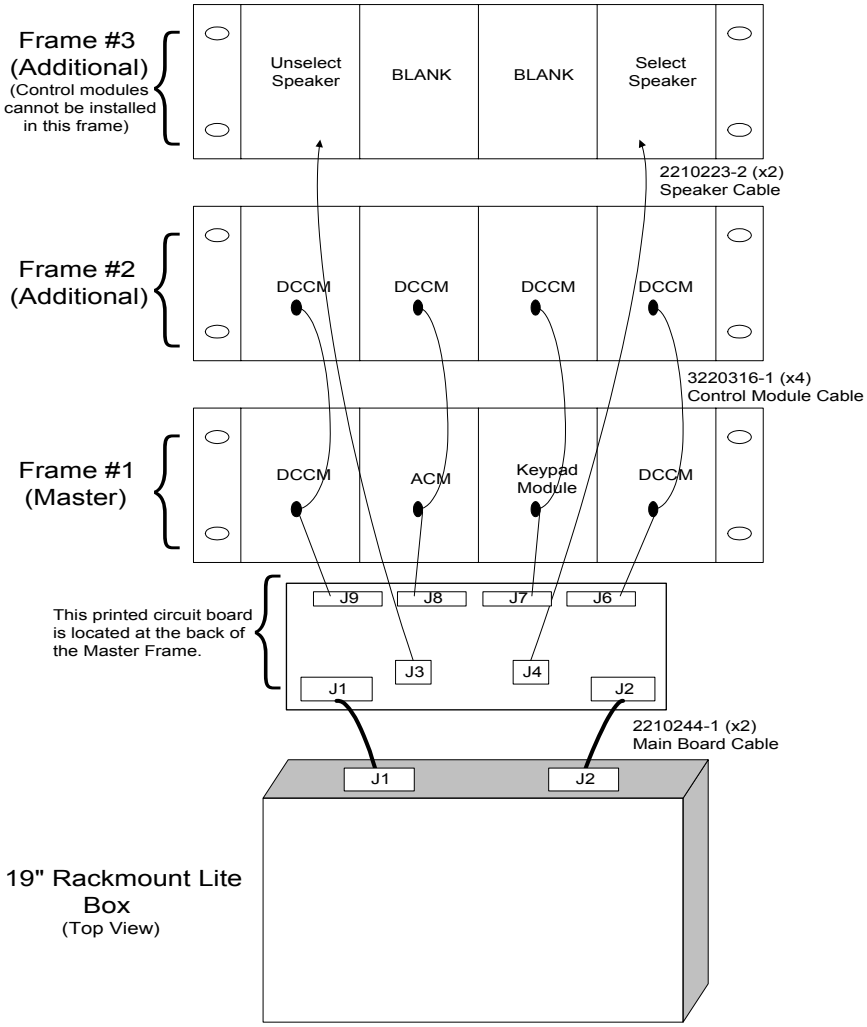


FIGURE 3-3 COMMANDSTAR LITE RACKMOUNT CONSOLE (BACK VIEW)

To install the operator control modules in racks:

PROCEDURE 3-1 HOW TO INSTALL THE OPERATOR CONTROL MODULES IN RACKS

1	Refer to your Configuration Manual or consult the site manager for the precise mounting location of each frame in the appropriate position.
2	Insert the clips shown in Figure 3-4 to line up with the holes in the console furniture. **NOTE** When installing the frames in Centracom console furniture, blocks must be inserted behind the side of the frame to make the side of the Centracom console level across the width of the mounting area. These blocks are generally made of Bakelite and the back is equipped with a tab that can be peeled-off to reveal a sticky surface. The spacing blocks can be glued to the Centracom mounting surface to assure a firm, even surface to mount the frame.
3	Align the frame with the appropriate holes in the console furniture.
4	Tighten the screws supplied with the frame to the console furniture. Make sure that you do not overtighten the screws as this might damage and distort the side of the frame.
5	Push the screw cover over the top of the screws to cover the screws.
6	Repeat steps 2-5 for the remaining frame(s).

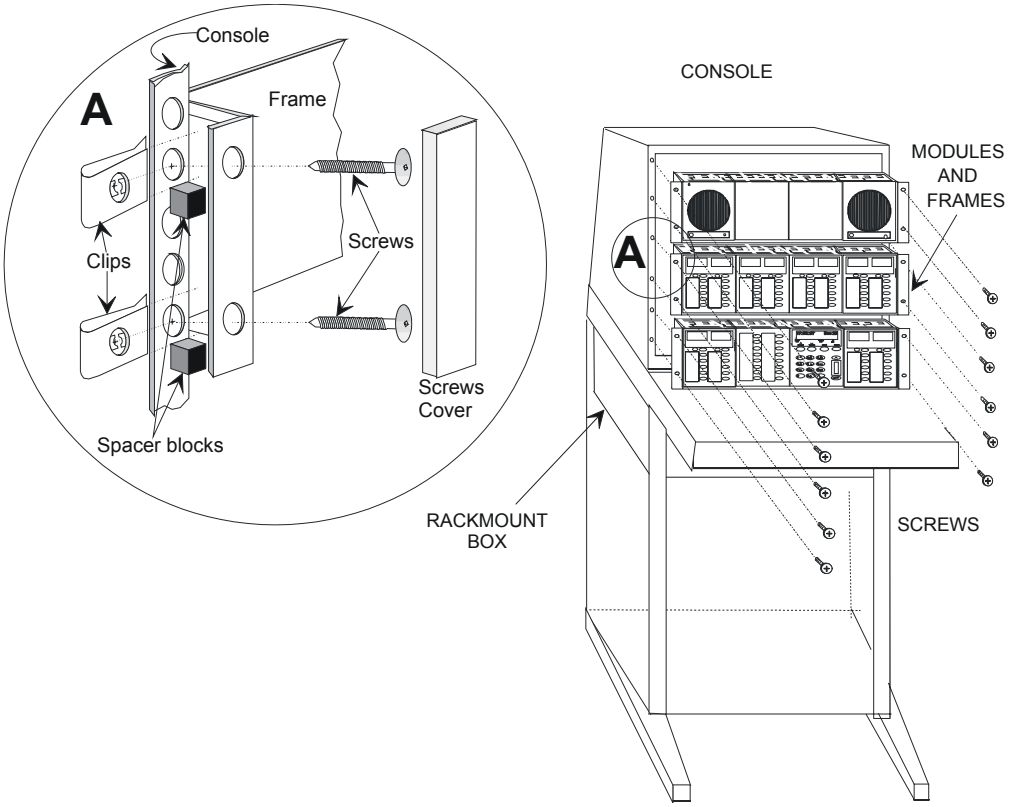


FIGURE 3-4 CONSOLE FRAME MOUNTING PROCEDURE

Using the flat, ribbon cables (3220316) supplied with your system, connect each the operator control module (maximum of four modules per frame) on the Additional frame to one end of the cable, connect the middle connector to the operator control module directly below it on the Master frame, then connect the other end of the cable to the connector (J6–J9) directly below it on the printed circuit board at the back of the Master frame. Refer to Figure 3-3 on page 3-5 for a detailed view.

WARNING

Do not connect any operator modules while power is on. This may permanently damage the LED display on the modules.

Normally, the Select and Unselect speakers are assembled as part of an Additional frame. It is a good practice, however, to assure that the connections to both speakers are properly established.

Make sure that the Select speaker is connected to J4 of the printed circuit board at the back of the Master frame using a speaker cable (2210223). The Unselect speaker should be connected to J3 on the same board using the same type of cable. Refer to Figure 3-3 on page 3-5 for a detailed view.

The rackmount box containing the CommandSTAR Lite circuitry comes with four L-brackets. Two L-brackets may be used to attach the rackmount box securely to the rack in a horizontal orientation (See Figure 3-5) or four brackets may be used as stabilizers to permit the box to stand vertically on one end like a tower (See Figure 3-6).

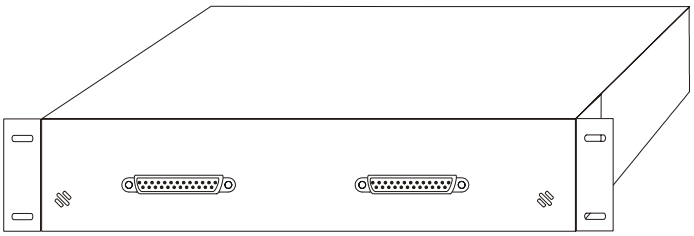


FIGURE 3-5 RACKMOUNT BOX IN HORIZONTAL ORIENTATION

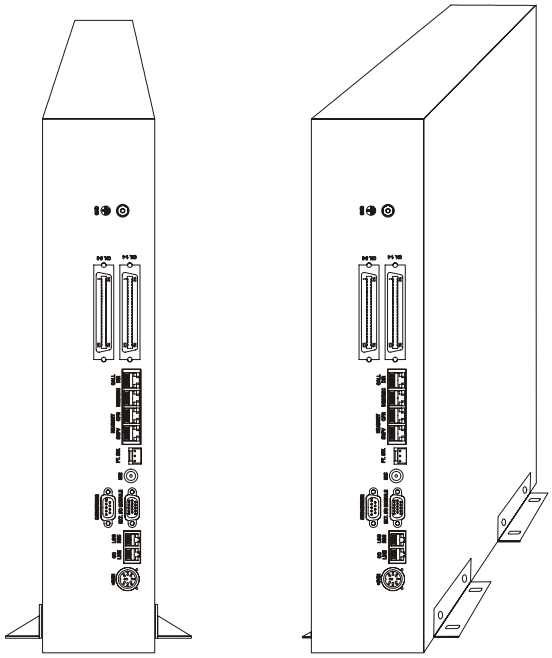


FIGURE 3-6 TWO VIEWS OF RACKMOUNT BOX IN VERTICAL ORIENTATION

The following peripheral equipment may be connected directly to the console back panel:

- Power cable
- Telephone line
- Instant logging recorder

- CSDM Lite
- I/O module
- PTT footswitch
- Gooseneck microphone
- Supervisor headset
- Operator headset
- Deskmic
- Call Director
- Punch-block cables for access to radio channels
- Ground

Peripheral equipment is connected to the back panel of the console located at the lower rear panel. Table 3-1 describes the function of each connector on the back panel. See Figure 3-7 on page 3-10 and Figure 3-4 on page 3-7 for a view of the equipment that may be connected and to see the back panel with connections.

TABLE 3-1 CONSOLE INTERFACE DESCRIPTION

Connector Name	Interface Description
+5 V IN	Connection for the power cable.
CO LINE	Connection for two (2) telephone lines.
LOG REC	Connection for the instant logging recorder.
CSDM/RS232	Connection for the CSDM Lite, serial printer, WWWB receiver, or external paging encoder.
EXT. I/O MODULE	Connection for an I/O Module.
MIC	Connection for a gooseneck microphone.
FT SW	Connection for a PTT Footswitch.
SUPV	Connection for a supervisor headset jackbox.
OPR	Connection for an operator headset jackbox.
DESKMIC	Connection for a desktop microphone jackbox.
CALL DIR	Connection for the Call Director.
CH 1-4	Connection to the punch block for radio channels 1 to 4.
CH 5-8	Connection to the punch block radio channels 5 to 8.
GND	Connection to site ground.

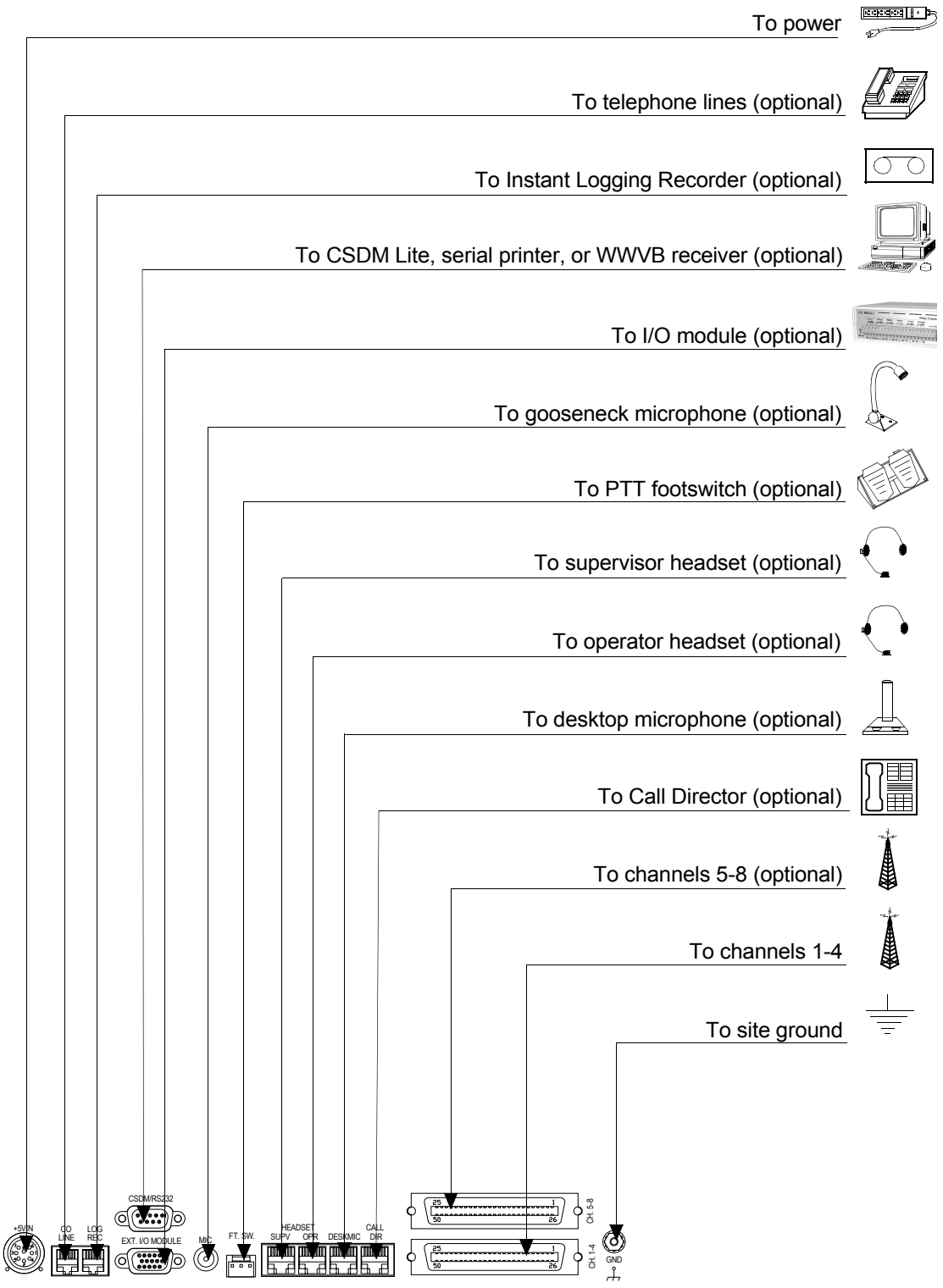


FIGURE 3-7 MAIN CONSOLE BACK PANEL CONNECTIONS (ALL MODELS)

EQUIPMENT ADJUSTMENT

Each CommandSTAR Lite console is shipped with the microphone sensitivity adjusted for the standard audio accessories used under normal conditions. Should the microphone sensitivity require adjustment, use the following procedure.

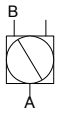
WARNING

These adjustments are potentially dangerous procedures. Excessively high gain may cause distortion and/or output amplifier saturation. When adjusting potentiometers, you should verify that the resultant quality of the audio signal default values are not exceeded.

OPERATOR HEADSET MICROPHONE SENSITIVITY ADJUSTMENT

The sensitivity can be adjusted using potentiometer R28 on the console main board.

To adjust the operator headset microphone sensitivity:



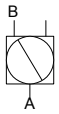
PROCEDURE 3-2 HOW TO ADJUST THE OPERATOR HEADSET MICROPHONE SENSITIVI

1	Use the multi-meter to measure the resistance between the single pin on the bottom (side nearest the back panel) of R28 and the left-most pin on the top (side farthest from the back panel) of R28.
2	Rotate R28 to adjust the value. **Result:** The lower the value is, the higher the gain. The default value for R28 is 16.3 K ohms.

SUPERVISOR HEADSET MICROPHONE ADJUSTMENT

The sensitivity can be adjusted using potentiometer R34 on the console main board.

To adjust the supervisor headset microphone:



PROCEDURE 3-3 HOW TO ADJUST THE SUPERVISOR HEADSET MICROPHONE

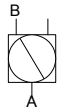
1. Use a multi-meter to measure the resistance between the single pin on the bottom (side nearest the back panel) of R34 and the left-most pin on the top (side farthest from the back panel) of R34.
2. Rotate R34 to adjust the value.

   Result: The lower the value is, the higher the gain. The default value for R34 is 16.3 K ohms.

CALL DIRECTOR AUDIO INPUT ADJUSTMENT

The sensitivity of the Call Director's carbon interface can be adjusted using potentiometer R22 on the console main board.

To adjust the call director audio input:



PROCEDURE 3-4 HOW TO ADJUST THE CALL DIRECTOR AUDIO INPUT

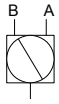
1. Use a multi-meter to measure the resistance between the single pin on the bottom (side nearest the back panel) of R22 and the left-most pin on the top (side farthest from the back panel) of R22.
2. Rotate R22 to adjust the value.

   NOTE
   The lower the value is, the higher the gain. The default value for R22 is 4.92 K ohms.

INTERNAL MICROPHONE ADJUSTMENT

The sensitivity can be adjusted using potentiometer R140 on the console main board.

To adjust the internal microphone:



PROCEDURE 3-5 HOW TO ADJUST THE INTERNAL MICROPHONE

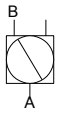
1. Use a multi-meter to measure the resistance between the two pins on the top (side nearest the back panel) of R140.
2. Rotate R140 to adjust the value.

   NOTE
   The lower the value is, the higher the gain. The default value for R140 is 8.14 K ohms.

GOOSENECK MICROPHONE SENSITIVITY ADJUSMENT

The sensitivity can be adjusted using potentiometer R96 on the console main board.

To adjust the gooseneck microphone sensitivity:



PROCEDURE 3-6 HOW TO ADJUST THE GOOSENECK MICROPHONE

1. Use a multi-meter to measure the resistance between the single pin on the bottom (side nearest the back panel) of R96 and the left-most pin on the top (side farthest from the back panel) of R96.

2. Rotate R96 to adjust the value.

NOTE

The lower the value is, the higher the gain. The default value for R96 is 16.4 K ohms.

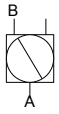
NOTE

You can only connect one (1) gooseneck or one (1) deskmic at a time, not both.

DESKMIC SENSITIVITY ADJUSTMENT

The sensitivity can be adjusted using potentiometer R18 on the console main board.

To adjust the deskmic sensitivity:



PROCEDURE 3-7 HOW TO ADJUST THE DESKMIC

1. Use a multi-meter to measure the resistance between the single pin on the bottom (side nearest the back panel) of R18 and the left-most pin on the top (side farthest from the back panel) of R18.

2. Rotate R18 to adjust the value.

NOTE

The lower the value is, the higher the gain. The default value for R18 is 10 K ohms.

For information on adjusting audio input levels, see the section on radio channel configuration in Chapter 4 of the *CommandSTAR Lite System Database Manager Manual* for RX Level, RX detect threshold, and RX hangover delay settings. Typical settings are: RX Level = –10 dBm, RX detect threshold = –29 dB, and RX hangover delay = 2000 ms.

HEADSET JACKBOX INSTALLATION

To install the headset jackbox:

PROCEDURE 3-8 HOW TO INSTALL THE HEADSET JACKBOX

1	Before installing the operator headset jackbox, consult the site manager for the precise location of the jackbox then measure the cable length for the Desktop-to-operator jackbox path.
2	If applicable, before installing the supervisor headset jackbox, consult the site manager for the precise location of the jackbox then measure the cable length for the Desktop-to-supervisor jackbox path.
3	Install the operator and/or supervisor headset jackbox (Figure 3-8) in the location designated by the site manager. Ensure that the cable length is adequate to connect to the console electronics before mounting. Figure 3-1 on page 3-2 shows a typical table installation.

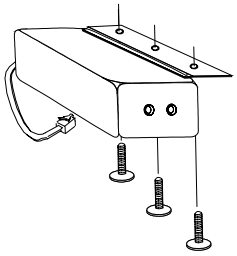


FIGURE 3-8 INSTALLING THE HEADSET JACKBOX (BLN7074)

MODIFYING A SIX-WIRE JACKBOX FOR USE WITH 4-WIRE HEADSETS (BLN7074)

Some models of headset jackbox (e.g., BLN7074) are equipped to handle a headset that has its own PTT button. These headsets and jackboxes use six (6) wires rather than four (4). When a four-wire headset (without a PTT button) is plugged into one of these jackboxes, the headset microphone transmits continuously on the selected channel.

To modify such a jackbox to work with a four-wire headset:

PROCEDURE 3-9 HOW TO MODIFY A SIX-WIRE JACKBOX

1	Open the jackbox cover.
2	Cut the RED wire and the jumper wire as shown in Figure 3-9 on page 3-15.
3	Close the jackbox cover.

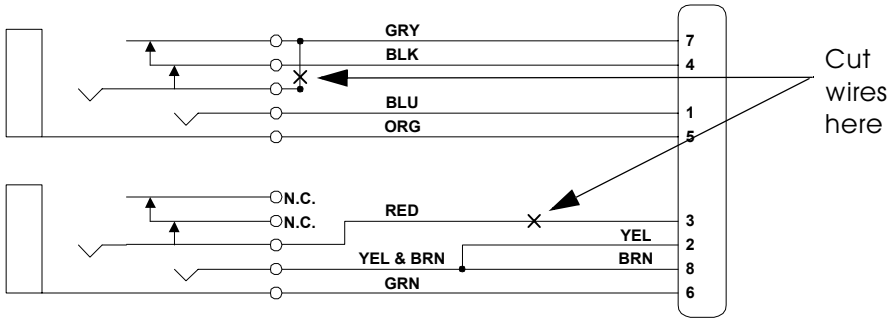


FIGURE 3-9 MODIFYING A SIX-WIRE JACKBOX (BLN7074)

INSTALLING THE HEADSET JACKBOX (DDN6516)

To install the headset jackbox:

PROCEDURE 3-10 HOW TO INSTALL THE HEADSET JACKBOX

1	Before installing the headset jackbox, consult the site manager for the precise location of the jackbox then measure the cable length for the desktop-to-operator jackbox path or, if applicable, the desktop-to-supervisor path. The cable length must not exceed six (6) feet.
2	Install the operator or supervisor headset jackbox in the designated location using the four (4) mounting tabs. The tabs will accommodate up to a #8 screw (not supplied).

CONNECTING TO A COMMANDSTAR LITE CONSOLE

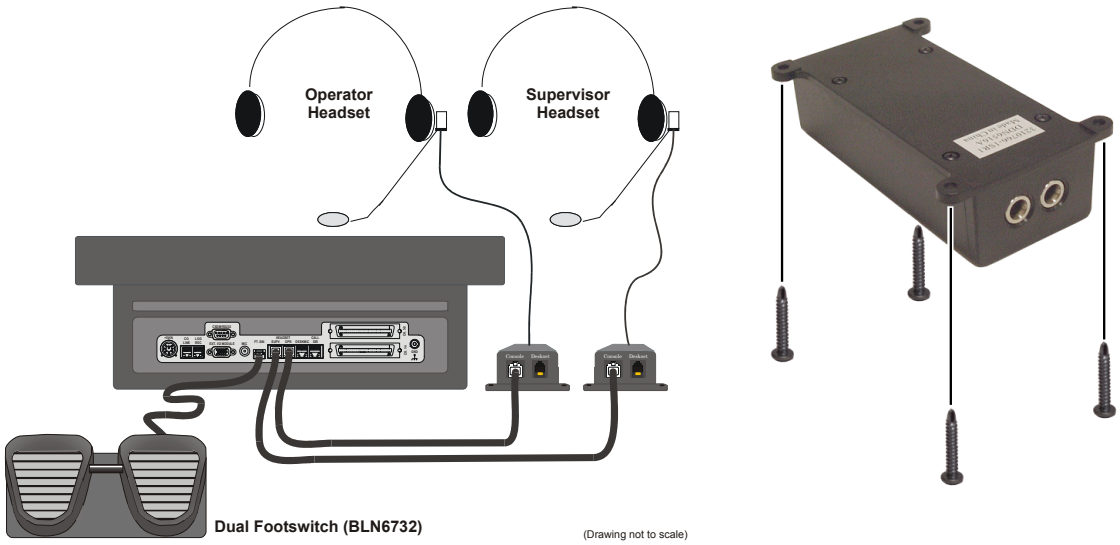


FIGURE 3-10 CONNECTING THE JACKBOX TO THE COMMANDSTAR LITE(DDN6516)

To connect the jackbox to the CommandSTAR Lite console:

PROCEDURE 3-11 HOW TO CONNECT THE JACKBOX TO THE COMMANDSTAR LITE

1	Prepare a cable as shown in Figure 3-11 or use a standard LAN cable (CAT5). The cable length must not exceed six (6) feet.
2	Plug one end of the cable into the connector on the jackbox labelled **Console** and plug the other end into either the connector on the console labelled **OPR** or the one labelled **SUPV**, as shown in Figure 3-4 on page 3-7.

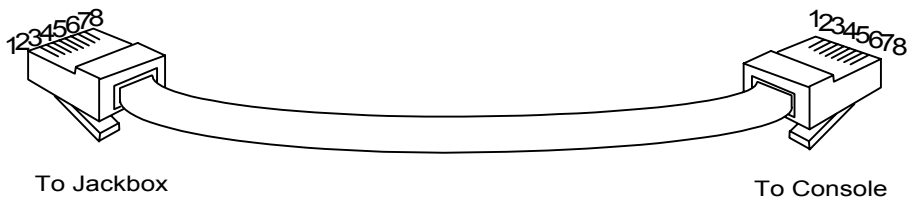


FIGURE 3-11 JACKBOX-TO-CONSOLE CABLE

MODIFYING A SIX-WIRE JACKBOX INTO A FOUR-WIRE JACKBOX (DDN6516)

This headset jackbox is equipped to handle a headset that has its own PTT switch. These headsets use six (6) wires rather than four (4) wires. When a four-wire headset (without a PTT switch) is plugged into an unmodified jackbox, the headset microphone transmits continuously on the selected channel.

	S1	S2
6-wire (default)	IN	IN
4-wire	OUT	OUT

To modify the jackbox to work with a four-wire headset:

PROCEDURE 3-12 HOW TO MODIFY THE JACKBOX TO WORK WIH A FOUR-WIRE HEADSET

1	Open the jackbox cover. Use a Phillips screwdriver to remove the four (4) screws in its base.
2	Carefully separate the top and bottom covers by unplugging the two plastic connectors.
3	Use a Phillips screwdriver to remove the two (2) screws holding the PC board to the jackbox housing.
4	Cut the wire for jumpers S1 and S2 (circled in Figure 3-12).
5	Replace the PC board and reconnect the two small connectors.
6	Close the jackbox cover and replace the screws.

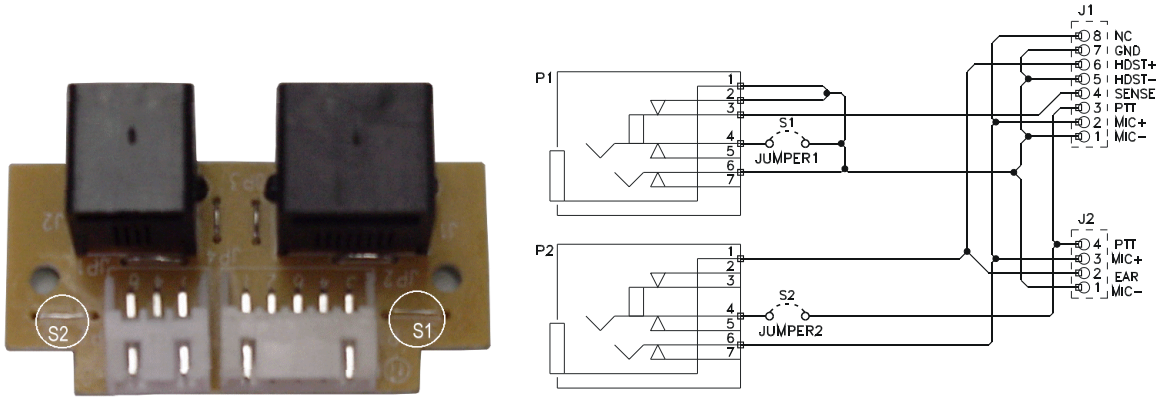


FIGURE 3-12 SIX-WIRE TO FOUR-WIRE JACKBOX SCHEMATIC WITH PIN-OUT; LEFT GRAPHIC CONNECTORS, IN ORDER: DESKSET (J2) AND CONSOLE (J1)

In order to support the go-ahead tone feature of trunked radio, a full-duplex, four-wire circuit must be used.

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CHAPTER 4

CONSOLE-TO-CSDM LITE INTERCONNECTION

This chapter provides installation information regarding CSDM Lite-to-console interconnection.

INTRODUCTION

The CSDM Lite is used for reconfiguring consoles, logging events for analysis and archiving, monitoring built-in tests for maintenance and reliability, and upgrading to a new release of software.

The main components of the CSDM Lite are:

- CSDM Lite software
- Intel PC or equivalent with 300 MHz processor
- Windows XP Professional
- Super VGA or higher video card capable of 800 x 600 resolution
- CD-ROM or DVD-ROM
- Mouse and keyboard
- Hard disk (2.0 GB minimum)
- 128 MB RAM
- Printer port
- COM port

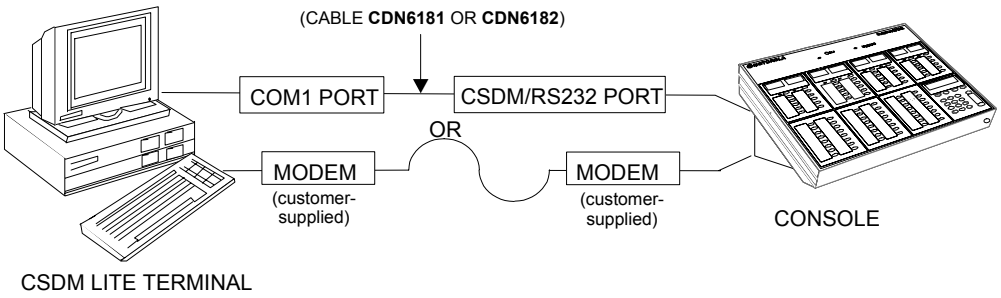

FIGURE 4-1 CSDM LITE-TO-CONSOLE CONNECTION

The CSDM Lite must be physically connected to the console you wish to reconfigure, monitor, or test.

The CSDM Lite and the console are connected with a cable equipped with a DB9 connector at both ends or a DB9 at the console end and a DB25 at the PC end. The pinout connections are given below.

TABLE 4-1 RS-232 CONNECTOR PINOUTS

Function	DB9 Console Side	Color	DB9 PC Side	DB25 PC Side
RX	3	Yellow	2	3
TX	2	Green	3	2
GND	5	Red	5	7

Figure 4-2 shows the DB9 to DB9 cable that connects between the console and the PC.

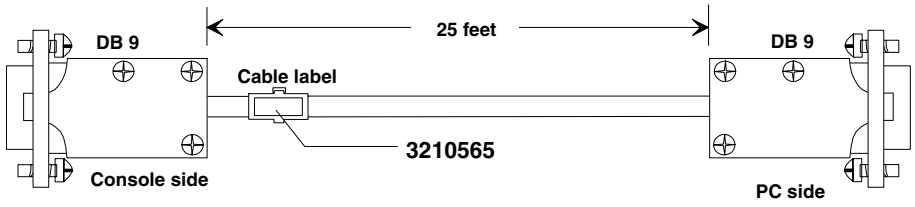

FIGURE 4-2 DB9 TO DB9 CONNECTORS AND CABLE FROM CONSOLE TO PC (CDN6182)

Figure 4-3 shows the DB9 to DB25 cable that connects between the console and the PC.

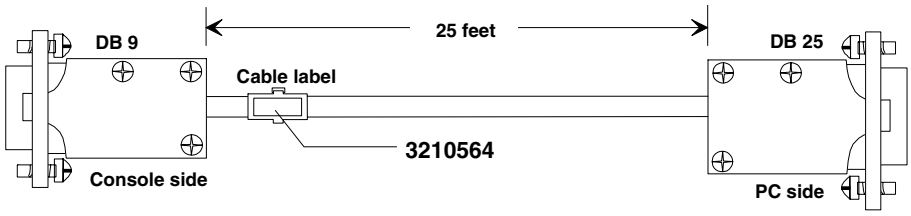

FIGURE 4-3 DB9 TO DB25 CONNECTORS AND CABLE FROM CONSOLE TO PC (CDN6181)

Use the CSDM Lite to verify the operational status of all peripheral equipment connected to the console.

PROCEDURE 4-1 HOW TO VERIFY THE OPERATIONAL STATUS OF PERIPHERAL EQUIPMENT USING THE CSDM LITE

1	Connect the CSDM Lite to the console.
2	Select the **Hardware Diagnostics** dialog box. (Select **Tools > Diagnostics > Hardware**.)
3	Review the status of connected peripheral equipment.
4	If the status of any peripheral is not “passed”, consult Chapter 8, “Troubleshooting Specific Problems.”, for troubleshooting information.

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CHAPTER 5

OPTIONS AND UPGRADE PROCEDURE

INTRODUCTION

This chapter describes procedures required to install optional equipment. The following procedures are described:

- Opening the Desktop Assembly
- Closing the Desktop Assembly
- Releasing an Operator Control Module from the Console
- Installing an Operator Control Module in the Console
- Adding and Removing Operator Control Modules
- Installing the Four-channel Expansion Module
- Installing an I/O Shelf or an I/O Box
- Installing a Two-CO Line Module
- Installing a Digital Radio Interface Module
- Installing a Direct Current Option Module
- Labelling the Digital Radio Control Module and Keypad

OPENING THE DESKTOP ASSEMBLY

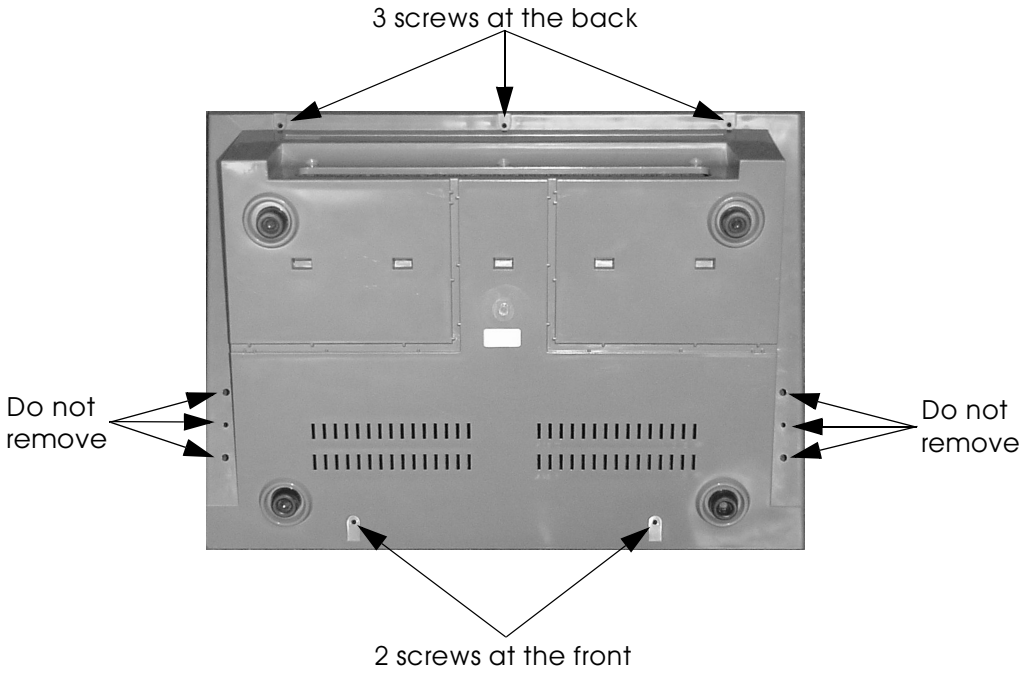
CAUTION

Before opening the Desktop console, make sure the power to the console is removed and that all the cables are disconnected from the Desktop backplane. Failure to remove the power may result in permanent damage to the display units on the Operator Control modules.

To open the Desktop assembly, follow these steps (you require one (1) Phillips screwdriver):

PROCEDURE 5-1 HOW TO OPEN THE DESKTOP ASSEMBLY

1 The top of the Desktop assembly is held to the bottom part with five (5) pan head Phillips screws; three (3) at the back, and two (2) at the fron. Remove the five (5) Phillips screws.



NOTE

Do *not* remove the screws at the right and left sides of the underside.

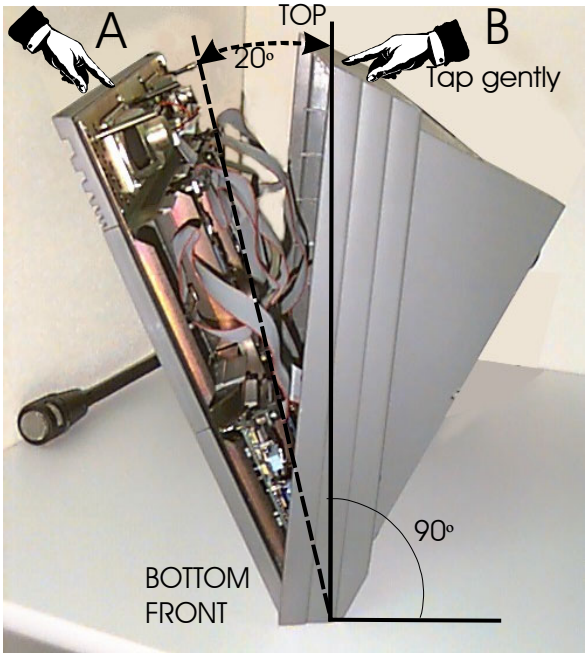
2 Once the top of the Desktop assembly is free, bring the Desktop forward and up at a 90° angle, while holding the top of the desktop.

CAUTION

Pulling too hard or too far on the desktop assembly may damage the cabling.

PROCEDURE 5-1 HOW TO OPEN THE DESKTOP ASSEMBLY

3 Tilt the bottom of the Desktop assembly by another 20° while holding the top of the Desktop. By tapping the back of the console gently, as shown in (B), the top of the Desktop should loosen and come forward. If the top of the Desktop does not come loose, you can use nail pressure, as shown in (A), to help it come loose.



4 Place the Desktop assembly back on your working area and hold the top of the Desktop at a 30° angle, which should give enough room to work inside the unit.

5 Remove the cables from the main board, then remove the top of the Desktop assembly carefully and set it on a static free pad to avoid damage.

CLOSING THE DESKTOP ASSEMBLY

CAUTION

When closing the Desktop assembly, make sure that no cables are protruding from the console. A cable that is not completely inside the console when the cover is closed may be damaged by pinching.

To close the Desktop assembly, follow these steps:

PROCEDURE 5-2 HOW TO CLOSE THE DESKTOP ASSEMBLY

1. Make sure that all the modules are properly inserted and secured on the top of the Desktop assembly. All the modules must be connected to their respective cable and all the cables must be connected and secured to the main board.
2. Carefully set the top of the Desktop on the top of the plastic housing and press it closed.
3. Move the unit into a position that allows you to insert and tighten the five pan head Phillips screws using a Phillips screwdriver at the bottom of the console. Step 3 of Procedure 5-1 on page 5-3 shows the location of the screws.

   NOTE

   Make sure that your other hand protects the top of the console from falling.
4. Insert and tighten each pan head Phillips screw in the holes provided at the bottom of the console plastic cover making sure not to overtighten the screws in the process.

RELEASING AN OPERATOR CONTROL MODULE FROM THE CONSOLE

To release an operator control module from the Desktop, the top of the desktop must be opened and the module must be released from the rear of the Desktop top panel (see Procedure 5-1 “How to open the desktop assembly,” on page 5-3).

To release an operator control module from the open console:

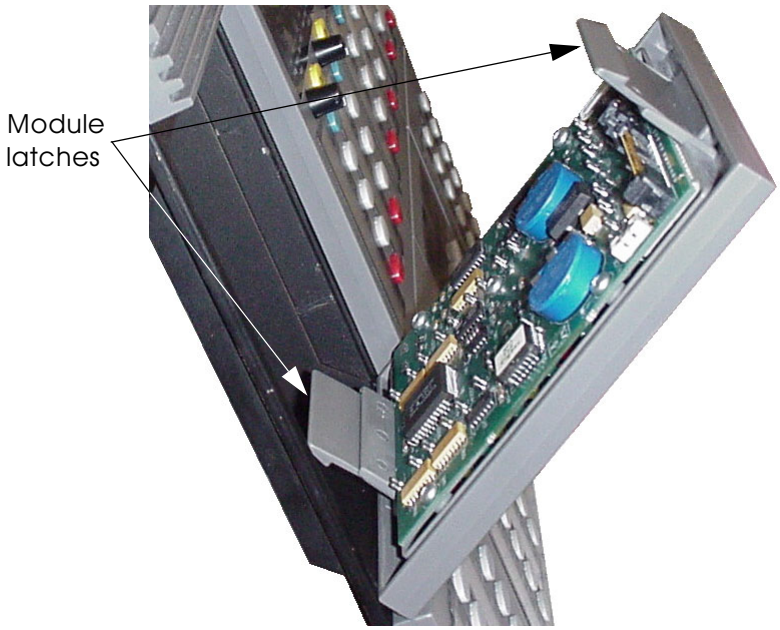
PROCEDURE 5-3 HOW TO RELEASE AN OPERATOR MODULE FROM THE OPEN CONSOLE

1. Once the top of the Desktop assembly is open, lift it carefully and locate the module to be released from the desktop.

PROCEDURE 5-3 HOW TO RELEASE AN OPERATOR MODULE FROM THE OPEN CONSOLE

2 Remove the cable from the module.

3 Press the two (2) module latches while gently pushing the module out.



Result: The operator module pops out.

CAUTION

When detaching the ribbon cable from an operator control module, hold the connector, not the cable. Pulling on the cable may damage it.

NOTE

Make sure that your other hand protects the module from falling.

To remove an operator control module from a Rackmount console, follow Steps 2 and 3.

INSTALLING AN OPERATOR CONTROL MODULE IN THE CONSOLE

To install a module in a Desktop console, proceed with the procedure for "Releasing an Operator Control Module from the Console," on page 5-5, but in reverse, making sure that the module is properly connected and secured and that the cabling is properly connected and secured. Finish by closing the Desktop assembly as described on "Closing the Desktop Assembly," on page 5-4.

ADDING AND REMOVING OPERATOR CONTROL MODULES

Whenever you add or remove an operator control module in the Desktop console, you must update the console configuration stored in the CSDM Lite. Connect the CSDM Lite to this console, log on to the CSDM Lite, and select **Console>Module** from the **Configuration** menu.

This step is important because the CSDM Lite updates the database it uses to assess problems with the CommandSTAR Lite console. The CSDM Lite assigns identification addresses to each module that is added to the console. On the CSDM Lite, select **File>Report>Configuration** to view the Console Configuration Report, which shows the identification address assigned to a new module.

Consult the *User Manual for the CommandSTAR Lite System Database Manager* for more information on configuring the Desktop console and viewing reports.

The module address must be set in the module using the DIP switches at SW1 of each module. See "SW1 Operator Control Module ID" on page A-11.

When adding a new operator control module, you should proceed in the following order:

1. Update the configuration database in the CSDM Lite.
2. View or print the Console Configuration Report to get the module identification address.
3. Set the module address using the DIP switches at SW1.
4. Install the new module in the Desktop console.

INSTALLING THE FOUR-CHANNEL EXPANSION MODULE

The Four-channel Expansion module adds the capability of interfacing to four additional radio channels (5–8). The module, shown in Figure 5-1 (with optional Digital Radio Option module attached) is designed for easy insertion.

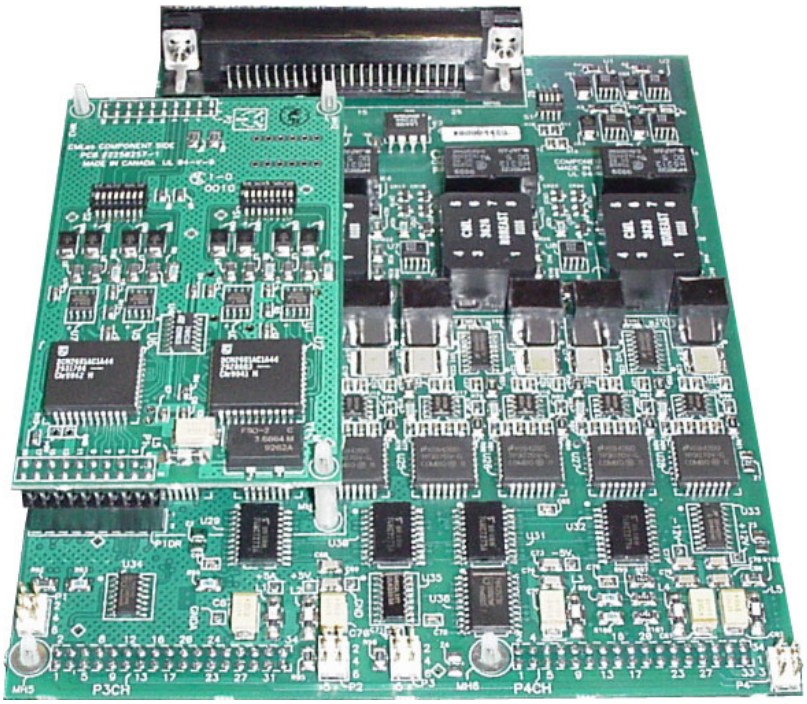


FIGURE 5-1 FOUR-CHANNEL EXPANSION MODULE (WITH OPTIONAL DIGITAL RADIO INTERFACE MODULE)

To install a Four-channel Expansion module, follow these steps (you require one (1) Phillips screwdriver):

PROCEDURE 5-4 HOW TO INSTALL A FOUR-CHANNEL EXPANSION MODULE

1	Open the Desktop assembly as described in Procedure 5-1 "How to open the desktop assembly," on page 5-3.
2	Locate the position reserved for the Four-channel Expansion module, above the main board and toward the left-hand side. The champ connector on the Four-channel Expansion module fits into the opening in the console back panel above the champ connector for channels 1–4.  **NOTE** Consult the "Component Layout Diagrams" on page B-1 for information on the locations of components.
3	Insert the three locking support posts into their receptacles in the main board (MH4, MH5, MH6).
4	Remove the metal protector covering the opening for the connector in the console back panel.
5	Insert the champ connector of the expansion module into the opening in the console back panel above the main board.  **NOTE** The locking brackets must be closed for the connector to fit through the hole in the console cabinet.
6	Slide the expansion module into place making sure that the pins of the two connectors on the underside at the near end of the module line up correctly with the two receptacles on the main board.
7	Press the Four-channel Expansion module downward until the pins of the connectors are correctly inserted into their receptacles on the main board and the locking support posts are all the way through.
8	Check to make sure the module is seated correctly.
9	Insert and tighten the two Phillips screws on either side of the champ connector at the back panel of the console.

INSTALLING AN I/O SHELF OR AN I/O BOX

The CommandSTAR Lite supports connection to two models of I/O module:

- I/O Box (no longer available) containing a single I/O module

- I/O Shelf, containing up to four I/O modules, including one I/O controller module, which handles addressing and communications for all I/O modules in the I/O Shelf

Both types of I/O module can be connected to the same console. Installation of the I/O Shelf is described first, followed by a description of installation details particular to the I/O Box, starting at "Protection for Relay Contacts and Opto-Couplers" on page 5-16. The following sections describe details that are common to both types of I/O module:

- "Console Connector for I/O Shelf and I/O Box" on page 5-12
- "Protection for Relay Contacts and Opto-Couplers" on page 5-16
- "Making I/O Module Inputs and Outputs Available on the Desktop" on page 5-21

CAUTION

The I/O Shelf must be powered OFF when connecting to a CommandSTAR Lite console. The console must be powered OFF when connecting an I/O Box. Connecting an I/O module to a console with the power on could result in damage to the console, I/O box or I/O shelf.

NOTE

To enable the opto-coupled inputs of an I/O module, the common lead (Com) must be connected to the +5 volt lead (+5 V) at the back of the I/O module. Input detection is done with a ground lead.

NOTE

When you enable access to I/O modules using the CSDM Lite, it is best to start with the lowest identification number (for example, 30H) and enable the I/O modules sequentially from lowest to highest. Keep this in mind as you proceed with the installation process. Don't assign I/O indication numbers randomly.

I/O SHELF DESCRIPTION

If your CommandSTAR Lite™ requires the installation of one or more I/O modules, proceed as detailed in this section. The I/O Shelf is available as a rack-mountable unit with up to four I/O modules on cards. Each I/O module card has six relay contacts and 12 opto-coupled inputs. Input and output are available via serial link. Each CommandSTAR Lite™ supports one fully configured I/O Shelf with four I/O module cards each, for a total of 24 relay contacts and 48 opto-coupled inputs.

I/O modules can be put to such uses as voting comparators, remote operation of doors, alarms, Main/Standby operation and visual indicators from console control at the operator position of an CommandSTAR Lite™ installation. Consult the *CommandSTAR Lite System Database Manager Manual* (6880309K01) for information on configuring I/O modules for use.

The I/O Shelf consists of a metal housing with a male DB25 connector to provide input and output to and from the console for up to four I/O module cards. Each I/O module card has its own 50-pin champ connector for serial communication with relays and opto-couplers. Each I/O module card is a printed circuit board (PCB) with relay output and opto-coupled input.

The I/O Shelf housing is black steel 19 in. (480 mm) wide by 7 in. (178 mm) deep by 2 in. (51 mm) high. The I/O module relays are form C dry closures with a 1 A maximum at 24 VAC maximum; switching power is 30 watts maximum. The opto-coupled inputs of the I/O module cards have 5 kOhm impedance and an unbalanced 5 to 12 mA input current.

FIGURE 5-2 I/O SHELF (FRONT VIEW)

FIGURE 5-3 I/O SHELF (BACK VIEW) WITH TWO I/O MODULES

I/O SHELF LED INDICATORS

The front panel of the I/O Shelf shows five LEDs. The LED labelled **Sanity** is tri-colored and displays the status of the I/O Shelf. The possible LED states are:

- LED is flashing Green — Sanity; card is working properly
- LED is flashing Amber — no data communication with the CES

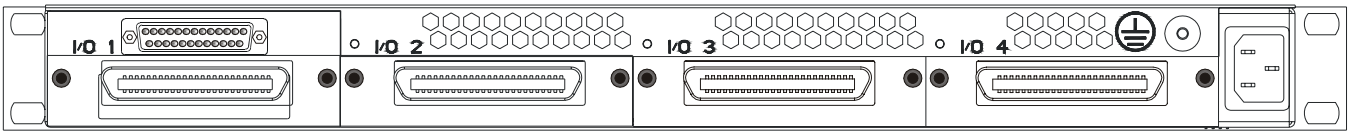
  When the I/O Shelf shows no data communication, verify your cable connections between the console and the I/O Shelf. If LED status does not change, contact the Motorola System Support Center (1-800-221-7144).

- LED is Red — failure

  When the I/O Shelf shows a failiure, replace the I/O Shelf controller module. If the LED status doesn't change, contact the Motorola System Support Center (1-800-221-7144).

The four LEDs labelled **I/O 1** to **I/O4** show green when an I/O module card is present on the corresponding slot. For example, if an I/O module card is present in the second slot on the I/O Shelf, the **I/O 2** LED is lit.

FIGURE 5-4 I/O SHELF BACK PANEL WITH FOUR MODULES SHOWING CONNECTORS



CONSOLE CONNECTOR FOR I/O SHELF AND I/O BOX

The I/O Shelf and I/O Box connection to the CommandSTAR Lite console operates over four leads: TX+, TX–, RX+, and RX–. If the I/O Shelf or I/O Box is operated remotely (more than eight feet away from the console, to a maximum of 4000 feet), a special cable with pin-out shown in Table 5-1 is required in order to connect it to the console.

TABLE 5-1 25-PIN OPERATOR CONTROL MODULE PORT ON I/O MODULE (SHELF AND BOX)

Pin	Signal	Pin	Signal
1[1]	SHIELD	14[1]	–TX ON
2[1]	+TX ON	15[1]	–RX ON
3[1]	+RX ON	16	+5 V
4	+5V	17	+5 V
5	GND	18	GND
6	GND	19	GND
7	GND	20	+5 V
8	+5 V	21[1]	+MOD-RST
9[1]	–MOD-RST	22	VU
10	POT2	23	reserved
11	reserved	24	reserved

TABLE 5-1 25-PIN OPERATOR CONTROL MODULE PORT ON I/O MODULE (SHELF AND BOX)

Pin	Signal	Pin	Signal
12	reserved	25	—
13	POT3		

1 If the I/O Shelf or I/O Box is operated remotely (more than 8 ft. away from the console), use only the pins shown with a star (*). If used remotely, an external +5 VDC supply (DDN7130A) is required on the I/O Box for operation.

RELAY AND OPTO-COUPLER CONNECTOR

Each I/O module in the I/O Shelf has a separate 50-pin champ connector to provide access to its six relays and 12 opto-couplers. Each relay can be connected for normally closed or normally open operation. All six relays are duplicated in two banks: Bank A and Bank B. You can connect to a relay using either Bank A or Bank B. You must make sure to use the pair of pins from the same bank for each relay you connect.

TABLE 5-2 50-PIN CHAMP CONNECTOR FOR RELAYS AND OPTO-COUPLERS

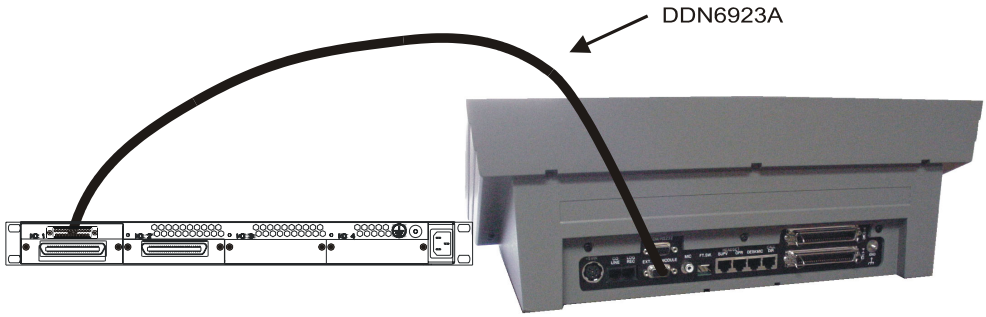
PIN	SIGNAL		PIN	SIGNAL	
1	Opto-coupler 1[1]	OPTO_IN1	26	Opto-coupler 2[1]	OPTO_IN2
2	Opto-coupler 3[1]	OPTO_IN3	27	Opto-coupler 4[1]	OPTO_IN4
3	Opto-coupler 5[1]	OPTO_IN5	28	Opto-coupler 6[1]	OPTO_IN6
4	Relay 1 (B) Common	COM_RLYB1	29	Relay 1 (B) Normally open	NO_RLYB1
5	Relay 1 (B) Normally closed	NC_RLYB1	30	Relay 1 (A) Normally closed	NC_RLYA1
6	Relay 1 (A) Common	COM_RLYA1	31	Relay 1 (A) Normally open	NO_RLYA1
7	Relay 2 (B) Common	COM_RLYB2	32	Relay 2 (B) Normally open	NO_RLYB2
8	Relay 2 (B) Normally closed	NC_RLYB2	33	Relay 2 (A) Normally closed	NC_RLYA2
9	Relay 2 (A) Common	COM_RLYA2	34	Relay 2 (A) Normally open	NO_RLYA2
10	Relay 3 (B) Common	COM_RLYB3	35	Relay 3 (B) Normally open	NO_RLYB3
11	Relay 3 (B) Normally closed	NC_RLYB3	36	Relay 3 (A) Normally closed	NC_RLYA3
12	Relay 3 (A) Common	COM_RLYA3	37	Relay 3 (A) Normally open	NO_RLYA3
13	Relay 4 (B) Common	COM_RLYB4	38	Relay 4 (B) Normally open	NO_RLYB4
14	Relay 4 (B) Normally closed	NC_RLYB4	39	Relay 4 (A) Normally closed	NC_RLYA4
15	Relay 4 (A) Common	COM_RLYA4	40	Relay 4 (A) Normally open	NO_RLYA4
16	Relay 5 (B) Common	COM_RLYB5	41	Relay 5 (B) Normally open	NO_RLYB5
17	Relay 5 (B) Normally closed	NC_RLYB5	42	Relay 5 (A) Normally closed	NC_RLYA5
18	Relay 5 (A) Common	COM_RLYA5	43	Relay 5 (A) Normally open	NO_RLYA5
19	Relay 6 (B) Common	COM_RLYB6	44	Relay 6 (B) Normally open	NO_RLYB6
20	Relay 6 (B) Normally closed	NC_RLYB6	45	Relay 6 (A) Normally closed	NC_RLYA6
21	Relay 6 (A) Common	COM_RLYA6	46	Relay 6 (A) Normally open	NO_RLYA6
22	Opto-coupler 7[1]	OPTO_IN7	47	Opto-coupler 8[1]	OPTO_IN8
23	Opto-coupler 9[1]	OPTO_IN9	48	Opto-coupler 10[1]	OPTO_IN10
24	Opto-coupler 11[1]	OPTO_IN11	49	Opto-coupler 12[1]	OPTO_IN12
25	GND		50	GND	

1 Active LOW

CONNECTING ONE I/O SHELF TO THE CONSOLE

When one I/O Shelf is used, connect one end of cable DDN6923A to the 25-pin RS-422 connector at the back of the I/O Shelf, above the I/O Shelf controller module. Then connect the other end of the cable to the connector labeled **EXT. I/O MODULE** at the back of the console. Figure 5-5 shows a typical installation of one I/O Shelf connected to a console.

