

RTX19/1

FM BROADCAST RECEIVER

87.5 ÷ 108 MHz

USER AND MAINTENANCE MANUAL



CONTENTS

1	R&TTE DECLARATION OF CONFORMITY (DoC)	3
2	INTRODUCTION	4
3	GENERAL DESCRIPTION	5
4	TECHNICAL FEATURES	6
	4.1 FRONT VIEW	6
	4.2 REAR VIEW	7
	4.3 TECHNICAL SPECIFICATIONS	8
5	REMOTE CONTROL FUNCTIONS	9
6	STL MANAGING FIRMWARE	10
	6.1 INTRODUCTION	10
	6.2 PASSWORD ORGANISATION	11
	6.3 FACTORY DEFAULT PASSWORDS	12
	6.4 MENU AND COMMANDS DESCRIPTION	13
	6.5 RECEIVER MENU	14
	6.6 FACTORY MENU	25
7	SERVICE AND MAINTENANCE	26
8	GUARANTEE	26
9	SERVICE MANUAL	27
	9.1 RECEIVER INTERNAL DESCRIPTION	27
	9.2 RECEIVER INTERNAL MODULES & ELECTRICAL DIAGRAMS	29

EU Declaration of Conformity (DoC)

Prot. 16/106/2016

We

SIELCO s.r.l
via Toscana 59
20090 - BUCCINASCO (MILANO) - ITALIA

declare that the DoC is issued under our sole responsibility and belongs to the following products:

RTX19/1 and RTX18B/1, FM Broadcast receiver

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

EMC Directive 2014/30/EU
Low Voltage Directive 2014/35/EU
RoHS Directive 2011/65/EU

The following harmonised standards and technical specifications have been applied:

Title, date of standard/specification:

EN 301 489-1 V1.9.2

EN 60215: 1989+A1 : 1992+A2 : 1994

EN 50581: 2012

Electromagnetic compatibility and Radio spectrum Matter
Safety requirements for radio transmitting equipment
Technical documentation for the assessment of electrical
and electronic products with respect to the restriction of
hazardous substances

Notified body (where applicable)

not involved

Signed for and on behalf of:

Place of issue:

Date of issue (yyyy/mm/dd)

Name, function, signature

Buccinasco - Italy

2016/05/05

ing. Salvatore Cosentino
SIELCO technical Manager



RTX19/1

FM BROADCAST RECEIVER

87.5 ÷ 108 MHz

INTRODUCTION

The RTX19/1 Receiver is the latest result of the experience gained by SIELCO (formerly SIEL) during years of producing FM broadcast equipment, transmitters, stl and stereo encoders.

This Receiver is specifically designed to be used in the harsh and noisy environment of a broadcast site discriminating weak signals in a crowded spectrum, filled with strong interfering signals to provide high quality modulation for a local FM repeater transmitter.

Great care was spent into producing a Hi-Fi-quality modulated signal, with low residual noise and distortion. Notwithstanding the robust interference management capability, adequate care must be provided to protect the received signal from strong local interfering signals on the FM band coming from on site transmitters. This can be usually accomplished by using a top quality directive antenna and RF cable which must be mounted as much as possible far from the transmitting antennas. In the worst cases an external passive high Q tuned filter must also be adopted.

To verify this requirements in order to obtain outstanding performance, SIELCO strongly recommend to rely on qualified personnel to install and verify the equipment which makes up the receiver installation and all the radio station. This will assure to achieve the best performance and stability in time.

To this aim, SIELCO especially recommend that their equipment should not be tampered with by unskilled personnel and its after-sale service is available to customers for any technical problem. Before proceeding to installation, please carefully read at least the general installation part of this manual, to gain confidence with the equipment.

This equipment is very stable and changes to the internal pre-setting other than frequency and few other options are not usually required but, if they are, once again they must be done by skilled personnel, with proper instrumentation and service documentation. Improperly tampering with the settings may harm the apparatus or jeopardize the guaranteed performance.

THIS EQUIPMENT COMPLIES WITH ALL RELEVANT  EMI/EMC AND SAFETY REQUIREMENTS, ETSI EN 300454-1/2 AND ETS 301489-01/11 STANDARDS.

NO INTERNAL ADJUSTMENT OR PRESETTING IS REQUIRED DURING NORMAL OPERATIONS. THE APPARATUS SHALL BE PROPERLY EARTHED AND BE OPERATED WITH ALL THE COVERS CLOSED TO PREVENT ELECTRICAL HAZARDS AND COMPLY WITH EMC STANDARDS.

———— MAINS VOLTAGE MAY KILL ————



GENERAL DESCRIPTION

The RTX19/1 Receiver is the front-end of a high quality FM Transponder which repeats the program coming from another FM broadcast site coupled with a local standard FM transmitter. Design of this apparatus derives from the established EXC/RTX19 series STL (Studio to Transmitter Link) whose circuitry is used in conjunction with an advanced synthesized FM receiver front-end in the same modern and attractive slim case. It allows the reception of mono or stereo signal and its retransmission without using any additional stereo-coder on the subsequent transmitter. In both cases the LF output signal from the receiver must be sent to the stereo input (linear or not pre-emphasised) of the local FM rebroadcast transmitter.

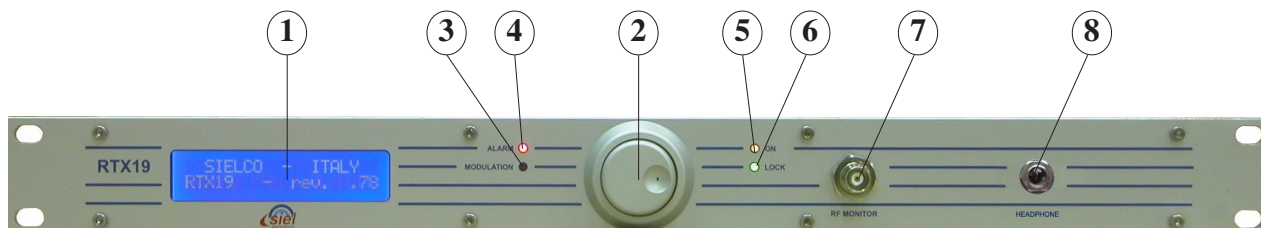
Being the Receiver fully synthesized and completely digitally controlled, it is extensively on field programmable by front panel or remotely in every respect. The alphanumeric display permits easy and accurate metering, adjustment and continuous monitoring of modulation levels, power, operation and internal parameters. All these information are externally available on a RS232 I/O serial port that may be used to remotely control the equipment. In addition to this, some signals and controls are also available on a parallel I/O socket for easy interfacing with others analog controllers or supervisory systems. A powerful 3-levels password management permits a very high degree of security and privacy as may be required in different situations.

The LF MPX output level is precisely adjustable over a broad range by means of 0.5dB stepwise variable attenuator. In addition to the main MPX output which is present on two BNC connectors with opposite phase, the receiver is equipped with a balanced XLR connector which outputs a filtered monophonic signal and an additional auxiliary buffered BNC connector which may be internally assigned to another mono or mpX filtered or wide-band filtered LF monitor output. The MPX output is capable to provide RDS and SCA signals, with almost no attenuation.

An optional top-quality stereo laboratory-grade decoder board may be factory installed or field retrofitted with minimum required technical skill. The powerful internal software and monitoring functions recognise its presence and enable the function. A universal switch-mode power supply permits operation in the extended 95-250 Vac range with no external or internal preset.

TECHNICAL FEATURES