FIGURE 5-5 I/O SHELF INSTALLATION



SETTING I/O MODULE ID FOR THE I/O SHELF

Each I/O module card in an I/O Shelf requires a module ID number to distinguish it from other I/O module cards (or I/O Boxes) connected to the same console.

The I/O Shelf only needs to have one ID set for it. Setting the base ID for the I/O controller module reserves the next three IDs for the other module cards that the Shelf can hold, whether they are present or not. The I/O module IDs for all modules the Shelf can hold are set using DIP switch S1, located near the rear of the I/O controller module (in the slot labeled **I/O 1**). To gain access to DIP switch S1, remove the I/O controller module from the I/O Shelf by loosening the two screws attaching it to the back panel of the I/O Shelf and pulling gently.

Table 5-3 shows the base module IDs available for the I/O Controller module in an I/O Shelf in the left-hand column. The other cells in each row show the IDs that are automatically assigned to other I/O module cards in the Shelf. DIP switch settings for each of the base IDs are as shown in Table 5-4 on page 5-16. The left-most column lists the available base ID numbers. (All numbers in these tables are in hexadecimal format.)

The default address for the main I/O card is 30H. It can be changed to any value in the **I/O Controller** column in Table 5-3 by setting DIP switch S1. See Figure 5-6 on page 5-16 for the location of DIP switch S1.

TABLE 5-3 AVAILABLE ADDRESSES FOR MODULES IN AN I/O SHELF

I/O Controller	I/O Module 2	I/O Module 3	I/O Module 4
30H	31H	32H	33H
34H	35H	36H	37H

TABLE 5-3 AVAILABLE ADDRESSES FOR MODULES IN AN I/O SHELF

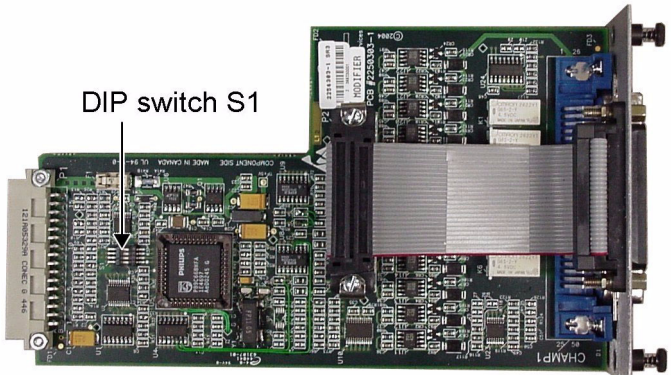
I/O Controller	I/O Module 2	I/O Module 3	I/O Module 4
38H	39H	3AH	3BH
3CH	3DH	3EH	3FH

TABLE 5-4 I/O SHELF DIP SWITCH ID SETTINGS

ID	BIT 1	BIT 2	BIT 3[1]	BIT 4
30H	OFF	OFF	ON	OFF
34H	OFF	ON	ON	OFF
38H	ON	OFF	ON	OFF
3CH	ON	ON	ON	OFF

1 For Release 2.6.0 and later versions of CommandSTAR Lite, Bit 3, the error checking (EC) bit, must be ON (cyclical redundancy check). For earlier versions, the EC bit must be OFF (checksum).

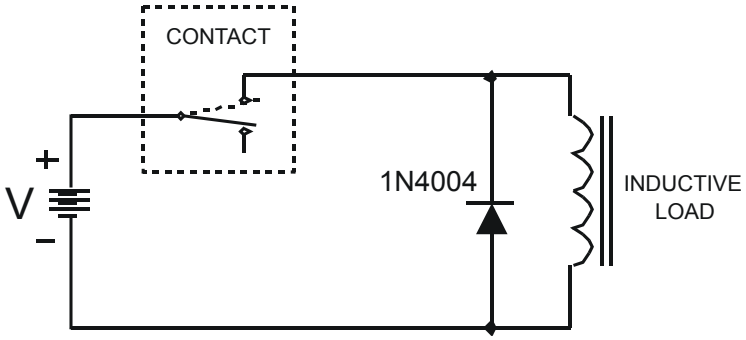
FIGURE 5-6 DIP SWITCH S1 ON I/O CONTROLLER



PROTECTION FOR RELAY CONTACTS AND OPTO-COUPLERS

When using the console relays (output) or opto-couplers (input) with unprotected external inductive impedances (for example, a solenoid), the console relays or opto-couplers can be damaged. To prevent damage, install a diode type 1N4004 or equivalent across the impedance as shown in Figure 5-7 on page 5-17. Otherwise, the resultant inductive charge released during state changes on the console relay contacts or opto-couplers can cause adverse system effects that might result in device failure over time.

FIGURE 5-7 CONSOLE DC RELAY PROTECTION CIRCUIT — EXAMPLE



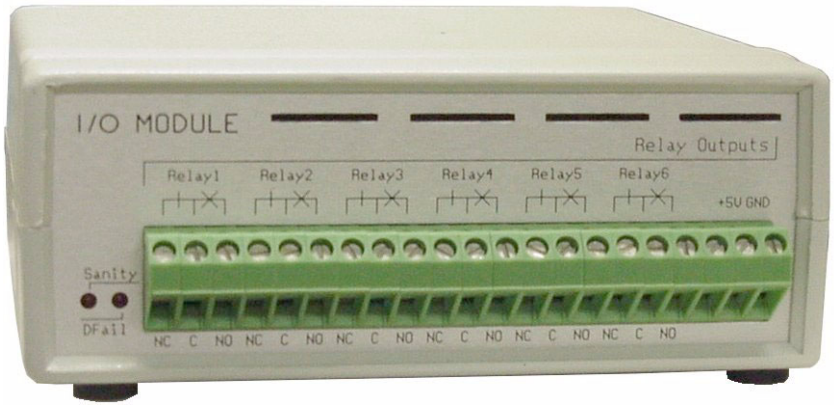
I/O BOX DESCRIPTION (NO LONGER AVAILABLE)

The I/O Box is packaged in a flame-retardant two-piece ABS plastic module. The gray case is 5.24 in W x 5.24 in D x 2.01 in H and has a matte, textured finish.

Figure 5-8 shows that the face plate has apertures for 2 PCB-mount LEDs and 21 high-current PCB terminal blocks (6 relays, +5 V, ground, and unused).

The I/O Box relays are form C dry closures with a 150 mA maximum or 60 VDC maximum; switching power is 3 watts maximum. The opto-coupled inputs of the I/O Box have 5 kOhm impedance and an unbalanced 5 to 20 mA input current.

FIGURE 5-8 I/O BOX (FRONT VIEW)



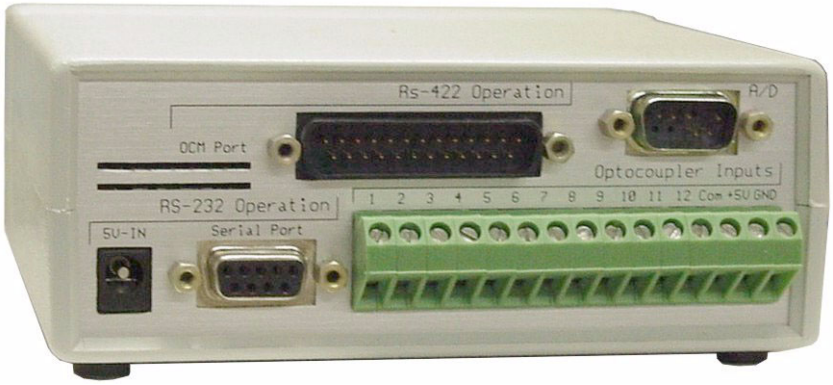
The terminal blocks have screw-clamp contacts that provide an easy and quick solution for securing electrical and mechanical connections to the relay contacts and to both +5 V and ground. All contacts are clearly labelled to identify their function.

Figure 5-9 shows that the back plate is assembled with:

- One male DB25 connector for RS-422 operation
- One male DB9 connector for analog-to-digital conversion (not used)
- One female DB9 connector for RS-232 operation (not used)
- One jack for the +5 V IN supply (optional external power supply)

- 15 high current PCB terminal blocks providing connections to the 12 opto-coupler inputs, a common input, +5 V, and to ground

FIGURE 5-9 I/O BOX (BACK VIEW)



The I/O Box relay contacts are clearly labelled 1–6 and the contacts for normally closed operation are labelled NC; the contacts for normally open operation are labelled NO. The opto-coupler contacts are clearly labelled 1–12. Use a flat-blade screwdriver to loosen and tighten the contacts.

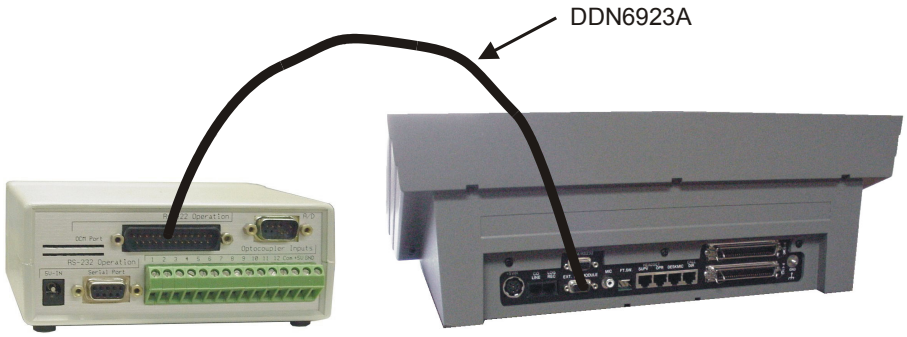
The I/O Box does *not* require the use of an external +5 V supply since the source of power comes from the console when connected (RS-422 mode) at short range. If the I/O Box is operated remotely (more than eight feet away from the console, to a maximum of 4000 feet), a +5 VDC supply (P/N DDN7130) and a special cable with pin-out shown in Table 5-1 on page 5-12 are required in order to connect the I/O Box.

In RS-422 mode of operation, the +5 V-IN jack is not required because the +5 V is obtained from the cable feeding the 25-pin connector. The pin-out of the 25-pin operator control module (OCM) port on the I/O Box is outlined in Table 5-1 on page 5-12.

CONNECTING ONE I/O BOX TO THE CONSOLE

When one I/O Box is used, connect one end of cable DDN6923A to the **RS-422 Operation** port at the back of the I/O Box. Then connect the other end of the cable to the connector labeled **EXT. I/O MODULE** at the back of the console. Figure 5-10 shows a typical installation of one I/O Box connected to a console.

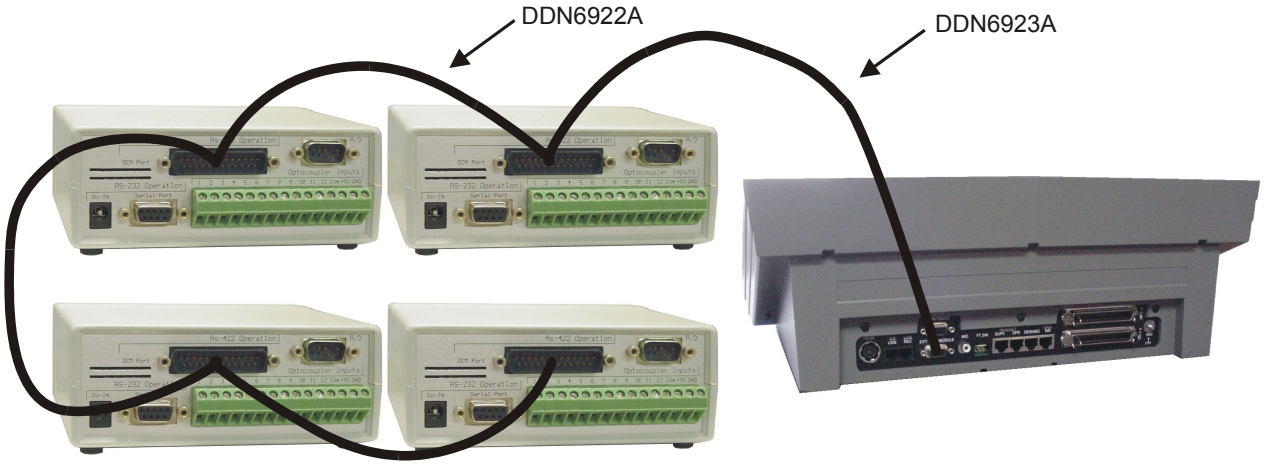
FIGURE 5-10 SINGLE I/O BOX INSTALLATION



CONNECTING MULTIPLE I/O BOXES TO THE CONSOLE

A maximum of four I/O Boxes can be used together on each of the two console I/O module ports for a total of eight I/O Boxes. When two or more I/O Boxes are used together, connect one end of cable DDN6923 to one end of cable DDN6922A. Then connect the other end of the cable to the connector labeled **EXT. I/O MODULE** at the back of the console. Daisy-chain all the I/O Boxes used using cable DDN6922. Figure 5-11 on page 5-19 shows a typical installation of four I/O Boxes connected to a console.

FIGURE 5-11 MULTIPLE I/O BOX INSTALLATION



SETTING I/O MODULE ID FOR THE I/O BOX

NOTE

The default ID factory setting for the I/O Box is 30H. If you connect more than one I/O Box to any console, you must make sure that the DIP switch settings inside the I/O Boxes indicate a different ID for each.

Each I/O Box requires an identification (ID) number to distinguish it from other I/O modules (Boxes or Shelves) connected to the same console. In the I/O Box, an I/O module ID is set using DIP switch S8. With jumpers S5, S7 and S16 IN, the standard settings for DIP switch S8 are as shown in Table 5-5. The left-most column lists the range of valid ID numbers in hexadecimal format; the remaining columns show which bits of S8 must be ON and OFF to implement each ID number. DIP switch S8 is located on the upper circuit board of the I/O Box, directly below the ribbon cable. To access the DIP switches and jumpers, remove the two Phillips screws from the underside of the module and lift off the top half of the cover.

TABLE 5-5 I/O BOX DIP SWITCH S8 — ID AND ERROR CHECK SETTINGS

ID	BIT 1[1]	BIT 2	BIT 3	BIT 4	BIT 5	BIT 6	BIT 7	BIT 8
30H	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
31H	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
32H	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
33H	ON	ON	OFF	OFF	ON	ON	OFF	OFF
34H	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
35H	ON	ON	OFF	ON	OFF	ON	OFF	OFF
36H	ON	ON	OFF	ON	ON	OFF	OFF	OFF
37H	ON	ON	OFF	ON	ON	ON	OFF	OFF
38H	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
39H	ON	ON	ON	OFF	OFF	ON	OFF	OFF
3AH	ON	ON	ON	OFF	ON	OFF	OFF	OFF
3BH	ON	ON	ON	OFF	ON	ON	OFF	OFF
3CH	ON	ON	ON	ON	OFF	OFF	OFF	OFF
3DH	ON	ON	ON	ON	OFF	ON	OFF	OFF
3EH	ON	ON	ON	ON	ON	OFF	OFF	OFF
3FH	ON	ON	ON	ON	ON	ON	OFF	OFF

1 For Release 2.6.0 and later versions of CommandSTAR Lite, Bit 1, the error checking (EC) bit, must be ON (cyclical redundancy check). For earlier versions, the EC bit must be OFF (checksum).

DIP switch S10 is located next to DIP switch S8 on the upper circuit board of the I/O Box, directly below the ribbon cable. Its bits should not be changed and should remain as shown in Table 5-6.

TABLE 5-6 I/O BOX DIP SWITCH S10 SETTINGS

BIT 1	BIT 2	BIT 3	BIT 4
OFF	ON	ON	OFF

MAKING I/O MODULE INPUTS AND OUTPUTS AVAILABLE ON THE DESKTOP

Pins for relays 1–6 and opto-couplers 1–12 for modules in the I/O Shelf can be identified using Table 5-2 on page 5-14. On the I/O Box, the relay contacts are clearly labelled 1–6 and the opto-coupler contacts are clearly labelled 1–12.

These numbers are referenced in the CSDM Lite interface to allow you to identify which relay or opto-coupler is being accessed. A maximum of 144 auxiliary I/O resources can be made available at each console position.

PROCEDURE 5-5 HOW TO CONFIGURE I/O MODULE INPUTS AND OUTPUTS

1	In the CSDM Lite, assign the I/O module to the console to which you have just physically connected it. Select **Configuration** > **Console** > **Console Layout**. **Result:** The **Console Configuration — Console Layout** dialog box appears.
2	Select the **I/O Modules** button. **Result:** The **I/O Module Configuration** dialog box appears.
3	Select the I/O module connected to the console. **Result:** A check mark appears in the box for that I/O module.
4	Click **OK**. **Result:** The **Console Configuration — Console Layout** dialog box closes.
5	In the CSDM Lite, configure the relays and opto-couplers you plan to use. Select **Configuration** > **Auxiliary I/O**. **Result:** The **Auxiliary I/O** dialog box appears.
6	To add a new relay or opto-coupler, select **Add**. **Result:** A new I/O entry is added with default information.

PROCEDURE 5-5 HOW TO CONFIGURE I/O MODULE INPUTS AND OUTPUTS

7	Specify the information required to identify and use the new relay or opto-coupler. See the *CommandSTAR Lite System Database Manager Manual* (6880309K01).
8	Click **OK**. **Result:** The **Auxiliary I/O** dialog box closes.
9	Save the database and upload it to the console.
10	At the console, select the I/O module resources available for use.

Consult the *CommandSTAR Lite System Database Manager Manual* (6880309K01) for information on using the CSDM Lite interface and the *CommandSTAR Lite Operator Manual* (6880309J99) for information on using the dispatcher interface.

INSTALLING A TWO-CO LINE MODULE

The Two-CO Line module adds the capability of interfacing to two telephone lines. The module, shown in Figure 5-12 is designed for easy insertion.

FIGURE 5-12 TWO-CO LINE MODULE

To install a Two-CO Line module, follow these steps (you require one (1) Phillips screwdriver):

PROCEDURE 5-6 HOW TO INSTALL A TWO-CO LINE MODULE

1	Open the Desktop assembly as described in Procedure 5-1 "How to open the desktop assembly," on page 5-3.
2	Locate the position reserved for the Two-CO Line module, above the main board and toward the right-hand side.  **NOTE** Consult the "Component Layout Diagrams" on page B-1 for information on the locations of components.
3	Insert the two locking support posts into their receptacles in the main board (MH14, MH15).
4	Slide the Two-CO Line module into place making sure that the pins of the two connectors on the underside (one at the near end and one at the far end) of the module line up correctly with the two receptacles on the main board.
5	Press the Two-CO Line module downward until the pins of the connectors are correctly inserted into their receptacles on the main board and the locking support posts are all the way through
6	Check to make sure the module is seated correctly.
7	DIP switch settings for the three DIP switches on this module must be as shown in Table 5-7.

TABLE 5-7 TWO-CO LINE MODULE DIP SWITCH SETTINGS

Switch	S1	S2	S3
BIT 1	OFF	OFF	OFF
BIT 2	OFF	ON	ON
BIT 3	OFF	OFF	OFF
BIT 4	OFF	ON	ON

INSTALLING A DIGITAL RADIO INTERFACE MODULE

The Digital Radio Interface module adds the capability of interfacing to up to six trunked digital radio channels. The module, shown in Figure 5-13, is designed for easy insertion. The Digital Radio Interface module can support up to four radio channels. A CommandSTAR Lite console in which a four-channel expansion module has been installed requires *two* Digital Radio Interface modules to support five or six digital channels.

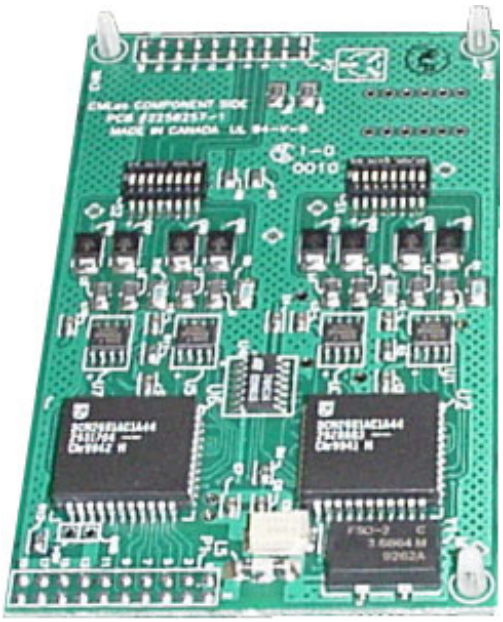


FIGURE 5-13 DIGITAL RADIO OPTION MODULE

To install a Digital Radio Interface module for channels 1–4, follow these steps (you require one (1) Phillips screwdriver):

PROCEDURE 5-7 HOW TO INSTALL A DIGITAL RADIO INTERFACE MODULE FOR CHANNELS 1-4

1	Open the Desktop assembly as described in Procedure 5-1 “How to open the desktop assembly,” on page 5-3.
2	Locate the position reserved for the Digital Radio Interface module above the main board, just to the right of the center line.

NOTE

Consult the “Component Layout Diagrams” on page B-1 for information on the locations of components.

PROCEDURE 5-7 HOW TO INSTALL A DIGITAL RADIO INTERFACE MODULE FOR CHANNELS 1-4

3	Insert the three locking support posts into their receptacles in the main board (MH1, MH2, MH3).
4	Slide the Digital Radio Interface module into place, making sure that the pins of the two connectors on the underside (one at the near end and one at the far end) of the module line up correctly with the two receptacles on the main board.
5	Press the Digital Radio Interface module downward until the pins of the connectors are correctly inserted into their receptacles on the main board and the locking support posts are all the way through
6	Check to make sure the module is seated correctly.

To install a Digital Radio Interface module for channels 5 or 6[1], follow these steps (you require one (1) Phillips screwdriver):

PROCEDURE 5-8 HOW TO INSTALL A DIGITAL RADIO INTERFACE MODULE FOR CHANNELS 5 AND 6

1	Open the Desktop assembly as described in Procedure 5-1 "How to open the desktop assembly," on page 5-3.
2	Locate the position reserved for the Digital Radio Interface module above the Four-channel Expansion module. **NOTE** Consult the "Component Layout Diagrams" on page B-1 for information on the locations of components. The layout of the Four-channel Expansion module is shown on Figure B-3 "Four-channel Expansion Module (DDN6127)," on page B-4.
3	Insert the three locking support posts into their receptacles in the Four-channel Expansion module (MH1, MH2, MH3).
4	Slide the Digital Radio Interface module into place, making sure that the pins of the two connectors on the underside (one at the near end and one at the far end) of the module line up correctly with the two receptacles on the Four-channel Expansion Module.

1. Channels 7 and 8 cannot be configured as digital channels. The CommandSTAR Lite only supports six digital channels.

PROCEDURE 5-8 HOW TO INSTALL A DIGITAL RADIO INTERFACE MODULE FOR CHANNELS 5 AND 6

5	Press the Digital Radio Interface module downward until the pins of the connectors are correctly inserted into their receptacles on the Four-channel Expansion module and the locking support posts are all the way through it.
6	Check to make sure the module is seated correctly.

NOTE

To enable or disable digital radio, See "Dip Switch Settings" on page A-8.

INSTALLING A DIRECT CURRENT OPTION MODULE

The Direct Current Option module permits direct current base station control for up to four channels. The module, shown in Figure 5-14 is designed for easy insertion.

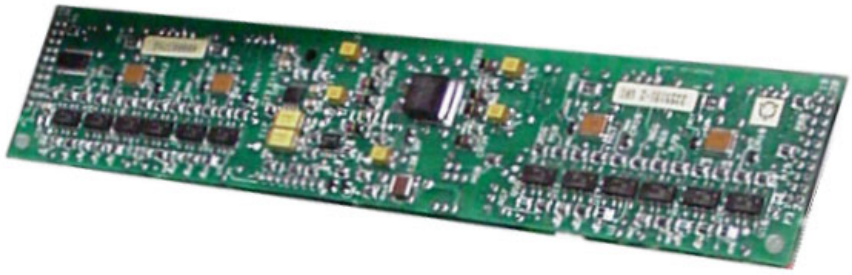


FIGURE 5-14 DIRECT CURRENT OPTION MODULE

To install a Direct Current Option module, follow these steps (you require one (1) Phillips screwdriver):

PROCEDURE 5-9 HOW TO INSTALL A DIRECT CURRENT OPTION MODULE

1	Open the Desktop assembly as described in Procedure 5-1 "How to open the desktop assembly," on page 5-3.
2	Locate the position reserved for the Direct Current Option module: • For channels 1–4, along the left-hand side of the main board. (Look for connectors P3DCA, P2DCA, and P1DCA.) • For channels 5–8, along the right-hand side of the main board. (Look for connectors P1DCB, P2DCB, and P3DCB.)  **NOTE** Consult the "Component Layout Diagrams" on page B-1 for information on the locations of components.
3	Insert the three locking support posts into their receptacles in the main board (MH8, MH9, MH19 for channels 1–4 or MH12, MH13, MH219 for channels 5–8).
4	Slide the Direct Current Option module into place making sure that the pins of the three connectors on the underside of the module line up correctly with the two receptacles on the main board.
5	Press the Direct Current Option module downward until the pins of the connectors are correctly inserted into their receptacles on the main board and the locking support posts are all the way through.
6	Check to make sure the module is seated correctly.

 **NOTE**

To enable DC signaling or to re-enable tone signaling, See "Dip Switch Settings" on page A-8.

LABELLING THE DIGITAL RADIO CONTROL MODULE AND KEYPAD

The CommandSTAR Lite Digital Radio Control Module (DRCM) emulates the programmable features of Motorola MCS 2000 (model III), iDEN (M470/LM3000), Digital Spectra (model W9—ASTRO), and CDM1550 Series (e.g., LTR or Passport) digital radios. The corresponding buttons and LEDs on the DRCM should be labelled to show the functions programmed into the radios. The keypad module also participates in the emulation of the programmable features and may, in some circumstances require labelling.

The diagrams on the following pages show how the function buttons and LEDs on the DRCM correspond to the programmable buttons on the MCS 2000, iDEN, Digital Spectra, and CDM1550 Series control heads.

NOTE

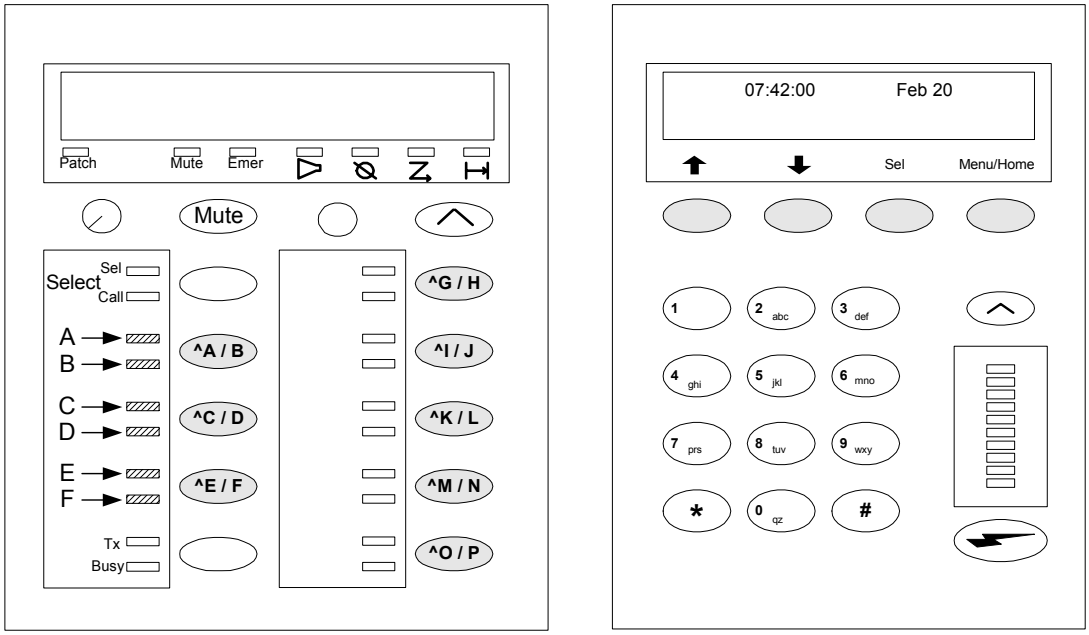
Digital Radio types are assigned to digital channels using the CSDM Lite. Channels must be assigned before they can be used. See the *CommandSTAR Lite System Database Manager Manual* for information on assigning digital radio channels.

For the CommandSTAR Lite push-button console, digital radio commands and indicators cannot be assigned until the digital channels have been assigned using the CSDM Lite.

Figure 5-15 on page 5-29 shows a CommandSTAR Lite DRCM with its function buttons labelled A–P and a Keypad module. (When a letter is preceded by "^", it means the shift button (^) must be pressed first.) Figure 5-16 on page 5-29 shows a Digital Spectra (ASTRO) radio control head with its programmable buttons labelled A–P (except the # button). To activate a function programmed into a Digital Spectra radio, press the corresponding button on the DRCM.

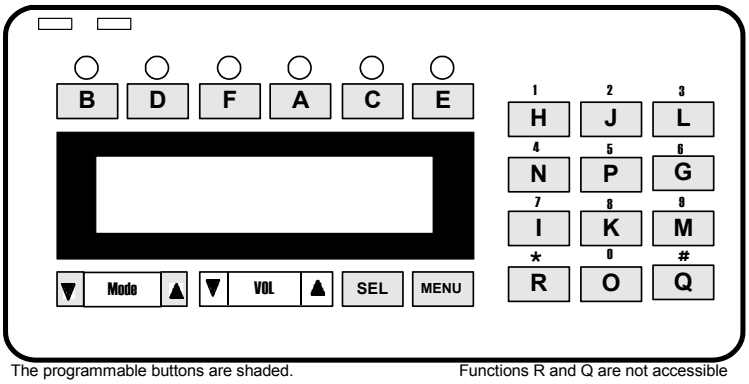
The programmable buttons labelled A–F on the Digital Spectra (ASTRO) radio control head (see Figure 5-16) return an acknowledgement that is indicated by a lit LED on the DRCM when the corresponding button is pressed on the DRCM. These LEDs are labelled A–F in Figure 5-15 on page 5-29.

For information on the programmable features of the Digital Spectra radio, refer to the user manual.



The function buttons are shaded. ^ before a letter means you must press the shift (^) button to invoke the corresponding function.

FIGURE 5-15 USING A DRCM AND KEYPAD WITH DIGITAL SPECTRA (ASTRO) RADIO



The programmable buttons are shaded.

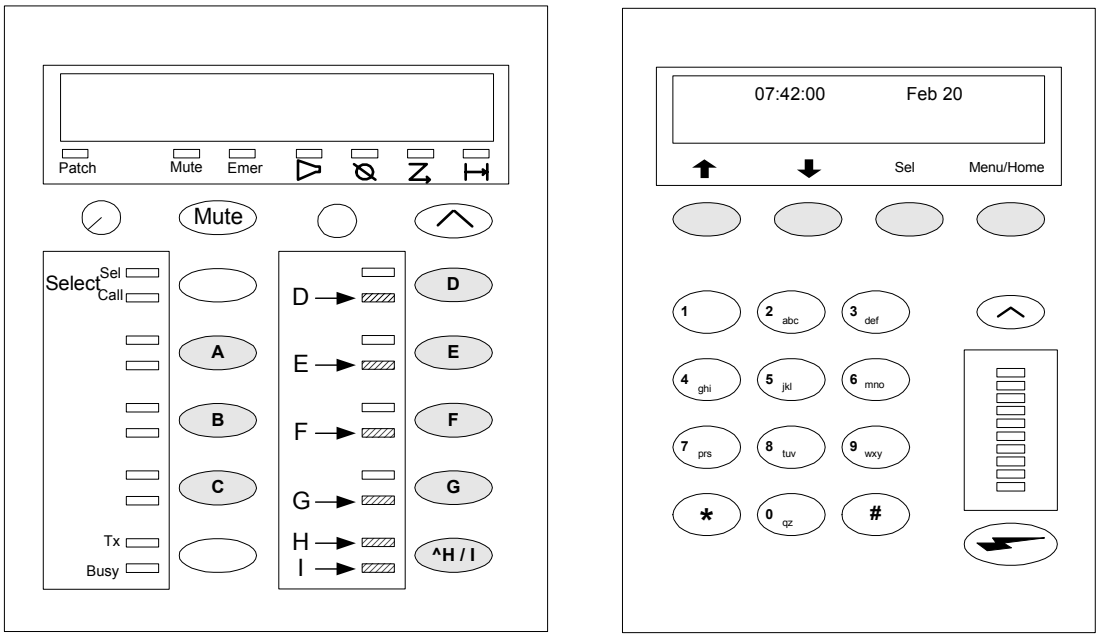
Functions R and Q are not accessible using push-button consoles.

FIGURE 5-16 CONTROL HEAD FOR DIGITAL SPECTRA (ASTRO) RADIO

Figure 5-17 on page 5-30 shows a CommandSTAR Lite DRCM with its function buttons labelled A–I and a Keypad module. (When a letter is preceded by "^", it means the shift button (^) must be pressed first.) Figure 5-18 on page 5-30 shows an MCS 2000 radio control head with its programmable buttons labelled A–I). To activate a function programmed into an MCS 2000 radio, press the corresponding button on the DRCM.

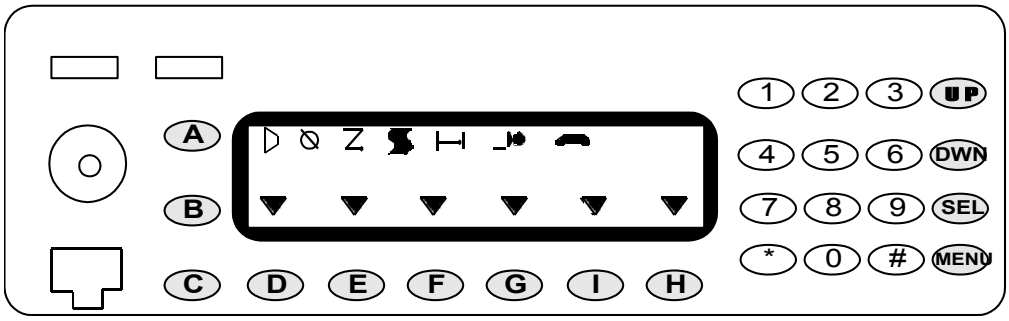
The programmable buttons labelled D–I on the MCS2000 radio control head (see Figure 5-18) return an acknowledgement that is indicated by a lit LED on the DRCM when the corresponding button is pressed on the DRCM. These LEDs are labelled D–I in Figure 5-17.

For information on the programmable features of the MCS2000 radio, refer to the user manual.



The function buttons are shaded. ^ before a letter means you must press the shift (^) button to invoke the corresponding function.

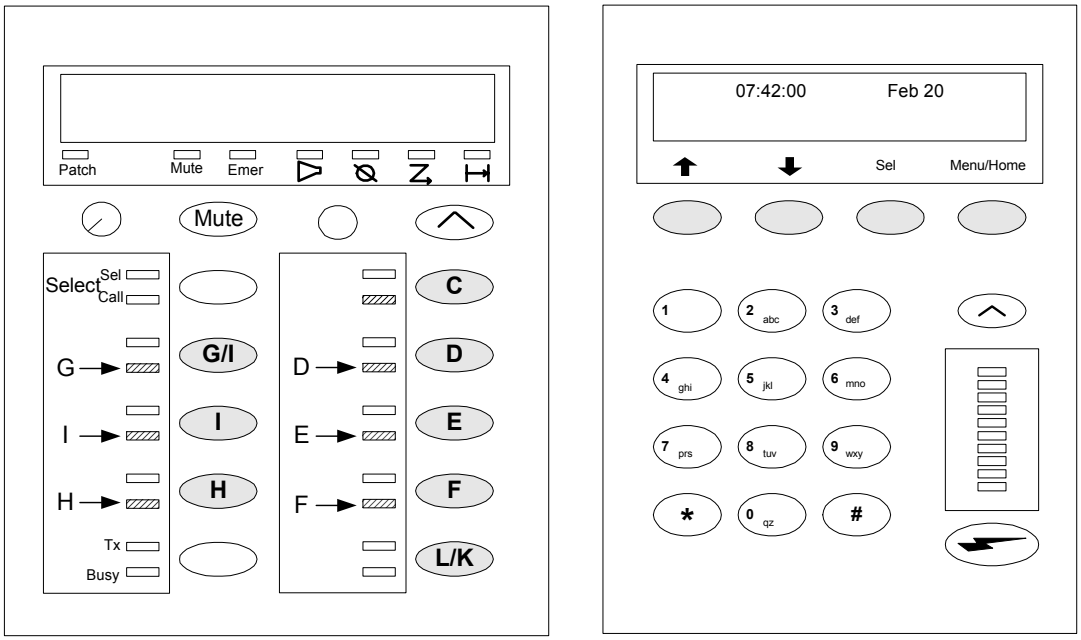
FIGURE 5-17 USING A DRCM AND KEYPAD WITH MCS 2000 RADIO



The programmable buttons are shaded.

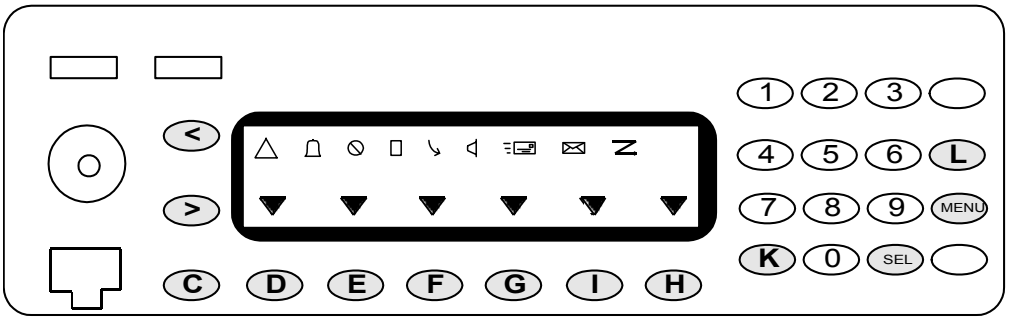
FIGURE 5-18 CONTROL HEAD FOR MCS 2000 RADIO

Figure 5-19 shows a CommandSTAR Lite DRCM with function buttons labelled C–I and K–L and a Keypad module. Figure 5-20 on page 5-31 shows an iDEN radio control head with its programmable buttons labelled C–I and K–L). To activate a function programmed into an iDEN radio, press the corresponding button on the DRCM.The programmable buttons labelled D–I on the iDEN radio control head (see Figure 5-20 on page 5-31) return an acknowledgement that is indicated by a lit LED on the DRCM when the corresponding button is pressed on the DRCM. These LEDs are labelled D–I (with an arrow) in Figure 5-19.For information on the programmable features of the iDEN radios, see the user manual.



The function buttons are shaded.

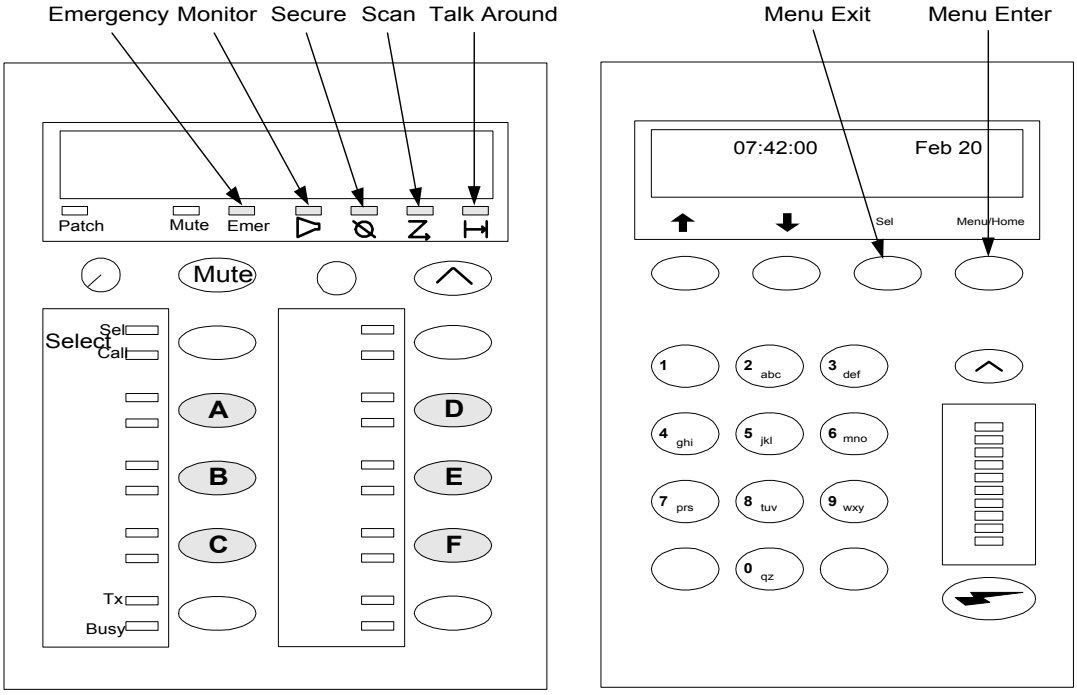
FIGURE 5-19 USING A DRCM AND KEYPAD WITH IDEN RADIO



The programmable buttons are shaded.

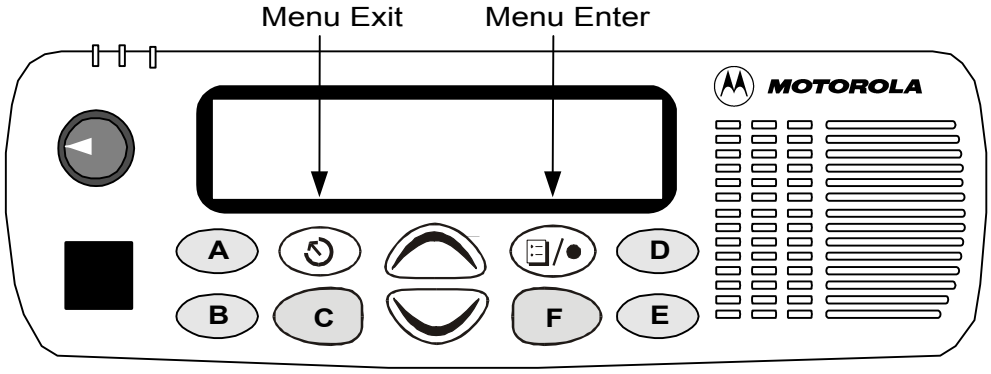
FIGURE 5-20 CONTROL HEAD FOR IDEN RADIO

Figure 5-21 on page 5-32 shows a CommandSTAR Lite DRCM with its function buttons labelled A–F and a Keypad module. Figure 5-22 on page 5-32 shows a CDM1550 Series radio control head with its function buttons labelled A–F. To activate a function programmed into a CDM1550 Series radio, press the corresponding button on the DRCM. To activate the menu (/● button on the CDM1550 Series radio) press the Menu/Home button on the Keypad module. To exit the menu (button on the CDM1550 Series radio) press the Sel button on the Keypad module.The Emergency, Monitor, Secure, Scan, and Talk Around icons from the CDM1550 Series radio display are emulated by LEDs on the DRCM, as indicated in Figure 5-21 on page 5-32.For information on the features of the CDM1550 Series radios, refer to the user manual.



The function buttons are shaded.

FIGURE 5-21 USING A DRCM AND KEYPAD WITH CDM1550 SERIES RADIO



The function buttons are shaded.

FIGURE 5-22 CONTROL HEAD FOR CDM1550 SERIES RADIO

CHAPTER

6

DIAGNOSTICS MODE

INTRODUCTION

All desktop and rackmount consoles are equipped with a keypad module that allows the operator to dial a telephone number, view the time of day in the 12 or 24-hour clock format, view the date and monitor the audio level (VU) of the selected radios and microphone audio. The keypad module is equipped with 12 standard buttons for dialing and six standard function buttons: Scroll Up (↑), Scroll Down (↓), Select (Sel), Menu/Home, Shift (^), and PTT ( ) that are used to set the features of the console or to start the console tests.

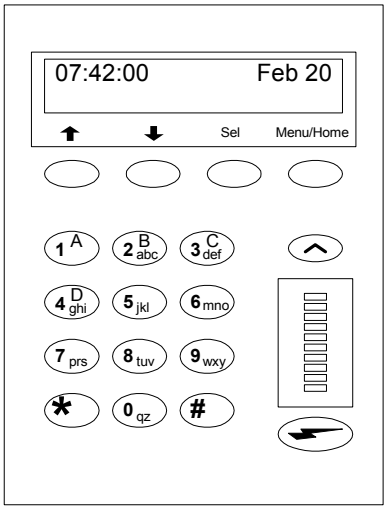


FIGURE 6-1 KEYPAD MODULE

NOTE

You cannot gain access to tests and programs on the console when it is in transmission mode (for example, when the PTT button has been pressed, or when the patch or local repeat feature has been enabled).

TABLE 6-1 KEYPAD FEATURES

Button name	Description
Menu/Home	Validates the digits entered on the keypad and confirms programming entries.
Keypad	Allows the entry of digits.
Select (Sel)	Enables console tests and configuration operations.
PTT ( )	Allows the operator to transmit over a selected radio channel.
Scroll Up (↑)	Used in console tests and programming mode to move up the list of actions.
Scroll Down (↓)	Used in console tests and programming mode to move down the list of actions.
Shift ∧	Used to select alternate keypad functions.
VU meter	Displays the volume level of the microphone and incoming audio.

In addition, the keypad module accesses internal tests and programming, such as button test, time and date set-up.

Use the following procedures to view the internal tests and setups or programs on the keypad display.

VIEWING INTERNAL TESTS AND PROGRAMS

The step procedures and the purpose for each test and program are summarized in the Quick reference table following. A detailed description is given in the following pages. See “Method 1” on page 6-4 for how to enter the test/setup menu. Tests 50 and onward require a special password or key combination to access.

TABLE 6-2 QUICK REFERENCE TABLE

Test	Description
0-TIME MODE?	This feature allows to select the 12 hour (AM and PM) or the 24 hour time display format.
1-SET TIME?	Allows setting of the system time.
2-SET DATE?	Allows setting of the system date.
3-DISP LEVEL?	Allows the increase or decrease of the intensity of the displays on the operator control modules.

TABLE 6-2 QUICK REFERENCE TABLE (CONTINUED)

Test	Description
4-LED LEVEL?	Allows the increase or decrease of the intensity of the LED on the control modules.
11-PROG PAGE?	Allows programming of a speed page or a manual page.
12-SET RAD VOL?	Adjusts the volume of the radio channels programmed on an Auxiliary Control Module (ACM).
13-SET DIAL UP?	Specifies phone numbers for dial-up connections for data and/or voice; connects and disconnects dial-up modem.
50-NODE ID	Displays the console identification name.
51-S/W NUMBER?	Displays the part number and the version number of the current console software installed.
52-DBASE REV?	Displays the version of the current database.
53-LED TEST?	Verifies the functionality of the LED and the segments of the displays on the operator modules.
54-BUTTON TEST?	Verifies that the buttons are operational and associated to the appropriate function.
55-VOLUME TEST?	Verifies that the volume controls are operational and associated with the appropriate function.
56-SENSE TEST?	Verifies that the operator or supervisor headset jackbox can sense a device connected to the headset jack.
61-TONE TEST?	Verifies speaker and headset operation using a tone frequency of 1000 Hz.
62-MIC TEST?	Verifies operation of the microphone.
63-PTT TEST?	Verifies the foot-switch and microphone PTT operation.
64-CALL DIR RX?	Adjusts the receive level of the Call Director.
65-CALL DIR TX?	Adjusts the transmit level of the Call Director.
68-SET GRANT?	Adjusts the level of the grant tone.
69-TONE TO I/F?	Routes a test tone to an interface.
70-RESET?	Initiates a console reset.
71-SET MIC AGC?	Sets the Automatic Gain Control (AGC) on the microphone (ON, OFF).
72-PAGING TONE?	Adjusts the level of the paging tone.

TABLE 6-2 QUICK REFERENCE TABLE (CONTINUED)

Test	Description
73-SERIAL PORT?	Specifies the use of the console's RS-232 port (CSDM, PRINTER, CLOCK).
74-MIC INPUT?	Specifies which microphone is in use (INTERNAL, GOOSE, DESKMIC).
75-SLV S/W NUM?	Displays the part number and the version number of the current TMS software installed.

To view internal tests and programs:

PROCEDURE 6-1 HOW TO VIEW INTERNAL TESTS AND PROGRAMS

1 Press the Shift ∧ and the Select (Sel) buttons on the keypad module.

Result: The keypad displays TEST/SETUP #.

2 Press Scroll Up (↑) or Scroll Down (↓).

Result: Tests and programs are shown in sequence on the keypad display.

NOTE

A number, shown on the left-hand side of the keypad display, is assigned to each test and program.

ENTERING A TEST PROGRAM

There are two methods to initiate a test/setup.

METHOD 1

To enter a test program (method 1):

PROCEDURE 6-2 HOW TO ENTER A TEST PROGRAM (METHOD 1)

1 Press the Shift ∧ and the Select (Sel) buttons on the keypad module.

Result: The keypad displays TEST/SETUP #.

2 Press Scroll Up (↑) or Scroll Down (↓) until the desired test or program appears on the keypad display.

Result: The keypad displays the name and the corresponding number of the program.

PROCEDURE 6-2 HOW TO ENTER A TEST PROGRAM (METHOD 1)

3	Press Menu/Home on the keypad. **Result:** Only the program name is displayed.
4	Initiate internal test or setup.

METHOD 2

To enter a test program (method 2):

PROCEDURE 6-3 HOW TO ENTER A TEST PROGRAM (METHOD 2)

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The keypad displays TEST/SETUP #.
2	Enter the digits corresponding to the test or program then press Menu/ Home.
3	Initiate internal test or setup.

NOTE

Tests 50 to 75 are reserved for maintenance. To access tests 50 and above, press Shift (^) and the Select (Sel) buttons while pressing the PTT switch on the Keypad, then use the Scroll Up (F) or Scroll Down (A) buttons to browse through the tests.

EXITING A TEST PROGRAM

To exit a test program:

PROCEDURE 6-4 HOW TO EXIT A TEST PROGRAM

1	Press the Select (Sel) button time to exit during a test or program. **Result:** The time and date are displayed on the keypad.

0-TIME MODE?

The TIME MODE feature allows you to select the 12 hour (AM and PM) or the 24 hour time display format.

NOTE

This test is only valid if the option is enabled by CSDM Lite.

To use the Time Mode feature:

PROCEDURE 6-5 HOW TO USE THE TIME MODE FEATURE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 0 on the keypad or press the Scroll Up (↑) and Scroll Down (↓) buttons until the keypad display indicates 0-TIME MODE?, then press Menu/Home.
3	Press digit 1 on the keypad to select the 12 hour format. **Result:** The Keypad displays FORMAT: 12-hour.
4	Press digit 2 on the keypad to select the 24 hour format. **Result:** The Keypad displays FORMAT: 24-hour.
5	Press Menu/Home to validate the Time Mode.

1-SET TIME?

SET TIME allows you to set the time of the console. As a preliminary step, identify the Time Mode (see "0-TIME MODE?" on page 6-5) before modifying the SET TIME.

NOTE

This test is only valid if the option is enabled by CSDM Lite.

SET TIME IN 12-HOUR FORMAT

To set the time in 12-hour format:

PROCEDURE 6-6 HOW TO SET THE TIME IN 12-HOUR FORMAT

1	Set the Time mode to 12-hour format (see "0-TIME MODE?" on page 6-5).
2	Enter the hour and minutes in 12-hour format. **Result:** The Keypad displays "?M", prompting the dispatcher to enter A for AM or P for PM.
3	To select A, press digit 1. To select P, press digit 2.
4	Press Menu/Home to validate the time.

NOTE

It is not possible to set the time in the 12 hour format while the Time Mode is in 24 hour format

SET TIME IN 24-HOUR FORMAT

To set the time in 24-hour format:

PROCEDURE 6-7 HOW TO SET THE TIME IN 24-HOUR FORMAT

1	Set the Time mode to 24-hour format (see "0-TIME MODE?" on page 6-5).
2	Enter the hour and minutes in 24-hour format.
3	Press Menu/Home to validate the time.

NOTE

It is not possible to set the time in the 24 hour format while the Time Mode is in 12 hour format

2-SET DATE?

The SET DATE allows you to modify or set a new date.

To set the date:

PROCEDURE 6-8 HOW TO SET THE DATE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 2 on the keypad or press the Scroll Up (↑) and Scroll Down (↓) buttons until the keypad display indicates 2-SET DATE?, then press Menu/Home.
3	Using the Keypad, enter the DAY/MONTH/YEAR.
4	Press Menu/Home to validate the date.

NOTE

This test is only valid if the option is enabled by CSDM Lite.

3-DISP LEVEL?

The DISP LEVEL allows you to increase or decrease the intensity of the displays on the control modules of a console.

To set the module display intensity:

PROCEDURE 6-9 HOW TO SET THE MODULE DISPLAY INTENSITY

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 3 on the keypad or press the Scroll Up (↑) and Scroll Down (↓) buttons until the keypad display indicates 3-DISP LEVEL?, then press Menu/Home. **Result:** The Keypad displays DISPLAY UP/DOWN.
3	Scroll Up (↑) or Scroll Down (↓) to increase or decrease the control module display intensity.
4	Press Menu/Home to validate the intensity setting of the displays.

4-LED LEVEL?

The LED LEVEL allows you to increase or decrease the intensity of the LED on the control modules of a console.

To set the LED intensity on the control modules:

PROCEDURE 6-10 HOW TO SET THE LED INTENSITY ON THE CONTROL MODULES

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 4 on the keypad or press the Scroll Up (↑) and Scroll Down (↓) buttons until the keypad display indicates 4-LED LEVEL?, then press Menu/Home. **Result:** The Keypad displays LED UP/DOWN.
3	Scroll Up (↑) or Scroll Down (↓) to increase or decrease the intensity of the LED on the control module.
4	Press Menu/Home to validate the LED level setting.

11-PROG PAGE?

This feature allow you to program a speed page or a manual page.

PAGE MENU

To activate the page menu:

PROCEDURE 6-11 HOW TO ACTIVATE THE PAGE MENU

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 11 on the keypad or press the Mode Up (↑) or Mode Down (↓) buttons until the keypad display indicates 11-PROG PAGE?, then press Menu/Home. **Result:** The Keypad displays Select PAGE or it shows the current value that was saved.

NOTE

The program feature is only valid if the option is enabled by CSDM Lite.

MANUAL PAGE

To program a manual page:

PROCEDURE 6-12 HOW TO PROGRAM A MANUAL PAGE

1	Activate the Page Menu (see “Page Menu” on page 6-9)
2	Press the Page # button that you want to reprogram. **Result:** The keypad displays the current page format.
3	Press Mode Up (↑) or Mode Down (↓) to select the page format. **Result:** The keypad display shows the new page format.
4	Press Menu/Home to validate the page format. **Result:** The keypad displays Annotation: XX.
5	Enter the new annotation using the keypad digits and Clear. **Result:** The keypad displays the new digits entered.
6	Press Menu/Home to validate the annotation. **Result:** The keypad displays the time.

SPEED PAGE

To program a speed page:

PROCEDURE 6-13 HOW TO PROGRAM A SPEED PAGE

1	Activate the Page Menu (see "Page Menu" on page 6-9).
2	Press the Speed Page # button that you want to reprogram. **Result:** The keypad displays the current speed page destination.
3	Scroll Up (↑) or Scroll Down (↓) to select the page destination. **Result:** The keypad displays the new speed page destination.
4	Press enter to validate the page destination. **Result:** The keypad displays the time.

12-SET RAD VOL?

To adjust the speaker volume of a radio channel that is programmed on an ACM:

PROCEDURE 6-14 HOW TO ADJUST THE SPEAKER VOLUME OF A RADIO CHANNEL PROGRAMMED ON AN ACM

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 12 on the keypad or press the Scroll Up (↑) and Scroll Down (↓) buttons until the keypad display indicates 12-SET RAD VOL?, then press Menu/Home. **Result:** The Keypad displays Select CHANNEL.
3	ress the Select button for the channel to be adjusted. **Result:** The keypad displays the name of the channel on the ACM (8 characters) followed by the last level setting in dB. The display looks as follows: CHANNEL_NAME: -3 dB
4	Press Scroll Up (↑) or Scroll Down (↓) to set the channel volume. **Result:** The volume varies from maximum to 0 dB to -21 dB in 3-dB steps.
5	Press Menu/Home to validate the time.

13-SET DIAL UP?

This function allows you to specify phone numbers for dial-up connections for data and/or voice and connects and disconnects the dial-up modem.

To specify a phone number for dial-up connection:

PROCEDURE 6-15 HOW TO SPECIFY A PHONE NUMBER FOR DIAL-UP CONNECTION

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 13 on the keypad or press the Scroll Up (↑) and Scroll Down (↓) buttons until the keypad display indicates 13-SET DIAL UP, then press Menu/Home. **Result:** The keypad display shows: Dial Up: Choose Channel
3	To choose the channel, press the Select button on the corresponding DRCM. **Result:** The display indicates Dial Up: Voice
4	If required, enter a telephone number for the voice channel and press Menu/Home. **Result:** You are returned to the main display on the keypad. OR Press Scroll Up (↑) to select the next item. **Result:** The display indicates Dial Up: Data
5	If required, enter a telephone number for the data channel and press Menu/Home. **Result:** You are returned to the main display on the keypad. OR Press Scroll Up (↑) to select the next item. **Result:** The display looks as follows: Press Menu/Home To Connect

PROCEDURE 6-15 HOW TO SPECIFY A PHONE NUMBER FOR DIAL-UP CONNECTION

6	Press Menu/Home to connect. **Result:** You are returned to the main display on the keypad. OR Press Scroll Up (↑) to select the next item. **Result:** The display looks as follows: Press Menu/Home To Disconnect
7	Press Menu/Home to disconnect. **Result:** You are returned to the main display on the keypad. OR Press Select (Sel) to cancel. **Result:** You are returned to the main display on the keypad.

50-NODE ID?

This function displays the console identification name.

To display the console identification name:

PROCEDURE 6-16 HOW TO DISPLAY THE CONSOLE IDENTIFICATION NAME

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 50 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 50-NODE ID?, then press Menu/Home. **Result:** The keypad displays the console identification name.
3	Press Select (Sel) to end the test.

51-S/W NUMBER?

This function displays the part number and version number of the current console software installed.

To display the part and version number at the current console:

PROCEDURE 6-17 HOW TO DISPLAY THE PART AND VERSION NUMBER AT THE CURRENT CONSOLE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 51 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 51-S/W NUMBER?, then press Menu/Home. **Result:** The keypad displays the P/N and version of the console software (**example:**, 3211111-1 SR1).
3	Press Select (Sel) to end the test.

52-DBASE REV?

The DBASE REV provides the revision code of the current database installed.

To display the revision code of the current database installed:

PROCEDURE 6-18 HOW TO DISPLAY THE REVISION CODE OF THE CURRENT DATABASE INSTALLED

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 52 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 52-DBASE REV?, then press Menu/Home. **Result:** The keypad displays the DATABASE REVISION (**example:** DATABASE REV-003).
3	Press Select (Sel) to end the test.

53-LED TEST?

Verifies the functionality of the LED and the segments of the display on an operator module.

To verify the functionality of the LED and of the display of an operator module:

PROCEDURE 6-19 HOW TO VERIFY THE FUNCTIONALITY OF THE LED AND OF THE DISPLAY OF AN OPERATOR MODULE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 53 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 53-LED TEST?, then press Menu/Home. **Result:** The Keypad display indicates LED TEST, all other display and LED are OFF
3	Press any button, except Select (Sel), on any module. **Result:** All indicators and displays on the module are turned ON and all indicators and displays are cleared, except for the LED TEST indication on the keypad display.
4	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

54-BUTTON TEST?

Verifies that the buttons are associated to the appropriate function.

To verify the module button assignments:

PROCEDURE 6-20 HOW TO VERIFY THE MODULE BUTTON ASSIGNMENTS

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 54 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 54-BUTTON TEST?, then press Menu/Home. **Result:** The Keypad display indicates BUTTON TEST
3	Press and hold the button you wish to test. They keypad display indicates the function. For example: Page TX SEL.
4	Release the button. **Result:** The keypad display indicates BUTTON TEST.

PROCEDURE 6-20 HOW TO VERIFY THE MODULE BUTTON ASSIGNMENTS

5	Repeat steps 3-4 for each button you wish to test.
6	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

55-VOLUME TEST?

Verifies the volume control settings of the CCM, Select and Unselect speakers.

To verify the volume of the CCM, Select and Unselect speakers:

PROCEDURE 6-21 HOW TO VERIFY THE VOLUME OF THE CCM, SELECT AND UNSELECT SPEAKERS

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 55 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 55-VOLUME TEST?, then press Menu/Home. **Result:** The Keypad display indicates VOLUME TEST.
3	Vary the Select speaker module volume control. **Result:** The keypad display indicates Select: VOL:##., where ## is a value between 00 and 15 depending on the position of the volume control.
4	Vary the Unselect speaker module volume control. **Result:** The keypad display indicates Unselect: VOL:##., where ## is a value between 00 and 15 depending on the position of the volume control.
5	Vary the CCM module volume controls. **Result:** The keypad display indicates *CHANNEL* VOL:##., where *CHANNEL* is the channel assigned to the CCM and ## is a value between 00 and 15 depending on the position of the volume control.
6	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

56-SENSE TEST?

Verifies that the operator or supervisor headset jackbox can detect a device connected to the headset jack.

To verify that the headset jackboxes can detect a connected device in the jack:

PROCEDURE 6-22 HOW TO VERIFY THAT THE HEADSET JACKBOXES CAN DETECT A CONNECTED DEVICE IN THE JACK

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 56 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 56-SENSE TEST?, then press Menu/Home. **Result:** The Keypad display indicates DEV: oper supv if no headset/ handsets are connected.
3	Insert the jack of a headset into the operator jackbox. **Result:** The keypad display should indicate DEV: OPER supv.
4	Insert the jack of a headset into the supervisor jackbox. **Result:** The keypad display should indicate DEV: OPER SUPV.
5	Remove the operator headset plug from the jackbox. **Result:** The keypad display should return to indicating DEV: oper SUP.
6	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

61-TONE TEST?

This function allows you to verify the speaker and headset operation.

To verify the speaker and headset operation:

PROCEDURE 6-23 HOW TO VERIFY THE SPEAKER AND HEADSET OPERATION

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 61 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 61-TONE TEST?, then press Menu/Home. **Result:** The keypad display indicates the name of the audio output device and a tone is sent to that device.
3	Select the audio output device you want to test by pressing the Scroll Up (↑) and Scroll Down (↓) buttons on the keypad. **Result:** The keypad display indicates the name of the audio output device where a tone is sent.
4	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

62-MIC TEST?

This function allows you to verify the microphone operation.

To verify the microphone operation:

PROCEDURE 6-24 HOW TO VERIFY THE MICROPHONE OPERATION

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 62 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 62-MIC TEST?, then press Menu/Home. **Result:** The Keypad display indicates MIC TEST
3	Select the audio input device you want to test by pressing the Scroll Up (↑) and Scroll Down (↓) buttons on the keypad. Both the operator and supervisor headset and desk/gooseneck microphone can be tested.

PROCEDURE 6-24 HOW TO VERIFY THE MICROPHONE OPERATION

4	Use the Scroll Up (↑) and Scroll Down (↓) buttons to select the appropriate setting. The following settings are available: • OPERATOR HS: the microphone on the operator headset is tested. • SUPERVISOR HS: the microphone on the supervisor headset is tested. • MIC IN: TEST #74: the selected microphone is tested. The selected microphone may be either the console's internal microphone, a gooseneck microphone, or a deskmic. See "74-MIC INPUT?" on page 6-24 to select a microphone.
5	Speak into the microphone. **Result:** The audio from the microphone is sent to the headset or Select speaker. The VU meter indicates the loudness of your voice.
6	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

63-PTT TEST?

Use this test to verify the foot-switch and microphone PTT operation.

When the test is selected, the keypad display indicates:

- "PTT" — Push-to-talk
- "lh" — left hand
- "rh" — right hand
- "mic" — microphone

Whenever a switch is detected, it appears on the keypad in capital letters. For instance, if you are testing the left switch on the footswitch, the Keypad display would indicate PTT: LH rh mic. Notice that LH is shown in capital letter to indicate that it is detected.

To verify the foot-switch and microphone PTT operation:

PROCEDURE 6-25 HOW TO VERIFY THE FOOT-SWITCH AND MICROPHONE PTT OPERATION

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 63 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 63-PTT TEST?, then press Menu/Home. **Result:** The Keypad display indicates PTT: lh rh mic.

PROCEDURE 6-25 HOW TO VERIFY THE FOOT-SWITCH AND MICROPHONE PTT OPERATION

3	Press the left switch of the foot-switch or the monitor button on the microphone. **Result:** The keypad display indicates PTT: LH rh mic.
4	Release the left switch of the foot-switch or the monitor button on the microphone. **Result:** The keypad display indicates PTT: lh rh mic.
5	Press the right switch of the foot-switch. **Result:** The keypad display indicates PTT: lh RH mic.
6	Release the right switch of the foot-switch. **Result:** The keypad display indicates PTT: lh rh mic.
7	Press the mic PTT. **Result:** The keypad display indicates PTT: lh rh MIC.
8	Release the mic PTT. **Result:** The keypad display indicates PTT: lh rh mic.
9	Press Select (Sel) to end the test. **Result:** The CommandSTAR Lite console returns to normal operating condition.

64-CALL DIR RX?

Use this function to set the receive level of the call director.

To set receive level of the call director:

PROCEDURE 6-26 HOW TO SET THE RECEIVE LEVEL OF THE CALL DIRECTOR

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 64 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 64-CALL DIR RX?, then press Menu/Home. **Result:** The Keypad displays the current level from 0 to 7.

PROCEDURE 6-26 HOW TO SET THE RECEIVE LEVEL OF THE CALL DIRECTOR

3	Use Scroll Up (↑) or Scroll Down (↓) to select the receive level of the call director. **Result:** Level shows on the keypad display.
4	Press Menu/Home to select appropriate level. **Result:** Return to the main display on the keypad.

65-CALL DIR TX?

This function allows you to set the transmit level for the call director.

To set the transmit level for the call director:

PROCEDURE 6-27 HOW TO SET THE TRANSMIT LEVEL FOR THE CALL DIRECTOR

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 65 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 65-CALL DIR TX?, then press Menu/Home. **Result:** The Keypad displays the current level from 0 to 7.
3	Use Scroll Up (↑), Scroll Down (↓), Menu/Home to select the transmit level of the call director. **Result:** Level shows on the keypad display.
4	Press Menu/Home to select appropriate level. **Result:** Return to the main display on the keypad.

68-SET GRANT?

This function allows you to adjust the level of the grant tone by allowing three levels of adjustment: NONE, SOFT, or LOUD.

To set the level of grant tone:

PROCEDURE 6-28 HOW TO SET THE LEVEL OF GRANT TONE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 68 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 68-SET GRANT?, then press Menu/Home. **Result:** The Keypad displays GRANT TONE: [setting], where setting is the last value that was saved.
3	Use the Scroll Up (↑) and Scroll Down (↓) buttons to select the appropriate setting. The following settings are available:NONE, SOFT, LOUD
4	Press Menu/Home to select appropriate setting. **Result:** Return to the main display on the keypad.

69-TONE TO I/F?

This test function routes an internally generated 1 kHz tone at programmed audio level instead of the microphone audio.This could be useful in the event the MIC audio path does not work and the dispatcher wants to test a specific audio path that would normally require the microphone.This function routes an internally generated 1 kHz tone at the Tx level set for that channel instead of the microphone audio.

To route a tone at the programmed audio level:

PROCEDURE 6-29 HOW TO ROUTE A TONE AT THE PROGRAMMED AUDIO LEVEL

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 69 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 69-TONE TO I/F?, then press Menu/Home. **Result:** The Keypad displays TONE TO I/F:OFF. It shows the status ON or OFF when test 69 is called.
3	Use Scroll Up (↑) and Scroll Down (↓) buttons to select the appropriate status. **Result:** The display indicates ON or OFF.
4	Press Menu/Home to select appropriate status. **Result:** You are returned to the main display on the Keypad.

70-RESET?

This function allows the maintenance personnel to initiate a console reset.

WARNING

Console reset should only be performed by qualified maintenance personnel. Resetting a console will affect system operation.

To initiate a console reset:

PROCEDURE 6-30 HOW TO INITIATE A CONSOLE RESET

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 70 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 70-RESET?, then press Menu/Home. **Result:** The Keypad displays PASSWORD
3	Enter the PASSWORD (the password is **12345**). This is not a hidden password, it is only a number that you enter so that the RESET is not immediate when RESET is selected.  **NOTE** If you enter the wrong numbers the keypad displays WRONG PASSWORD.
4	Press Menu/Home to select validate RESET. The console resets is equivalent to turning the power OFF, then ON.

71-SET MIC AGC?

This function allows you to set the Automatic Gain Control (AGC) ON or OFF on the microphone.

To toggle the AGC:

PROCEDURE 6-31 HOW TO TOGGLE THE AGC

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 71 on the keypad or hold the PTT button while pressing the Scroll Up (🡅) and Scroll Down (🡇) buttons simultaneously, then Scroll Up (🡅) and Scroll Down (🡇) until the keypad display indicates 71-SET MIC AGC?, then press Menu/Home. **Result:** Depending on the actual setup, the Keypad displays one of the following: "AGC: ON," "AGC: HDST ONLY," or "AGC OFF."
3	Use the Scroll Up (🡅) and Scroll Down (🡇) buttons to select the appropriate setting. The following settings are available: • AGC: ON — AGC is set on all microphones • AGC: HDST ONLY — AGC is set on headset microphones but not on the Gooseneck or the Desktop microphones • AGC OFF — NO AGC on the microphones
4	Press Menu/Home to select appropriate setting. **Result:** You are returned to the main display on the keypad.

72-PAGING TONE?

This function allows you to adjust the level of the paging tone by allowing three levels of adjustment: NONE, SOFT, or LOUD.

To set the level of the paging tone heard at the console:

PROCEDURE 6-32 HOW TO SET THE LEVEL OF THE PAGING TONE HEARD AT THE CONSOLE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 72 on the keypad or hold the PTT button while pressing the Scroll Up (🡅) and Scroll Down (🡇) buttons simultaneously, then Scroll Up (🡅) and Scroll Down (🡇) until the keypad display indicates 72-PAGING TONE?, then press Menu/Home. **Result:** The Keypad displays PAGING TONE: [SETTING], where 'setting' is the last value that was saved.
3	Use the Scroll Up (🡅) and Scroll Down (🡇) buttons to select the appropriate setting. The following settings are available: "NONE," "SOFT," or "LOUD."
4	Press Menu/Home to select appropriate setting. **Result:** You are returned to the main display on the keypad.

73-SERIAL PORT?

This function allows you to specify the use of the console RS-232 port (CSDM, PRINTER, CLOCK).

To specify the console RS-232 port:

PROCEDURE 6-33 HOW TO SPECIFY THE CONSOLE RS-232

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 73 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 73-SERIAL PORT?, then press Menu/Home. **Result:** Depending on the current setting, the Keypad displays one of the following: "SERIAL PORT: CSDM," "SERIAL PORT: PRINTER," or "SERIAL PORT:CLOCK."
3	Use the Scroll Up (↑) and Scroll Down (↓) buttons to select the appropriate setting. The following settings are available: • SERIAL PORT: CSDM — the console's RS-232 port is connected to the CSDM Lite computer. • SERIAL PORT: PRINTER — the console's RS-232 port is connected to a printer. • SERIAL PORT: CLOCK — the console's RS-232 port is connected to an external clock source.
4	Press Menu/Home to select appropriate setting. **Result:** Return to the main display on the keypad.

74-MIC INPUT?

This function allows you to specify which microphone is in use (INTERNAL, GOOSE, DESKMIC).

To specify the microphone in use:

PROCEDURE 6-34 HOW TO SPECIFY THE MICROPHONE IN USE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 74 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons simultaneously, then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 74-MIC INPUT?, then press Menu/Home. **Result:** Depending on the current setting, the Keypad displays one of the following: "MIC INPUT: INTERNAL," "MIC INPUT: GOOSE," or "MIC INPUT: DESKMIC."
3	Use the Scroll Up (↑) and Scroll Down (↓) buttons to select the appropriate setting. The following settings are available: • MIC INPUT: INTERNAL — the console's internal microphone is in use. • MIC INPUT: GOOSE — a gooseneck microphone is in use. • MIC INPUT: DESKMIC — a deskmic is in use.
4	Press Menu/Home to select appropriate setting. **Result:** Return to the main display on the keypad.

75-SLV S/W NUM?

This function displays the part number and version number of the current TMS software installed.

To display the part and version number of the current TMS software:

PROCEDURE 6-35 HOW TO DISPLAY THE PART AND VERSION NUMBER OF THE CURRENT TMS SOFTWARE

1	Press the Shift ∧ and the Select (Sel) buttons on the keypad module. **Result:** The display indicates TEST/SETUP #
2	Either enter 75 on the keypad or hold the PTT button while pressing the Scroll Up (↑) and Scroll Down (↓) buttons then Scroll Up (↑) and Scroll Down (↓) until the keypad display indicates 75-SLV S/W NUM?, then press Menu/Home. **Result:** The keypad displays the P/N and version of the TMS software (**example:** 3211111-1 SR1).
3	Press Select (Sel) to end the test.

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CHAPTER 7

COMMANDSTAR LITE SYSTEM DATABASE MANAGER (CSDM LITE)

The CommandSTAR Lite System Database Manager (CSDM Lite) is conceived as a powerful configuration and maintenance tool for CommandSTAR Lite console. Through the use of an intuitive menu-driven interface, not only is it possible to configure a CommandSTAR Lite system to meet numerous requirements but it is also possible, through the CSDM Lite monitoring facility to troubleshoot console problems. Features such as alarm messaging and diagnostic features allow you to troubleshoot the consoles to the module level.

This chapter lists the options provided at the CSDM Lite to verify the integrity of individual modules.

CSDM LITE HARDWARE REQUIREMENTS

A CSDM Lite terminal consists of an Intel-based PC with enough power to operate Windows XP Professional, a mouse, and CSDM Lite software.

NOTE

The CSDM Lite software is compatible only with Windows XP.

CSDM LITE ALARMS AND MESSAGES

GENERAL

The CommandSTAR Lite console reports all error conditions and system diagnostics to a connected CSDM Lite.

To help identify system errors quickly and efficiently, CSDM Lite displays on the screen and stores on magnetic media for future reference, any events reported by a CommandSTAR Lite console. Reporting of events on the screen and on the magnetic media is performed regardless of the active menu at the CSDM Lite. There is no error logging menu in the CSDM Lite because CSDM Lite is always ready to capture errors reported by the CommandSTAR Lite a console to which it is connected.

USER INTERFACE

CommandSTAR Lite maintains a separate file containing the daily log. Utilities such as page up, page down, search are provided to help qualified personnel browse through the log file and search for specific events.

At midnight daily, the current log file is closed for archival purposes and a new log file is opened. The log file name always reflects the current system date.

Each error log contains the following fields:

1. Time Stamp the date and time at which the event has occurred.
2. Error string an English sentence or a set of abbreviations that easily identify the nature of the event.
3. Source file name of the file where the log is originating.
4. Source line number line number in the source file where the log is originating.

For any error logging level, these four fields are stored on the CSDM Lite magnetic media. When the CSDM Lite is not present, the latest logs are kept at the consoles in non-volatile memory.

See the *CommandSTAR Lite System Database Manager Manual* for more detailed information.

BROWSING THE LOG FILES

At the CSDM Lite terminal, a menu option is provided to generate the log files.

The log files are generated to be viewed using a web browser. The browser utility provides:

- Text search
- Search again
- Page up
- Page down
- HTML table of contents
- Scroll line up
- Scroll line down

See the *CommandSTAR Lite System Database Manager Manual* for more detailed information.

CSDM LITE MESSAGES ON CSDM LITE PROBLEMS

The CSDM Lite software is an executable program; it should start when the program name is invoked, but it will not test itself to find out what is wrong. If anything goes wrong when starting CSDM Lite, Windows XP will most likely report a message on the screen. The probable cause of failure, in this case, is an improper computer configuration.

After login, anything wrong with the system is reported on the screen through alarms and error messages.

In any case, you should always look at the screen carefully to identify any message that is not normal. Write the error message with associated number, string number or reference and report the problem immediately to Motorola.

SOFTWARE ON BACK-UP DISKS

If the CSDM Lite software becomes corrupted, it is usually indicated by an error message, system crash or lockup, or by the inability of the program to display the start-up screen. You can use your backup copy to replace the software or if Motorola provides a new and improved version of the CSDM Lite software, you can use the upgrade disk to load the changes.

To re-install the CSDM Lite software insert the CSDM Lite CD-ROM disk and follow the on-screen instructions.

It is recommended that back-up copies of your database files (*.dbl) be backed-up on a piece of portable media, such as a diskette, a recordable CD-ROM, or a flash card using the **Save As** command in the CSDM Lite. If your local database file becomes corrupted, replace it with the backed-up copy to the local directory.

NOTE

Be sure to store your backup and upgrade disks securely.

RELOADING THE FACTORY DATABASE

If a console indicates “NOT IN DATABASE” at power-up, you must upload the configuration database. A copy of the database should be available on the CSDM Lite hard disk from the last time a Save Configuration command was executed. At the very least, a copy of the initial database generated at installation will be available.

NOTE

Whenever you make configuration change (especially at initial set-up), be sure to save a copy of the new configuration.

If multiple databases are present, upload the database that is appropriate. This is done in two steps:

PROCEDURE 7-1 RELOADING THE FACTORY DATABASE

1	Load the configuration.
2	Execute a database upload command.

See the *CommandSTAR Lite System Database Manager Manual* for more detailed information.

RELOADING THE CONSOLE SOFTWARE

If a console indicates "BOOTSTRAP" at power-up, you must upload the console software. If you have previously received a software upgrade kit for the console, you can use the software included in the kit. Otherwise, contact Motorola for a copy of the software.

Follow these steps to upload the console software:

PROCEDURE 7-2 RELOADING THE CONSOLE SOFTWARE

1 Copy the three console software files to the directory on the CSDM Lite computer that holds the CSDM Lite executable program.

NOTE

If necessary, extract the files from an archive (e.g., a zip file). The three files are: TMS.hi, TMS.lo, and Cop.x

2 Execute a software upload command.

See the *CommandSTAR Lite System Database Manager Manual* for more detailed information.

VENDOR SOFTWARE

If you encounter problems with non-Motorola software, such as Windows XP, use standard PC utilities to investigate further. If you come to a dead-end, contact the appropriate vendor.

HARDWARE DIAGNOSTICS

CSDM Lite is capable of performing hardware testing of a CommandSTAR Lite console. These tests provide in-depth verification of analog and digital paths of the system audio routing and assist the CSDM Lite operator in isolating audio circuitry faults to the sub-circuit level.

See “Hardware Status” in the “Diagnostics” chapter of the *CommandSTAR Lite System Database Manager Manual* for detailed information on reviewing hardware diagnostic status.

SOFTWARE UPLOAD

From time to time, improvements and new features are made to CommandSTAR Lite consoles. These improvements and new features are packaged as an upgrade kit that you can order from Motorola or your Motorola dealer. Usually, these upgrades take the form of new software for components of the CommandSTAR Lite console. The CSDM Lite is used to upload new software to the components of a CommandSTAR Lite console.

See the “Upgrade Menu” chapter in the *CommandSTAR Lite System Database Manager Manual* for instructions on how to upload a software upgrade.

SYSTEM ALARMS

GENERAL

Regardless of the login level of the user, when a malfunction or a failure is detected by the system, an alarm is triggered at the CSDM Lite to warn you that something has happened. The visual ALARM string appears and blinks in the status bar, at the left of the Active database: field in the top right corner of the screen.

USER INTERFACE

The **Alarm Type** option on the **System Configuration - General** dialog allows you to select the type of audible alarm that will be heard at the console.

When a malfunction or a failure is detected, the ACK ALARM action box is enabled, and highlighted in the taskbar, allowing the user to acknowledge the alarm. When selected, the blinking visual indicator stops blinking and remains permanently ON, the audible alarm is muted and the action box is dimmed (gray).

The visual ALARM indicator disappears when the alarm is acknowledged and all tests are good. The various alarm conditions resume as follows:

TABLE 7-1 VARIOUS ALARM CONDITIONS

Blinking:	a new fail diagnostic has been received
Steady ON:	the user has acknowledged the alarm but the test still fails
OFF:	all tests are good

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CHAPTER 8

TROUBLESHOOTING SPECIFIC PROBLEMS

This chapter provides suggestions to perform preliminary verifications on the CommandSTAR Lite should the dispatcher encounter operational problems during radio or telephone operations. References to additional troubleshooting information and procedures are also specified in this chapter.

QUICK REFERENCE

TABLE 8-1 TROUBLESHOOTING SPECIFIC PROBLEMS: QUICK REFERENCE

Problems	Page Ref
Headset cannot transmit or receive signal	page 8-2
Incorrect display on CCM or Keypad	page 8-3
Internal tests cannot be monitored	page 8-3
No audio at customer equipment	page 8-3
No Radio communication	page 8-4
No radio, telephone line, intercom, or control over external devices	page 8-4
Non-operational LED	page 8-4
Radio Channels	page 8-2
Select or unselect speaker volume control does not work	page 8-5
The console is not working (no LED or no display)	page 8-5
The Keypad display says “BOOTSTRAP”	page 8-5
The Keypad display says “NOT IN DATABASE”	page 8-6
Hardware diagnostic status is not “PASSED”	page 8-6

RADIO CHANNELS

When you have a problem with a radio channel, verify whether the problem occurs:

- On a single radio channel
- On multiple radio channels
- On a single console
- At multiple consoles

Once you have established the source of the problem, you can proceed to find the condition in the next paragraphs and take whatever action is required to identify and eliminate the problem.

TROUBLESHOOTING THE COMMANDSTAR LITE

The next tables are divided in three columns; a column indicating the steps required to resume a procedure, an action column detailing the suggested verification or procedure to locate the problem and a column providing references to additional information, where applicable. These initial verifications and procedures require no special tools or equipment.

HEADSET CANNOT TRANSMIT OR RECEIVE SIGNAL

TABLE 8-2 THE HEADSET CANNOT TRANSMIT OR RECEIVE SIGNAL

Step	Action	Reference
1	Perform the Sense test to verify that the headset jackboxes are operational.	Chapter 3
2	If the Sense test fails, replace the defective jackbox.	
3	Perform the Tone to device tests to verify the headset is functional and perform the MIC test.	Chapter 3
4	If the Tone test to the headset fails, replace the headset.	

INCORRECT DISPLAY ON CCM OR KEYPAD

TABLE 8-3 INCORRECT DISPLAY ON CCM OR KEYPAD

Step	Action	Reference
1	Perform LED test and to verify that no segments are inoperative.	Chapter 3
2	If any segment are found inoperative, replace the faulty module.	

INTERNAL TESTS CANNOT BE MONITORED

TABLE 8-4 INTERNAL TESTS CANNOT BE MONITORED

Step	Action	Reference
1	From the CSDM Lite, monitor audio tests on the console.	See *CSDM Lite Manual.*
2	Verify that all modules are firmly inserted in the console and the cables between console and peripheral equipment are tightly in place and secured.	

NO AUDIO AT CUSTOMER EQUIPMENT

TABLE 8-5 NO AUDIO AT CUSTOMER EQUIPMENT

Step	Action	Reference
1	Verify that the signal is present at the cross-connect terminal. **NOTE** If the signal is present at the cross-connect terminal, the problem is outside the CommandSTAR Lite.	Chapter 3
2	Verify vendor equipment.	Vendor information.
3	If the signal is not present at the cross-connect terminal, replace defective module.	Chapter 3

NO RADIO COMMUNICATION

TABLE 8-6 NO RADIO COMMUNICATION

Step	Action	Reference
1	From the CSDM Lite, consult the Hardware Status menu.	See *CSDM Lite Manual*.
2	Perform the Tone to Device tests to verify that a tone can be routed from the CSDM Lite to the headset or speaker.	Chapter 3
3	Perform the Sense test and determine the operator/ supervisor headset and jackbox functionality.	Chapter 3
4	Replace any module that does not meet requirements.	

NO RADIO, TELEPHONE LINE, INTERCOM, OR CONTROL OVER EXTERNAL DEVICES

TABLE 8-7 NO RADIO, TELEPHONE LINE, INTERCOM, OR CONTROL OVER EXTERNAL DEVICES

Step	Action	Reference
1	Verify the telephone connections to console back panel.	
2	Verify the headset or desk microphone connections.	
3	Peripheral cards may be down. From the CSDM Lite, monitor audio tests on the console peripherals.	See *CSDM Lite Manual*.
4	Replace any module that does not meet requirements.	

NON-OPERATIONAL LED

TABLE 8-8 NON-OPERATIONAL LED

Step	Action	Reference
1	Perform LED test and to verify that all LED light upon pressing a button on the control module.	Chapter 3
2	Replace any module that has defective LED.	

SELECT OR UNSELECT SPEAKER VOLUME CONTROL DOES NOT WORK

TABLE 8-9 SELECT OR UNSELECT SPEAKER VOLUME CONTROL DOES NOT WORK

Step	Action	Reference
1	Perform the Volume Test on speakers and CCM.	Chapter 3
2	If CCM fails tests, replace the module.	
3	Perform the Tone test to verify that a tone can be routed from the console to the speaker.	Chapter 3
4	If the Tone test fails, replace the module.	

THE CONSOLE IS NOT WORKING (NO LED OR NO DISPLAY)

TABLE 8-10 THE CONSOLE IS NOT WORKING (NO LED OR NO DISPLAY)

Step	Action	Reference
1	Verify that the console is plugged to the 115 VAC output. Make sure the 115 VAC outlet is serviceable.	
2	Verify that the AC cord is properly plugged into the console.	
3	Verify that the console power switch is switched to ON.	
4	Verify that all the cables from the console to peripheral equipment are tight and secured.	
5	When all fails, return the console back for further bench testing.	

THE KEYPAD DISPLAY SAYS "BOOTSTRAP"

TABLE 8-11 THE KEYPAD DISPLAY SHOWS "BOOTSTRAP"

Step	Action	Reference
1	Use the CSDM Lite Upgrade menu to upload console software.	Chapter 3
2	If this fails or if you do not have a copy of the console software, contact Motorola.	

THE KEYPAD DISPLAY SAYS "NOT IN DATABASE"

TABLE 8-12 THE KEYPAD DISPLAY SHOWS "NOT IN DATABASE"

Step	Action	Reference
1	Use the CSDM Lite Upgrade menu to upload the configuration database.	Chapter 3

HARDWARE DIAGNOSTIC STATUS IS NOT "PASSED"

TABLE 8-13 HARDWARE DIAGNOSTIC STATUS IS NOT "PASSED"

Step	Action	Reference
1	Connect a loopback cable to the console connector for the channel or channels in question.	Appendix A
2	Test the channel or channels in question to determine if the problem is in the console or in the connected equipment.	
3	If the problem is in the console, contact Motorola for repair or replacement of parts.	

CHAPTER 9

PREVENTIVE MAINTENANCE

This chapter describes the tests and procedures that should be performed at regular interval to avoid or minimize problems with your CommandSTAR Lite system.

MONITORING THE CSDM LITE

The CSDM Lite provides messages log that gives you direct information on how the system is behaving.

MONITORING MESSAGES

The CSDM Lite message should be verified regularly. The CSDM Lite messages provide alarms and diagnostics of critical problems and may identify minor problems that may be attended at an early stage, before they develop into major problems. Motorola offers maintenance contracts where Motorola monitors your system remotely and identifies possible problems which may become major concerns.

SITE MAINTENANCE

For the equipment to perform reliably and safely, certain requirements regarding the site maintenance must be met according to the equipment specifications. However, the site should be monitored on a continuous basis to ensure that the system is not affected by environmental changes such as new constructions, additions and modifications to an existing site. This chapter reviews site related topics necessary to minimize problems in the future.

CLEANING THE CONSOLES, MODULES

WARNING

The use of isopropyl alcohol or strong detergents to clean the outside surface of the equipment, may permanently damage or dull the finish of the equipment.

OUTSIDE SURFACE

It is recommended that any outside surface be cleaned using a soft damp cloth with warm water and a soft soap solution.

APPENDIX

A

PIN-OUTS AND SETTINGS

CONNECTOR PIN-OUTS

TABLE A-1 CHAMP1 50-PIN CONNECTOR (CH. 1–4)

PIN	SIGNAL		PIN	SIGNAL	
	CONVENT'L	DIGITAL		CONVENT'L	DIGITAL
1	GND		26	GND	
2	TX+ CH 1		27	TX– CH 1	
3	RX+ CH 1		28	RX– CH 1	
4	RCU+ CH 1	DATA+ CH 1	29	RCU– CH 1	DATA– CH 1
5	M LEAD+ CH 1		30	M LEAD– CH 1	
6	E LEAD CH 1	DIG BUSY CH 1	31	GND	
7	RECORDER+ CH 1		32	RECORDER– CH 1	
8	TX+ CH 2		33	TX– CH 2	
9	RX+ CH 2		34	RX– CH 2	
10	RCU+ CH 2	DATA+ CH 2	35	RCU– CH 2	DATA– CH 2
11	M LEAD+ CH 2		36	M LEAD– CH 2	
12	E LEAD CH 2	DIG BUSY CH 2	37	GND	
13	RECORDER+ CH 2		38	RECORDER– CH 2	
14	TX+ CH 3		39	TX– CH 3	
15	RX+ CH 3		40	RX– CH 3	
16	RCU+ CH 3	DATA+ CH 3	41	RCU– CH 3	DATA– CH 3
17	M LEAD+ CH 3		42	M LEAD– CH 3	
18	E LEAD CH 3	DIG BUSY CH 3	43	GND	
19	RECORDER+ CH 3		44	RECORDER– CH 3	
20	TX+ CH 4		45	TX– CH 4	
21	RX+ CH 4		46	RX– CH 4	
22	RCU+ CH 4	DATA+ CH 4	47	RCU– CH 4	DATA– CH 4
23	M LEAD+ CH 4		48	M LEAD– CH 4	
24	E LEAD CH 4	DIG BUSY CH 4	49	GND	
25	RECORDER+ CH 4		50	RECORDER– CH 4	

To create a cable for loopback testing (see *CSDM Lite Manual*), connect the following pins:

- Pin 2 to Pin 3 and Pin 27 to 28 for Channel 1
- Pin 8 to Pin 9 and Pin 33 to 34 for Channel 2
- Pin 14 to Pin 15 and Pin 39 to Pin 40 for Channel 3
- Pin 20 to Pin 21 and Pin 45 to Pin 46 for Channel 4

TABLE A-2 CHAMP2 50-PIN CONNECTOR (CH. 5–8)

PIN	SIGNAL		PIN	SIGNAL	
	CONVENT'L	DIGITAL		CONVENT'L	DIGITAL
1	GND		26	GND	
2	TX+ CH 5		27	TX– CH 5	
3	RX+ CH 5		28	RX– CH 5	
4	RCU+ CH 5	DATA+ CH 5	29	RCU– CH 5	DATA– CH 5
5	M LEAD+ CH 5		30	M LEAD– CH 5	
6	E LEAD CH 5	DIG BUSY CH 5	31	GND	
7	RECORDER+ CH 5		32	RECORDER– CH 5	
8	TX+ CH 6		33	TX– CH 6	
9	RX+ CH 6		34	RX– CH 6	
10	RCU+ CH 6	DATA+ CH 6	35	RCU– CH 6	DATA– CH 6
11	M LEAD+ CH 6		36	M LEAD– CH 6	
12	E LEAD CH 6	DIG BUSY CH 6	37	GND	
13	RECORDER+ CH 6		38	RECORDER– CH 6	
14	TX+ CH 7		39	TX– CH 7	
16	RX+ CH 7		40	RX– CH 7	
16	RCU+ CH 7	DATA+ CH 7	41	RCU– CH 7	DATA– CH 7
17	M LEAD+ CH 7		42	M LEAD– CH 7	
18	E LEAD CH 7	DIG BUSY CH 7	43	GND	
19	RECORDER+ CH 7		44	RECORDER– CH 7	
20	TX+ CH 8		45	TX– CH 8	
21	RX+ CH 8		46	RX– CH 8	
22	RCU+ CH 8	DATA+ CH 8	47	RCU– CH 8	DATA– CH 8
23	M LEAD+ CH 8		48	M LEAD– CH 8	
24	E LEAD CH 8	DIG BUSY CH 8	49	GND	
25	RECORDER+ CH 8		50	RECORDER– CH 8	

To create a cable for loopback testing (see *CSDM Lite Manual*), connect the following pins:

- Pin 2 to Pin 3 and Pin 27 to 28 for Channel 5
- Pin 8 to Pin 9 and Pin 33 to 34 for Channel 6

- Pin 14 to Pin 15 and Pin 39 to Pin 40 for Channel 7
- Pin 20 to Pin 21 and Pin 45 to Pin 46 for Channel 8

TABLE A-3 CALL DIRECTOR RJ45 CONNECTOR (CALL DIR)

PIN	SIGNAL
1	CALL DIRECTOR RX–
2	CALL DIRECTOR RX+
3	OFF HOOK
4	HANDSET SENSE
5	CALL DIRECTOR TX–
6	CALL DIRECTOR TX+
7	SHIELD
8	GND

TABLE A-4 DESKMIC RJ45 CONNECTOR (DESKMIC)

PIN	SIGNAL
1	—
2	—
3	MIC PTT
4	MIC IN+
5	MIC IN–
6	MONITOR
7	—
8	—

TABLE A-5 HEADSET RJ45 CONNECTOR (HEADSET OPR)

PIN	SIGNAL
1	OPER MIC–
2	OPER MIC+

TABLE A-5 HEADSET RJ45 CONNECTOR (HEADSET OPR)

PIN	SIGNAL
3	PTT SWITCH
4	HEADSET SENSE
5	OPER HDST–
6	OPER HDST+
7	SHIELD
8	—

TABLE A-6 SUPERVISOR HEADSET R45 CONNECTOR (HEADSET SUPV)

PIN	SIGNAL
1	SUPV MIC–
2	SUPV MIC+
3	PTT SWITCH
4	HEADSET SENSE
5	SUPV HDST–
6	SUPV HDST+
7	SHIELD
8	—

TABLE A-7 PTT FOOTSWITCH CONNECTOR (FTSW)

PIN	SIGNAL
1	FOOTSWITCH PTT
2	GND
3	MONITOR

TABLE A-8 GOOSENECK MICROPHONE CONNECTOR (MIC)

PIN	SIGNAL
1	MIC–
2	MIC+
3	MIC–

TABLE A-9 CSDM LITE DB9 RS-232 CONNECTOR (SCDM/RS232)

PIN	SIGNAL
1	SHIELD
2	RS-232 RX
3	RS-232 TX
4	—
5	GND
6	EXT TONE ENCODER RX+
7	EXT TONE ENCODER RX–
8	EXT TONE ENCODER SENSE
9	GND

TABLE A-10 I/O MODULE DB15 RS-422 CONNECTOR (EXT. I/O MODULE)

PIN	SIGNAL
1	SHIELD
2	+5V
3	+5V
4	+5V
5	+5V
6	RESET+
7	GND
8	RS-422 RX+

TABLE A-10 I/O MODULE DB15 RS-422 CONNECTOR (EXT. I/O MODULE)

PIN	SIGNAL
9	GND
10	RS-422 TX+
11	RESET–
12	GND
13	RS-422 RX–
14	GND
15	RS-422 TX–

TABLE A-11 INSTANT LOGGING RECORDER RJ12 CONNECTOR (LOG REC)

PIN	SIGNAL
1	—
2	RELAY/NO
3	RECORD+
4	RECORD–
5	RELAY/CM
6	—

TABLE A-12 CO LINE RJ12 CONNECTOR (CO LINE)

PIN	SIGNAL
1	—
2	LINE 2 TIP
3	LINE 1 RING
4	LINE 1 TIP
5	LINE 2 RING
6	—

TABLE A-13 POWER SUPPLY CONNECTOR (+5VIN)

PIN	SIGNAL
1	GND
2	IN –12V
3	IN +5V
4	IN –5A
5	IN +12V
6	GND
7	IN +5V
8	—

JUMPER SETTINGS

MAIN BOARD AND FOUR-CHANNEL EXPANSION MODULE

There are four jumpers on the Desktop console Main Board (P1–P4) and four more on the Four-channel Expansion module (also P1–P4). These jumpers are used to enable or disable the Direct Current Option module and to set its operation. Each jumper applies to one channel in the following order:

TABLE A-14 CHANNEL LOCATION

Channel 1:	Main board P1
Channel 2:	Main board P2
Channel 3:	Main board P3
Channel 4:	Main board P4
Channel 5:	Four-Channel Expansion Module P1
Channel 6:	Four-Channel Expansion Module P2
Channel 7:	Four-Channel Expansion Module P3
Channel 8:	Four-Channel Expansion Module P4

The following table shows the settings for these eight jumpters:

TABLE A-15 DC OPTION

PINS	OPEN	CLOSED
1–2	DC Option module present	No DC Option module
3–4	DC Option disabled	DC Option enabled
5–6	DC Loop	Line-to-ground

DIP SWITCH SETTINGS

S2 CONSOLE ID

Use S2 to specify the console address for digital radio. S2 is located toward the left front ocrner of the console main board

TABLE A-16 S2 CONSOLE ID

SWITCH	SETTING
BIT 1	Reserved (must be OFF — erases program code)
BIT 2	Reserved (must be OFF)
BIT 3	Reserved (must be OFF)
BIT 4	Reserved (must be OFF)
BIT 5	Reserved (must be OFF)
BIT 6	Reserved (must be OFF)
BIT 7	Always ON
BIT 8	Reserved (must be OFF — erases ROM database)

S1 MAIN BOARD — CONSOLE RADIO TYPE

S1 is located near the left rear corner of the console main board (A1).

When a bit in this DIP switch is OFF, the corresponding radio channel is conventional. When a bit ON, the corresponding radio channel is digital.

TABLE A-17 S1 MAIN BOARD – CONSOLE RADIO TYPE

SWITCH	SETTING
BIT 1	E1/BUSY1 (OFF/ON)
BIT 2	E2/BUSY2 (OFF/ON)
BIT 3	E3/BUSY3 (OFF/ON)
BIT 4	E4/BUSY4 (OFF/ON)

S1 FOUR-CHANNEL EXPANSION MODULE — CONSOLE RADIO TYPE

S1 is located near the right rear corner of the four-channel expansion module.

When a bit in this DIP switch is OFF, the corresponding radio channel is conventional. When a bit is ON, the corresponding radio channel is digital.

TABLE A-18 S1 FOUR-CHANNEL EXPANSION MODULE — CONSOLE RADIO TYPE

SWITCH	SETTING
BIT 1	E5/BUSY5 (OFF/ON)
BIT 2	E6/BUSY6 (OFF/ON)
BIT 3	E7/BUSY7 (OFF/ON)
BIT 4	E8/BUSY8 (OFF/ON)

S1 DIGITAL RADIO INTERFACE MODULE — LOADING (CH. 3–4)

S1 is located near the right rear corner of the Digital Radio Interface module. The DRI module installed on the console main board controls channels 1–4.

TABLE A-19 S1 DIGITAL RADIO INTERFACE MODULE — LOADING (CH. 3–4)

SWITCH	SETTING
BIT 1	ON — CH 4 DATA –
BIT 2	ON — CH 4 (WITH LOAD)
BIT 3	ON — CH 4 DATA +
BIT 4	—
BIT 5	—

TABLE A-19 S1 DIGITAL RADIO INTERFACE MODULE — LOADING (CH. 3–4)

SWITCH	SETTING
BIT 6	ON — CH 3 (WITH LOAD)
BIT 7	ON — CH 3 DATA –
BIT 8	ON — CH 3 DATA +

NOTE

By default, Bit 2 and Bit 6 are OFF.

S2 DIGITAL RADIO INTERFACE MODULE — CHANNEL LOADING (CH. 1–2)

S2 is located near the left rear corner of the Digital Radio Interface module. The DRI module installed on the console main board controls channels 1–4.

TABLE A-20 S2 DIGITAL RADIO INTERFACE MODULE — CHANNEL LOADING (CH. 1–2)

SWITCH	SETTING
BIT 1	ON — CH 2 DATA –
BIT 2	ON — CH 2 (WITH LOAD)
BIT 3	ON — CH 2 DATA +
BIT 4	—
BIT 5	—
BIT 6	ON — CH 1 (WITH LOAD)
BIT 7	ON — CH 1 DATA –
BIT 8	ON — CH 1 DATA +

NOTE

By default, Bit 2 and Bit 6 are OFF.

S2 DIGITAL RADIO INTERFACE MODULE — CHANNEL LOADING (CH. 5–6)

S2 is located near the right rear corner of the Digital Radio Interface module. The DRI module installed on the Four-channel Expansion module controls channels 5–6.

TABLE A-21 S2 DIGITAL RADIO INTERFACE MODULE — CHANNEL LOADING (CH. 5–6)

SWITCH	SETTING
BIT 1	ON — CH 6 DATA –
BIT 2	ON — CH 6 (WITH LOAD)
BIT 3	ON — CH 6 DATA +
BIT 4	—
BIT 5	—
BIT 6	ON — CH 5 (WITH LOAD)
BIT 7	ON — CH 5 DATA –
BIT 8	ON — CH 5 DATA +

NOTE

By default, Bit 2 and Bit 6 are OFF.

SW1 OPERATOR CONTROL MODULE ID

The keypad module always has an address of 0 (i.e., all bits ON). The first ACM always has an address of 1. The other operator control modules have addresses ranging from 2 to 7, as identified in the CSDM Lite Configuration Report.

Before you install a new operator control module, you must add it to the console's configuration database in the CSDM Lite. The module is assigned an address by the CSDM Lite that you must then enter using the SW1 DIP switches.

TABLE A-22 SW1 OPERATOR CONTROL MODULE ID

SWITCH	SETTING
BIT 1	Module address (MSB)
BIT 2	Module address
BIT 3	Module address (LSB)
BIT 4	—

TABLE A-23 EXAMPLE OPERATOR CONTROL MODULE IDS

SWITCH	KEYPAD	1st ACM	NEXT MODULE	NEXT MODULE	NEXT MODULE	NEXT MODULE	NEXT MODULE	LAST MODULE
BIT 1	ON	ON	ON	ON	**OFF**	**OFF**	**OFF**	**OFF**
BIT 2	ON	ON	**OFF**	**OFF**	ON	ON	**OFF**	**OFF**
BIT 3	ON	**OFF**	ON	**OFF**	ON	**OFF**	ON	**OFF**
BIT 4	ON	ON	ON	ON	ON	ON	ON	ON

APPENDIX

B

COMPONENT LAYOUTS

COMPONENT LAYOUT DIAGRAMS

This appendix contains component layout diagrams for the following modules:

- Console Main Board (DDN6126)
- Four-channel Expansion Module (DDN6127)
- Two-CO Line Module (CDN6275)
- Keypad Control Module (DDN6129)
- Channel Control Modules (DDN6130, DDN6131 and DDN6696)
- Auxiliary Control Module (DDN6132)
- Digital Radio Interface Module (DDN6137)
- Digital Radio Control Module (DDN6138)
- Direct Current Option Module (TDN9897) Top and Bottom Views

FIGURE B-1 CONSOLE MAIN BOARD (DDN6126)

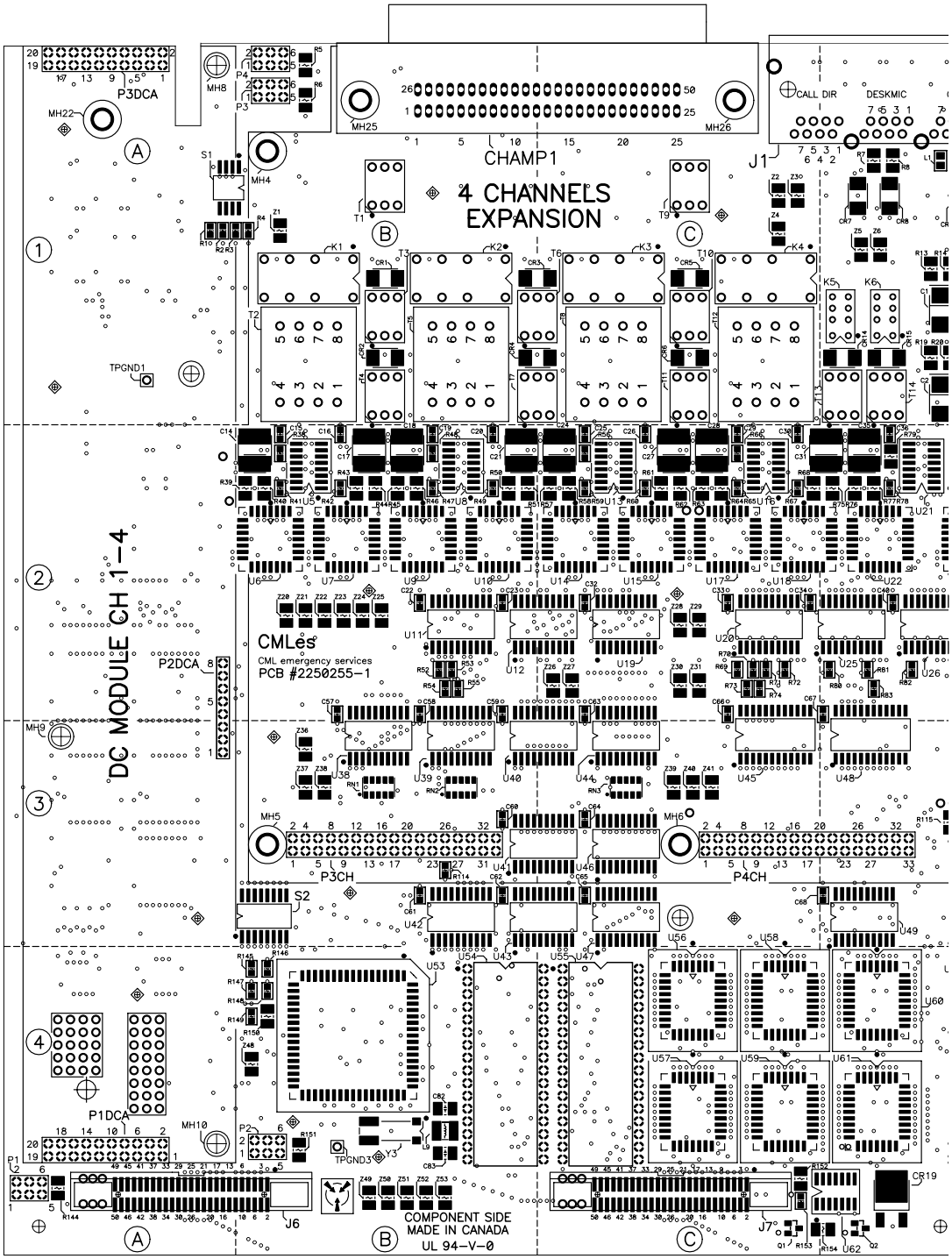


FIGURE B-2 CONSOLE MAIN BOARD (DDN6126) (CONTINUED)

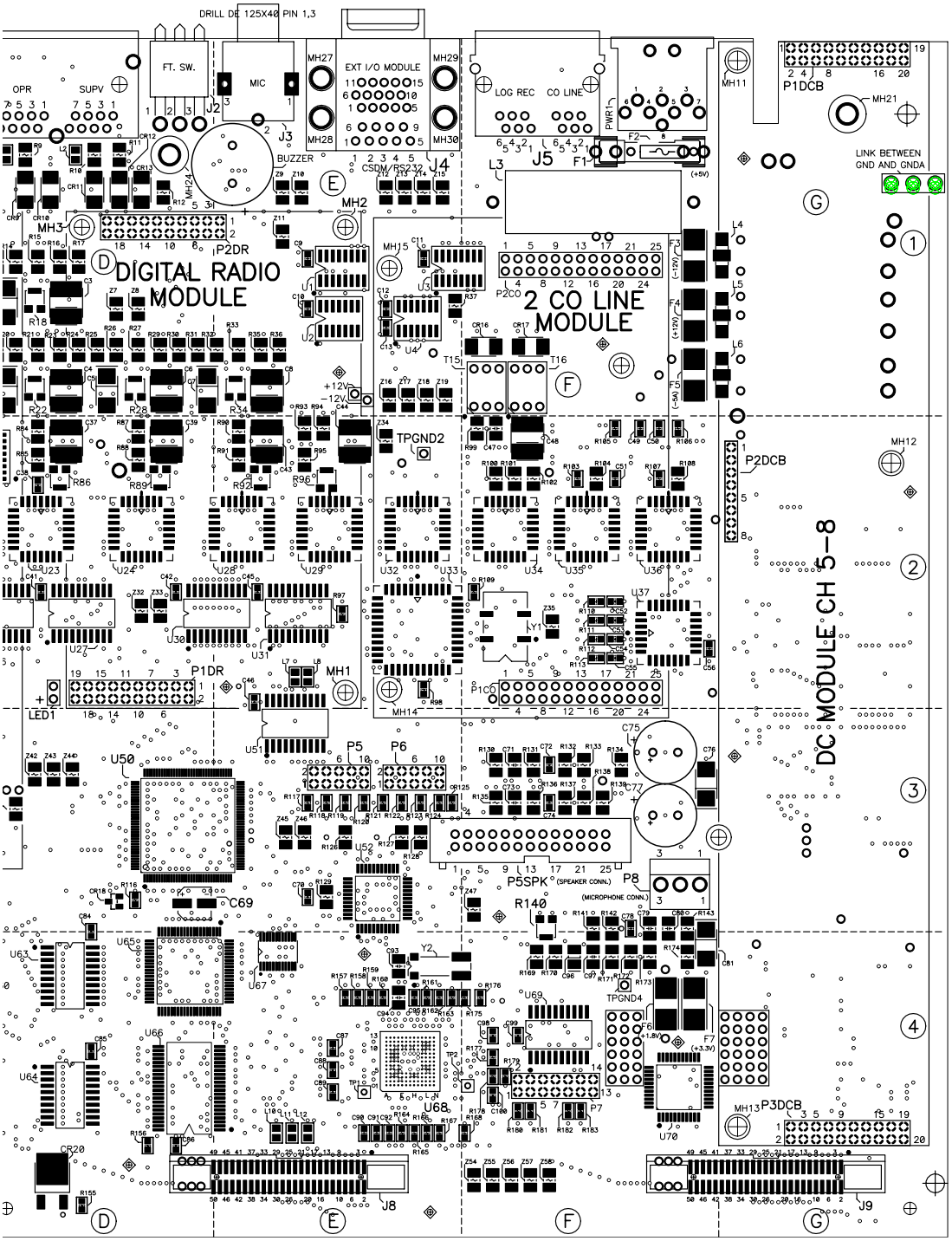


FIGURE B-3 FOUR-CHANNEL EXPANSION MODULE (DDN6127)

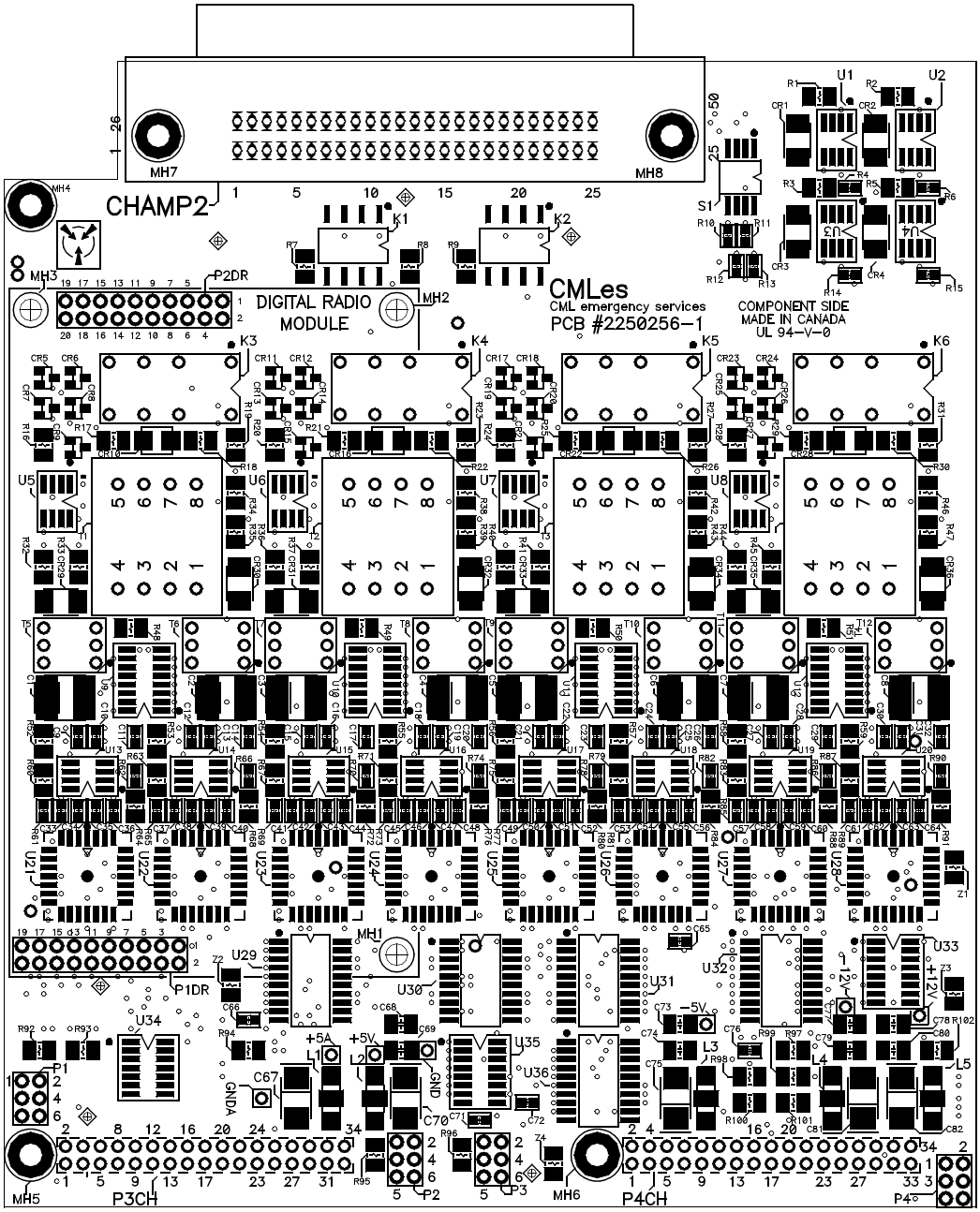


FIGURE B-4 TWO-CO LINE MODULE (CDN6275)

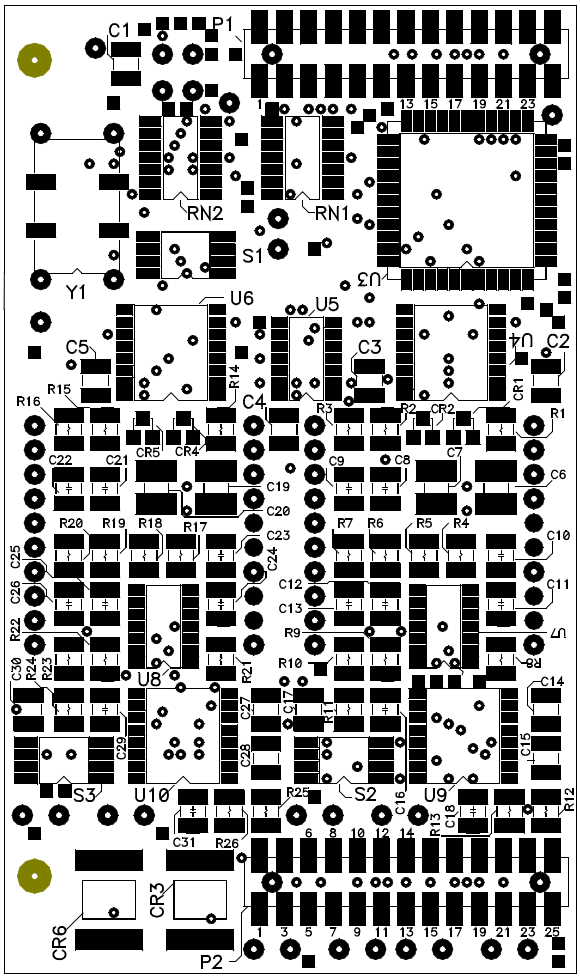


FIGURE B-5 KEYPAD CONTROL MODULE (DDN6129)

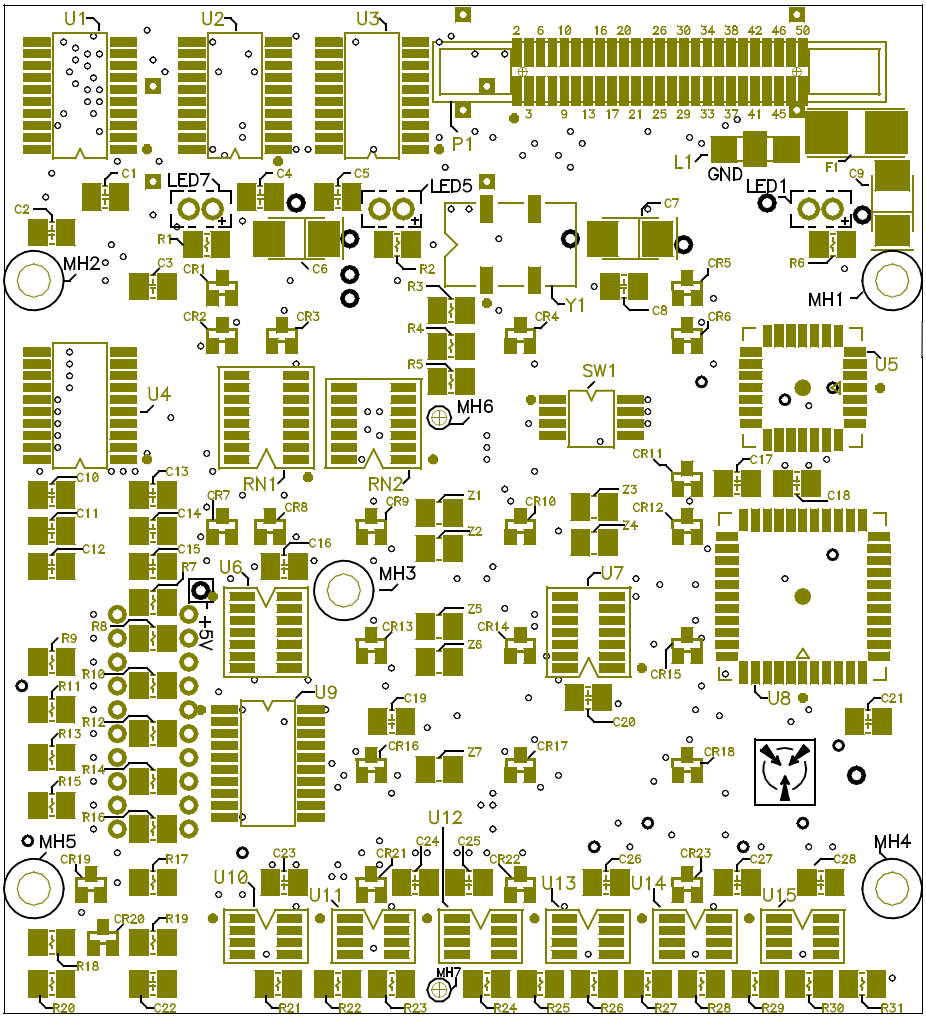


FIGURE B-6 CHANNEL CONTROL MODULES (DDN6130, DDN6131 AND DDN6696)

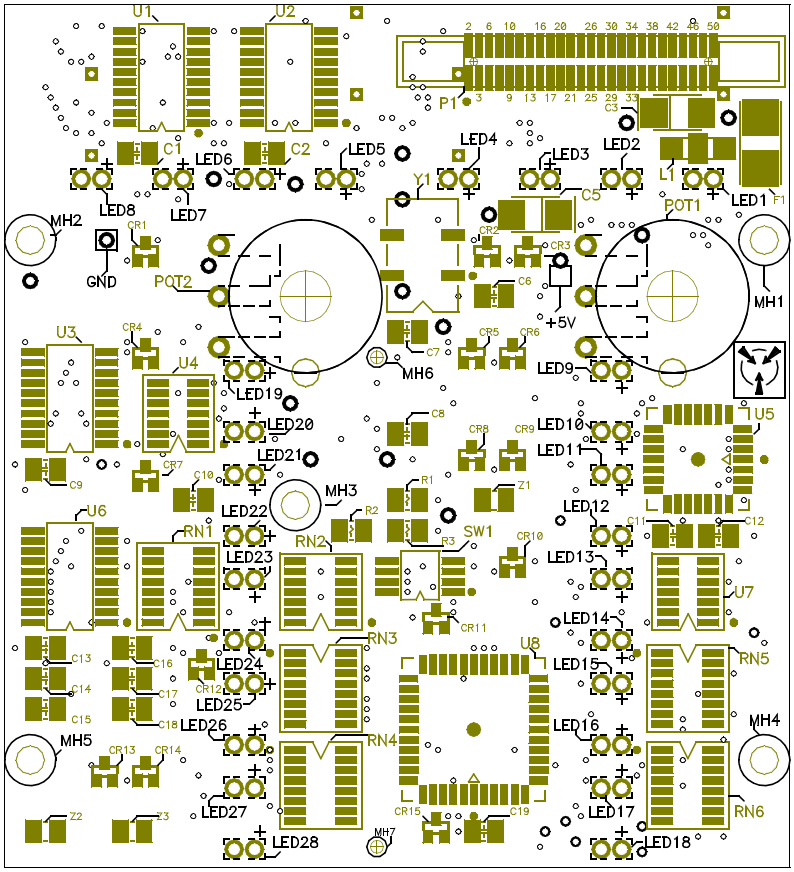


FIGURE B-7 AUXILIARY CONTROL MODULE (DDN6132)

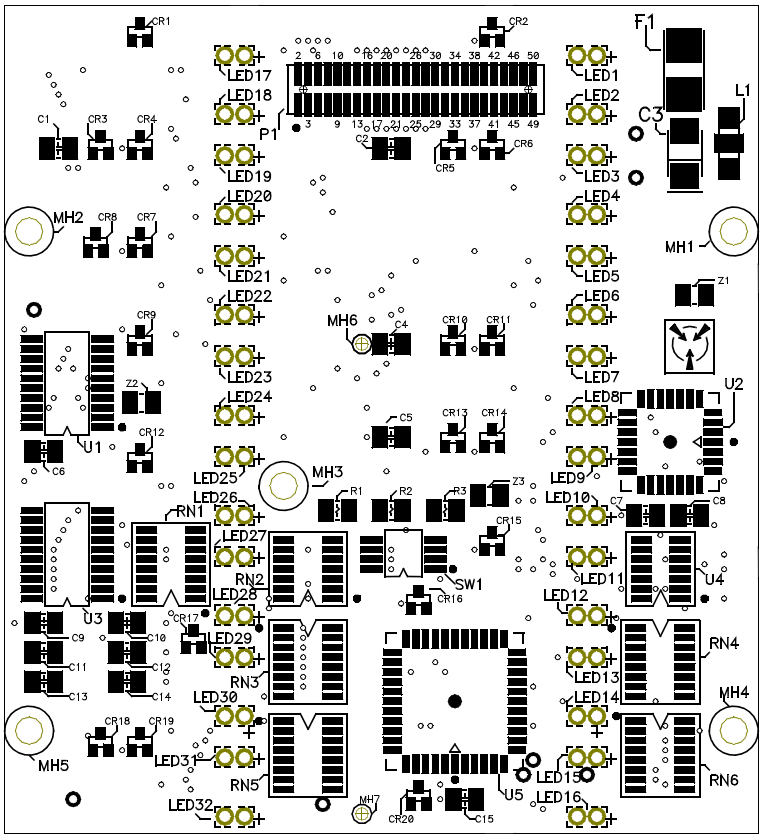


FIGURE B-8 DIGITAL RADIO INTERFACE MODULE (DDN6137)

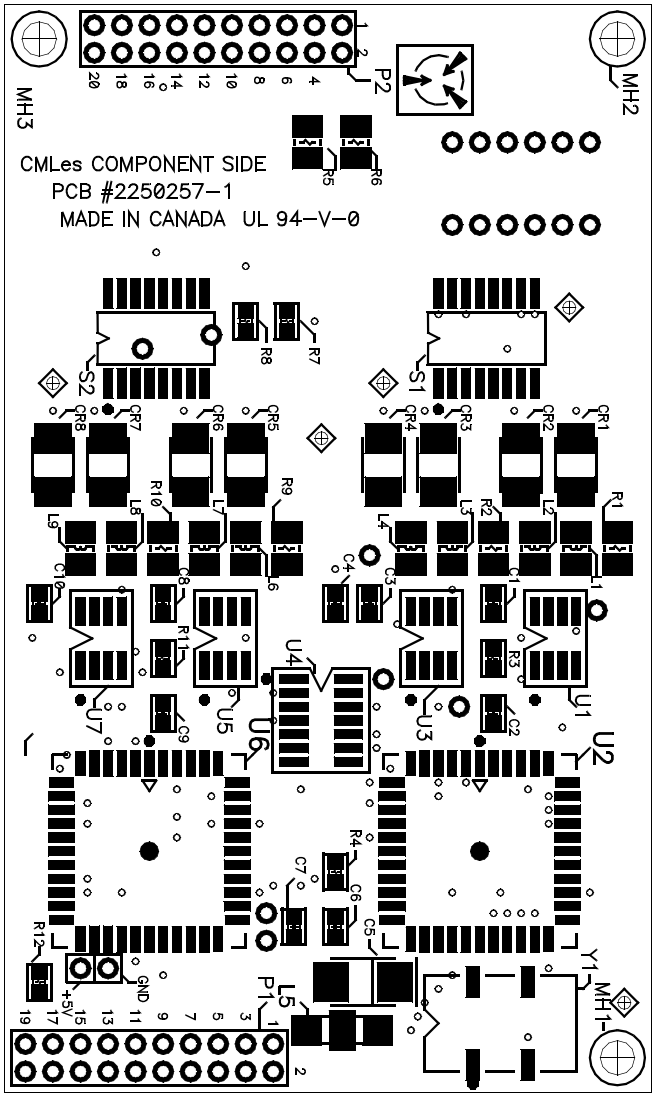


FIGURE B-9 DIGITAL RADIO CONTROL MODULE (DDN6138)

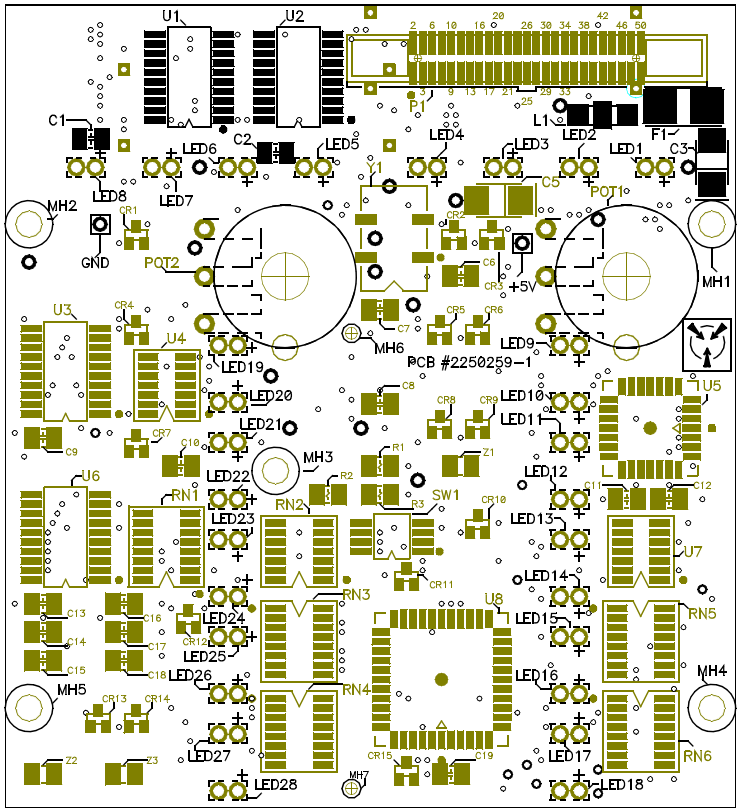
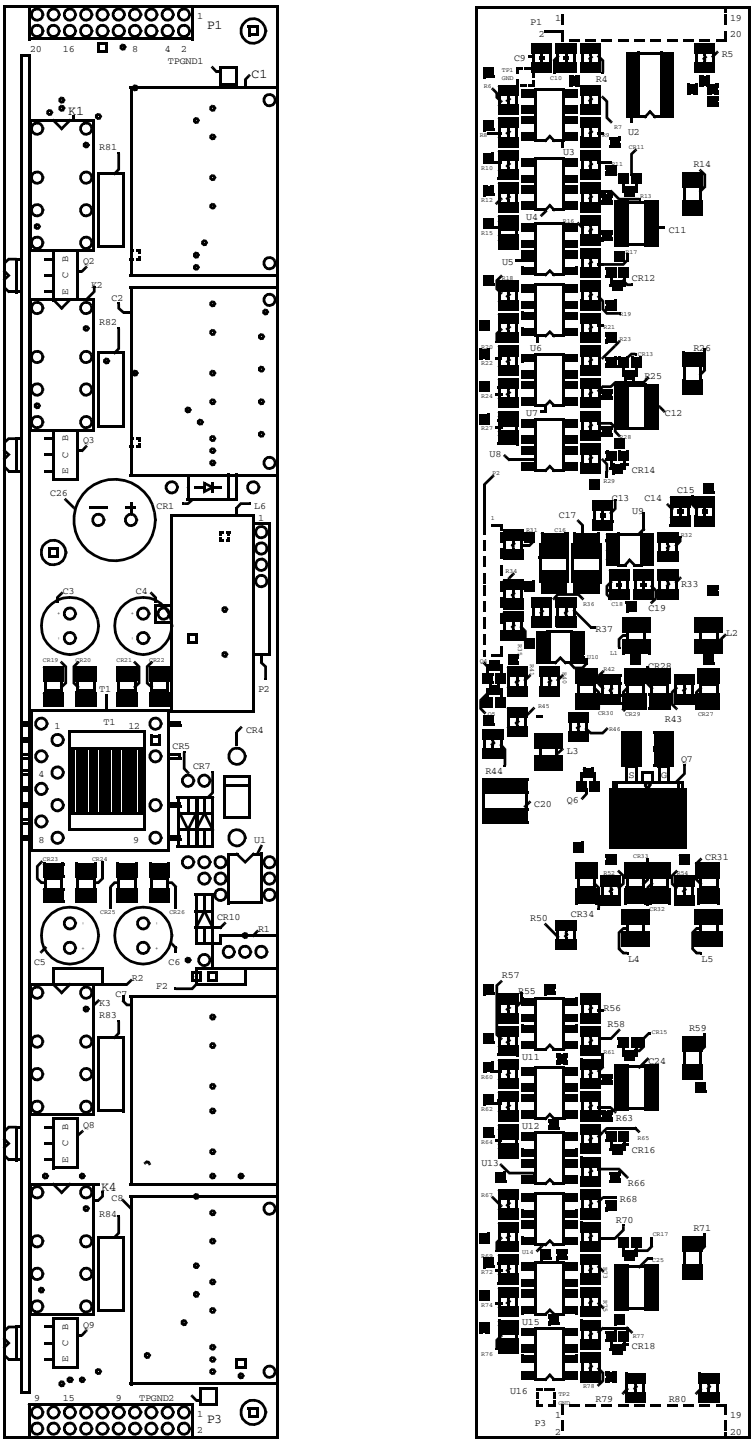


FIGURE B-10 DIRECT CURRENT OPTION MODULE (TDN9897) TOP AND BOTTOM VIEWS



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APPENDIX

C

SCHEMATICS

This appendix contains schematic diagrams for the following modules:

DESKTOP CONSOLE MAIN BOARD (DDN6126)

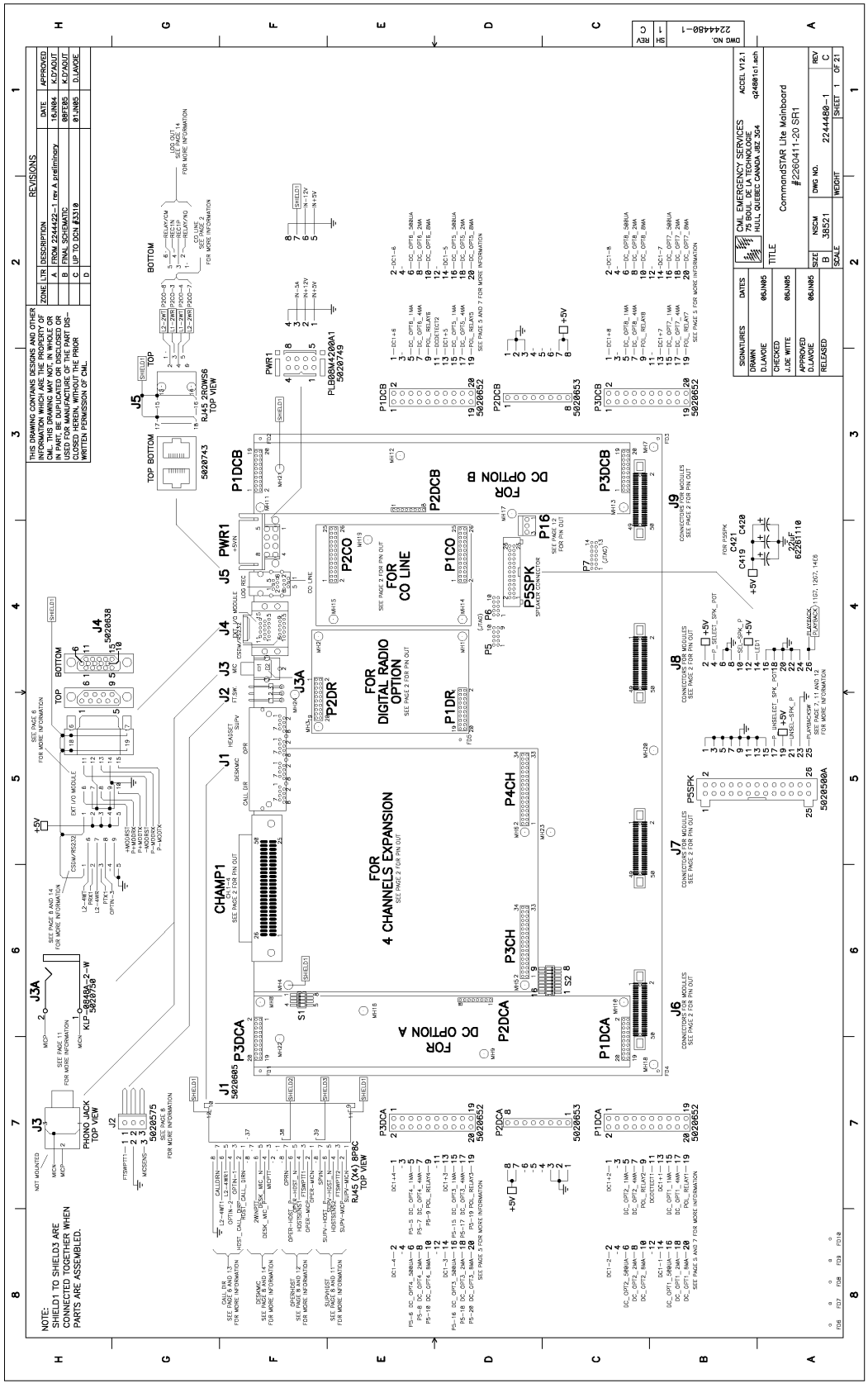
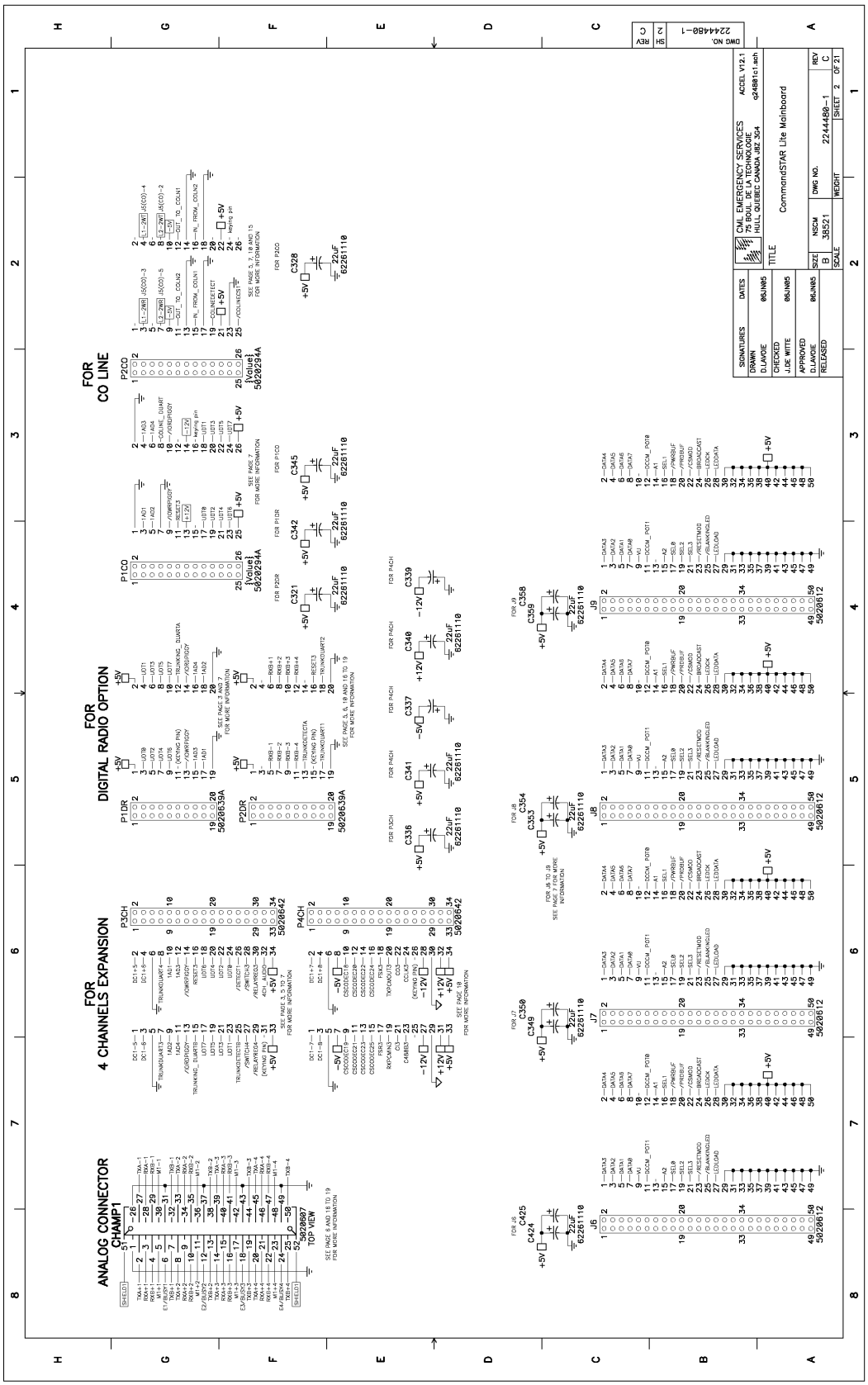


FIGURE C-1 DESKTOP CONSOLE MAIN BOARD (1 OF 20)

FIGURE C-2 DESKTOP CONSOLE MAIN BOARD (2 OF 20)



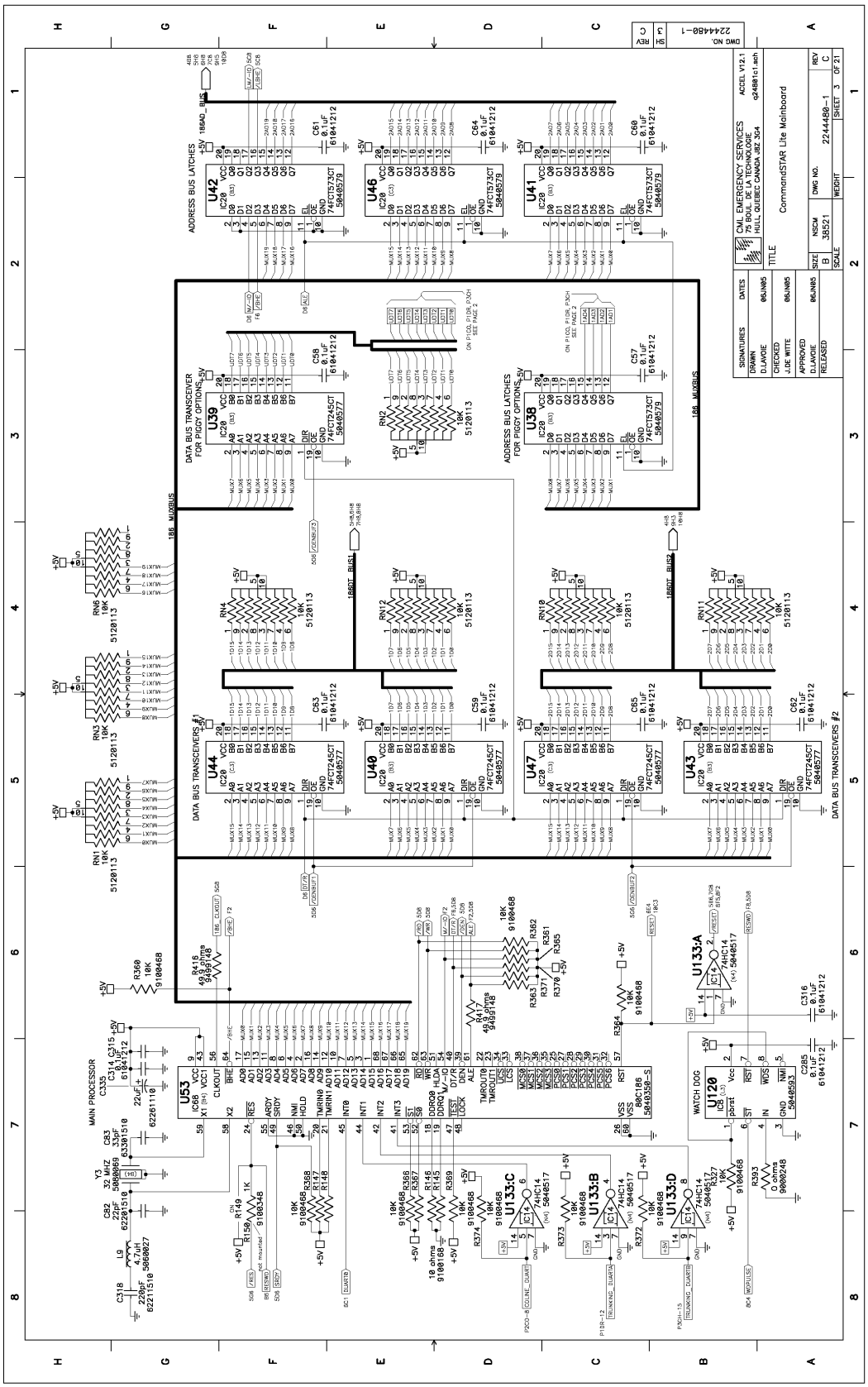


FIGURE C-3 DESKTOP CONSOLE MAIN BOARD (3 OF 20)

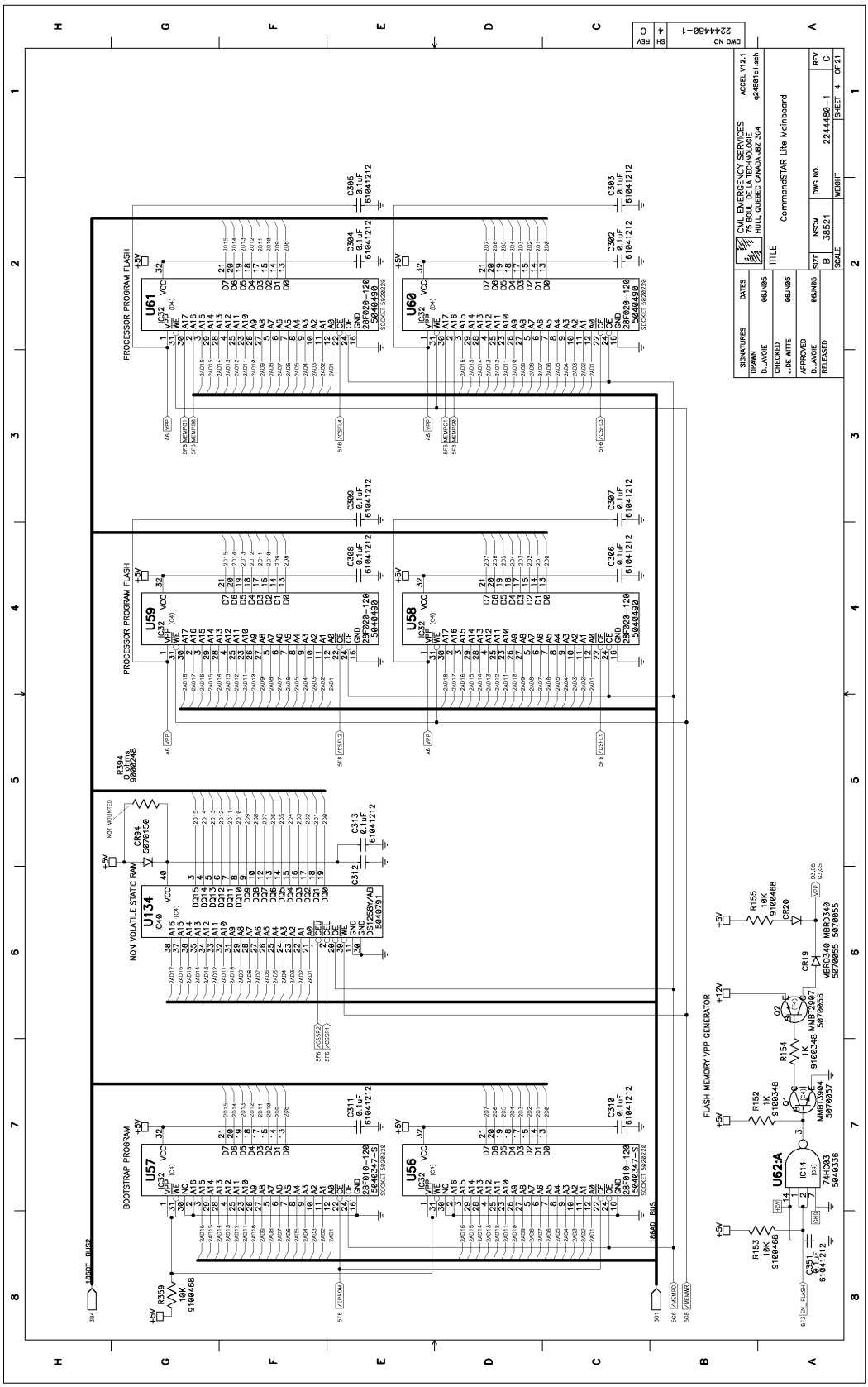


FIGURE C-4 DESKTOP CONSOLE MAIN BOARD (4 OF 20)

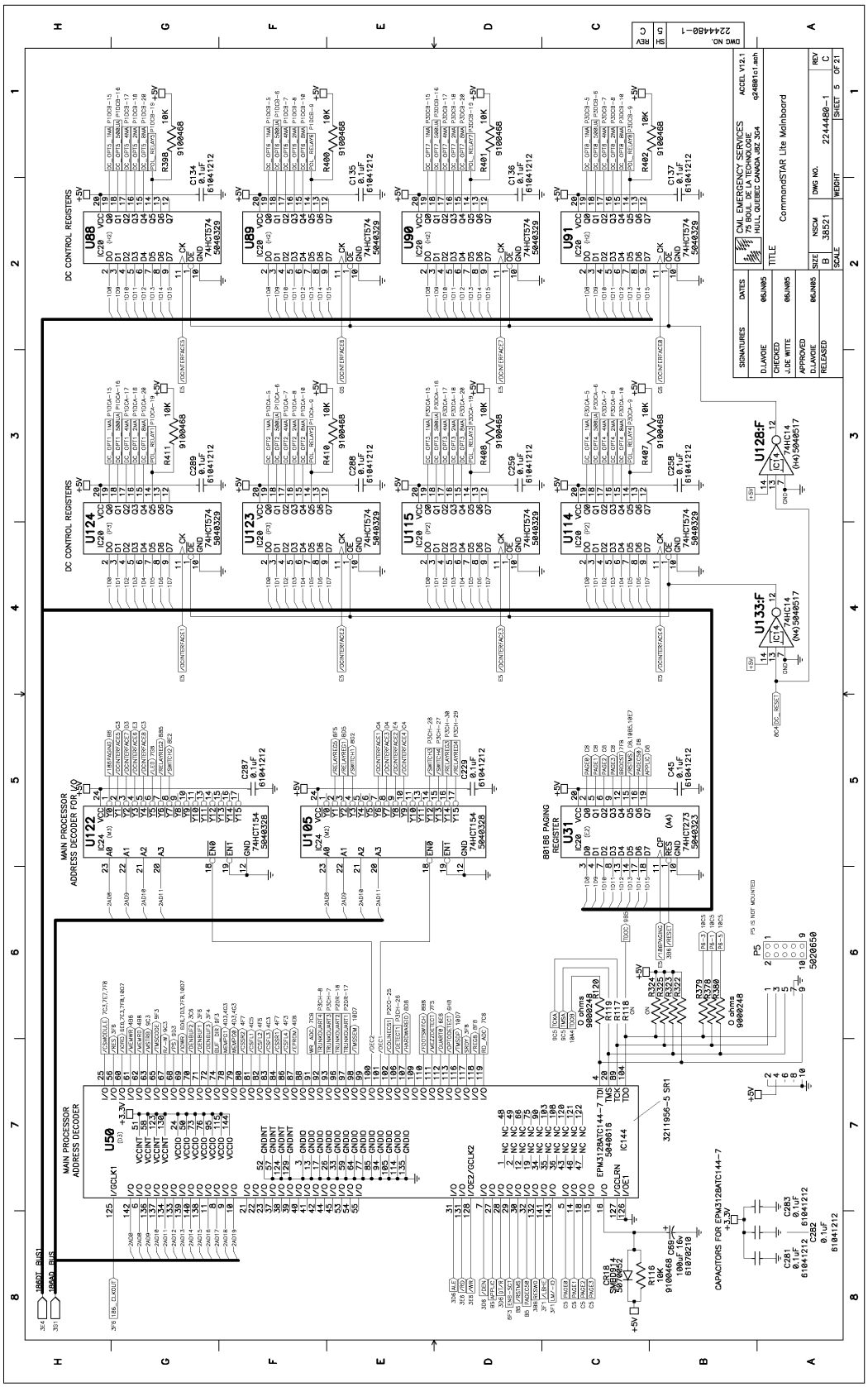


FIGURE C-5 DESKTOP CONSOLE MAIN BOARD (5 OF 20)

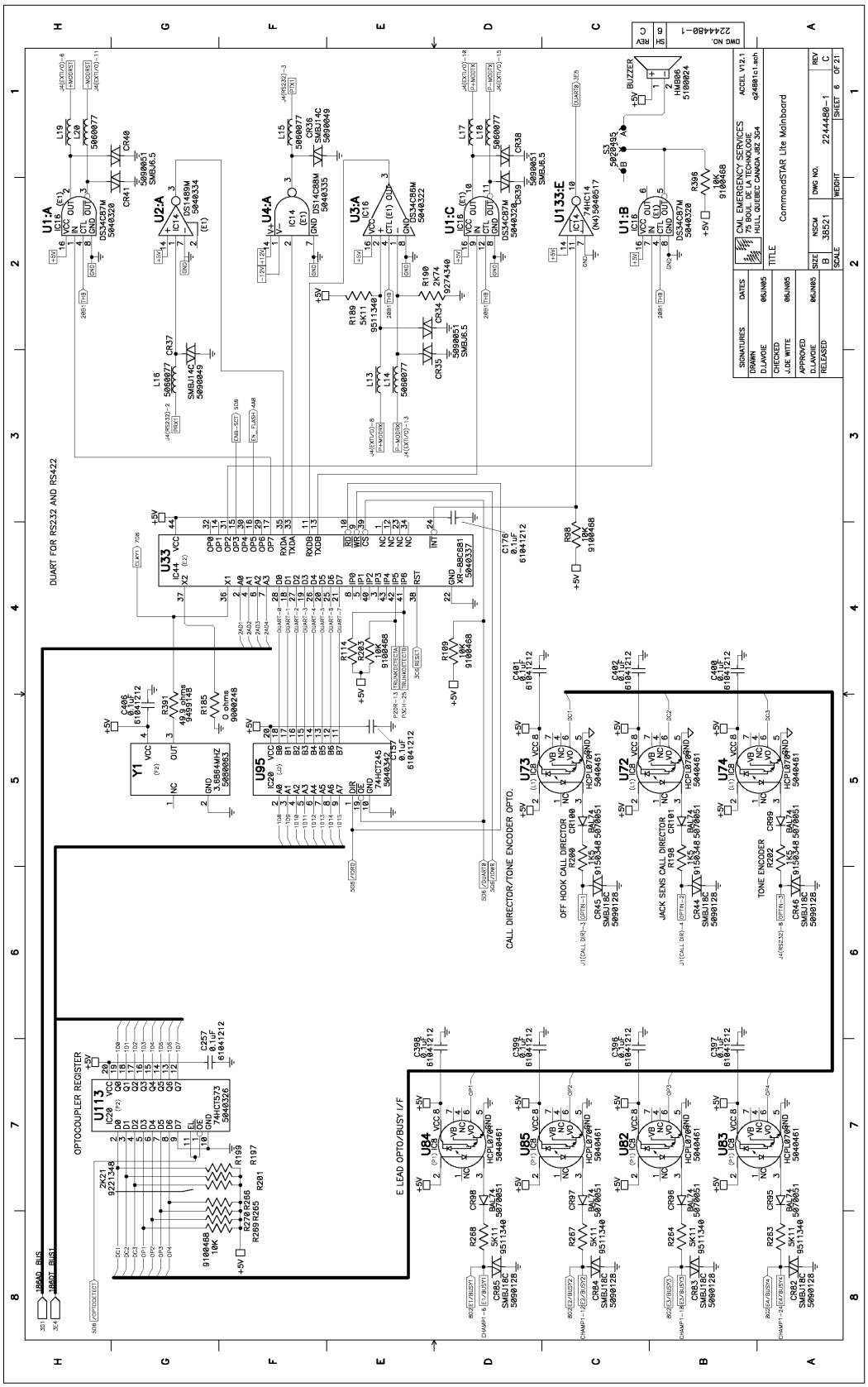


FIGURE C-6 DESKTOP CONSOLE MAIN BOARD (6 OF 20)

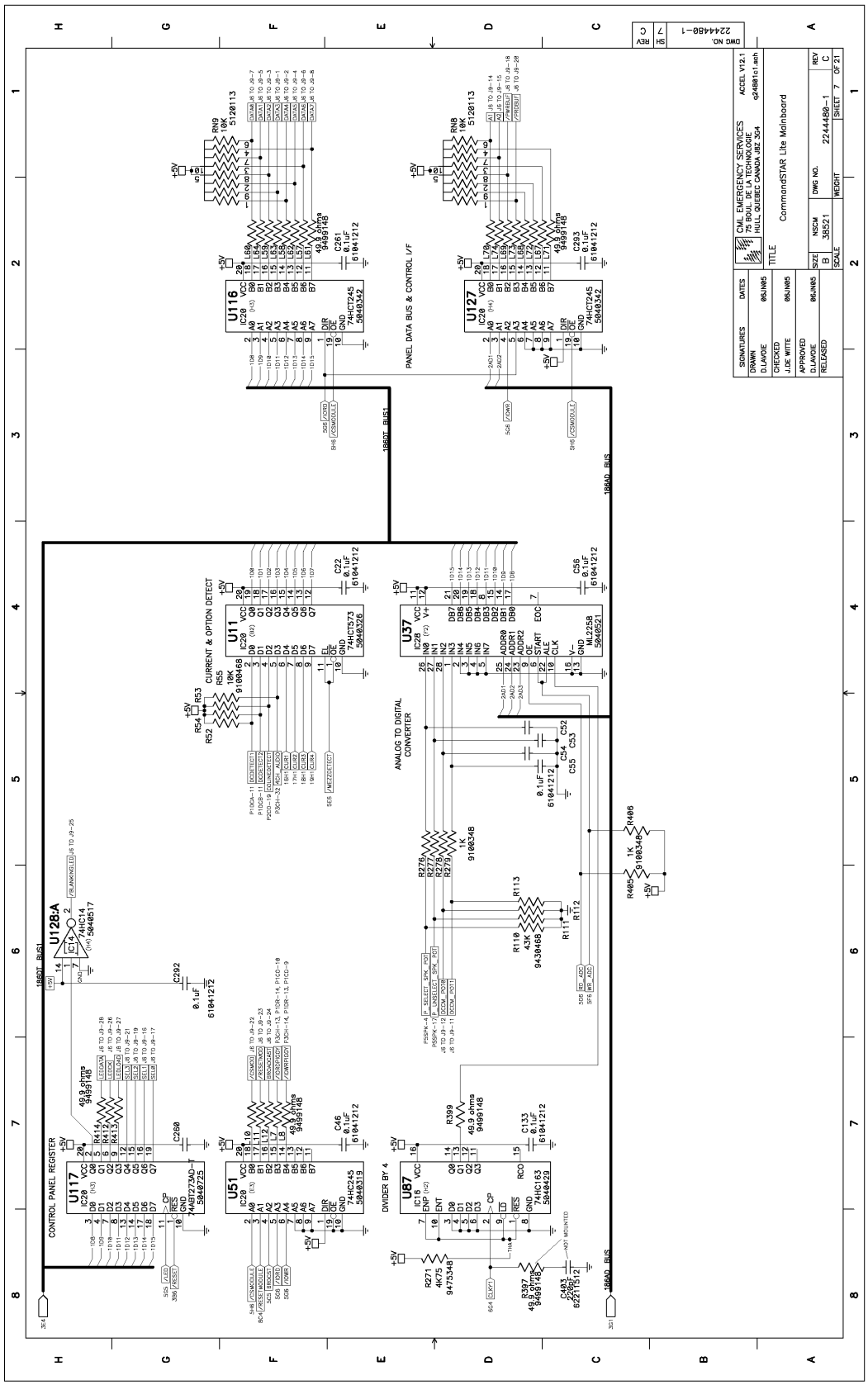


FIGURE C-7 DESKTOP CONSOLE MAIN BOARD (7 OF 20)

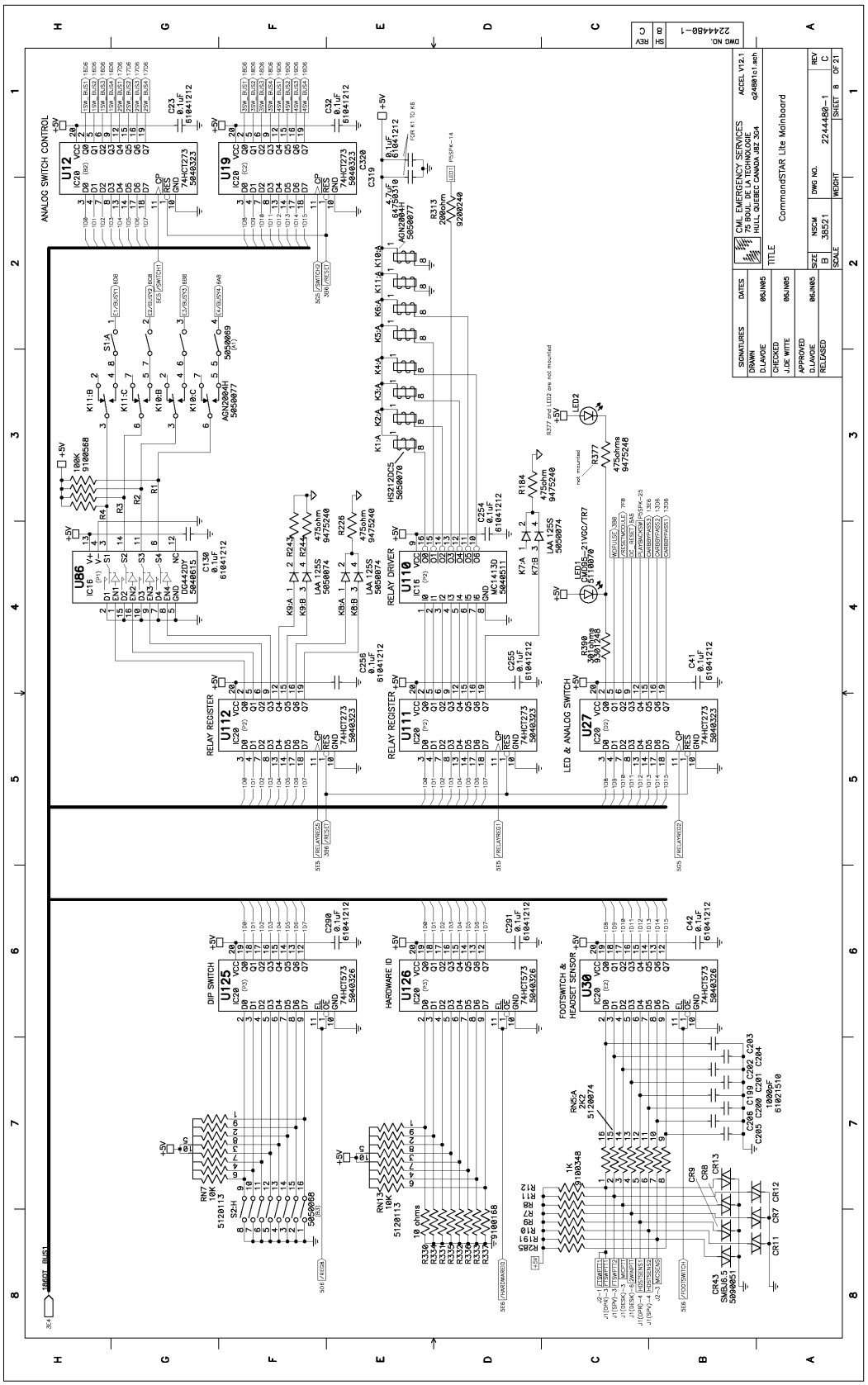


FIGURE C-8 DESKTOP CONSOLE MAIN BOARD (8 OF 20)

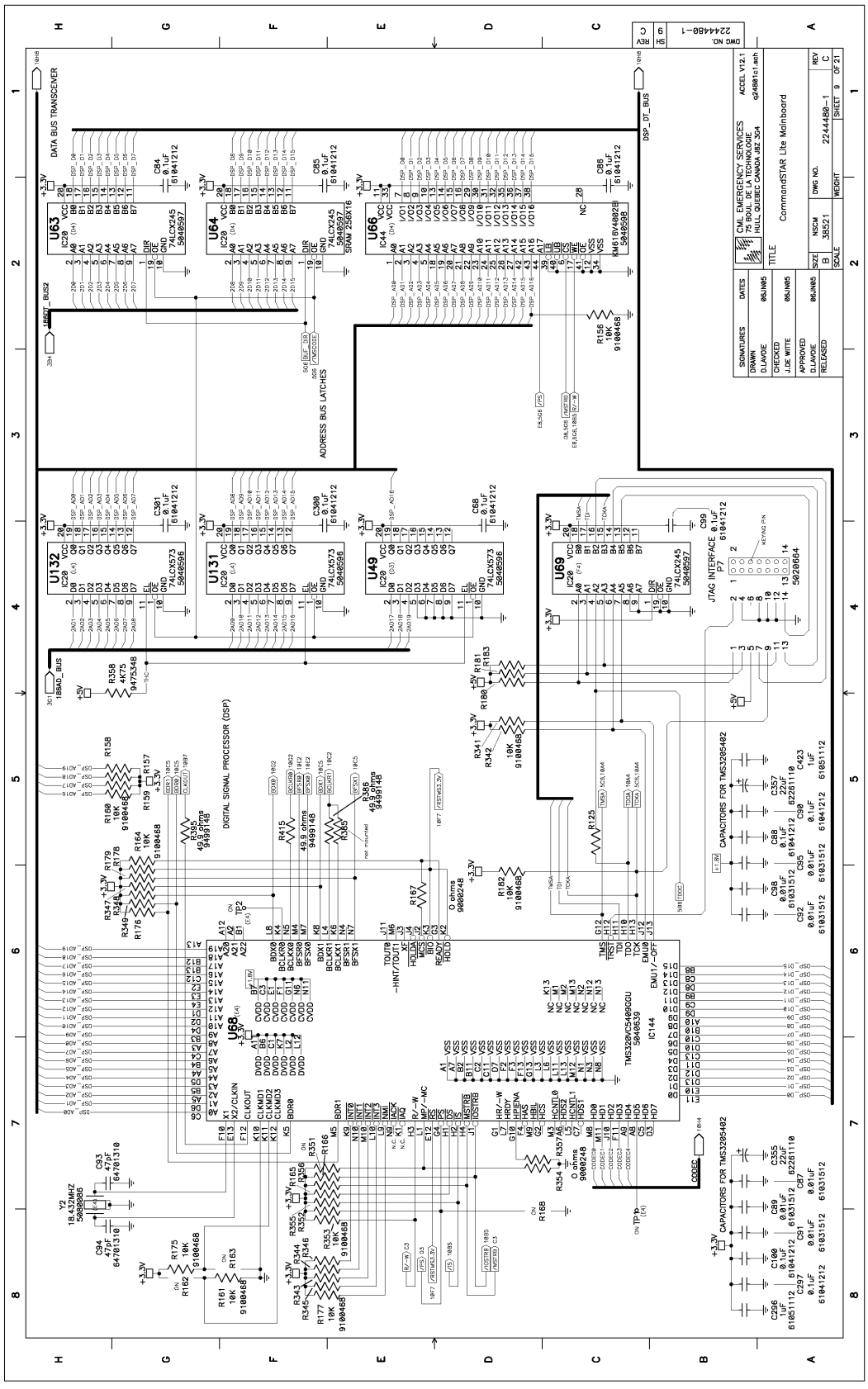


FIGURE C-9 DESKTOP CONSOLE MAIN BOARD (9 OF 20)

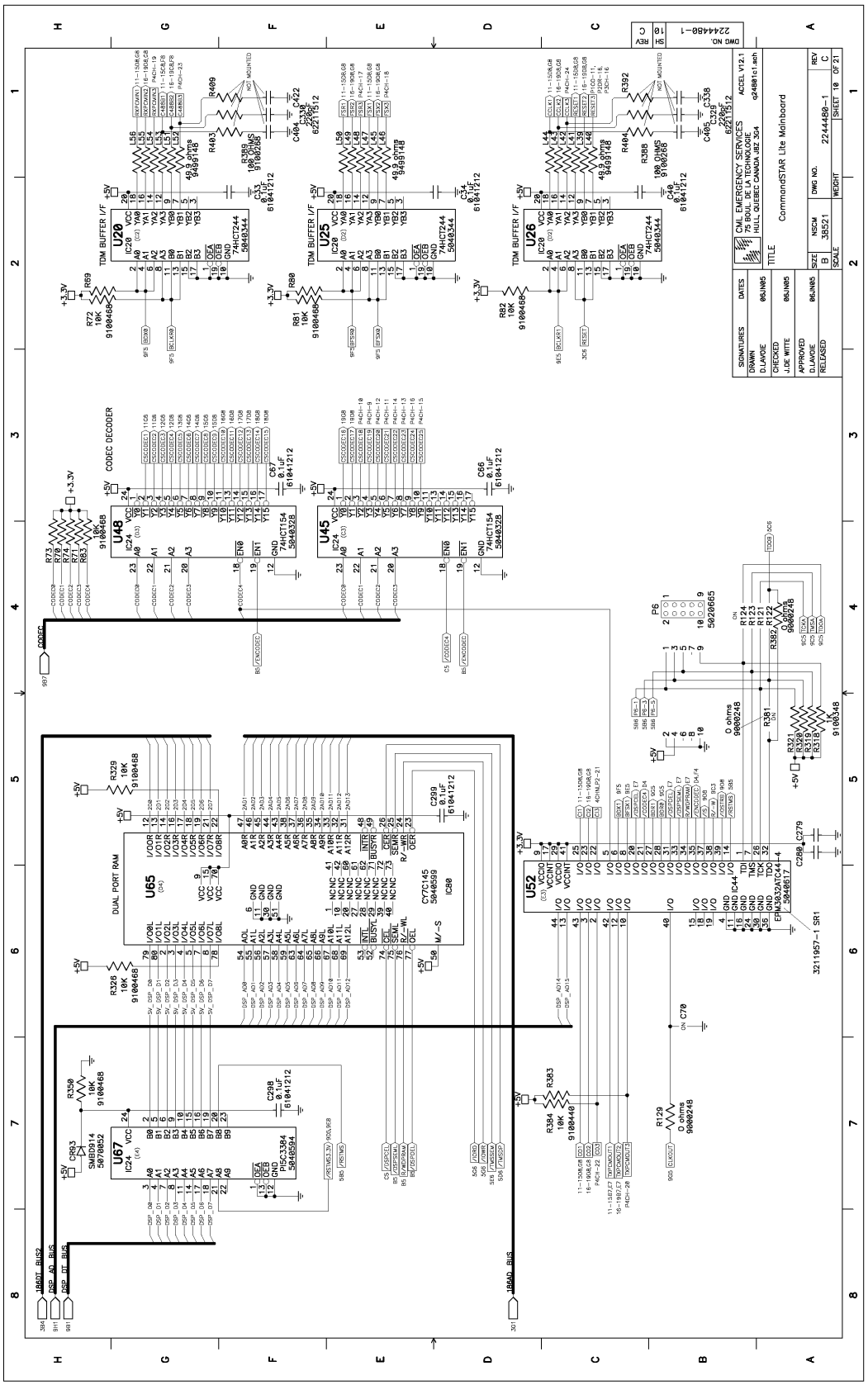


FIGURE C-10 DESKTOP CONSOLE MAIN BOARD (10 OF 20)

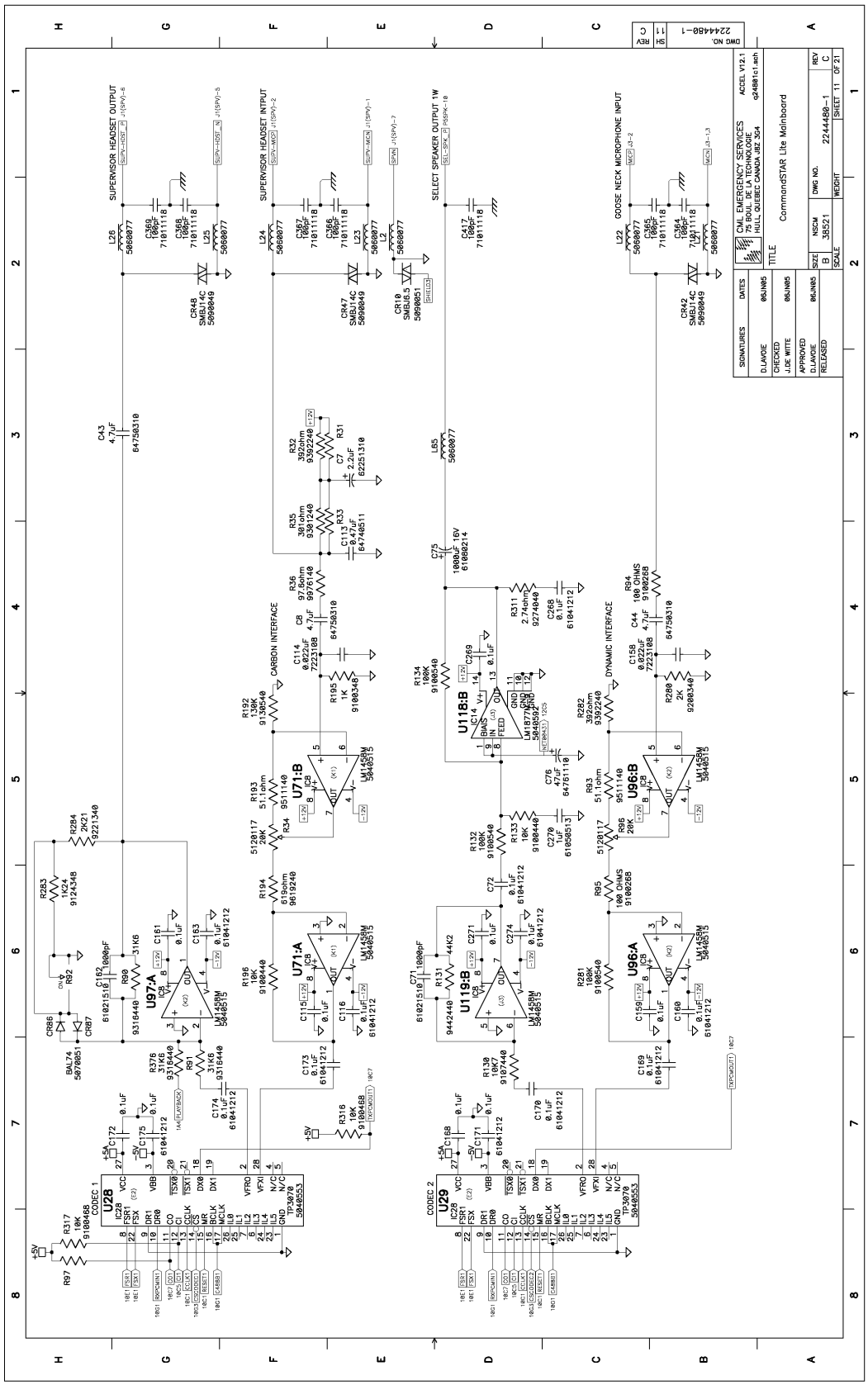


FIGURE C-11 DESKTOP CONSOLE MAIN BOARD (11 OF 20)

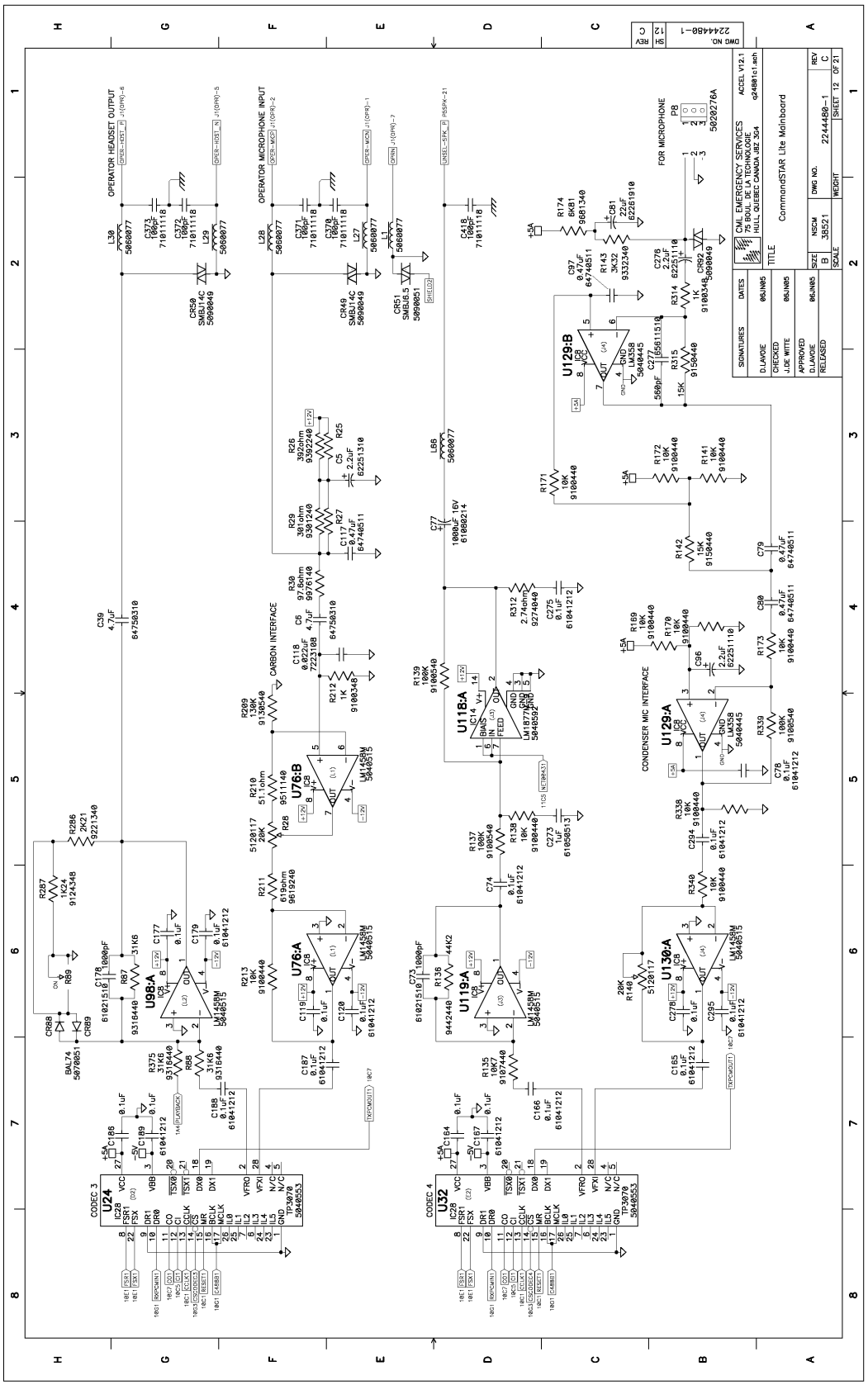


FIGURE C-12 DESKTOP CONSOLE MAIN BOARD (12 OF 20)

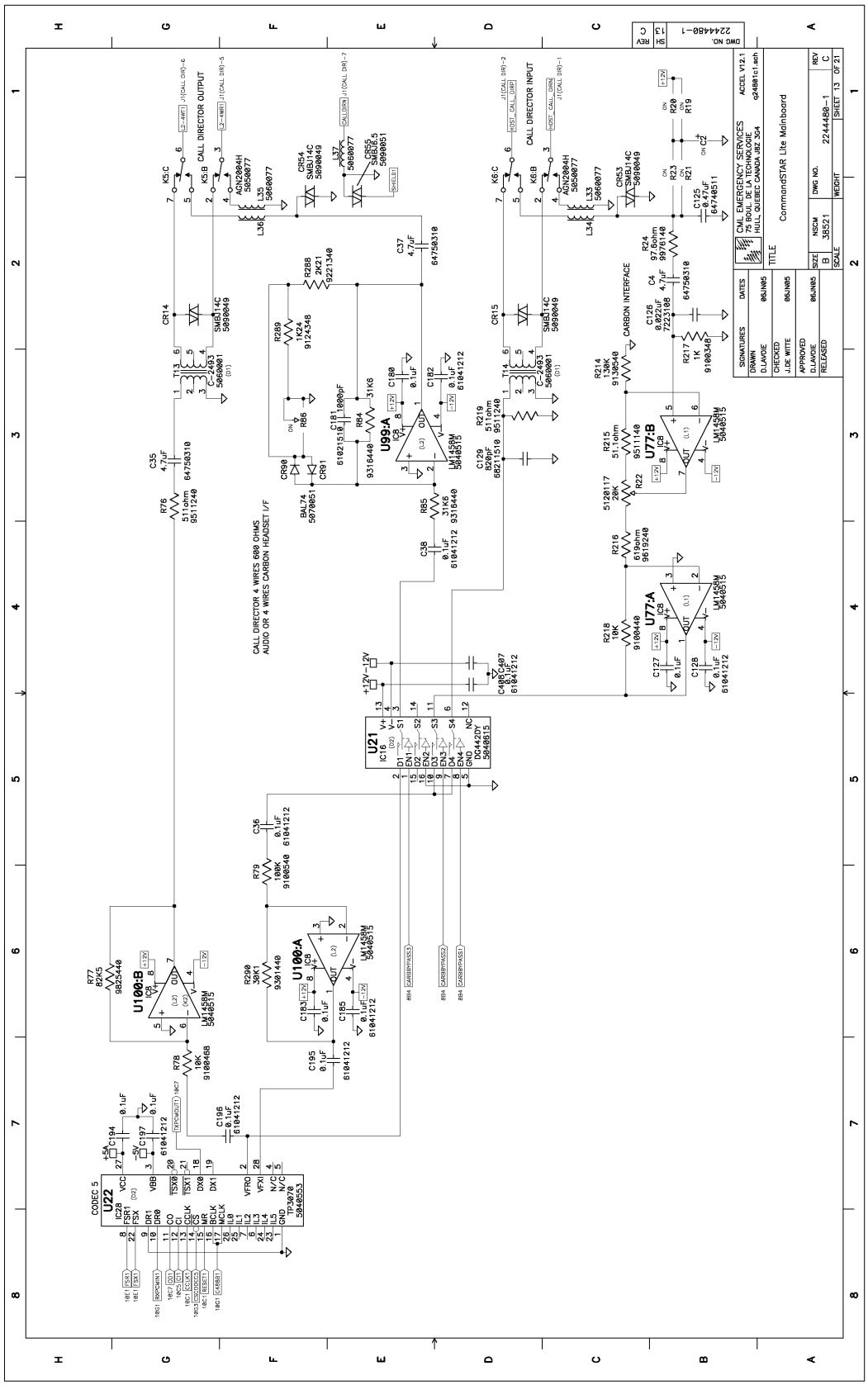


FIGURE C-13 DESKTOP CONSOLE MAIN BOARD (13 OF 20)

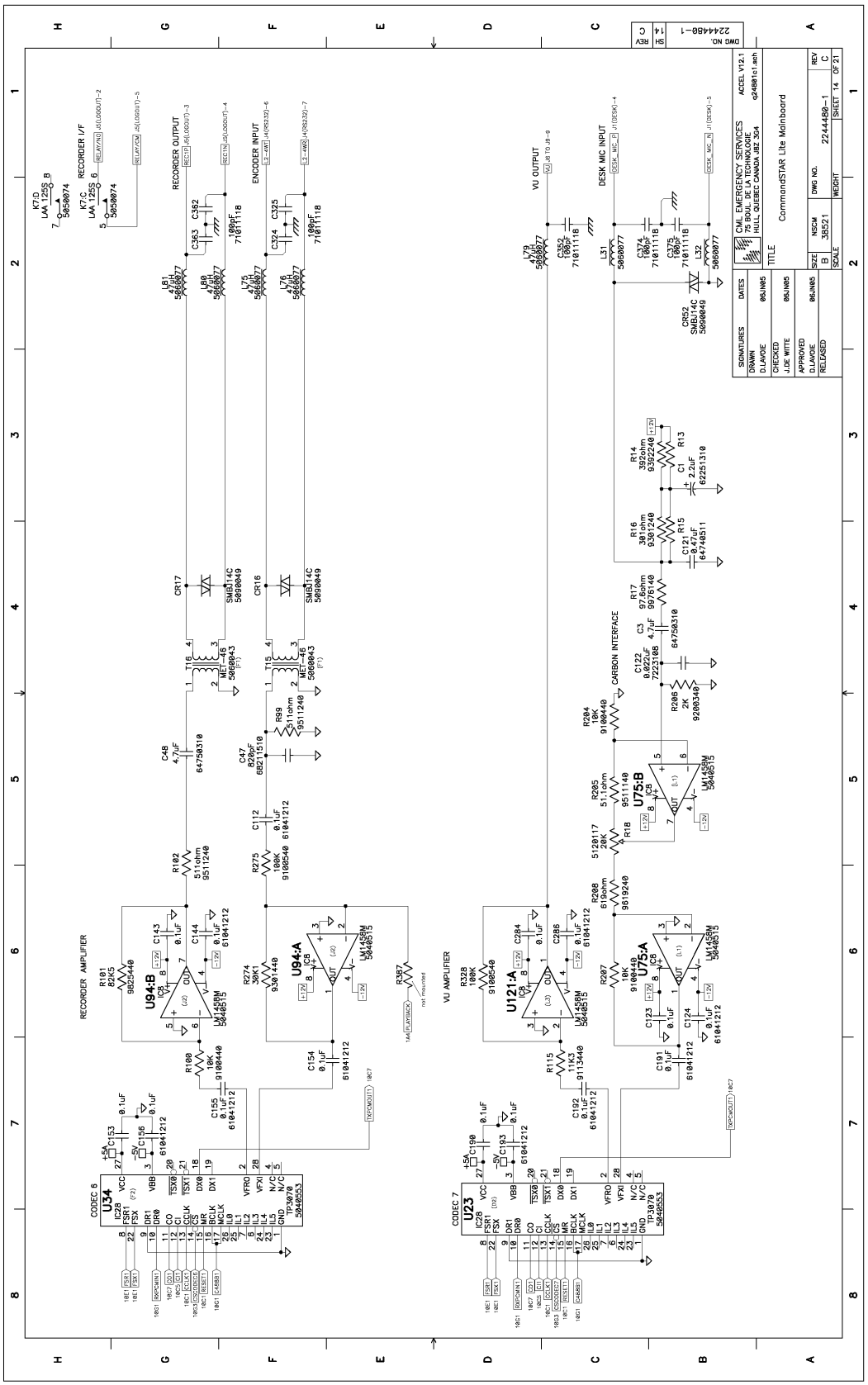


FIGURE C-14 DESKTOP CONSOLE MAIN BOARD (14 OF 20)

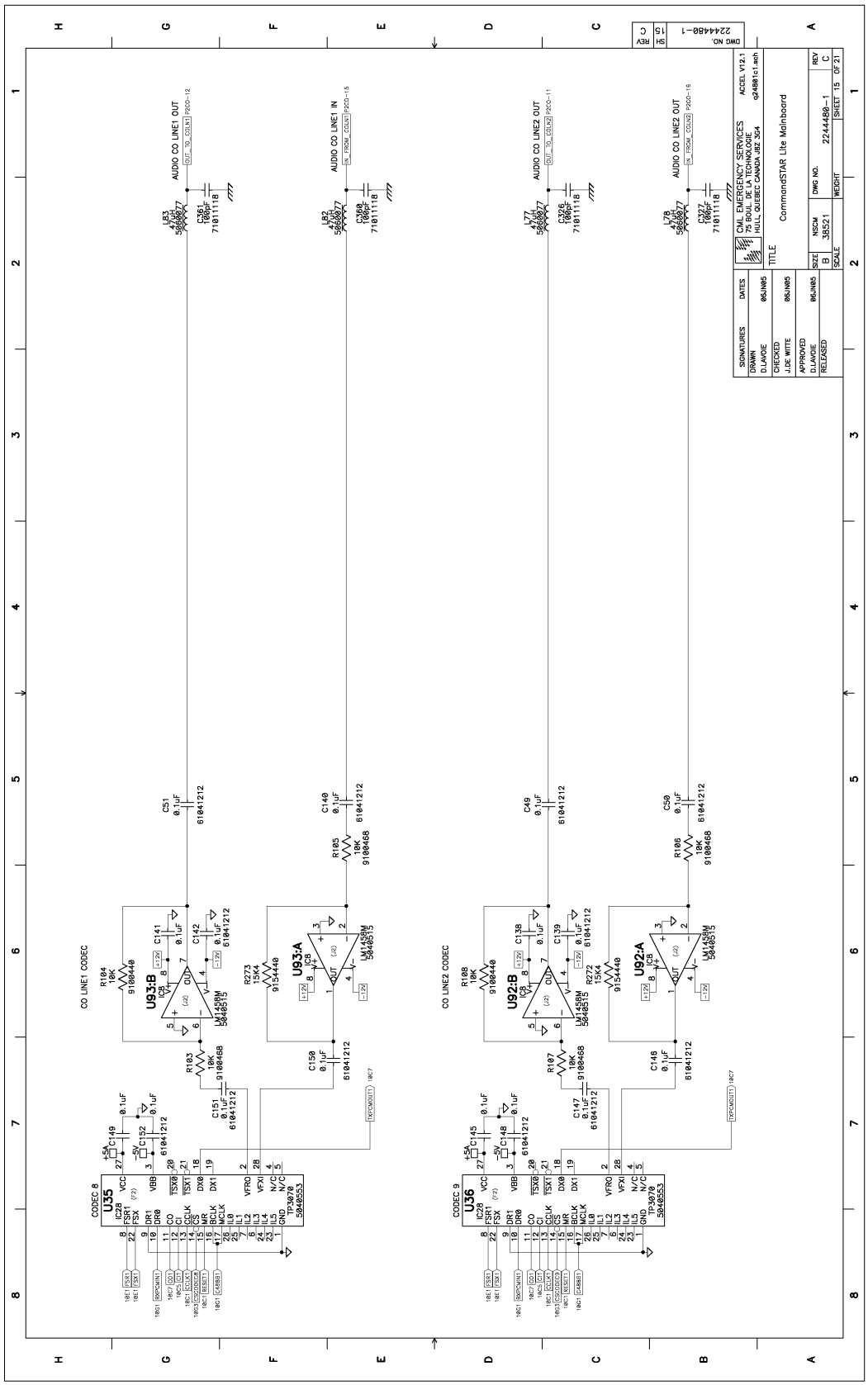


FIGURE C-15 DESKTOP CONSOLE MAIN BOARD (15 OF 20)

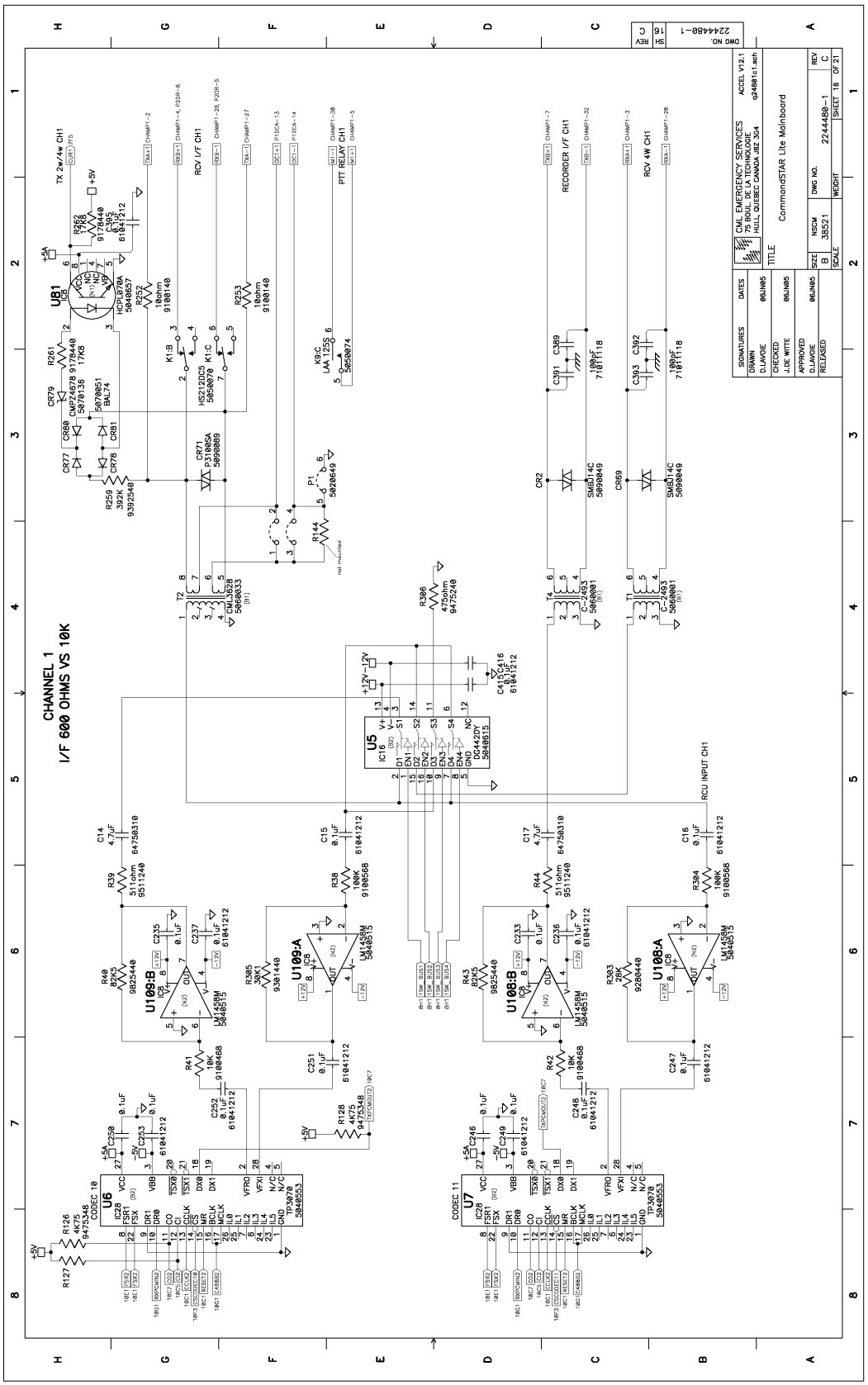


FIGURE C-16 DESKTOP CONSOLE MAIN BOARD (16 OF 20)

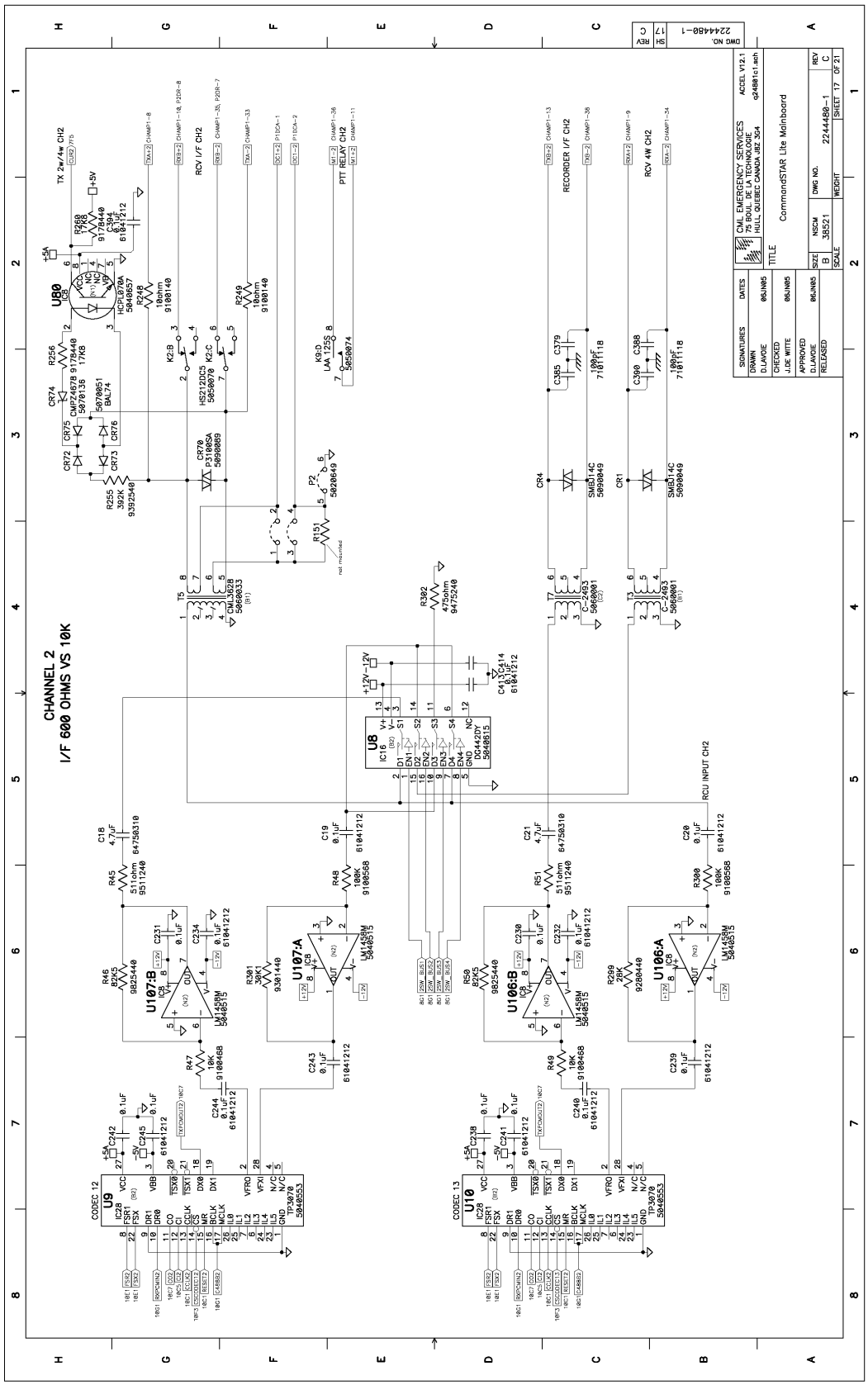


FIGURE C-17 DESKTOP CONSOLE MAIN BOARD (17 OF 20)

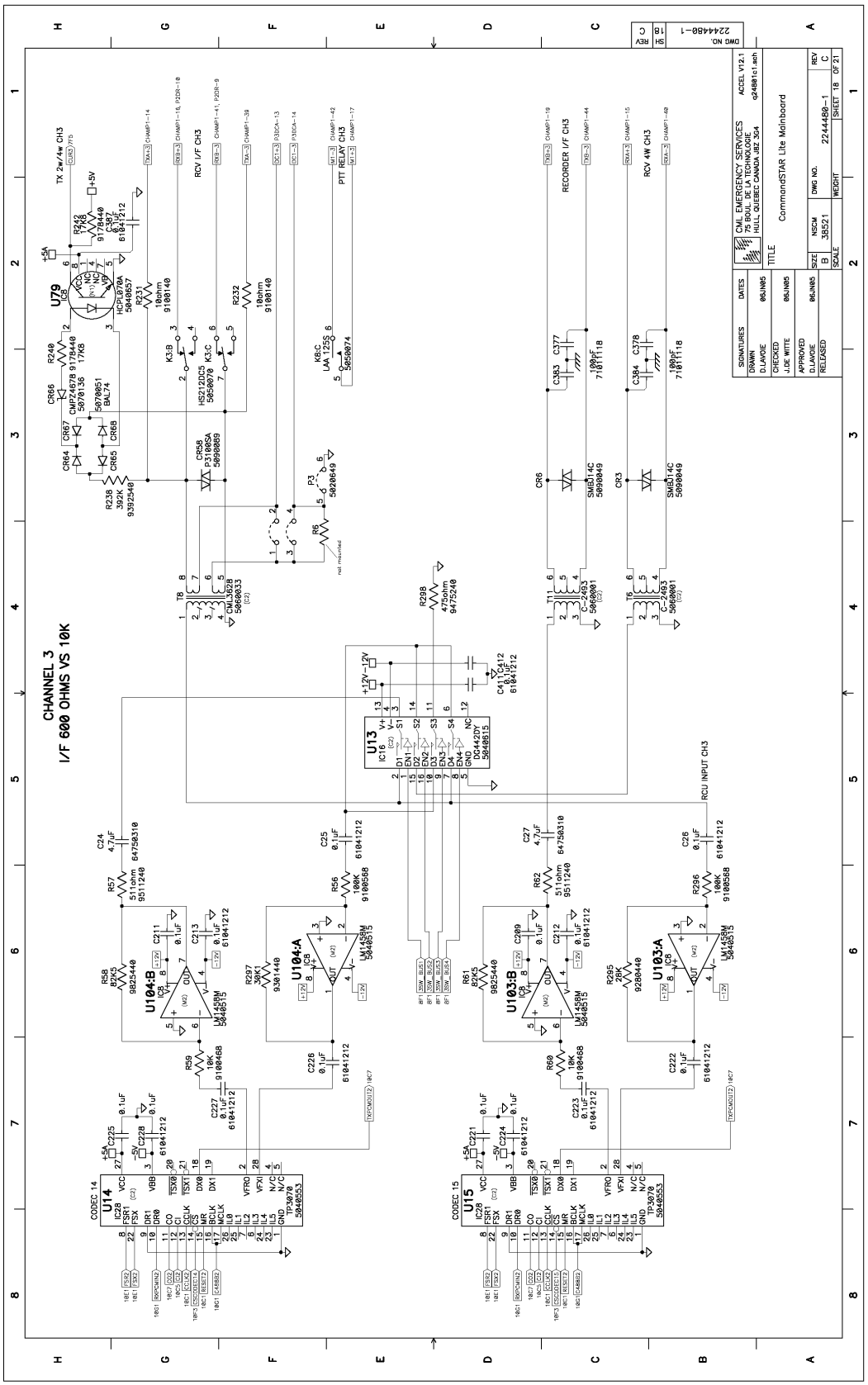


FIGURE C-18 DESKTOP CONSOLE MAIN BOARD (18 OF 20)

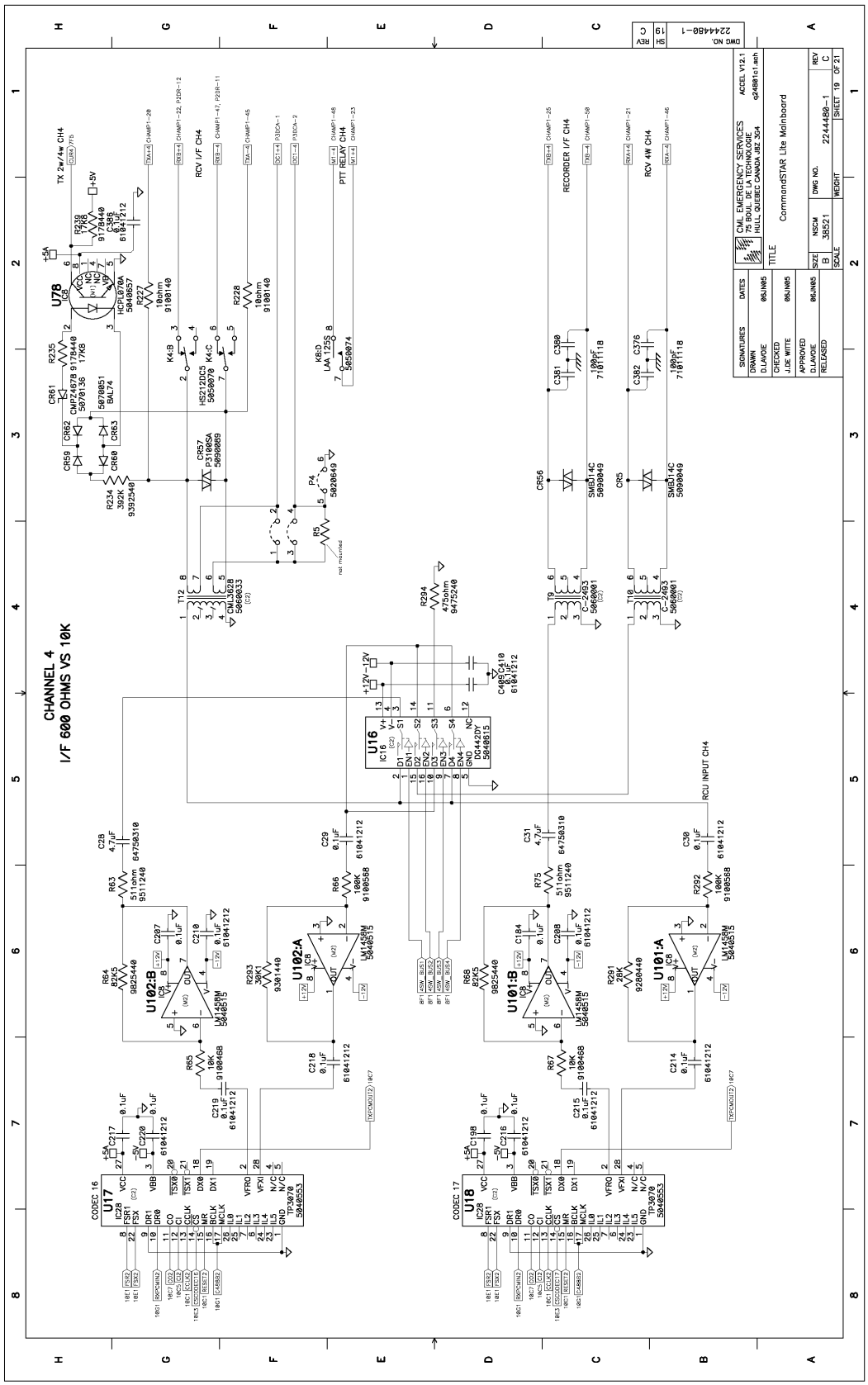


FIGURE C-19 DESKTOP CONSOLE MAIN BOARD (19 OF 20)

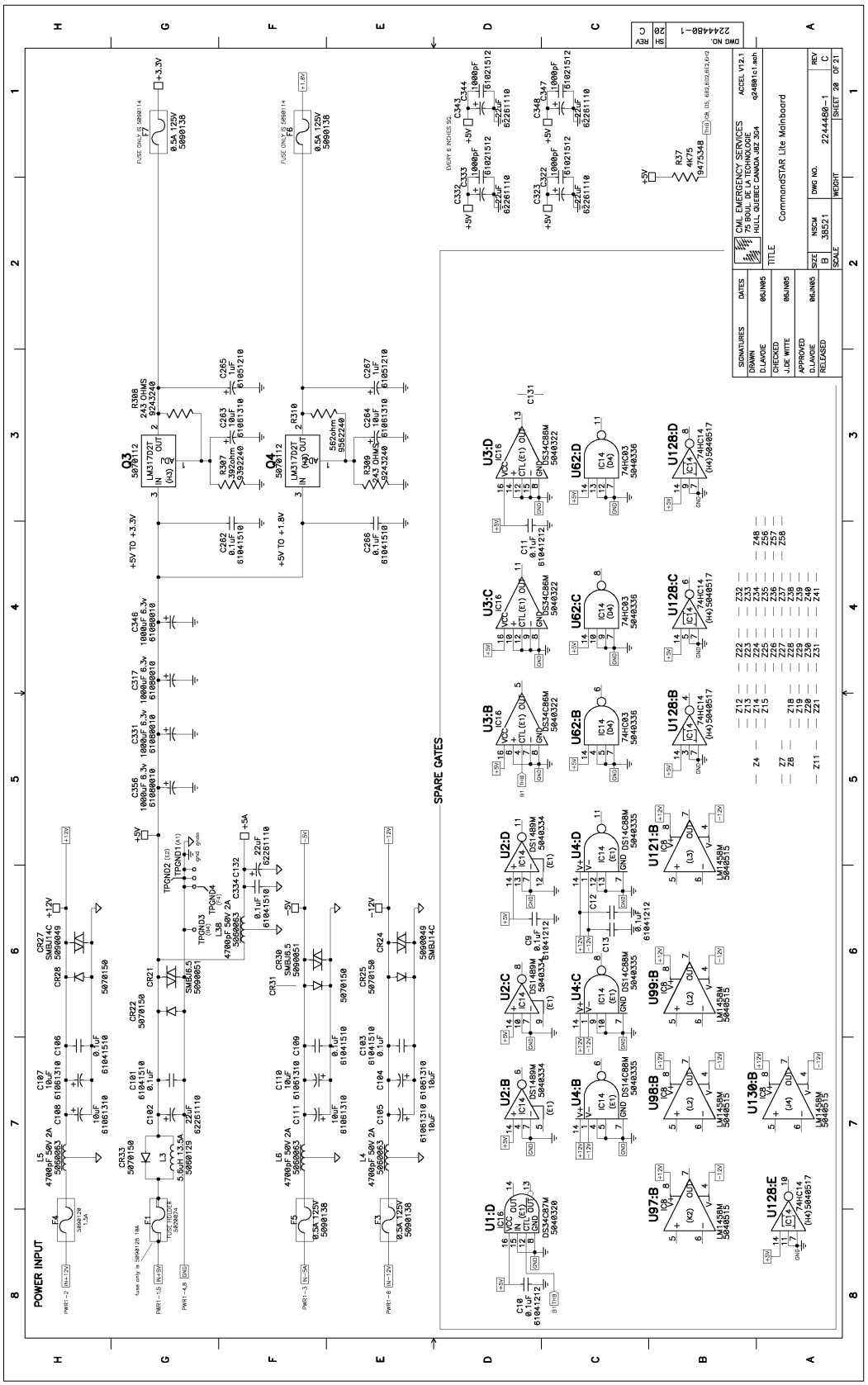


FIGURE C-20 DESKTOP CONSOLE MAIN BOARD (20 OF 20)

FOUR-CHANNEL EXPANSION MODULE (DDN6127)

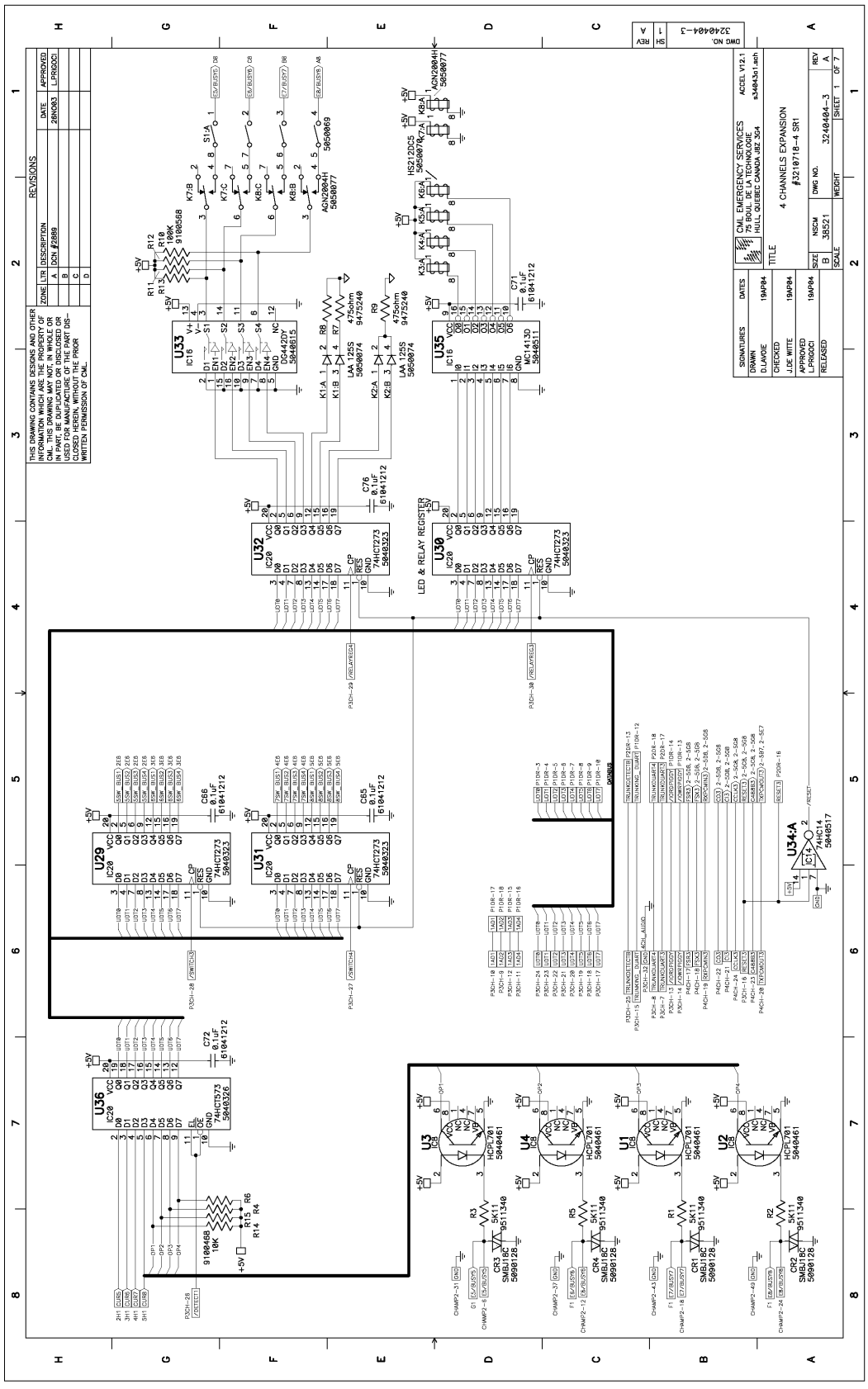


FIGURE C-21 FOUR-CHANNEL EXPANSION MODULE (1 OF 6)

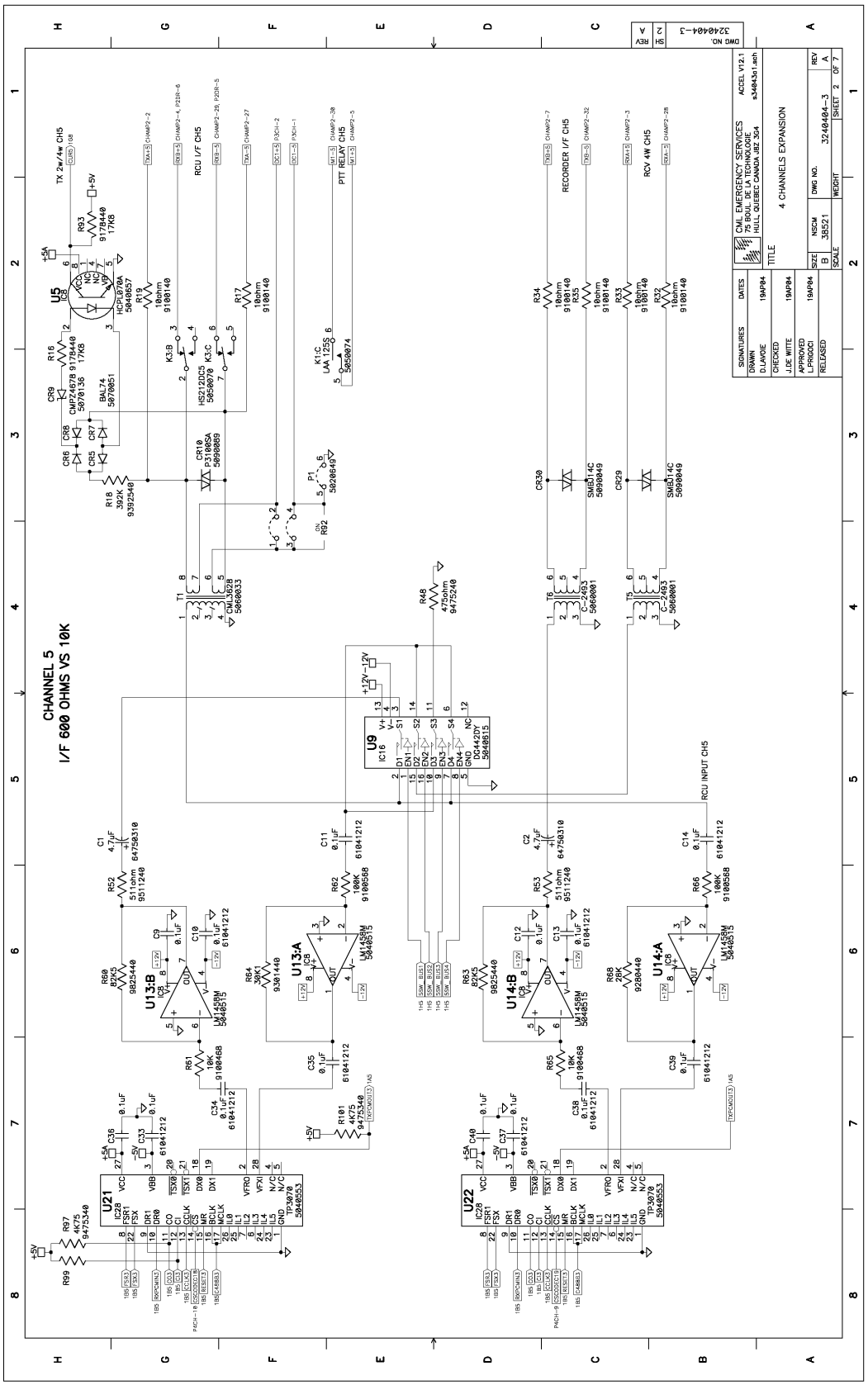


FIGURE C-22 FOUR-CHANNEL EXPANSION MODULE (2 OF 6)

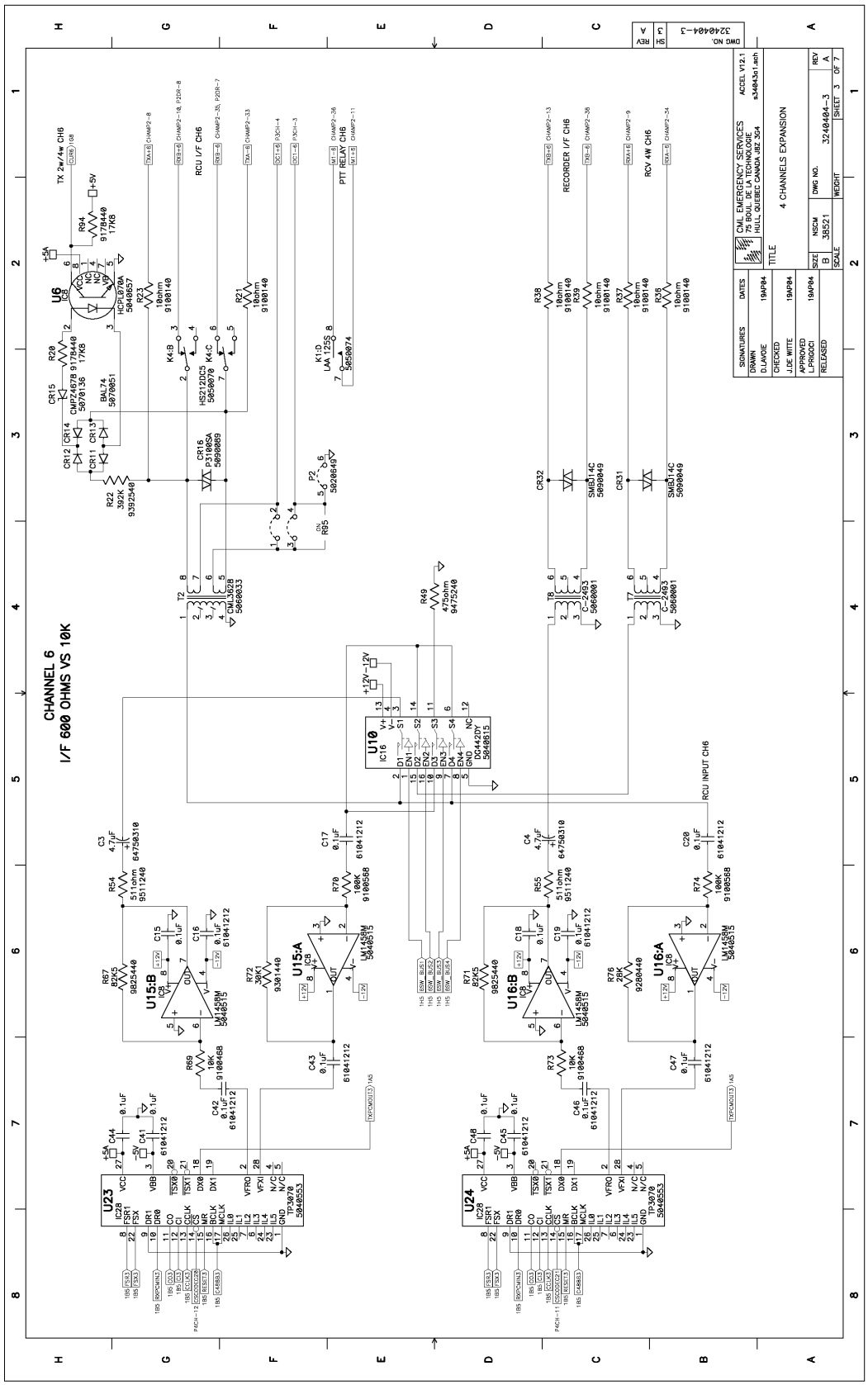


FIGURE C-23 FOUR-CHANNEL EXPANSION MODULE (3 OF 6)

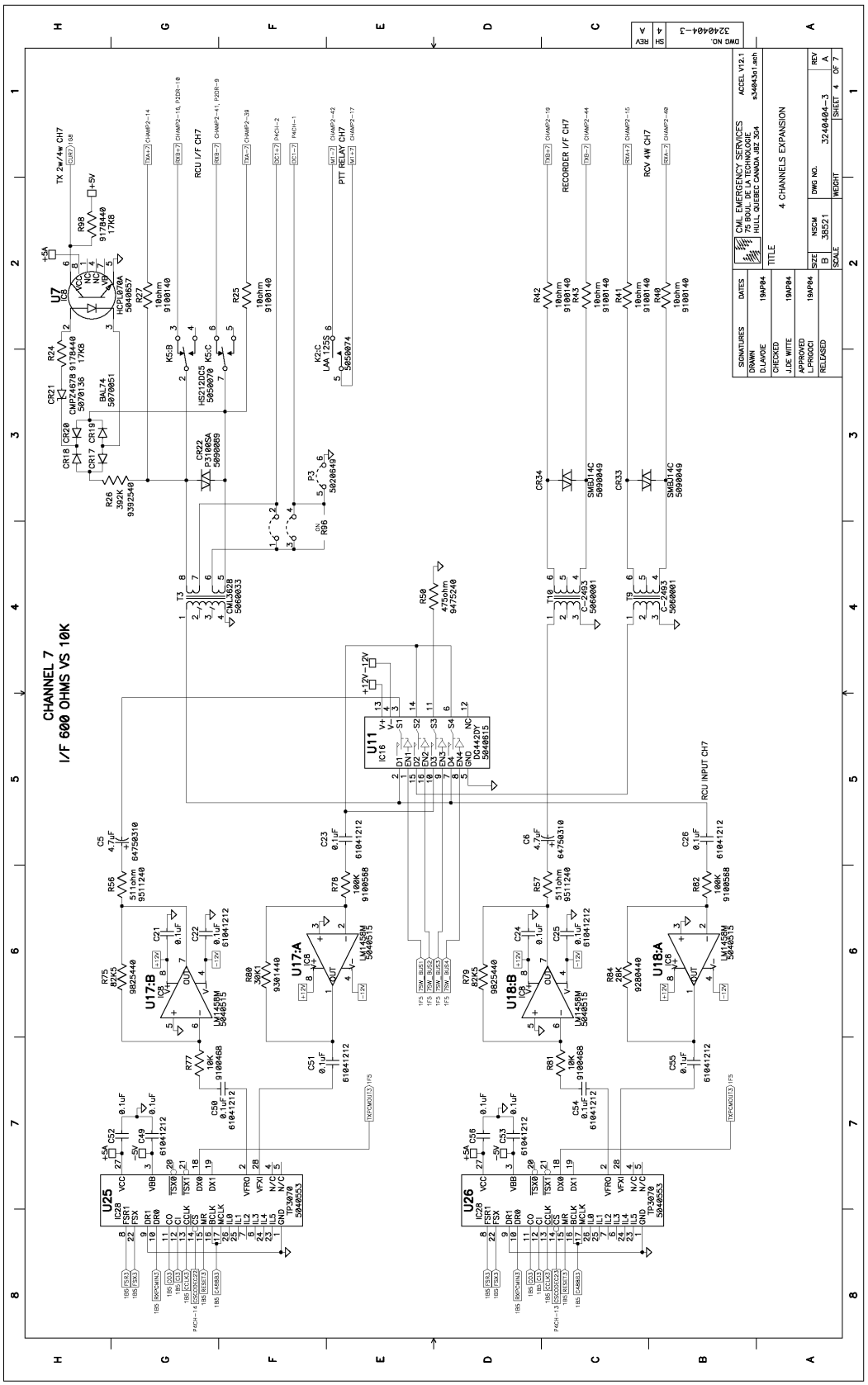


FIGURE C-24 FOUR-CHANNEL EXPANSION MODULE (4 OF 6)

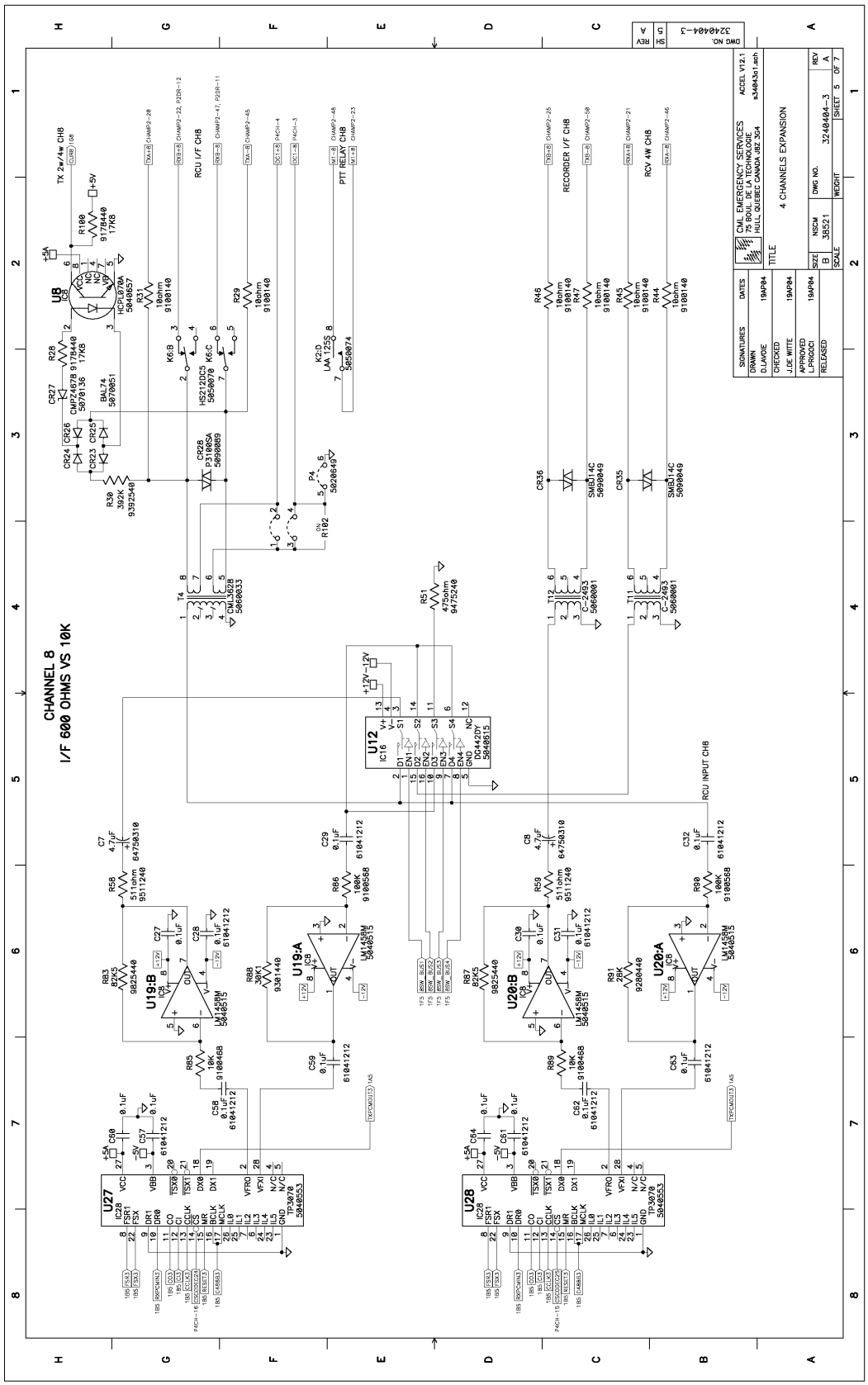


FIGURE C-25 FOUR-CHANNEL EXPANSION MODULE (5 OF 6)

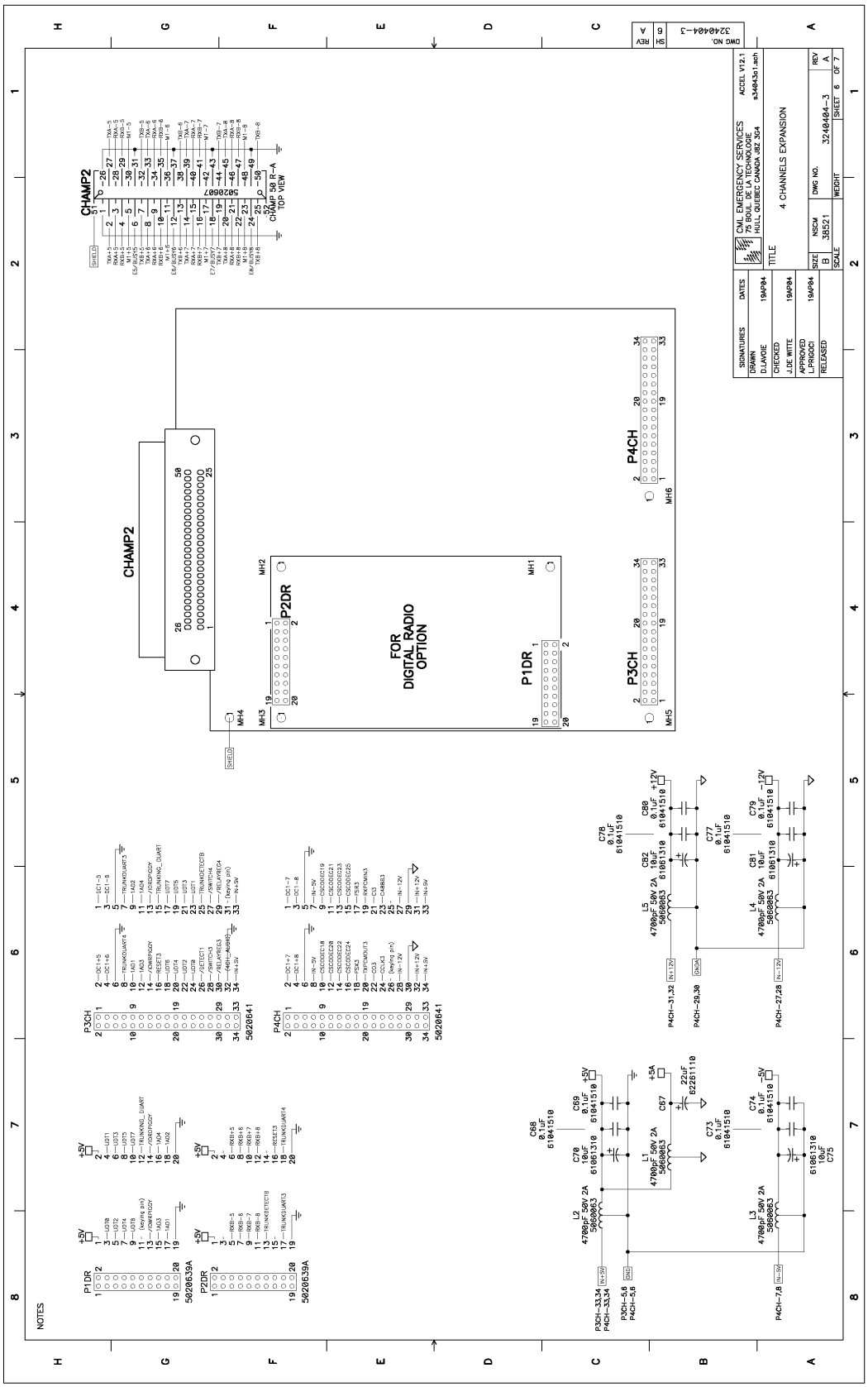
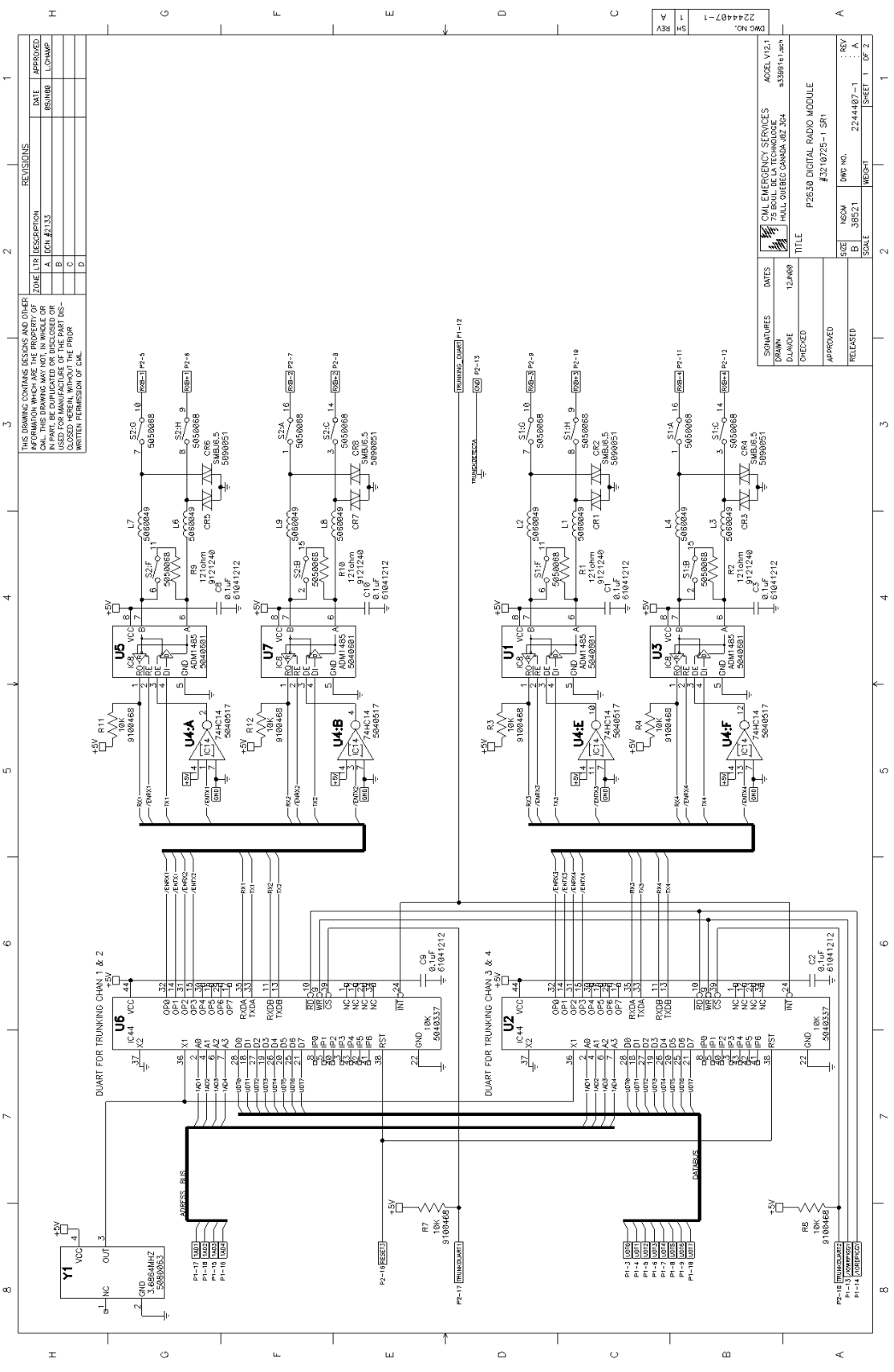


FIGURE C-26 FOUR-CHANNEL EXPANSION MODULE (6 OF 6)

DIGITAL RADIO INTERFACE MODULE (DDN6137)

FIGURE C-27 DIGITAL RADIO INTERFACE MODULE (1 OF 1)



TWO-CO LINE MODULE (CDN6275)

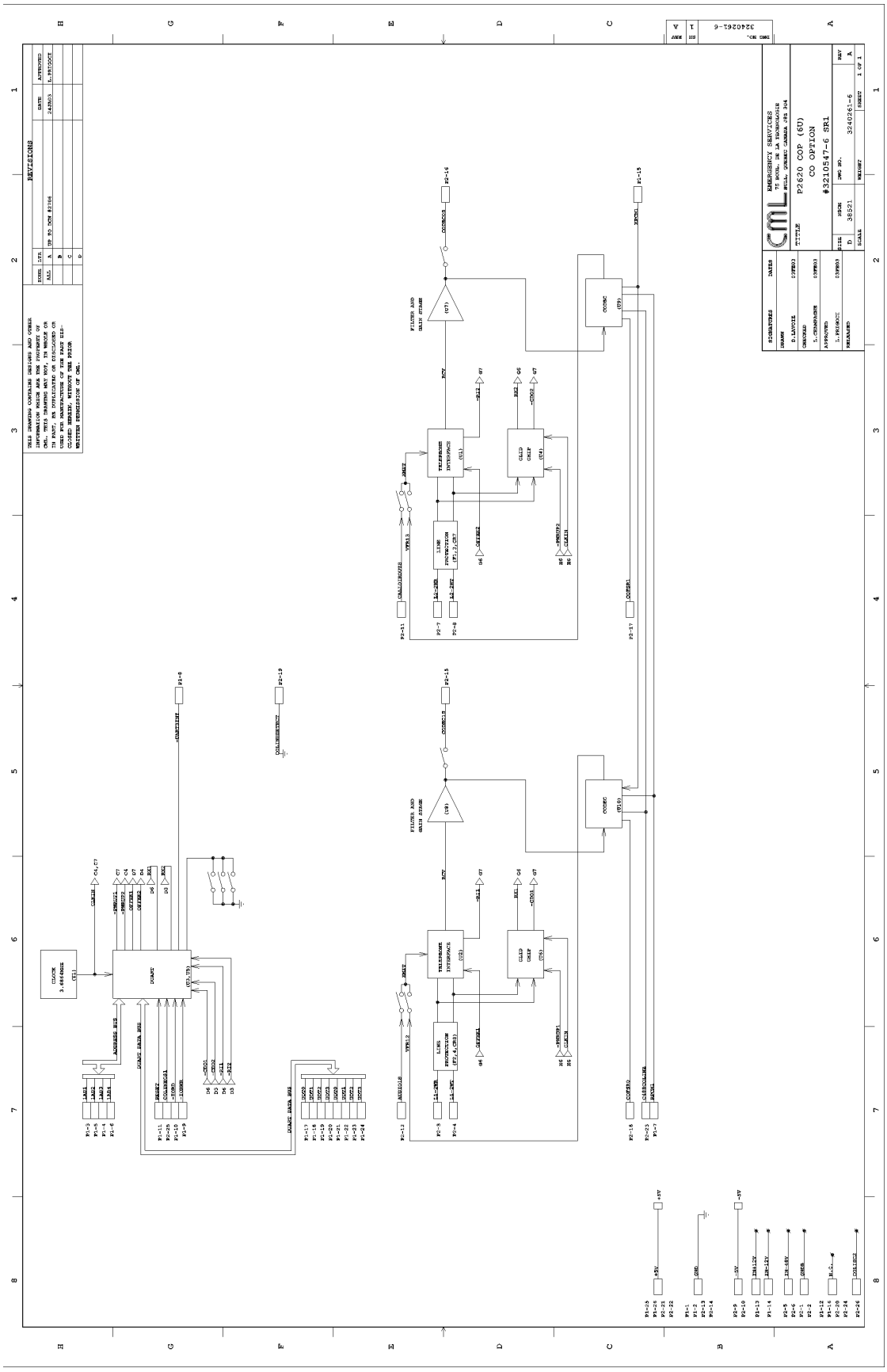


FIGURE C-28 TWO-CO LINE MODULE (1 OF 5)

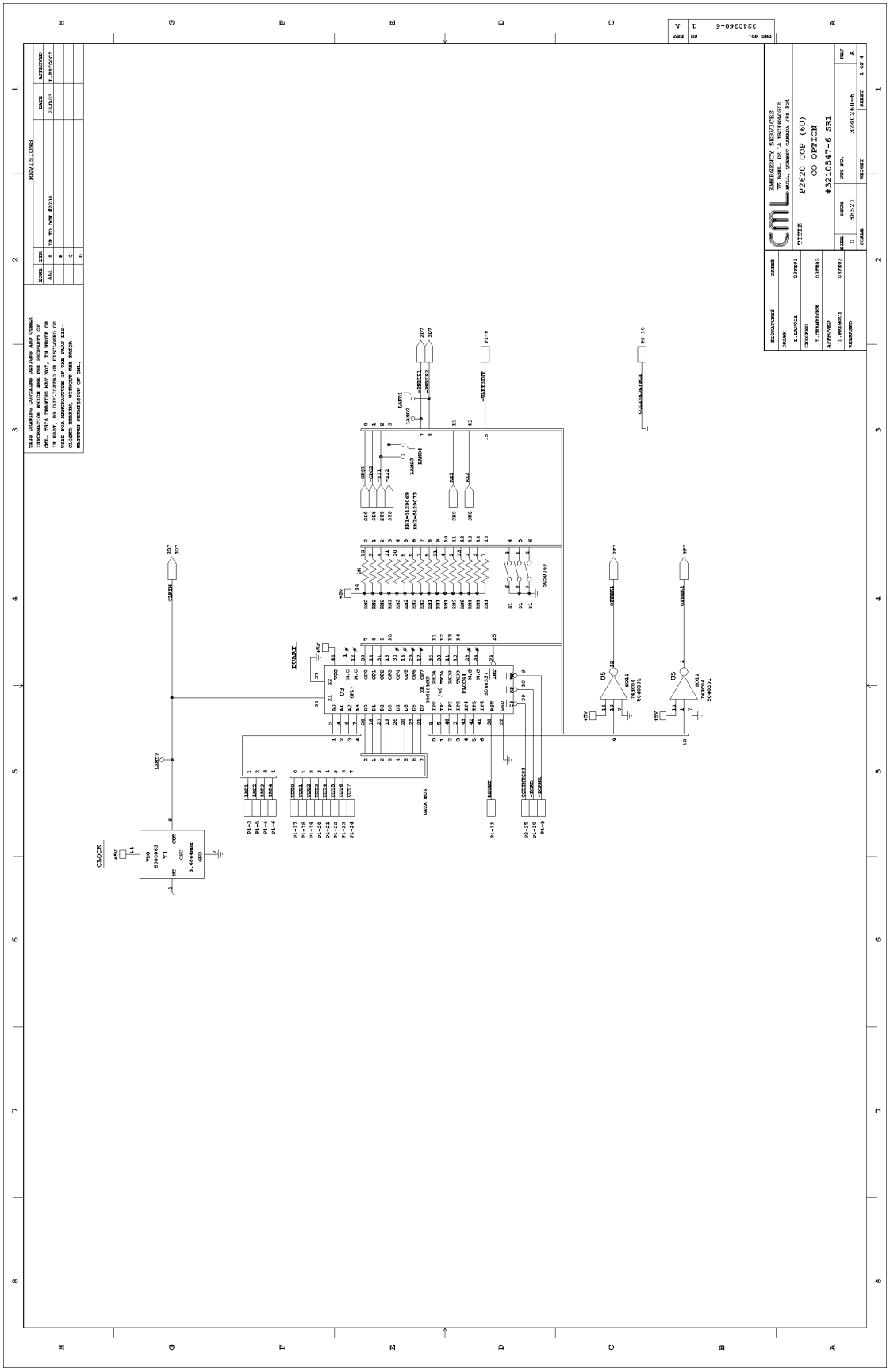


FIGURE C-29 TWO-CO LINE MODULE (2 OF 5)

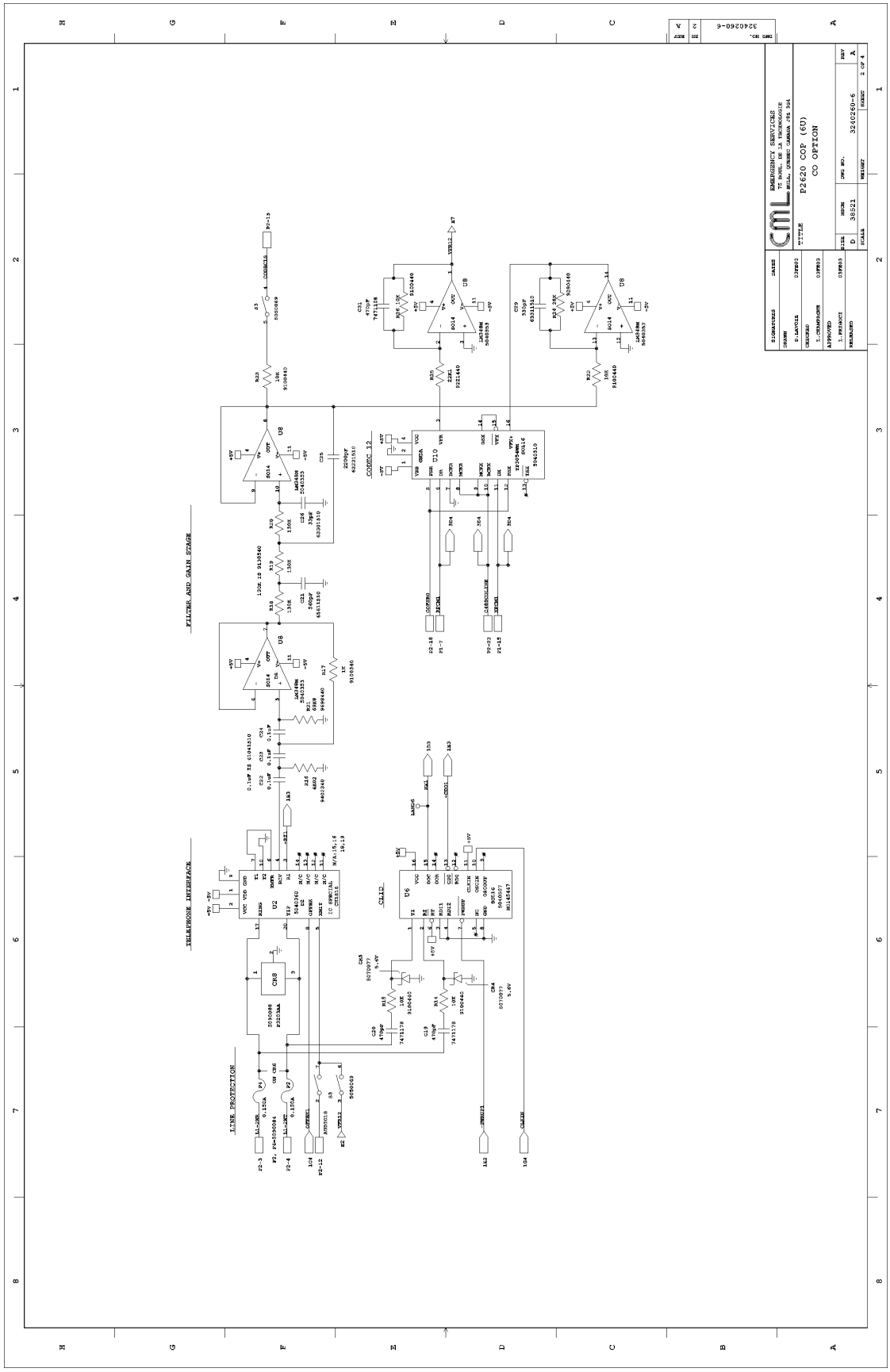


FIGURE C-30 TWO-CO LINE MODULE (3 OF 5)

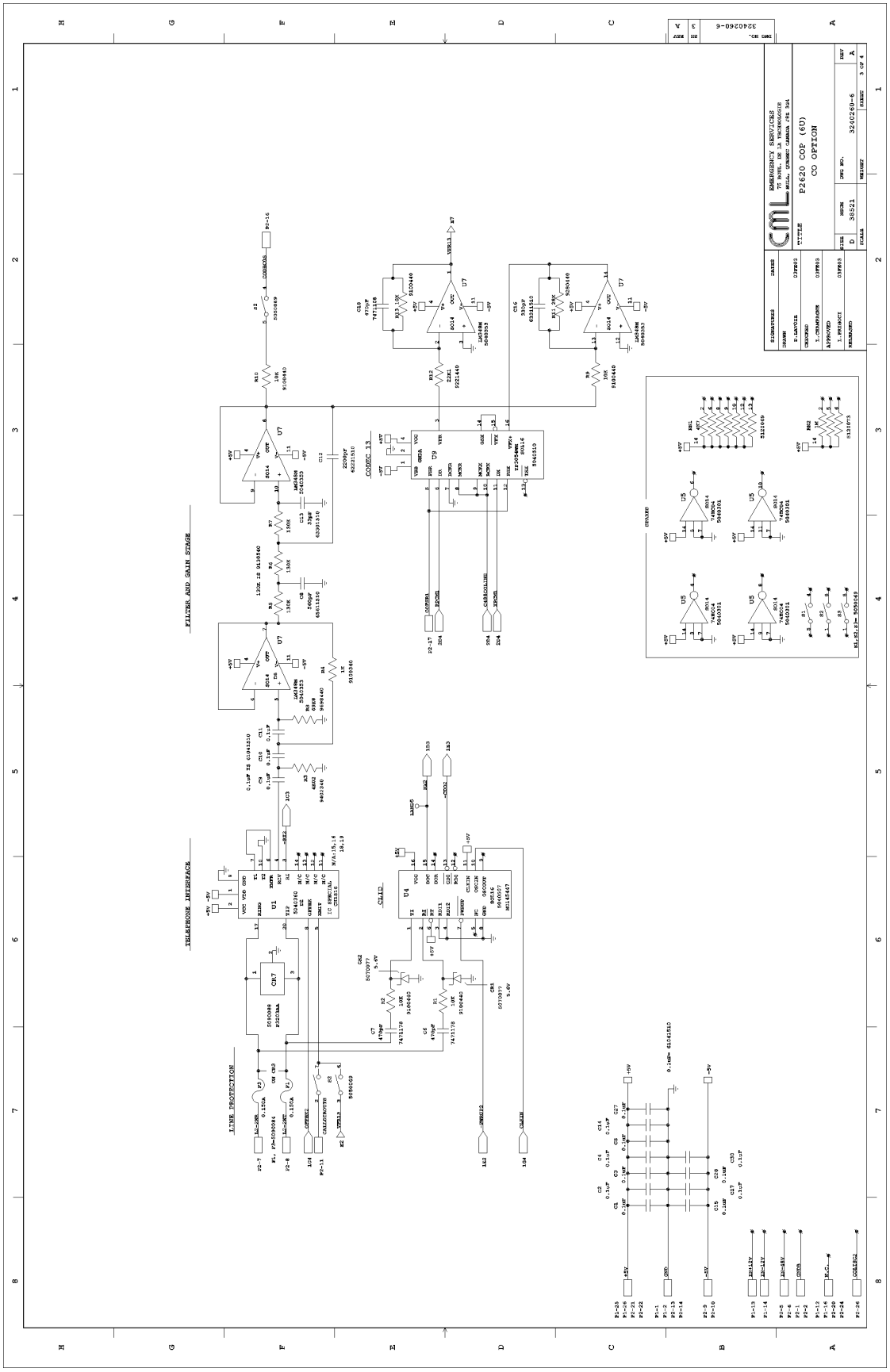


FIGURE C-31 TWO-CO LINE MODULE (4 OF 5)

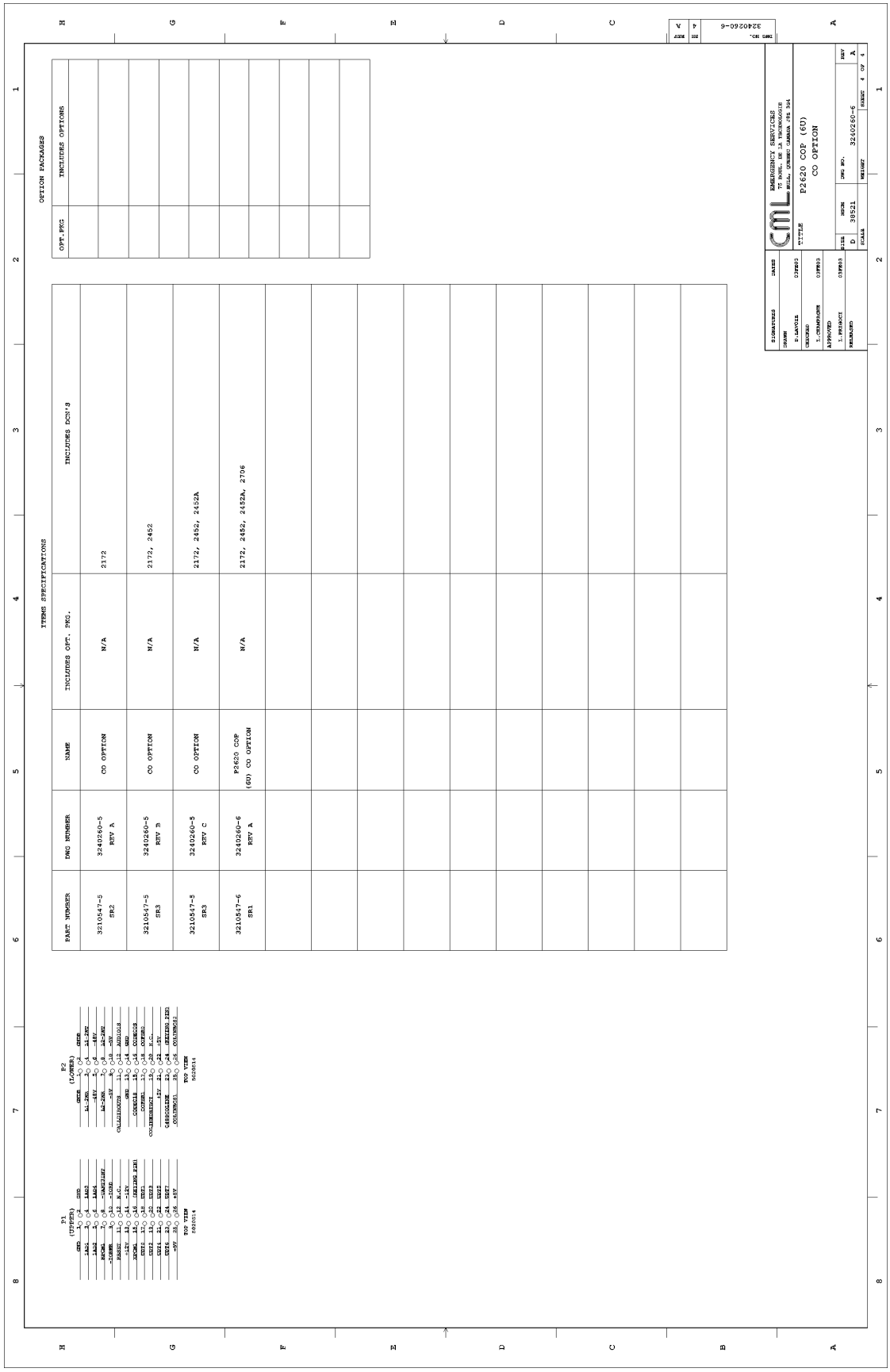


FIGURE C-32 TWO-CO LINE MODULE (5 OF 5)

DC CONTROL MODULE (TDN9897)

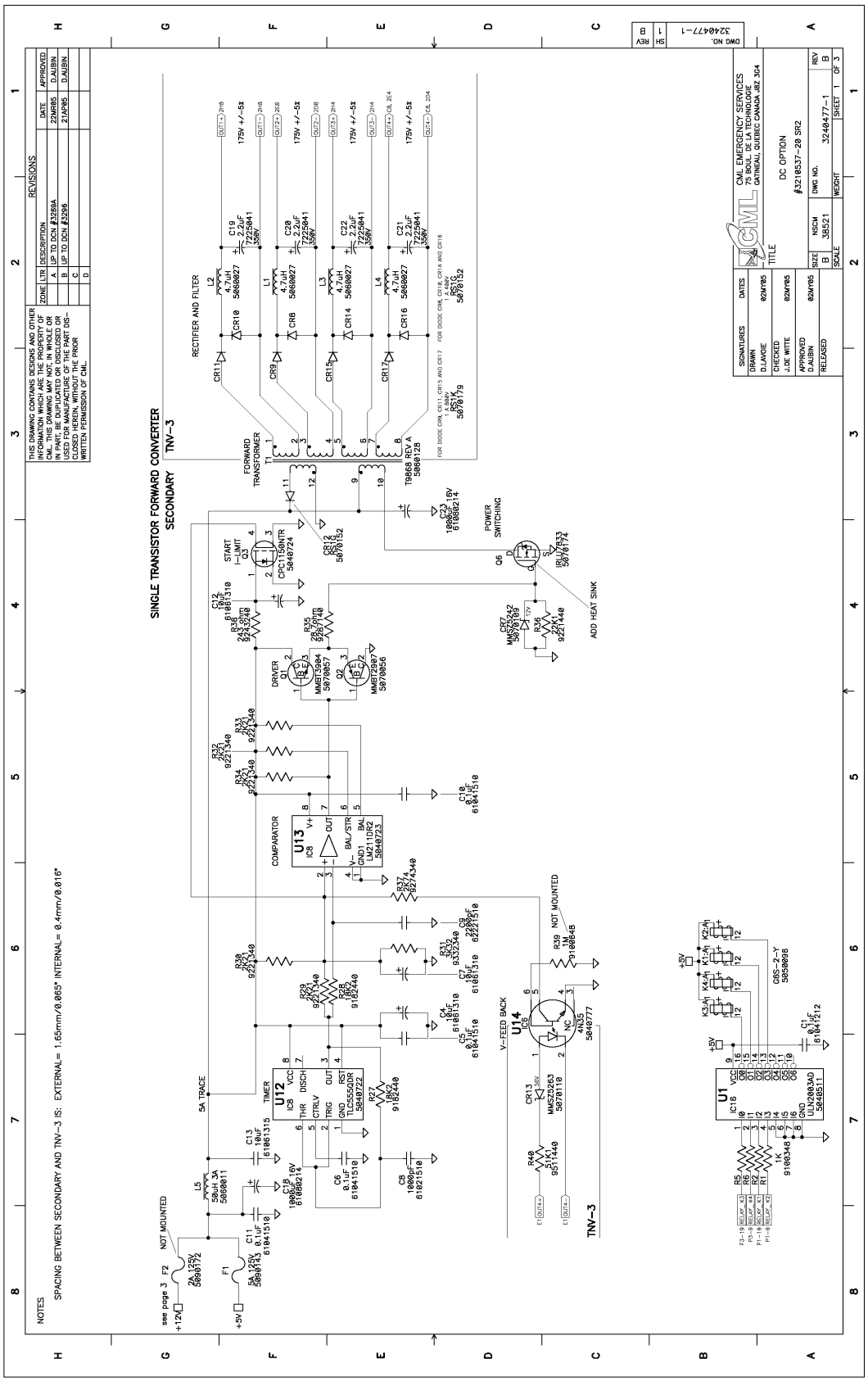


FIGURE C-33 DC CONTROL MODULE (1 OF 3)

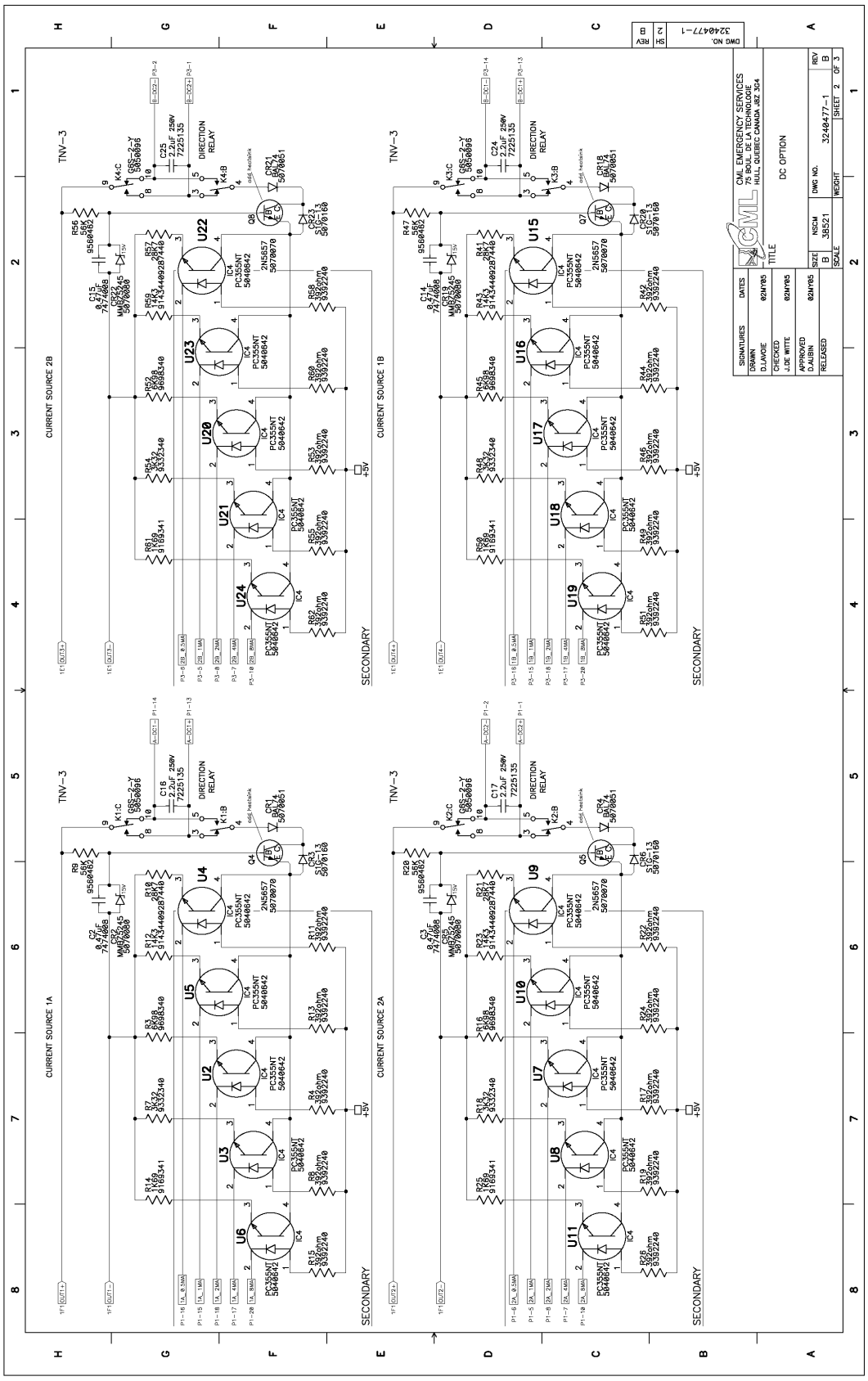


FIGURE C-34 DC CONTROL MODULE (2 OF 3)

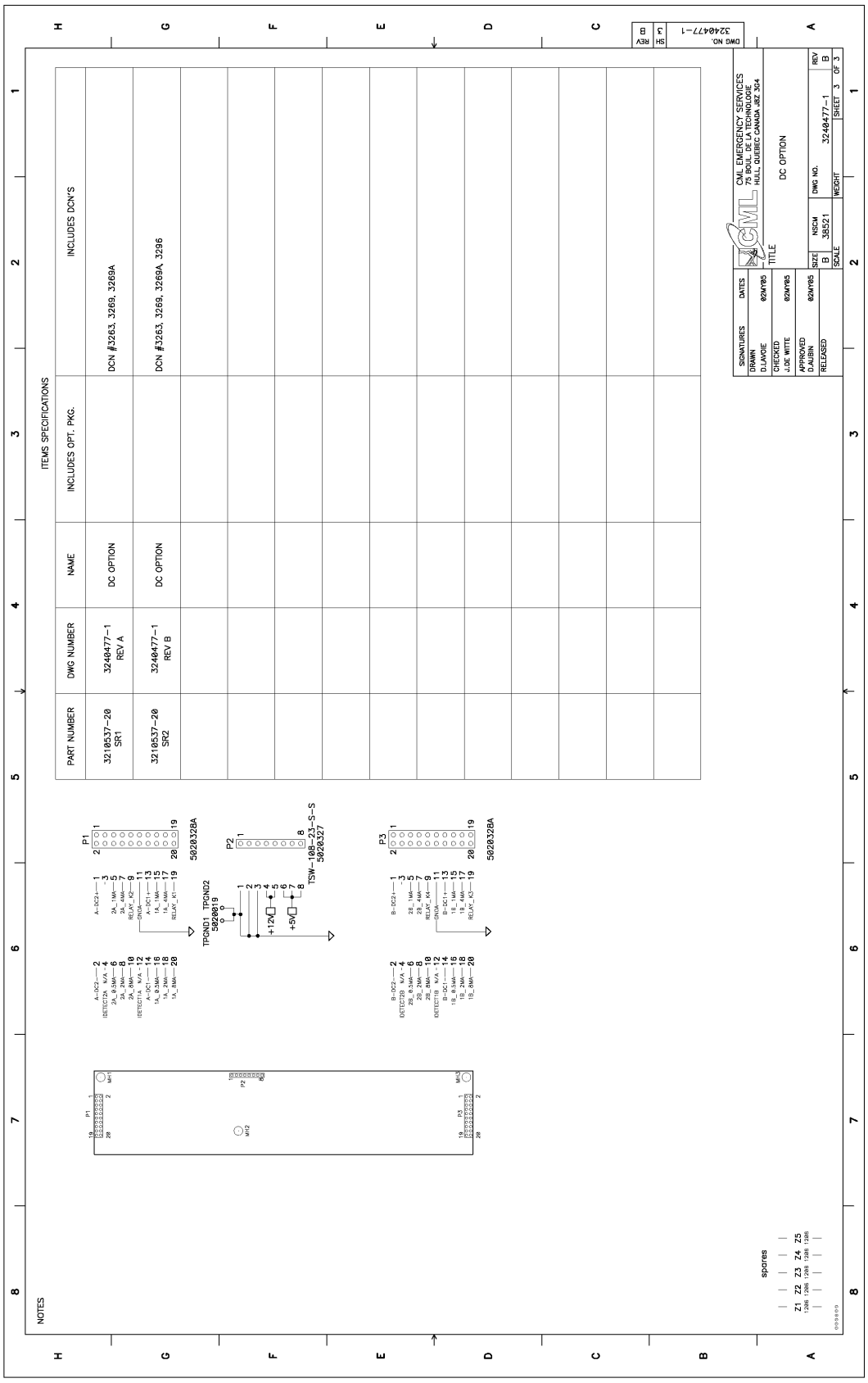
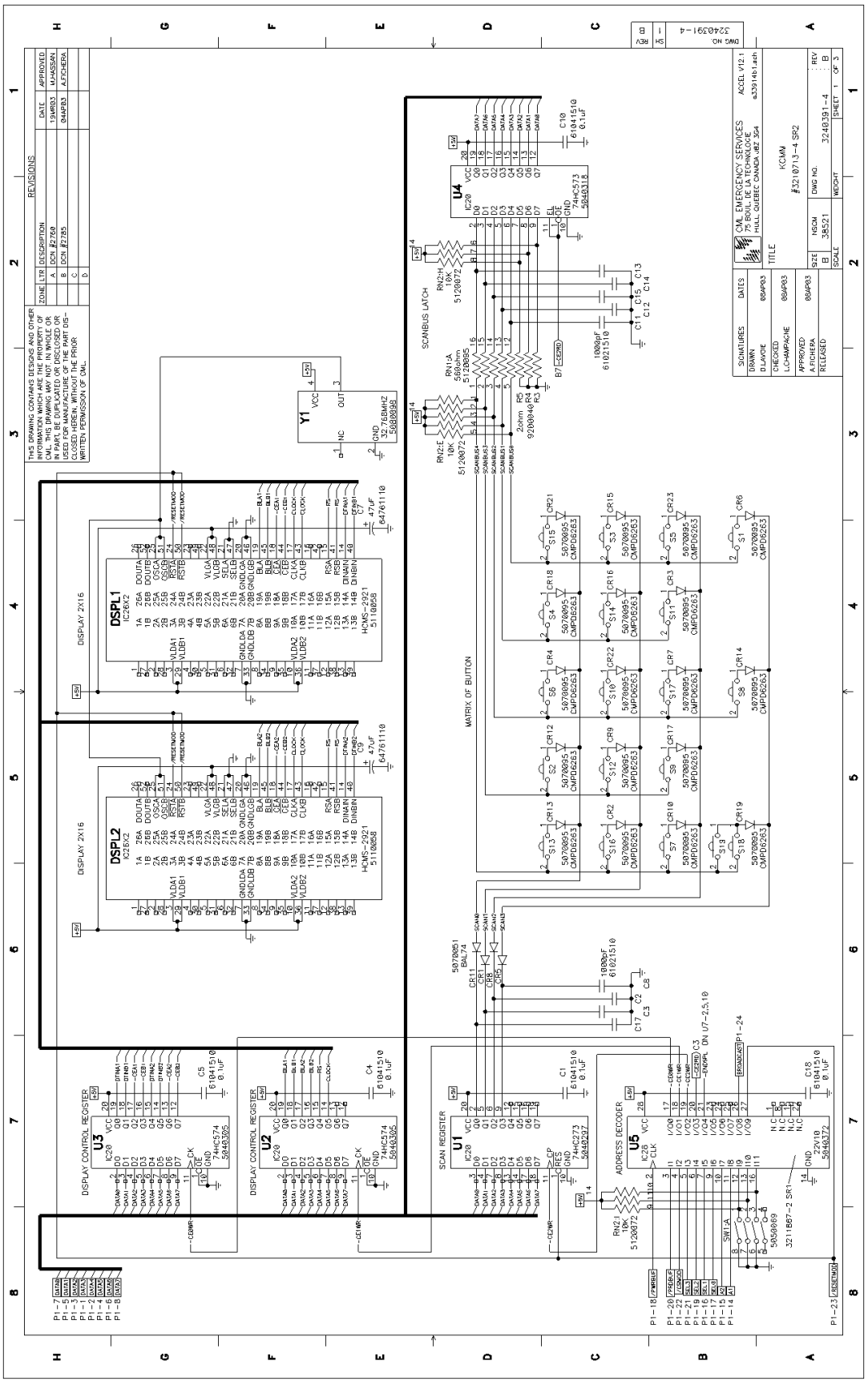


FIGURE C-35 DC CONTROL MODULE (3 OF 3)

KEYPAD CONTROL MODULE (DDN6129)

FIGURE C-36 KEYPAD CONTROL MODULE (1 OF 3)



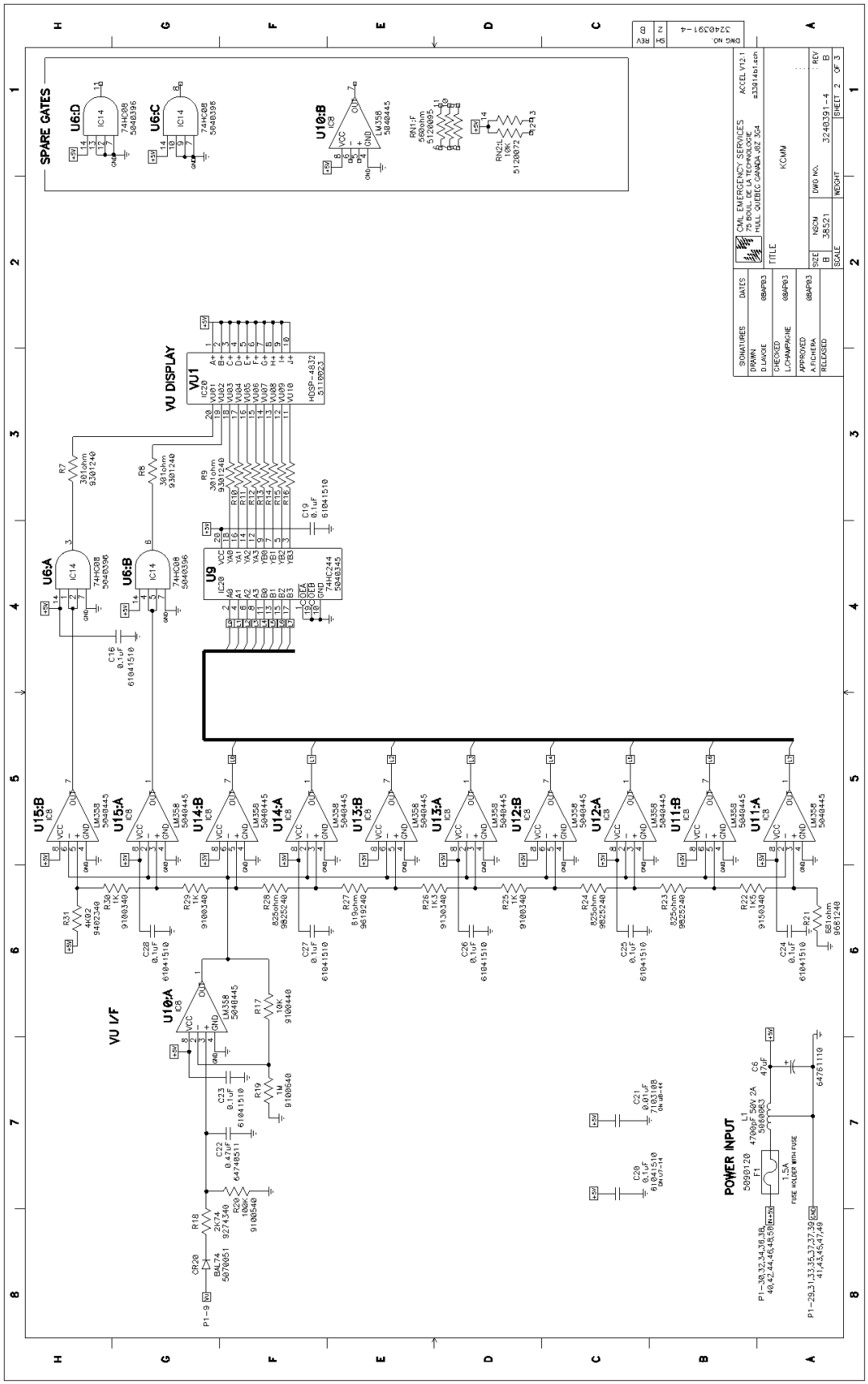
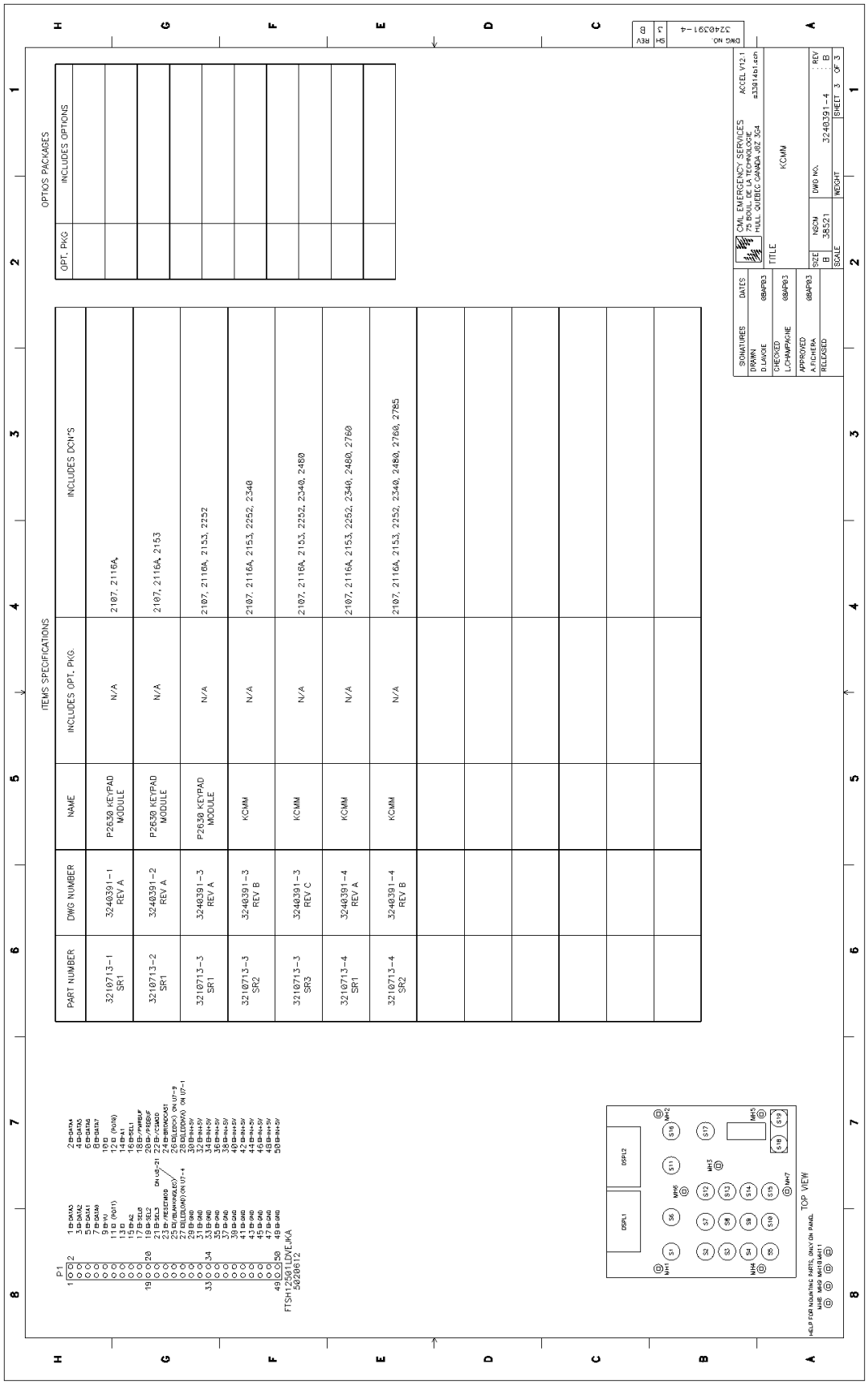


FIGURE C-37 KEYPAD CONTROL MODULE (2 OF 3)

FIGURE C-38 KEYPAD CONTROL MODULE (3 OF 3)



DUAL CHANNEL CONTROL MODULE WITHOUT DISPLAY (DDN6130)

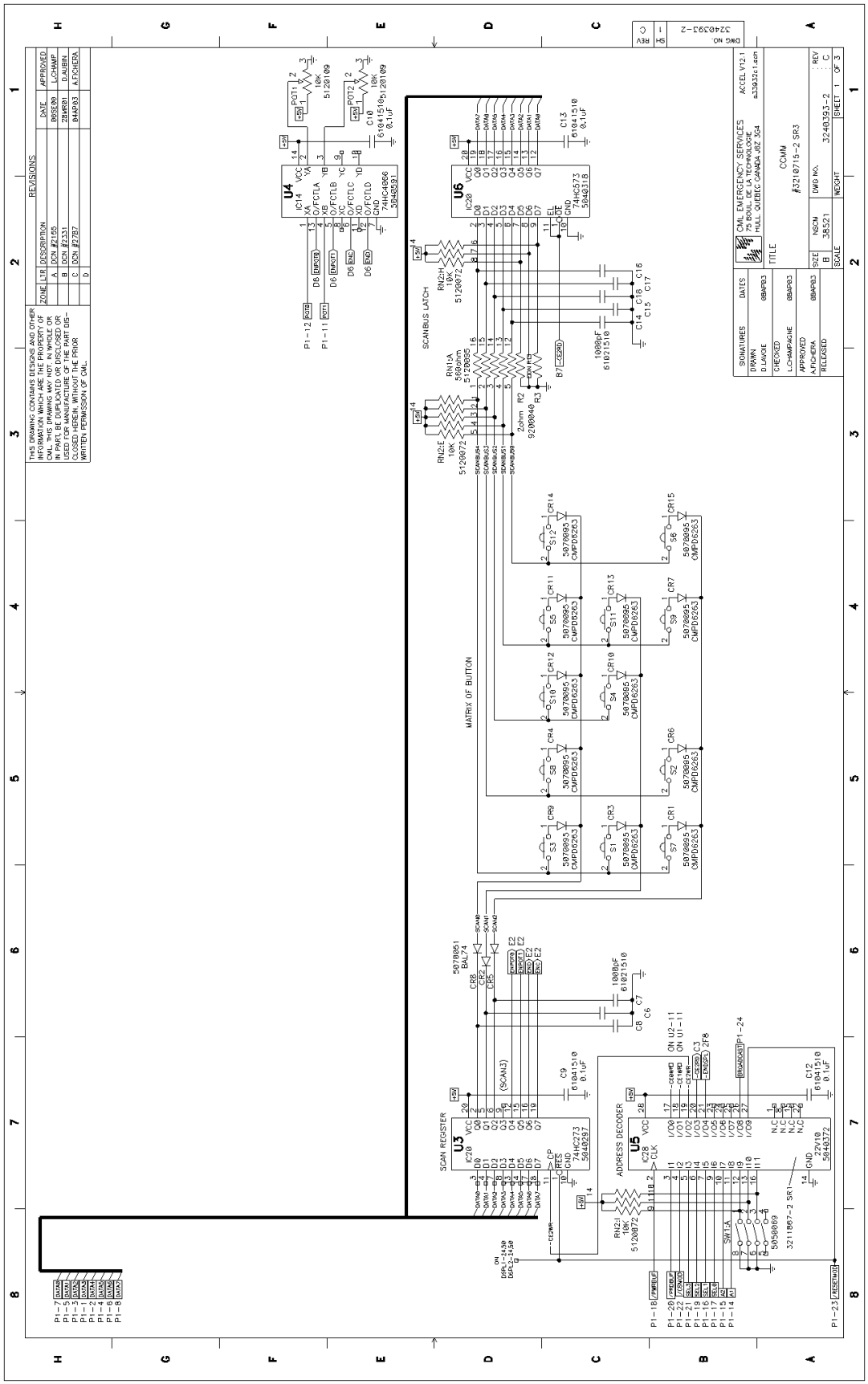


FIGURE C-39 DUAL CHANNEL CONTROL MODULE WITHOUT DISPLAY (1 OF 3)

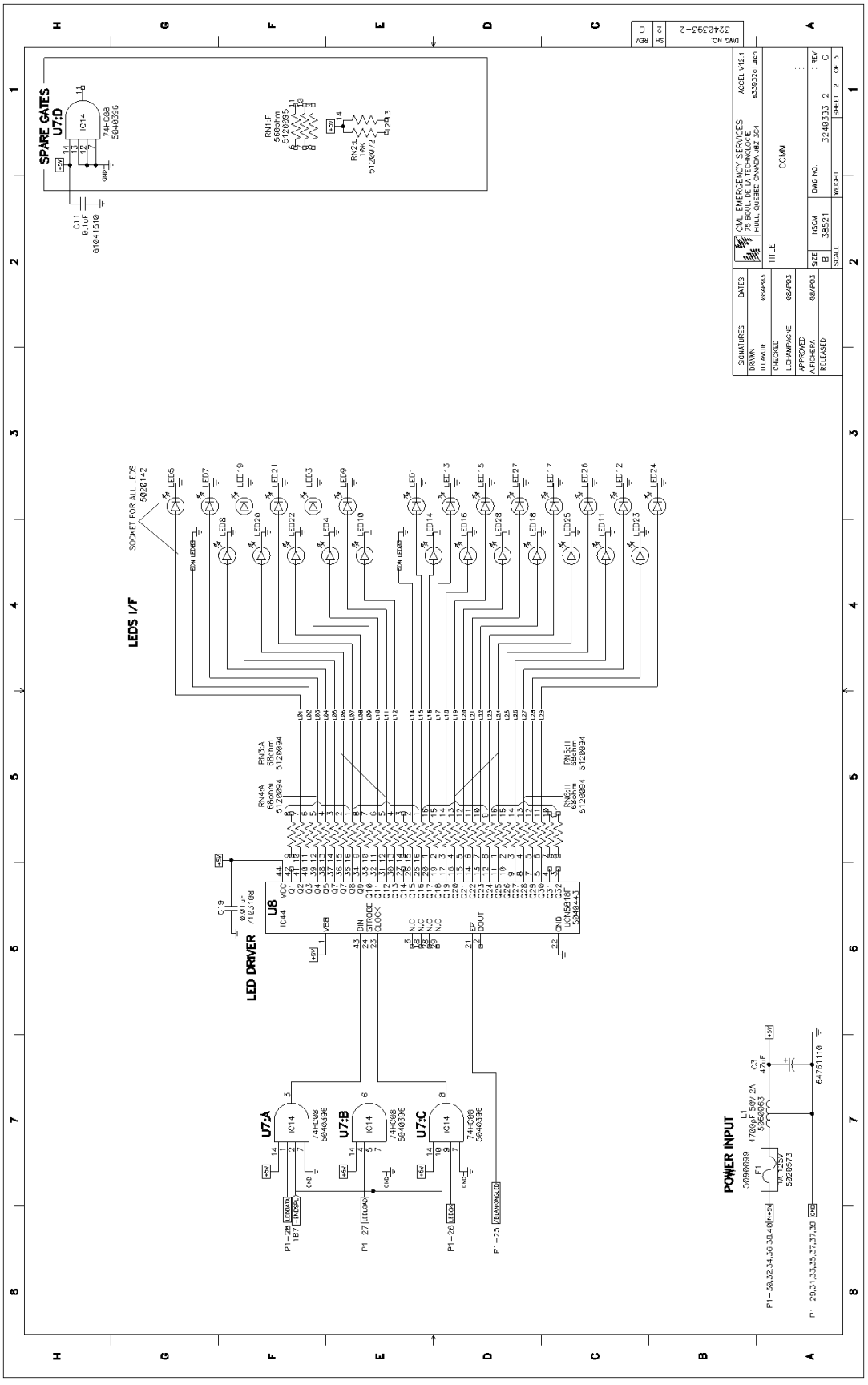


FIGURE C-40 DUAL CHANNEL CONTROL MODULE WITHOUT DISPLAY (2 OF 3)

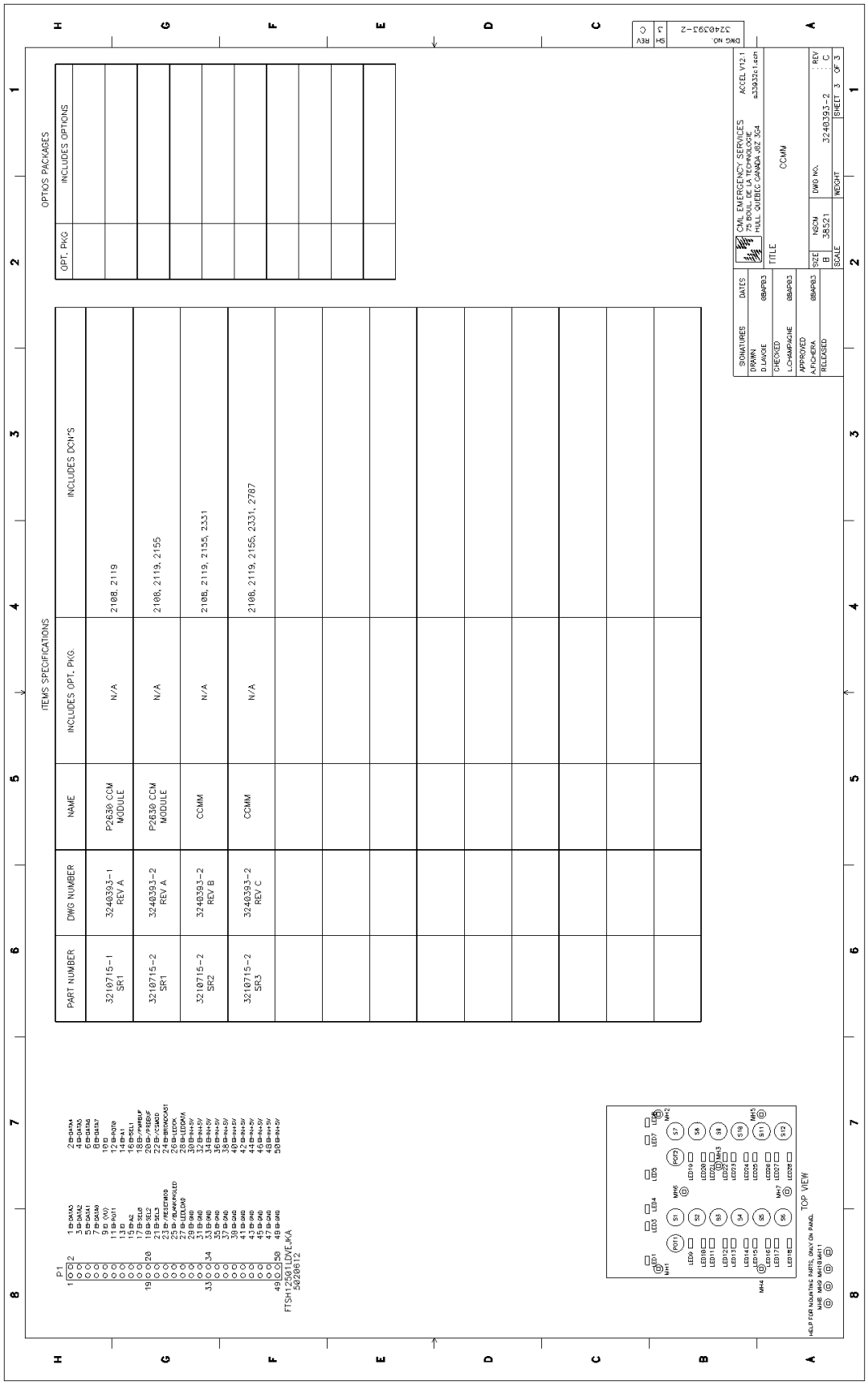


FIGURE C-41 DUAL CHANNEL CONTROL MODULE WITHOUT DISPLAY (3 OF 3)

DUAL CHANNEL CONTROL MODULE WITH DISPLAY (DDN6131)

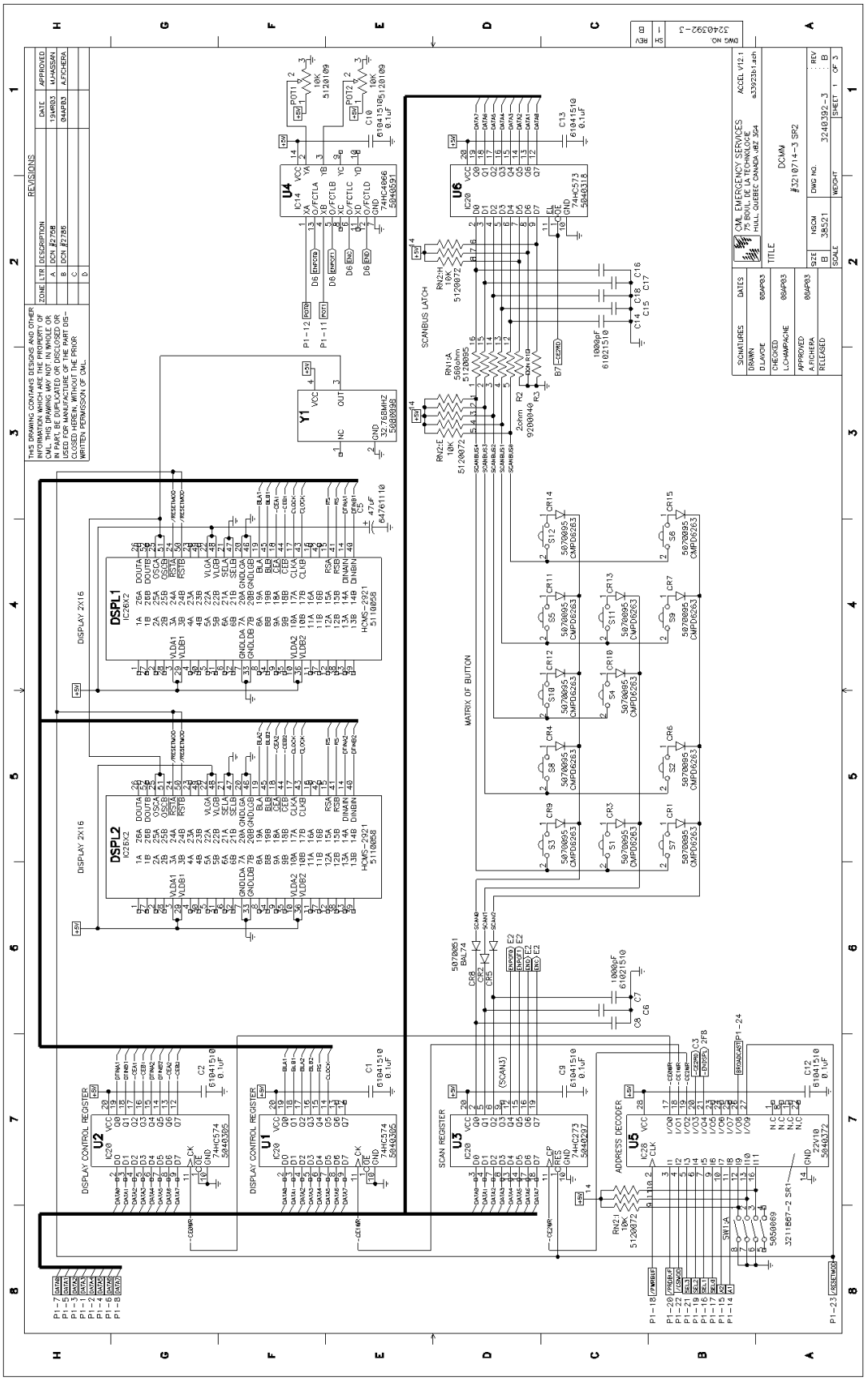


FIGURE C-42 DUAL CHANNEL CONTROL MODULE WITH DISPLAY (1 OF 3)

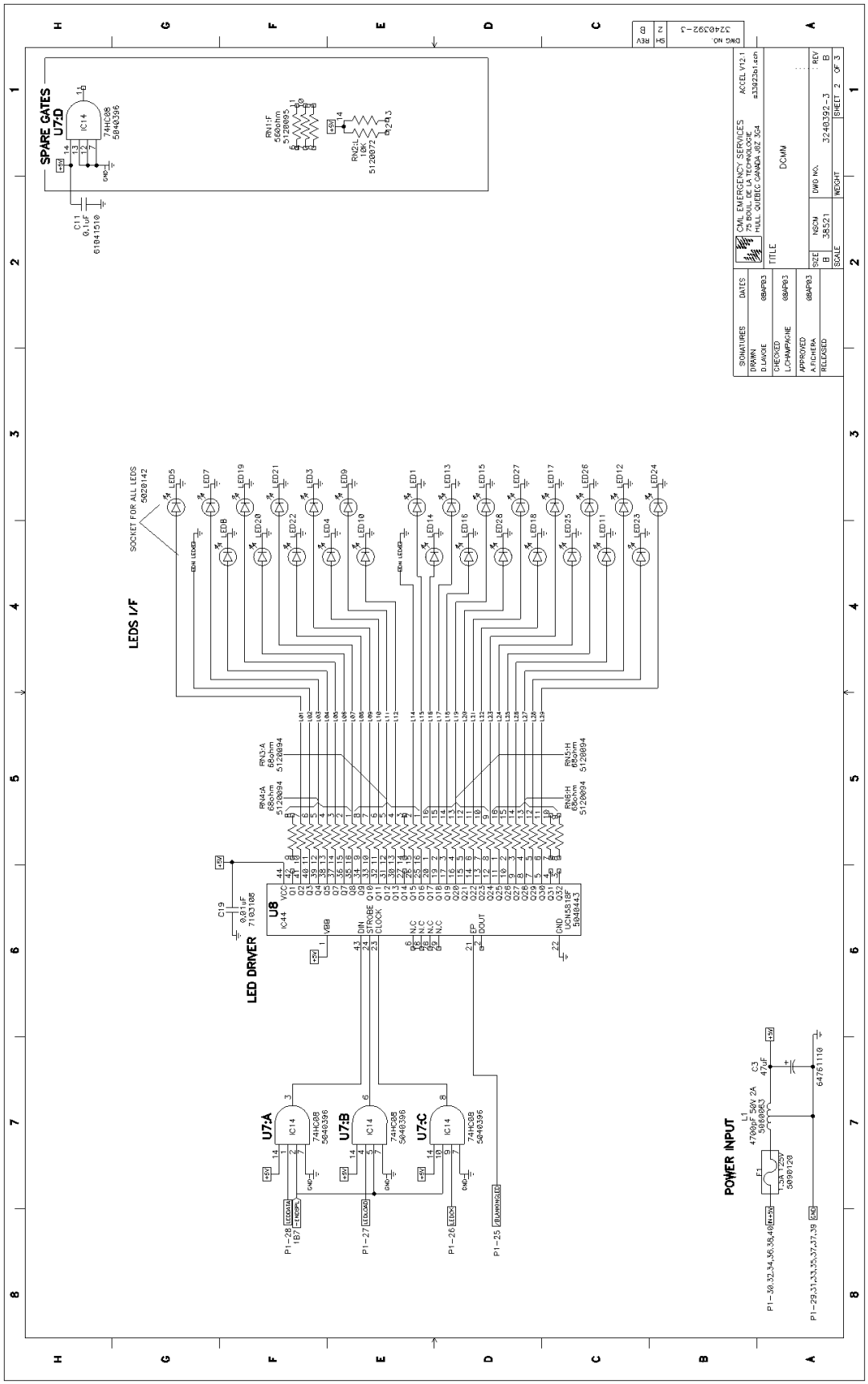
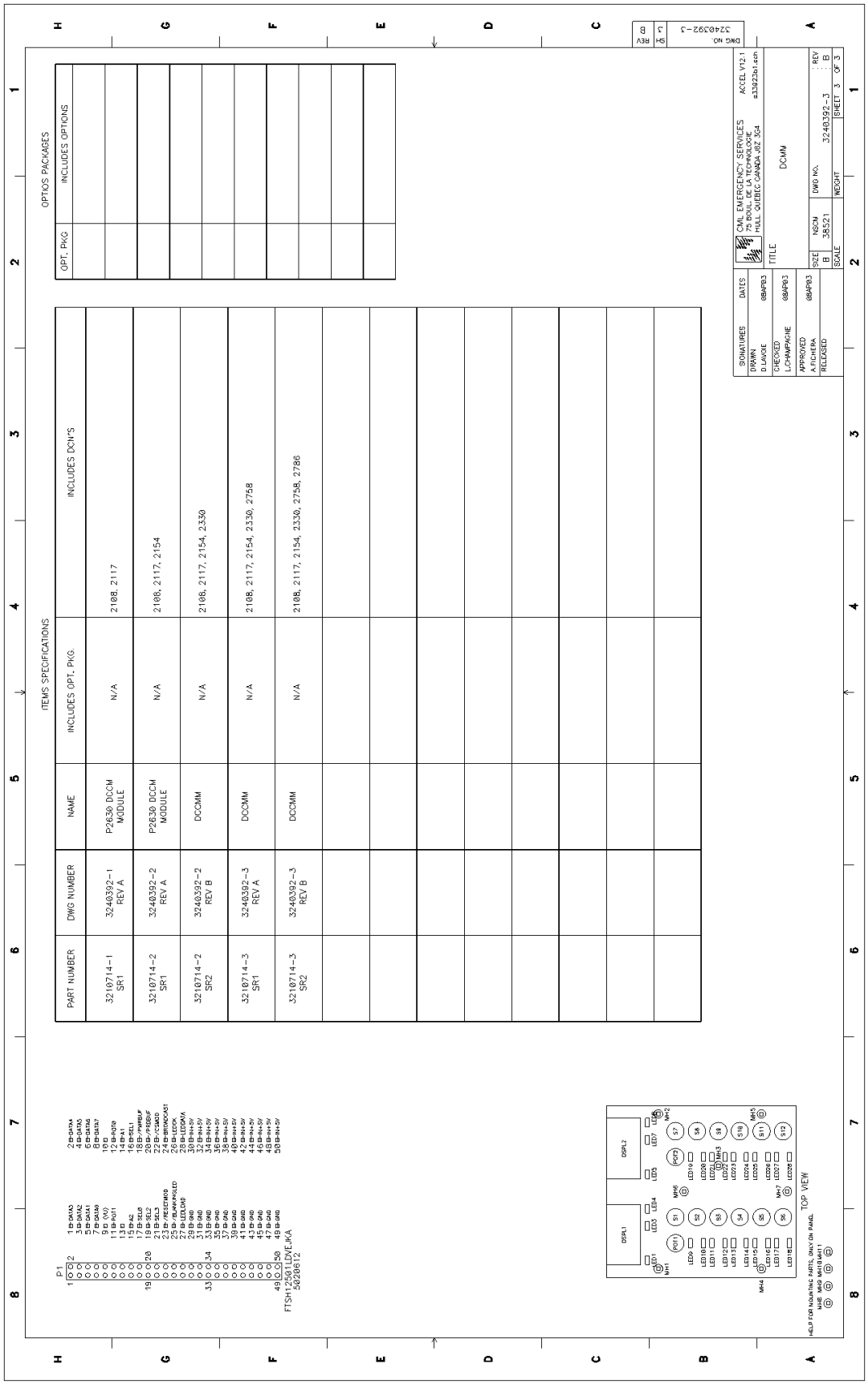


FIGURE C-43 DUAL CHANNEL CONTROL MODULE WITH DISPLAY (2 OF 3)

FIGURE C-44 DUAL CHANNEL CONTROL MODULE WITH DISPLAY (3 OF 3)



SINGLE DISPLAY CHANNEL CONTROL MODULE (DDN6696)

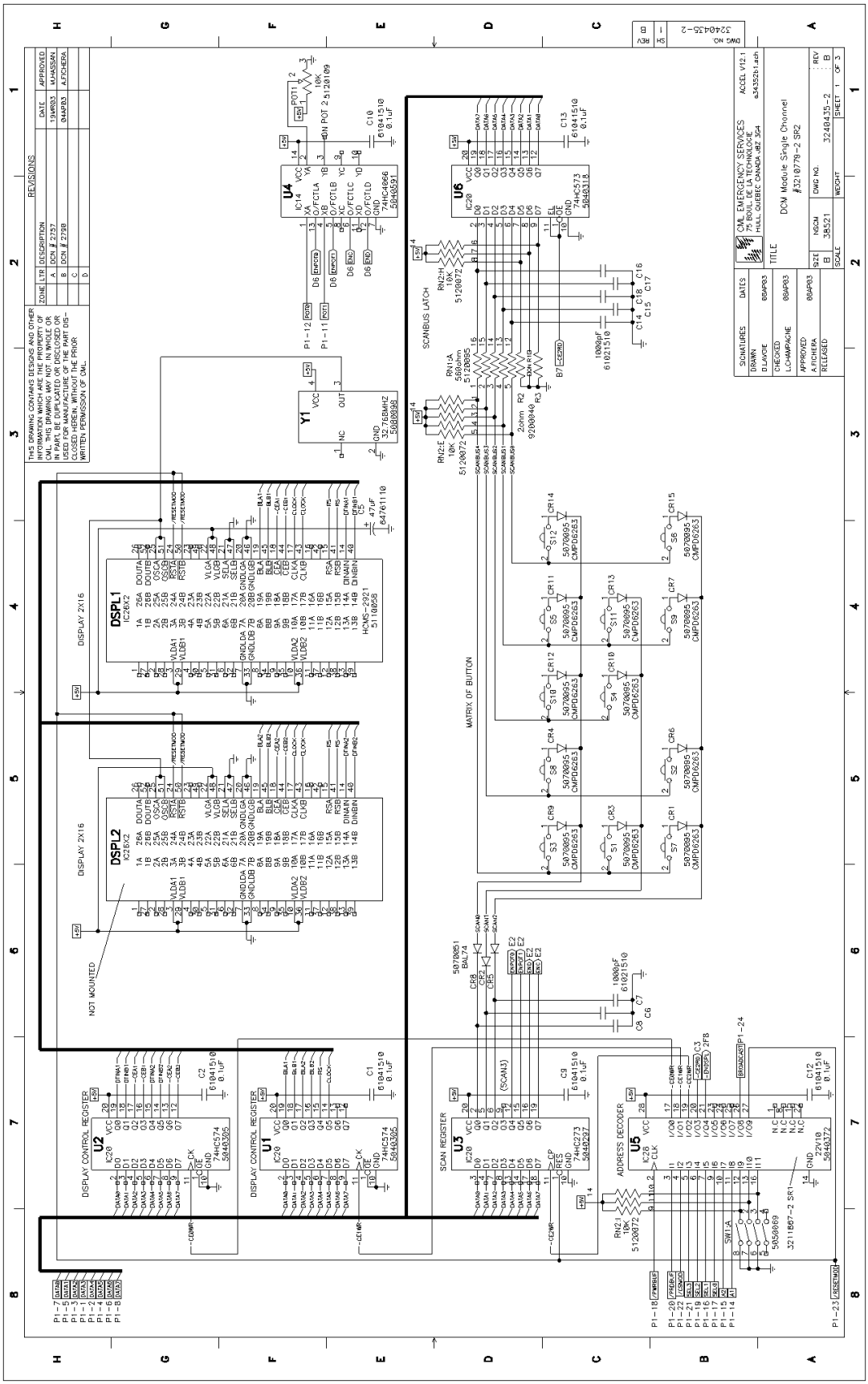


FIGURE C-45 SINGLE DISPLAY CHANNEL CONTROL MODULE (1 OF 3)

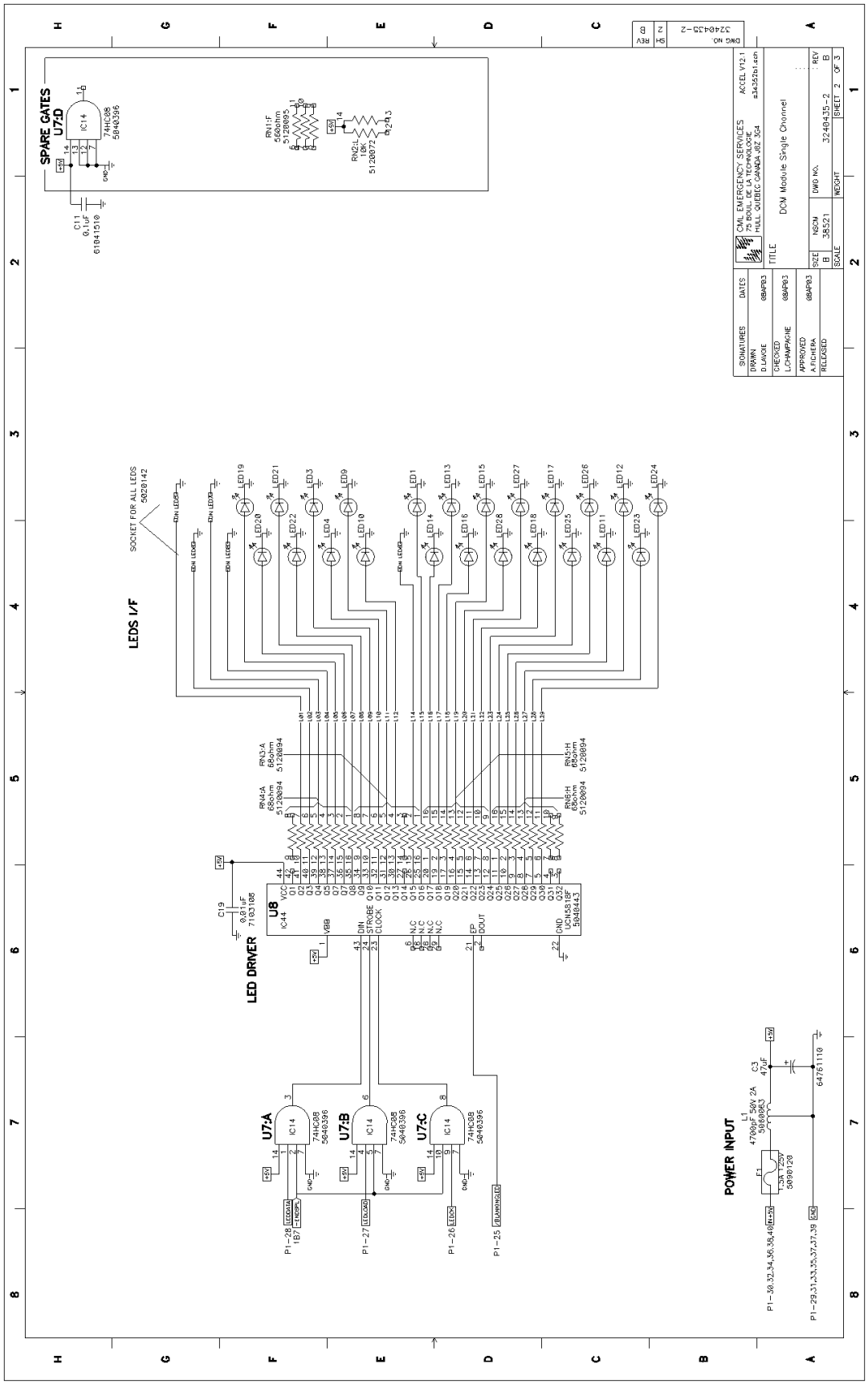
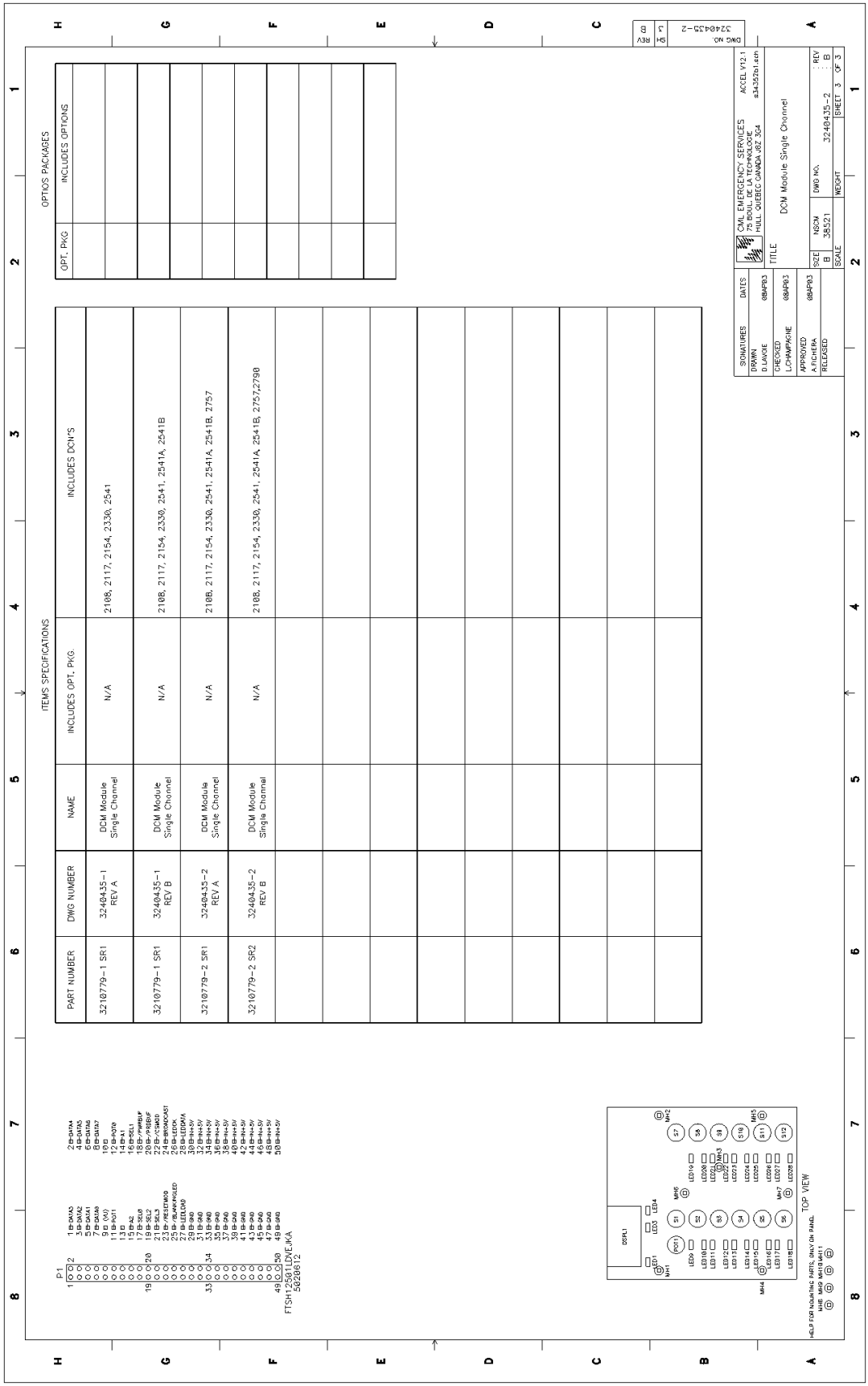


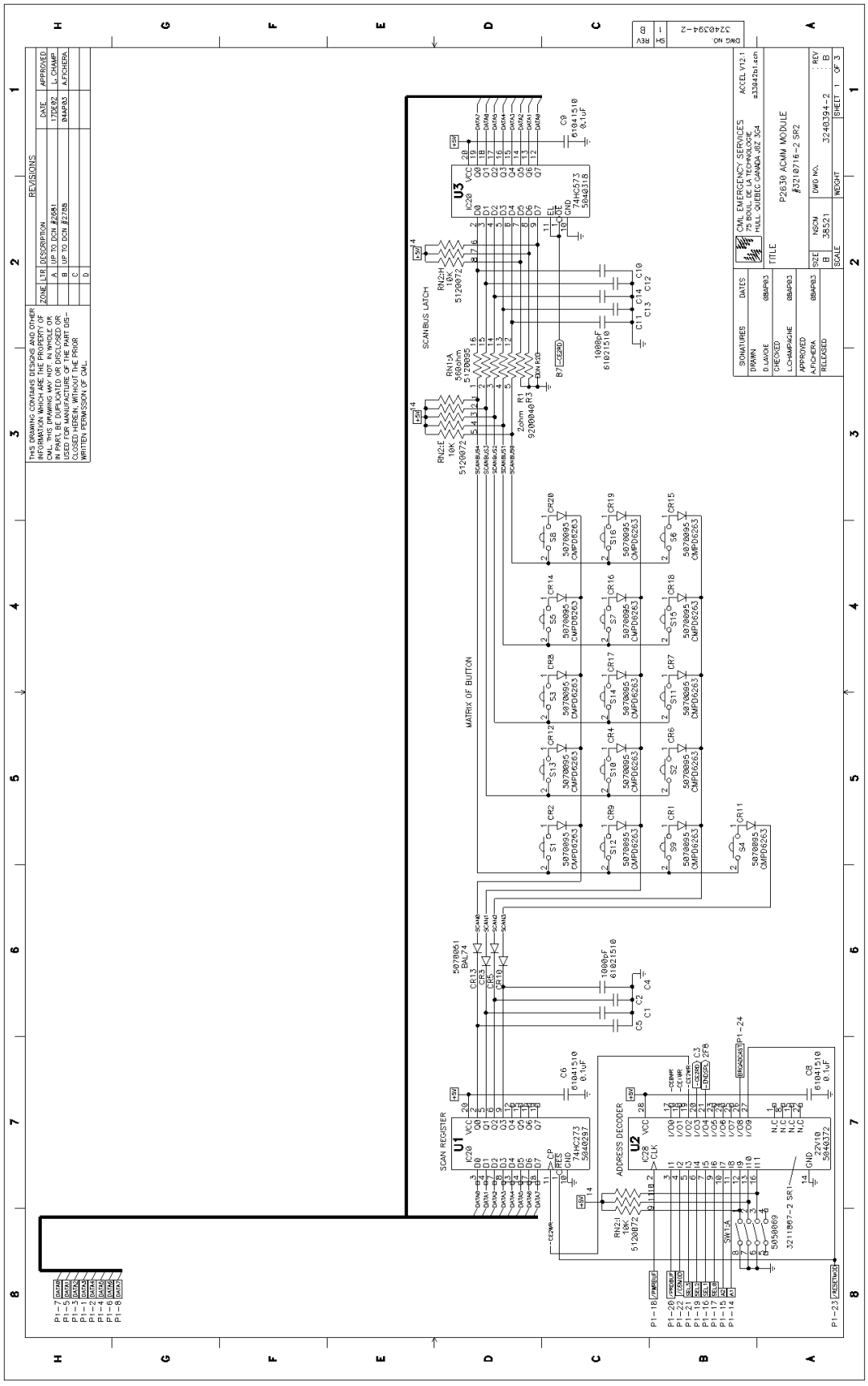
FIGURE C-46 SINGLE DISPLAY CHANNEL CONTROL MODULE (2 OF 3)

FIGURE C-47 SINGLE DISPLAY CHANNEL CONTROL MODULE (3 OF 3)



AUXILIARY CONTROL MODULE (DDN6132)

FIGURE C-48 AUXILIARY CONTROL MODULE (1 OF 3)



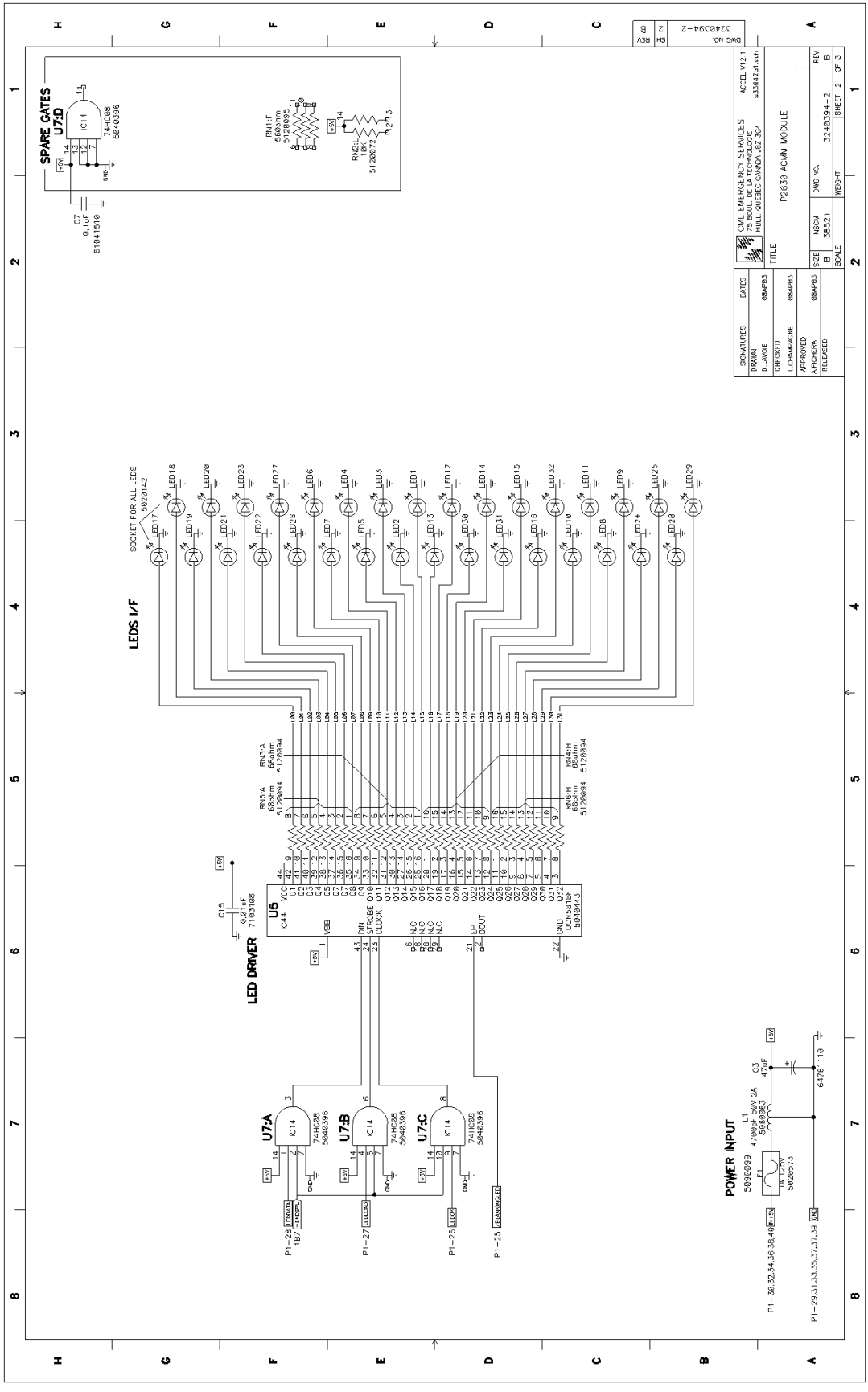
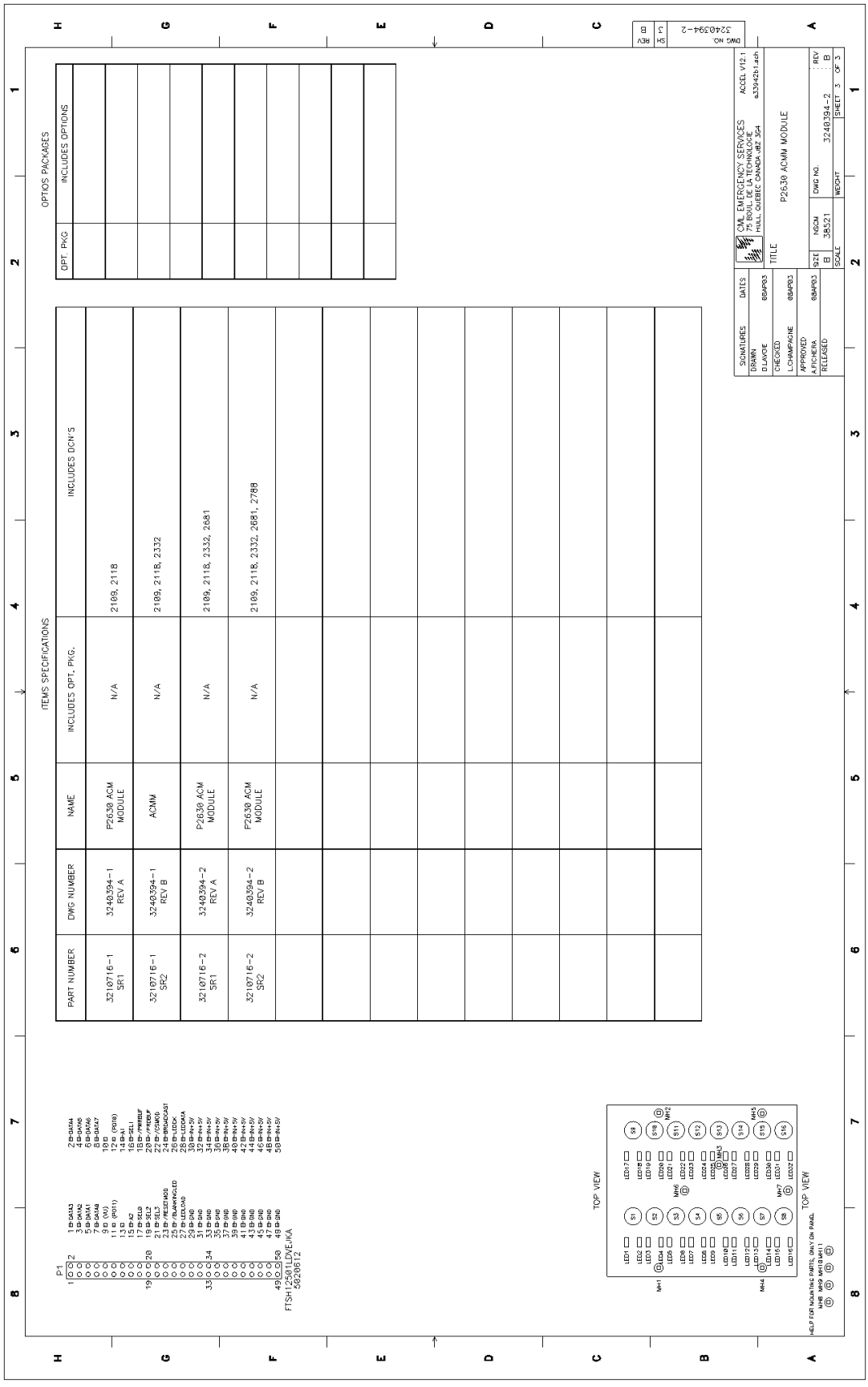


FIGURE C-49 AUXILIARY CONTROL MODULE (2 OF 3)

FIGURE C-50 AUXILIARY CONTROL MODULE (3 OF 3)



DIGITAL RADIO CONTROL MODULE (DDN6138)

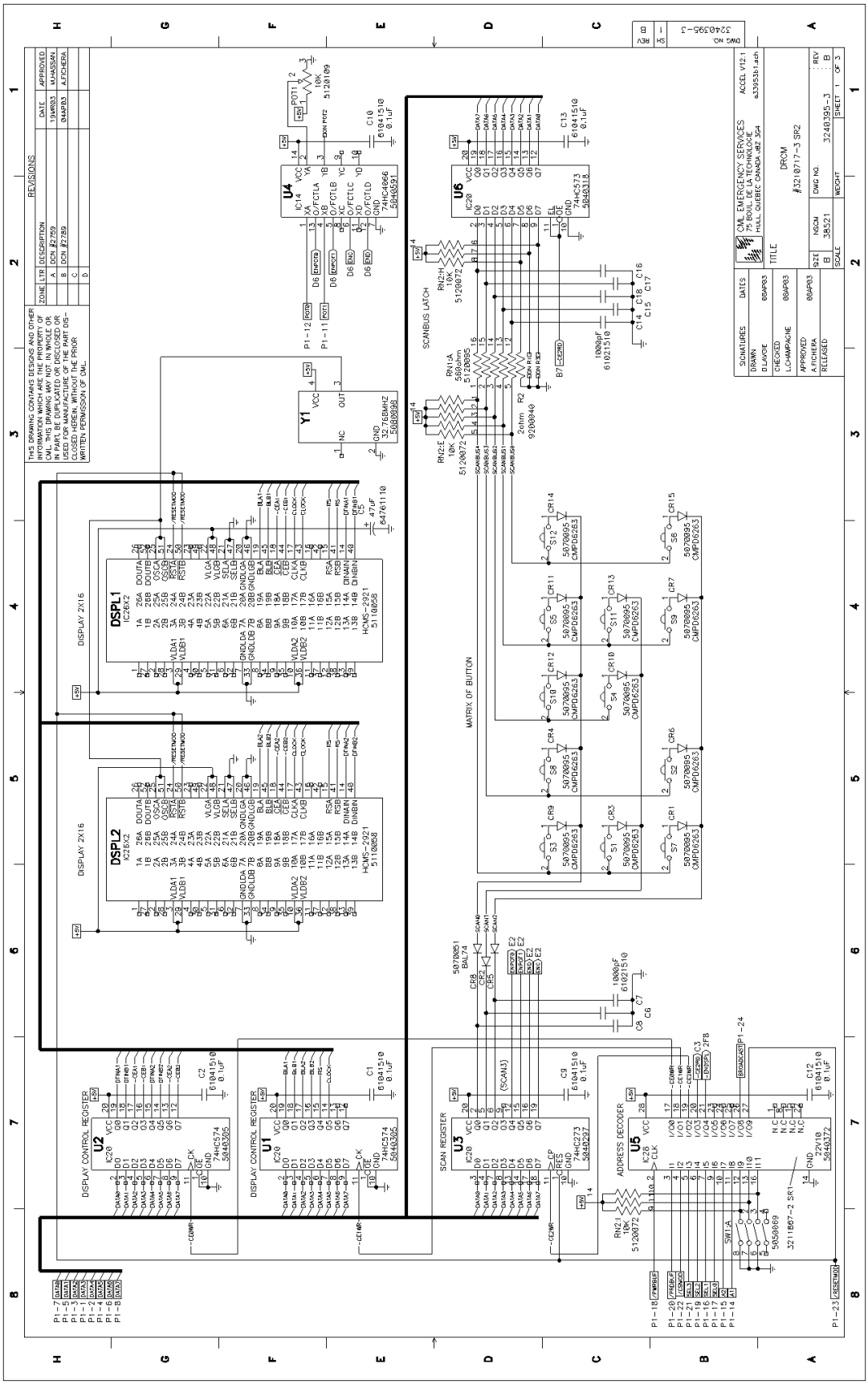


FIGURE C-51 DIGITAL RADIO CONTROL MODULE (1 OF 3)

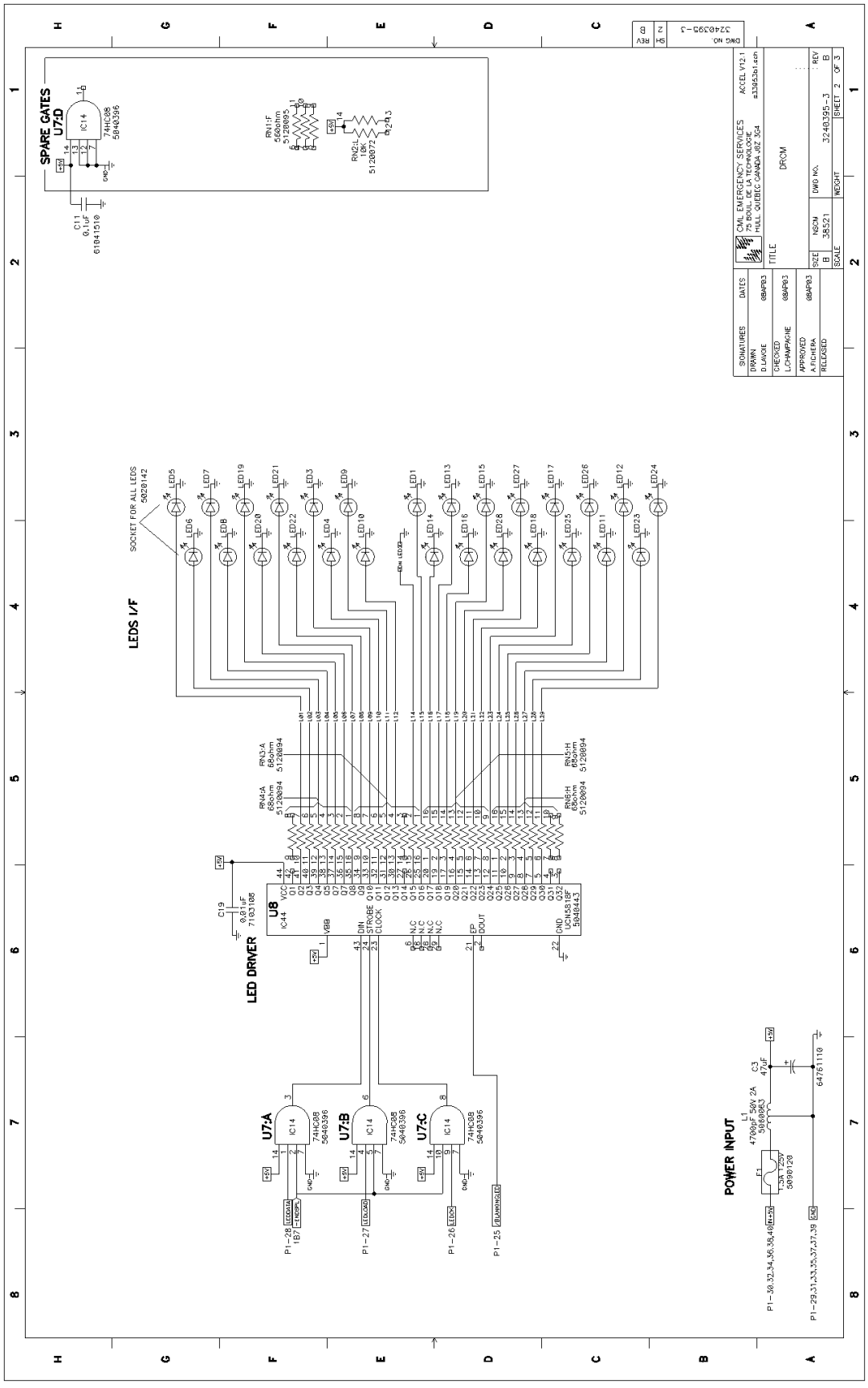


FIGURE C-52 DIGITAL RADIO CONTROL MODULE (2 OF 3)

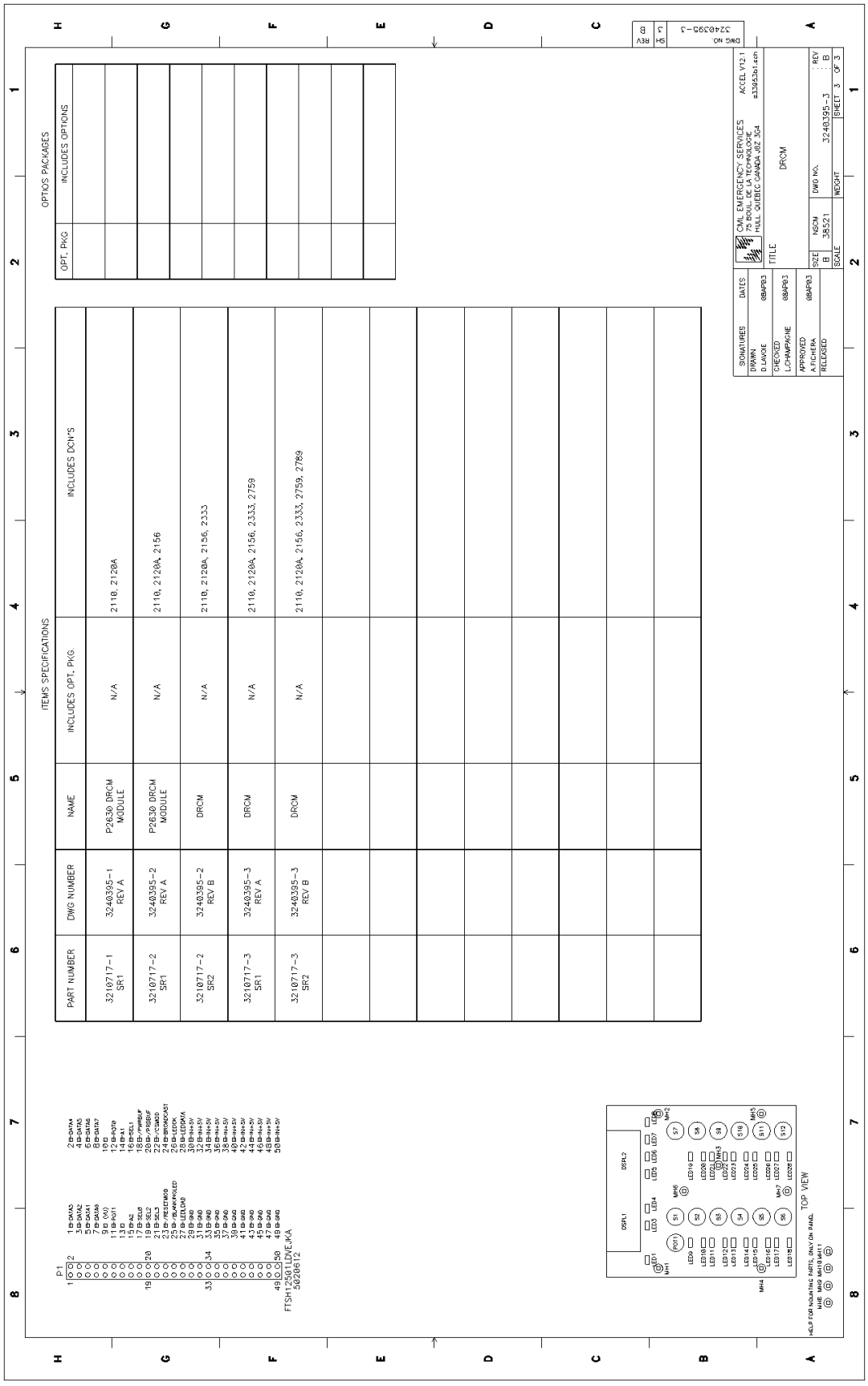


FIGURE C-53 DIGITAL RADIO CONTROL MODULE (3 OF 3)

I/O BOX ASSEMBLY (2260328)

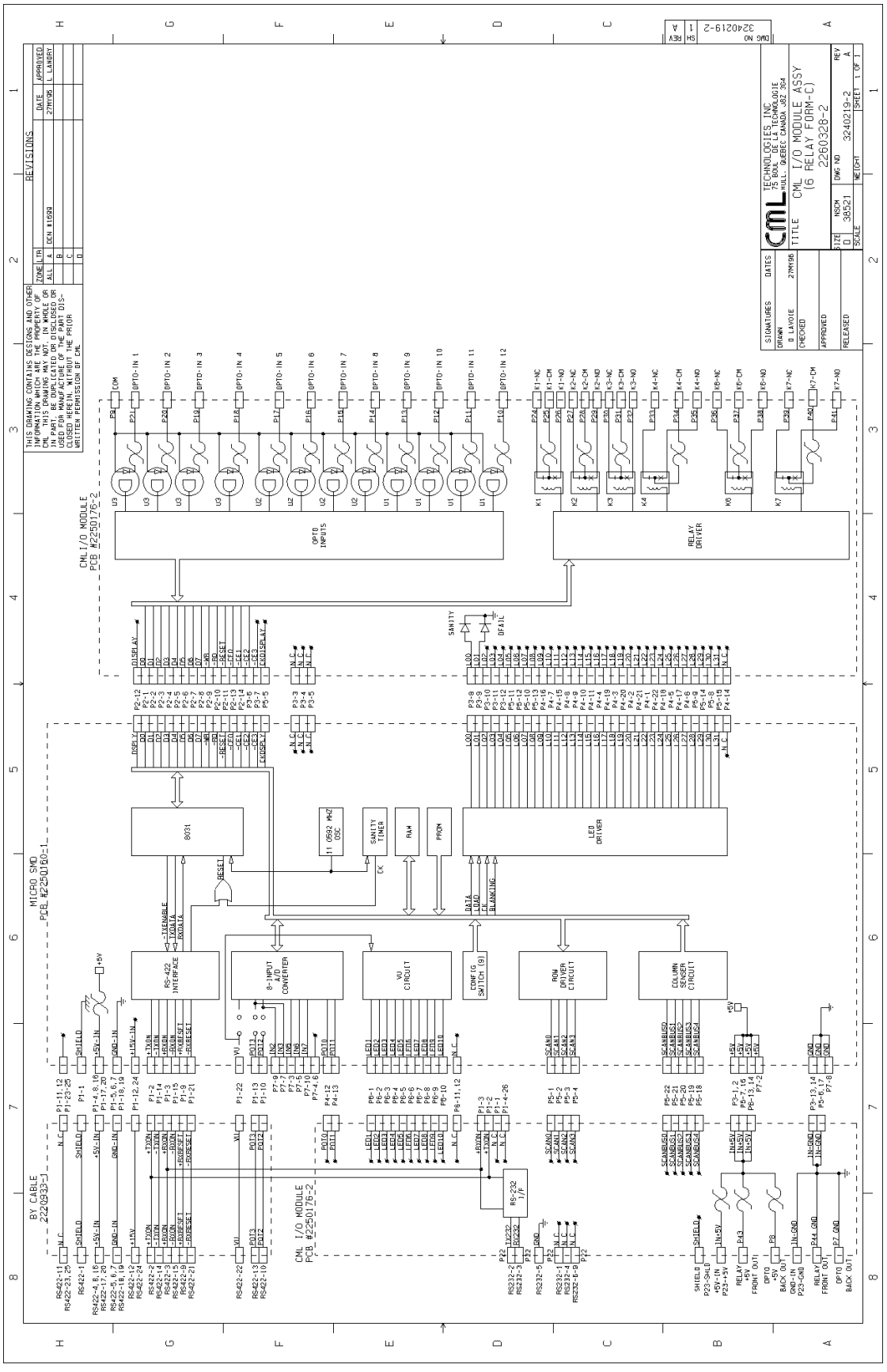


FIGURE C-54 I/O BOX ASSEMBLY (1 OF 2)

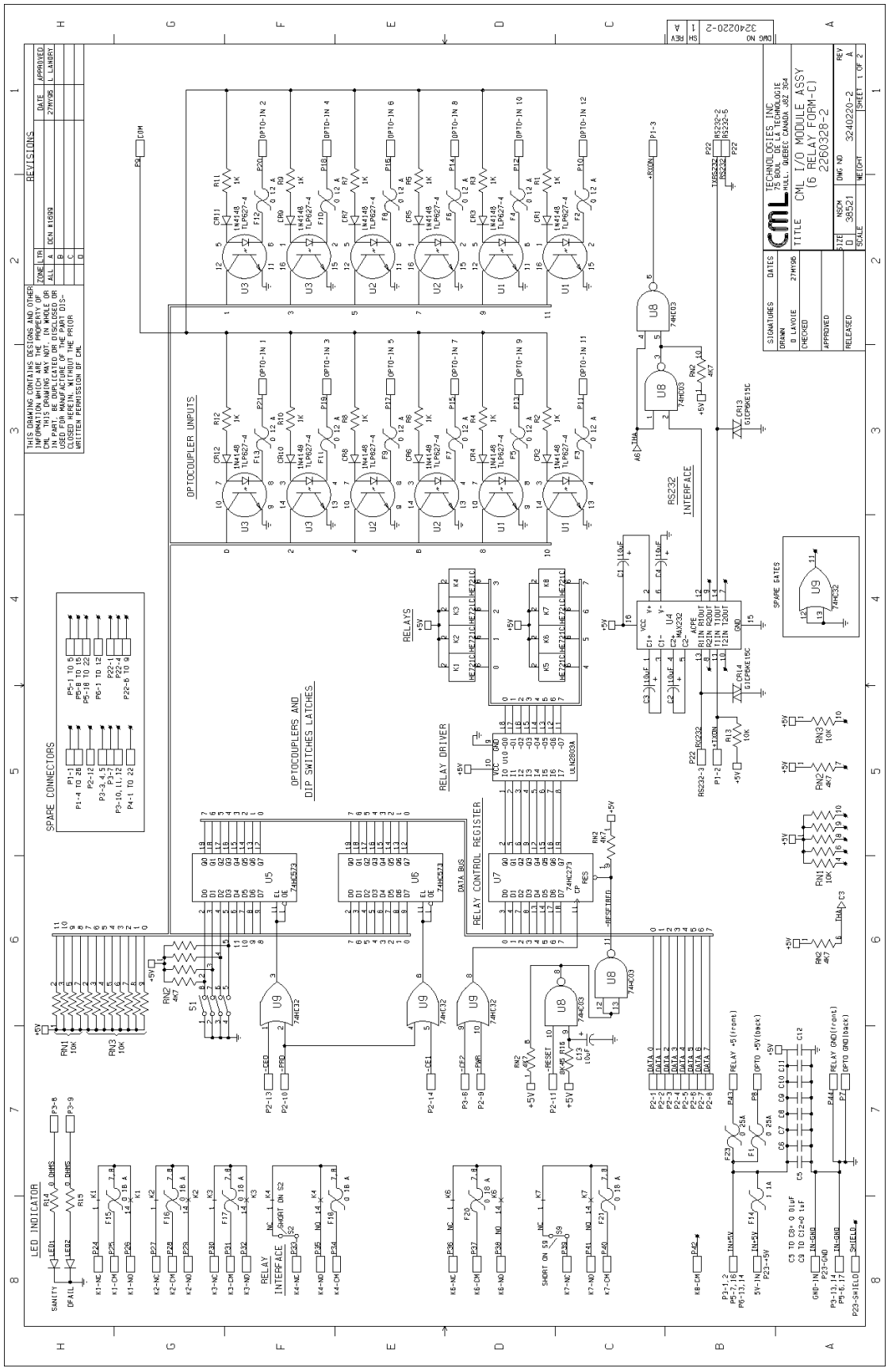
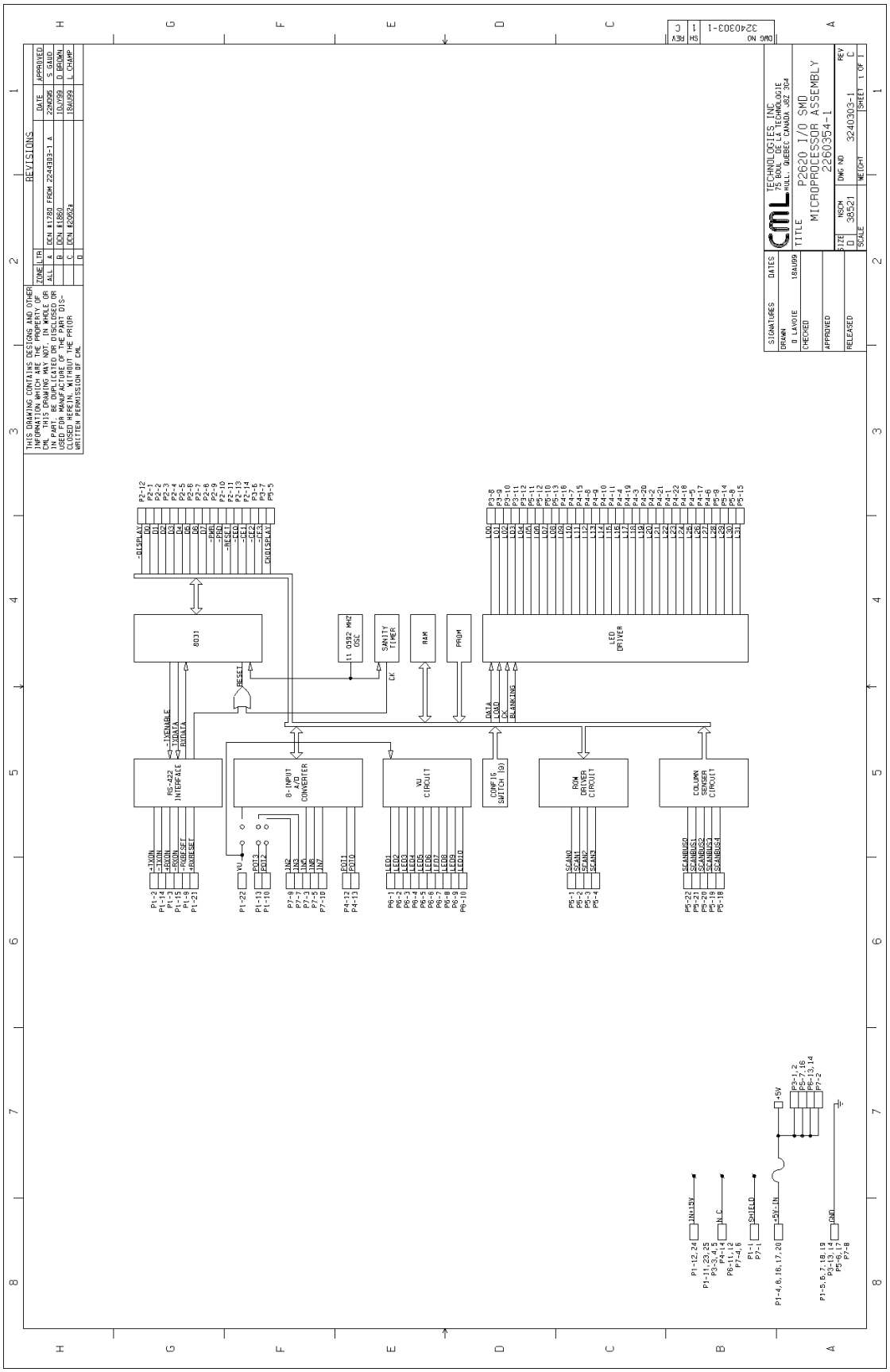


FIGURE C-55 I/O BOX ASSEMBLY (2 OF 2)

I/O MODULE MICROPROCESSOR FOR I/O BOX (2260354)

FIGURE C-56 I/O MODULE MICROPROCESSOR FOR I/O BOX (1 OF 3)



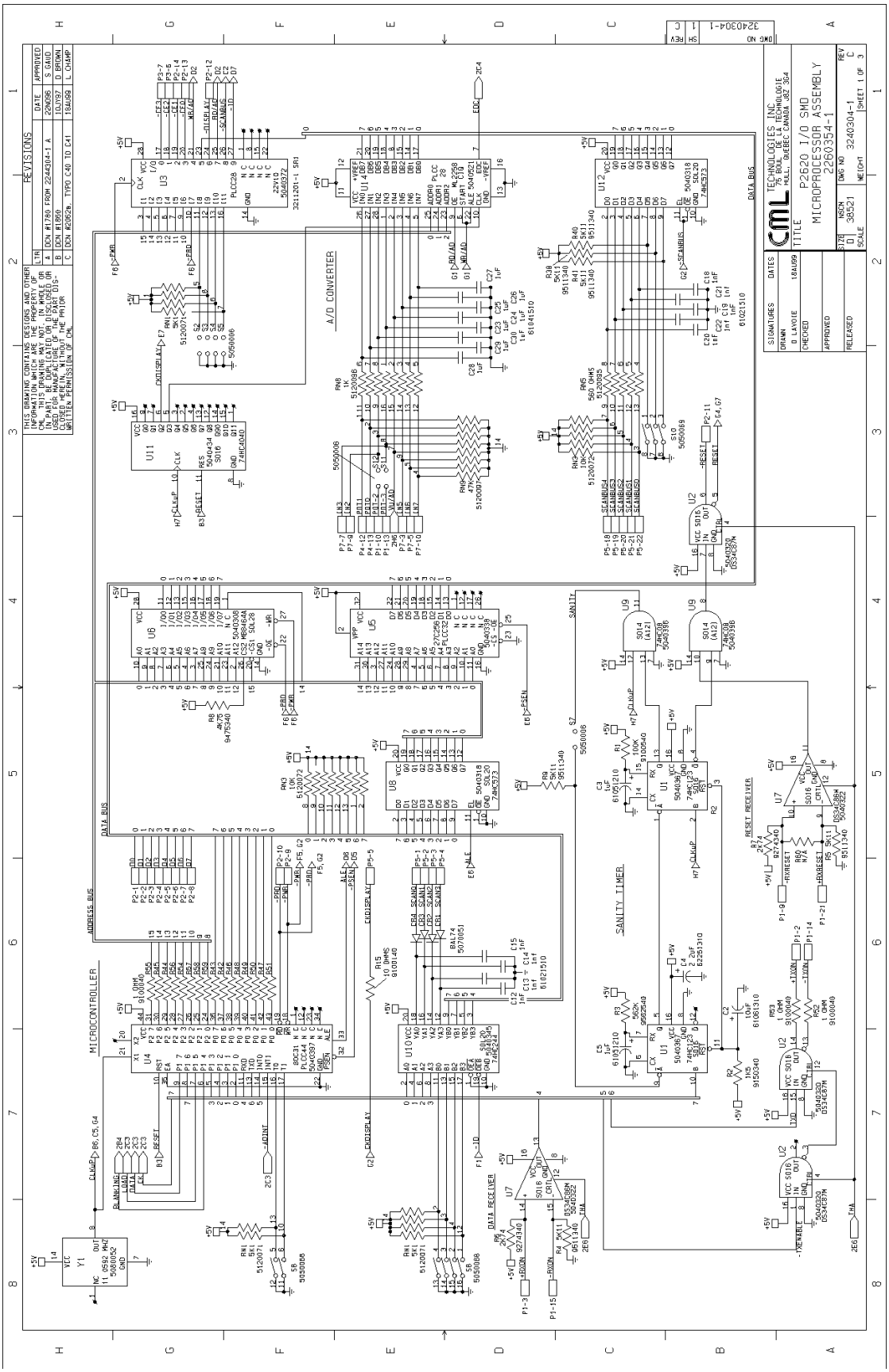


FIGURE C-57 I/O MODULE MICROPROCESSOR FOR I/O BOX (2 OF 3)

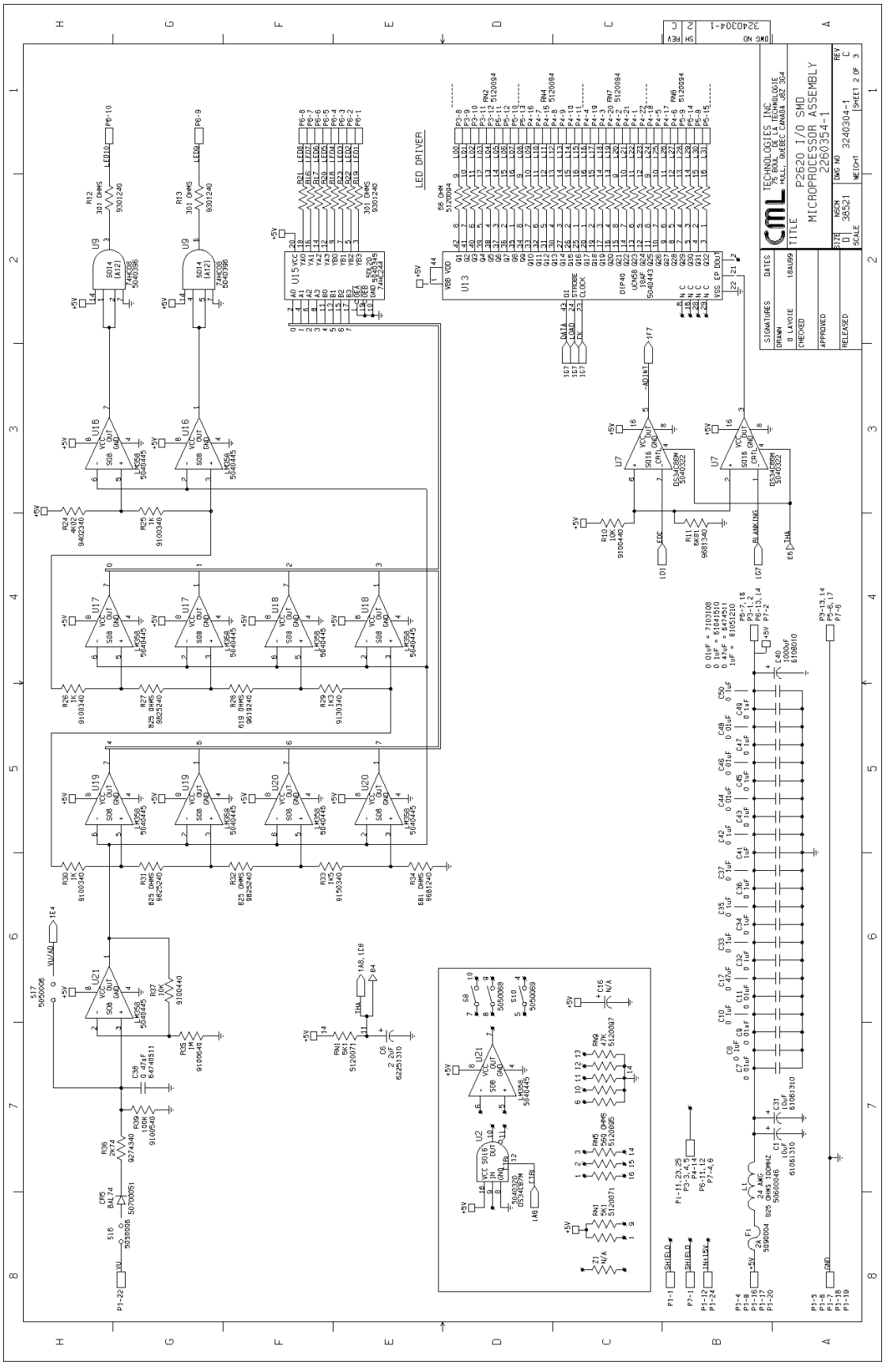


FIGURE C-58 I/O MODULE MICROPROCESSOR FOR I/O BOX (3 OF 3)

I/O SHELF CONTROLLER (3210874)

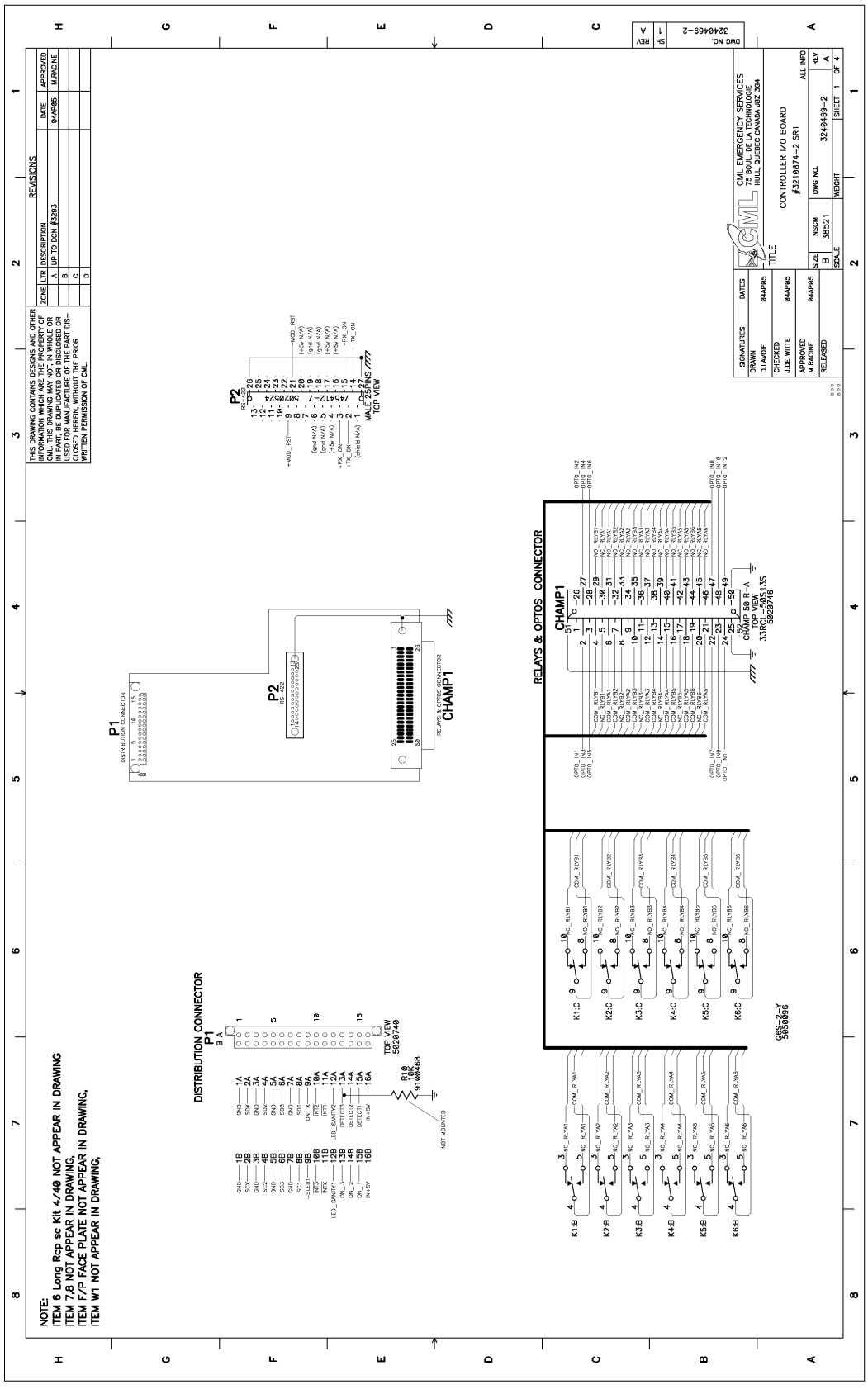


FIGURE C-59 I/O SHELF CONTROLLER (1 OF 4)

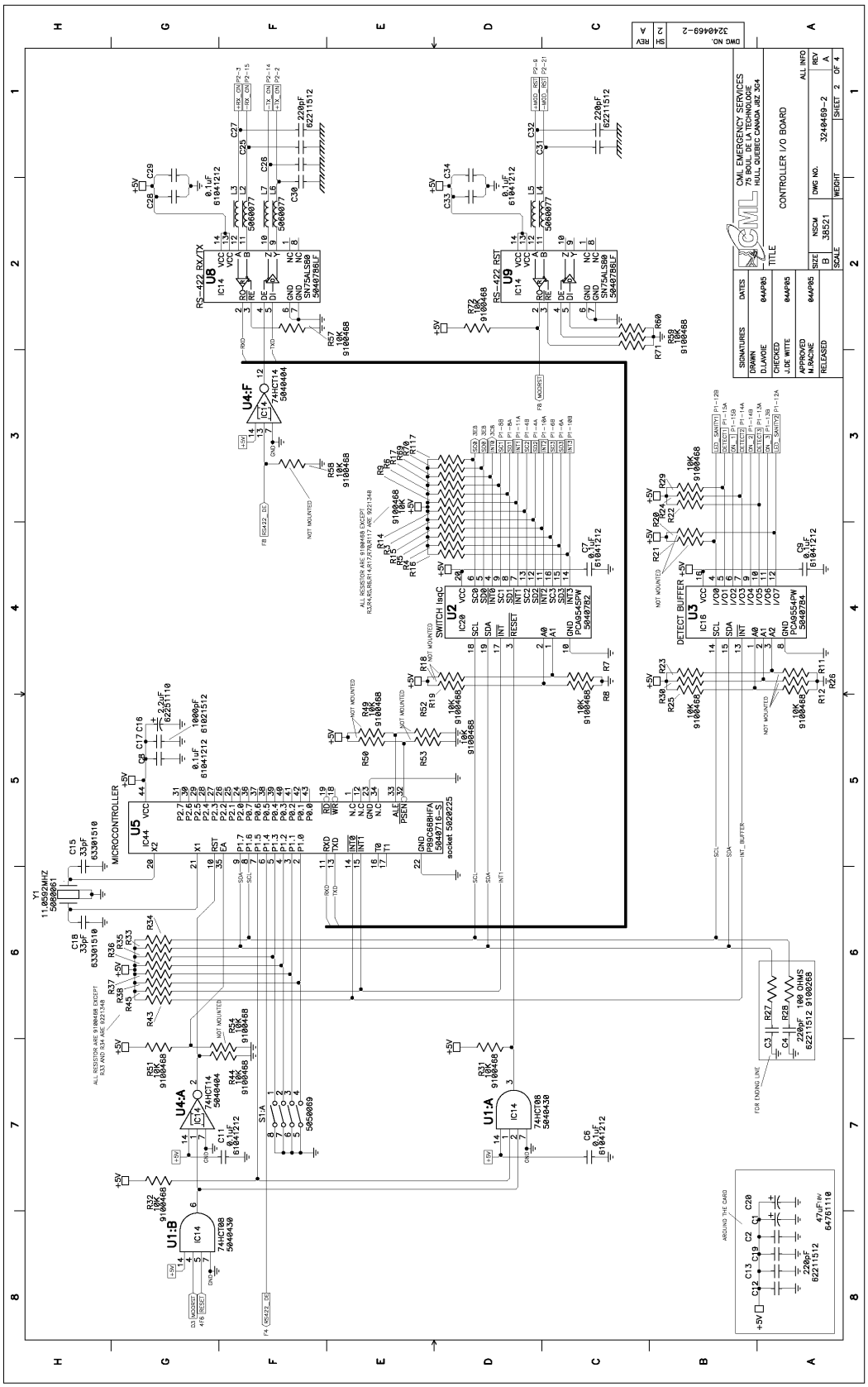


FIGURE C-60 I/O SHELF CONTROLLER (2 OF 4)

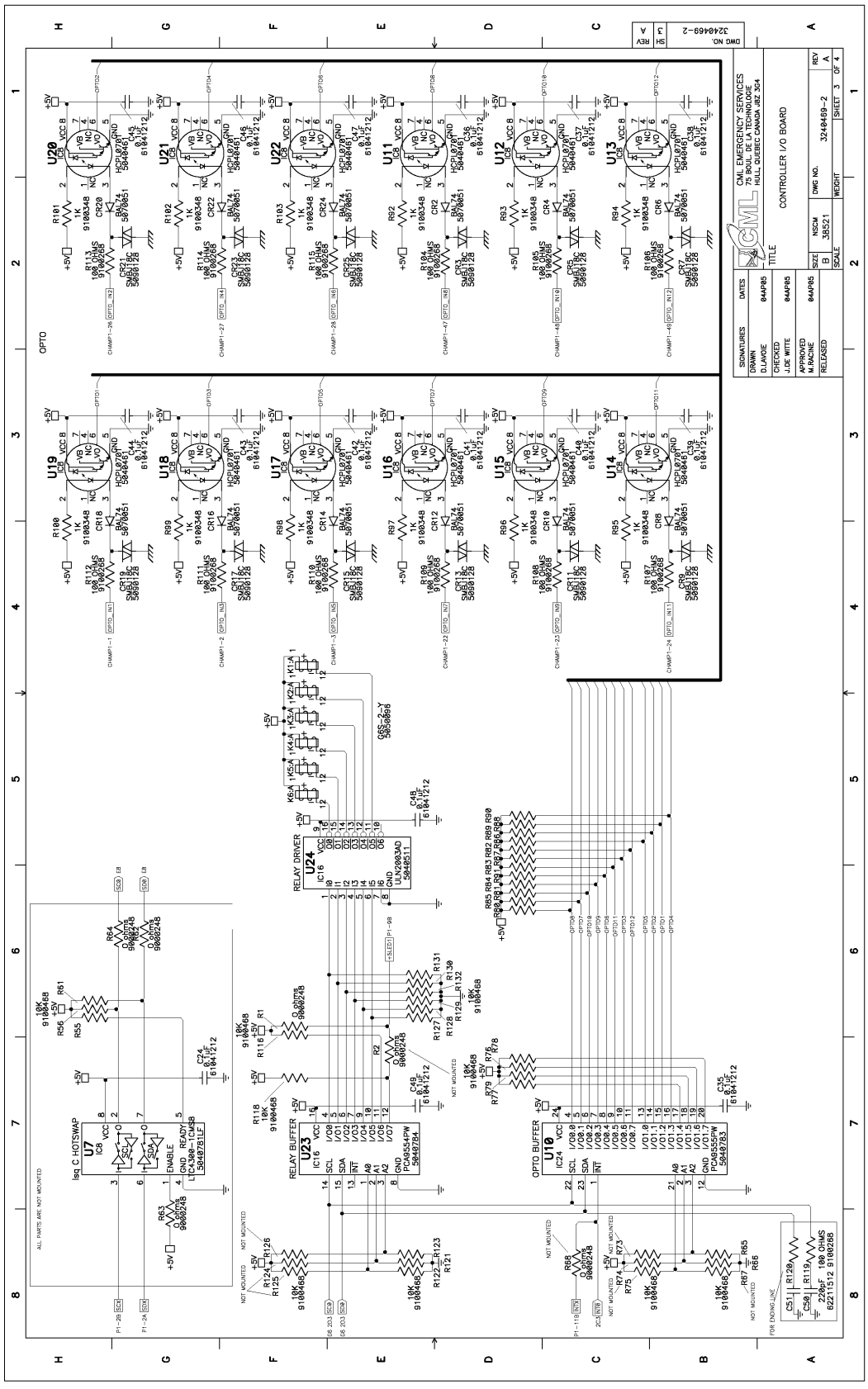


FIGURE C-61 I/O SHELF CONTROLLER (3 OF 4)

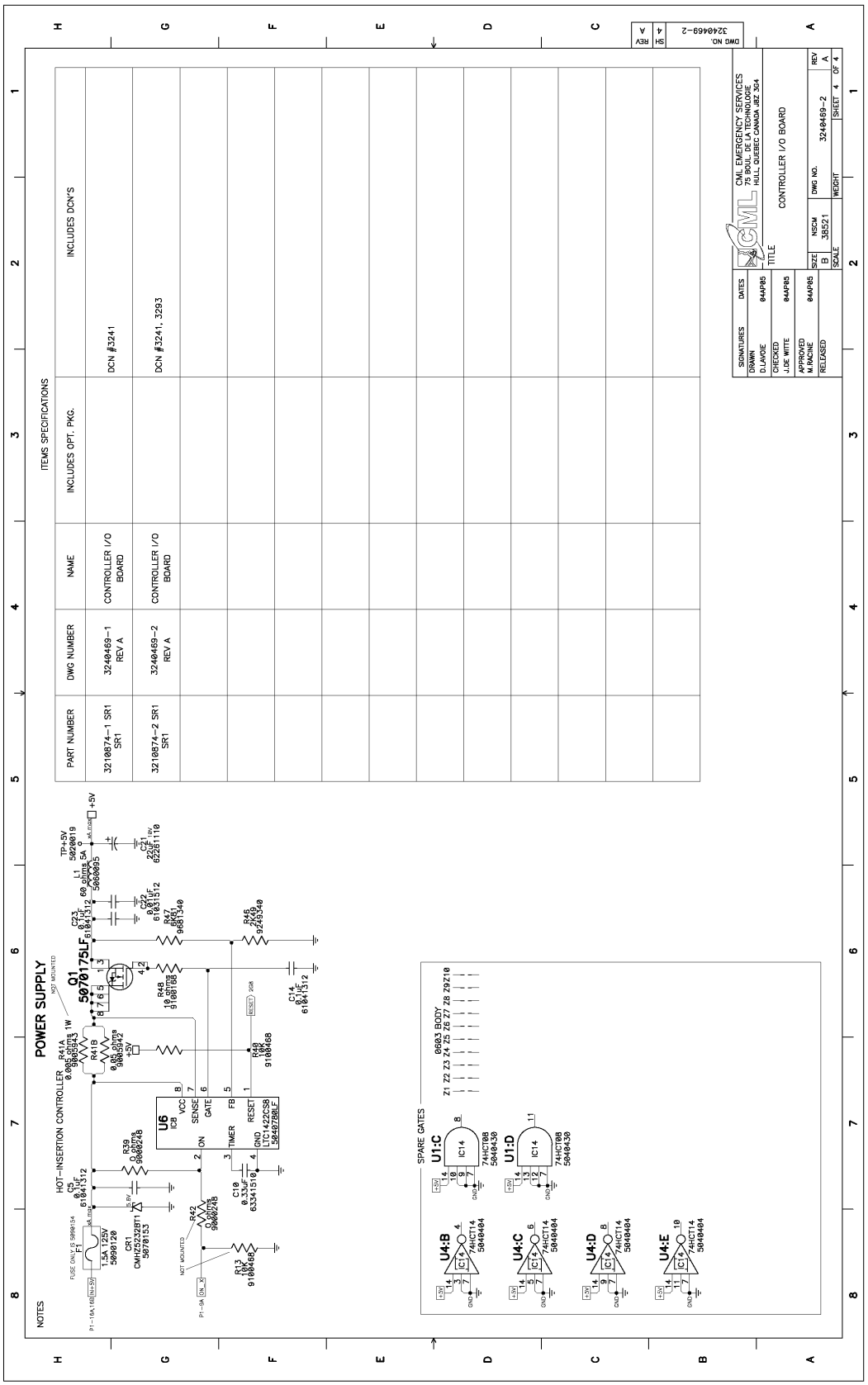


FIGURE C-62 I/O SHELF CONTROLLER (4 OF 4)

I/O SHELF MODULE (3210875)

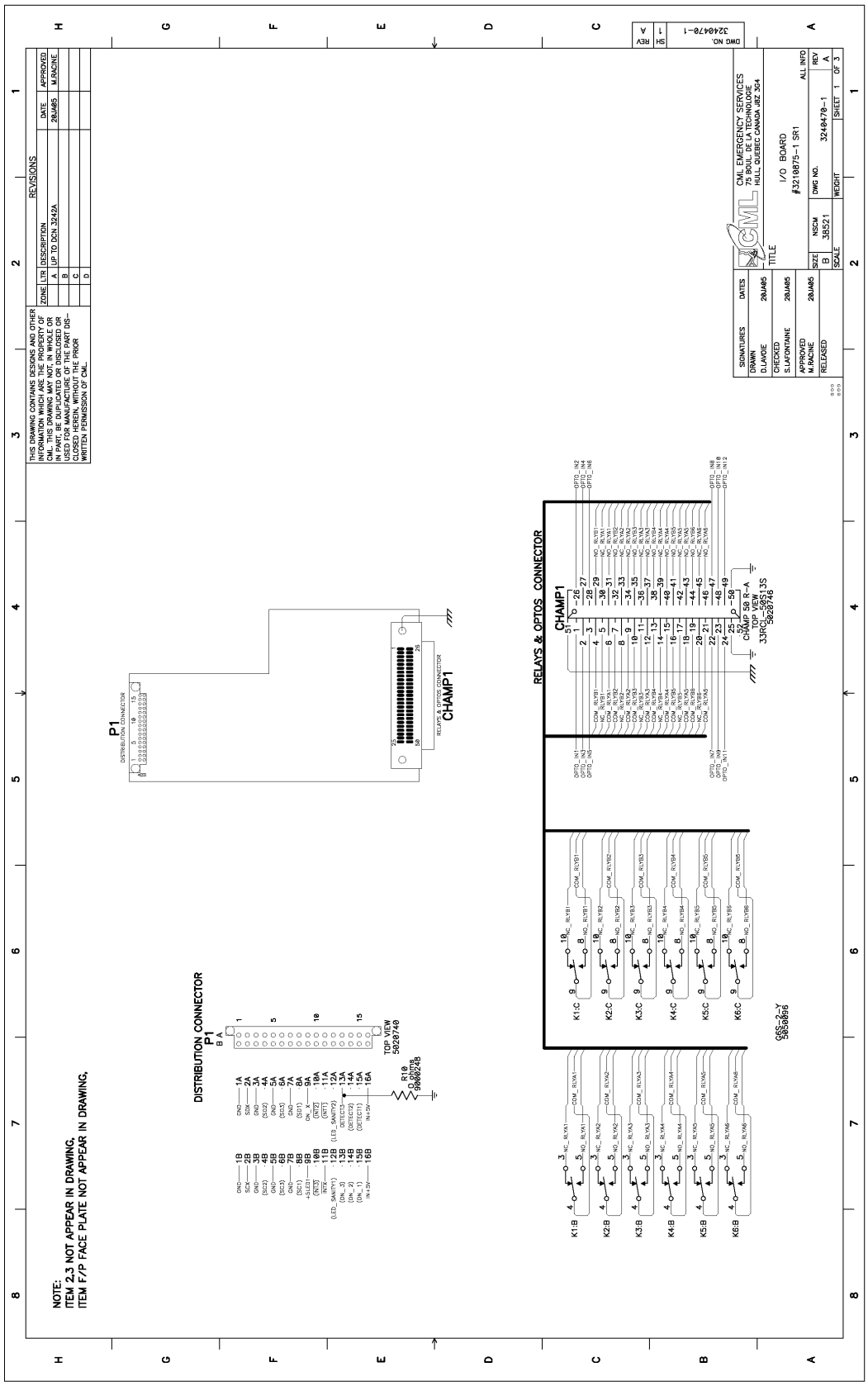


FIGURE C-63 I/O SHELF MODULE (1 OF 3)

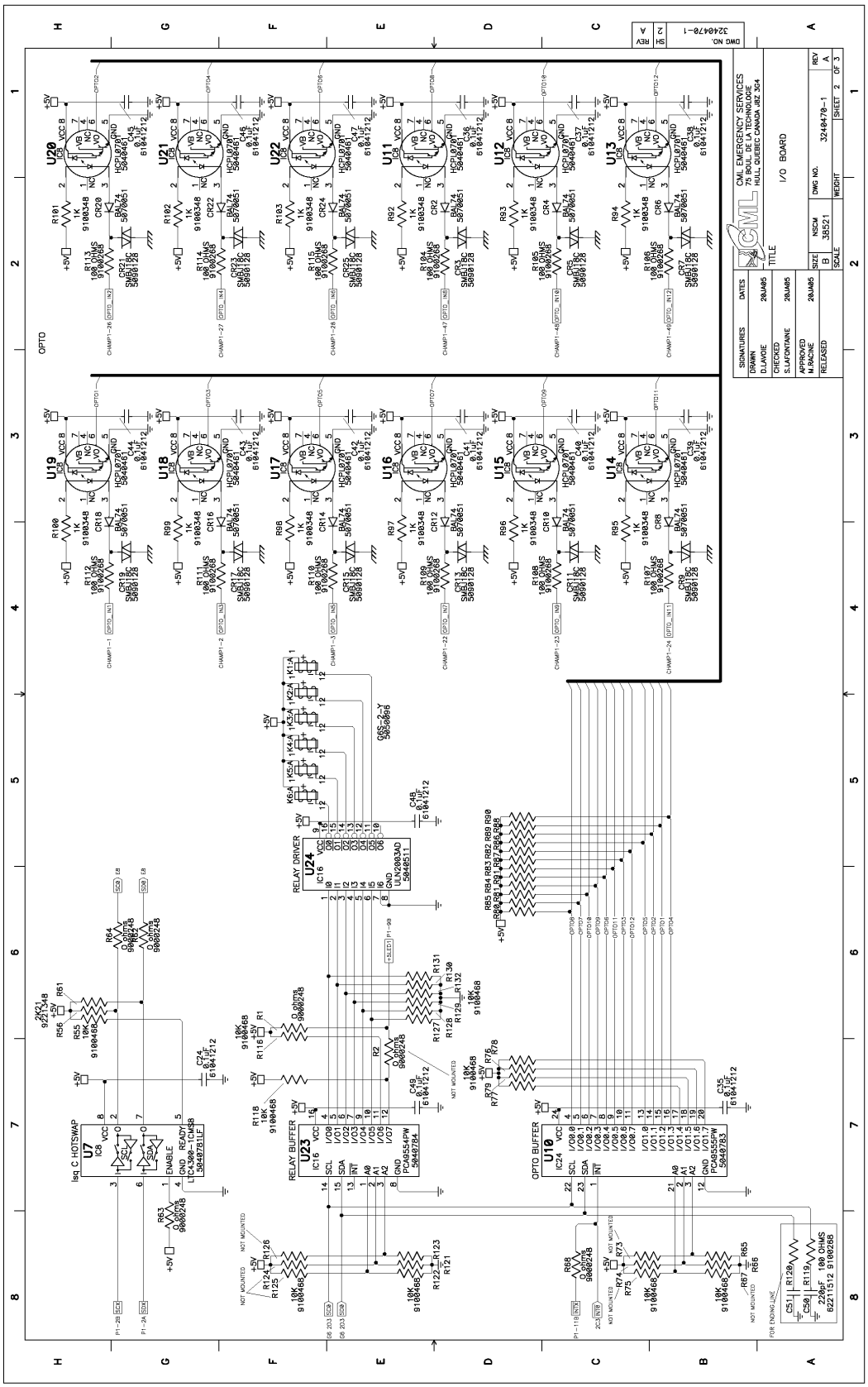


FIGURE C-64 I/O SHELF MODULE (2 OF 3)

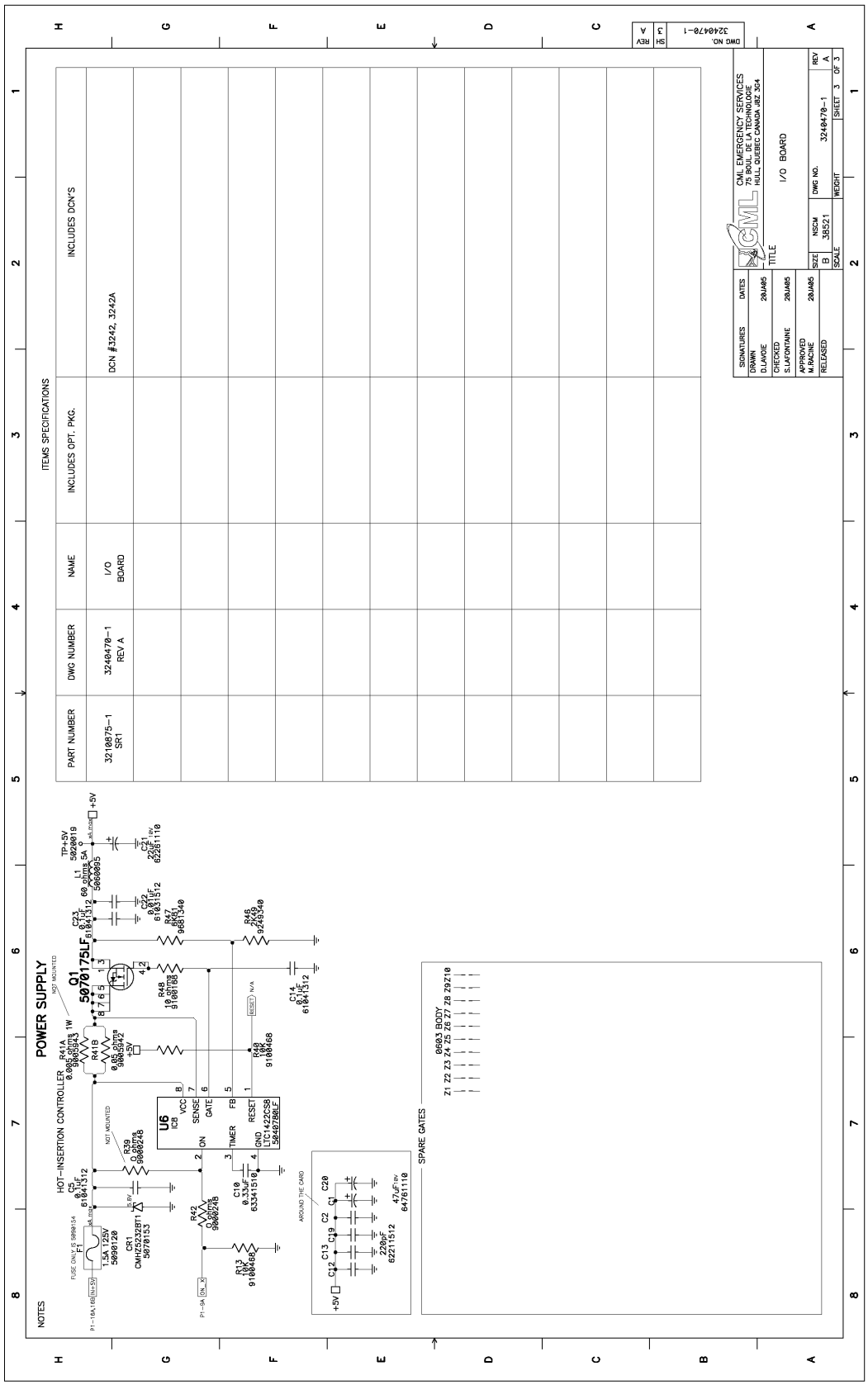


FIGURE C-65 I/O SHELF MODULE (3 OF 3)

I/O SHELF (3210868)

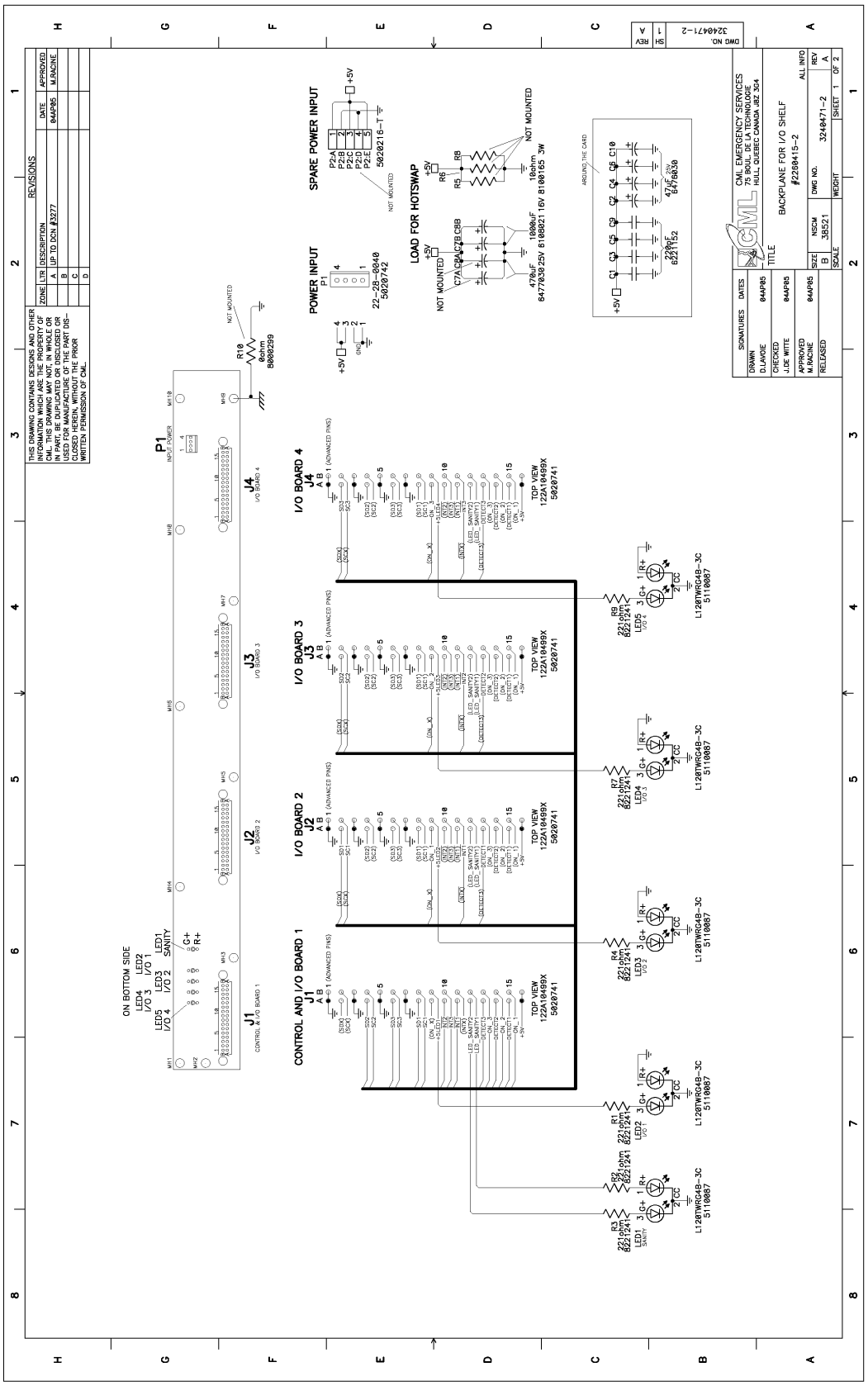


FIGURE C-66 I/O SHELF (1 OF 1)

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GLOSSARY

ABS — Acrylonitrile-Butadiene-Styrene, a durable, fire-resistant plastic.

AC — See *Alternating current*.

ACO — Alarm cut off.

AGC — Automatic gain control.

AGP — Accelerated graphics port.

APB — All points bulletin.

Alternating current — Electrical current that flows in alternately in one direction then the other, such as supplied by most electrical power grids for public consumption.

CD — Call Director (local telephone); also compact disc.

Channel — The radio's channel communication is one of the following:

- transmit frequency only-for one-way communication
- receive frequency only-for one-way communication
- simplex frequency-using one frequency for two-way communication, one-way at a time
- half-duplex or two frequency simplex-using a separate transmit and receive frequency for two-way communication, one-way at a time
- full-duplex frequencies-using a separate transmit and receive frequency for two-way simultaneous communication

CO — Central office; applied to the facilities of a telephone service provider.

CO line — A normal telephone line.

COM, Com — Usually “communications” as in the COM port on a PC, a serial communications port; also “common ground” as in the Com port on an I/O module.

CommandSTAR Lite System Database Manager (CSDM Lite) — A powerful configuration and maintenance tool for CommandSTAR Lite console. The CSDM Lite is used to configure an CommandSTAR Lite push-button console, to monitor the system, and to troubleshoot console problems.

CPU — Central processing unit

CRC — See *Cyclical redundancy check (CRC)*.

CRC error — The occurrence of a received CRC code that is not identical to the corresponding locally calculated CRC code.

CSDM Lite — See *CommandSTAR Lite System Database Manager (CSDM Lite)*.

CTCSS — Continuous tone carrier squelch system.

Cyclical redundancy check (CRC) — An error-detection system in which parity bits are generated by polynomial encoding and decoding algorithms to detect errors generated during transmission.

D — Disable.

dB — Decibel; a unit used to express relative difference in power, usually between acoustic or electric signals, equal to ten times the common logarithm of the ratio of the two levels.

dBm — Decibel relative to 1 milliwatt.

DC — See *Direct current*.

Deskmic — Desktop microphone

DIP — Dual in-line package. See *DIP switch*.

DIP switch — A series of tiny on/off toggle switches built into a housing and commonly connected to a circuit board. The switches typically control the conditions under which the circuit board operates. A DIP switch usually has a black or gray housing with four to eight red switches.

Direct current — Electrical current that flows in one direction only, such as supplied by a battery

DSP — Digital signal processor.

DTMF — Dual tone multiple frequency.

Emerg — Emergency.

EMI — Electromagnetic interference.

ESD — Feedback — The return of some of the output of a system to the input of the same system. In the case of audio systems, feedback can cause speakers to emit a high-pitched squeal or an echo that severely impairs sound quality from the speakers.

Frequency Coupled — The radio channel has a fixed transmit and receive frequency pair for simplex or duplex operation. For more information, see *Radio channel*.

FV — Force vote

Hangover delay — The hangover delay is a period of time after incoming audio has stopped that the system will consider that the channel is still in use.

Hz — A measure of frequency equal to the number of cycles per second.

I/F — Interface.

I/O — Input/output.

IPM — Iterations per minute.

k — Kilo (1,000)

kHz — Kilohertz; that is, one thousand Hertz (1,000 cycles per second)

LED — Light emitting diode

mA — Milli-Amperes.

Mbps — Megabits (millions of bits) per second.

MDC — Mobile data communications.

MIC — Microphone.

ms — Millisecond (1/1000 of a second).

Multi-Sel — Multiple selection.

P/A — Public address.

PC — See *Personal computer (PC)*.

PCB — Printed circuit board.

PCM — See *Pulse code modulation (PCM)*.

Personal computer (PC) — An IBM-compatible single-user computer.

Prog — Program.

PS/2 port — A port available on most PCs that can be used to plug in a mouse or keyboard. It has a socket for a 6-pin mini-DIN plug. The PS/2 port is sometimes called the mouse port.

PSTN — See *Public switched telephone network (PSTN)*.

PTT — See *Push-to-talk (PTT)*.

Public switched telephone network (PSTN) — Commercial land-based telecommunications.

Pulse code modulation (PCM) — A data stream format; usually, 64 Kbit/second; a coding scheme for converting analog voice signals into a digital bit stream; a digitizing technique, PCM is the basis for digital communications in North America.

Push-to-talk (PTT) — The way a subscriber initiates a call. When the PTT switch on a radio is pressed (also known as keying up), this indicates that a call is being initiated by a user. Also known as press-to-talk.

Radio frequency (RF) — General term for the range of frequencies at which used in radio communication systems.

RAC — Repeater access code.

Radio channel — In radio technology, the radio's channel communication is one of the following:

- transmit frequency only—for one-way communication
- receive frequency only—for one-way communication
- simplex frequency—using one frequency for two-way communication, one-way at a time
- half-duplex or two frequency simplex—using a separate transmit and receive frequency for two-way communication, one-way at a time

- full-duplex frequencies—using a separate transmit and receive frequency for two-way simultaneous communication

RCU — Remote control unit

Resources — A general term for network infrastructure and radio channels. Also buttons that executes features related to network infrastructure and radio channels.

REN — See *Ringer equivalency number (REN)*.

RF — See *Radio frequency (RF)*.

RFI — Radio frequency interference.

Ringer equivalency number (REN) — A number determined in accordance with the Code of Federal Regulations, Title 47, Part 68, which number represents the ringer loading effect on a line. A ringer equivalency number of 1 represents the loading effect of a single traditional telephone set ringing circuit.

RMS — Root mean square.

RX, Rx — Receive/received/receiving.

SIP — See *Standard Interface Panel (SIP)*.

Standard Interface Panel (SIP) — A panel to provide interfaces between devices that use different types of standard connectors (for example, 50-pin CHAMP to RJ45).

SVGA — Super video graphics array.

Talkdown — A time interval following the transmission of paging or alert tones during which the channels are kept open for the dispatcher. The dispatcher must use the common PTT button or footswitch during that interval to make an announcement on the channels that were paged. After the paging announcement the PTT button and footswitch resume normal operations.

TIMS — See *Transmission impairment measuring set (TIMS)*.

TMGB — Terminal Main ground bus.

TMS — See *Translation matrix for signals (TMS)*.

Translation matrix for signals (TMS) — A digital signal processor.

Transmission impairment measuring set (TIMS) — A test set that performs measurements for level, frequency, circuit noise, noise-with-tone, signal-to-noise ratio, 3 level impulse, etc.

TX, Tx — Transmit/transmitted/transmitting.

TXAP — Transmitting to an associate processor. In the Motorola CommandSTAR Lite™, a COP is an associate processor. See *TXPP*.

TXPP — Transmitting to a peripheral processor. In the CommandSTAR Lite™, a DAP is a peripheral processor. See *TXAP*.

UPS — Uninterruptable power supply.

VDC — DC volts.

VIN — Input voltage.

Voice annotation delay — The time that the radio channel is held open (keyed) for the dispatcher to send a voice message; also called “voice message delay”.

Voice message delay — The time that the radio channel is held open (keyed) for the dispatcher to send a voice message; also called “voice annotation delay”.

VOL — Volume.

VOX — voice operated switch.

VU — Volume Unit; a volume meter that visually indicates the volume over time, usually by means of green, red, and amber rectangles that form a bar graph.

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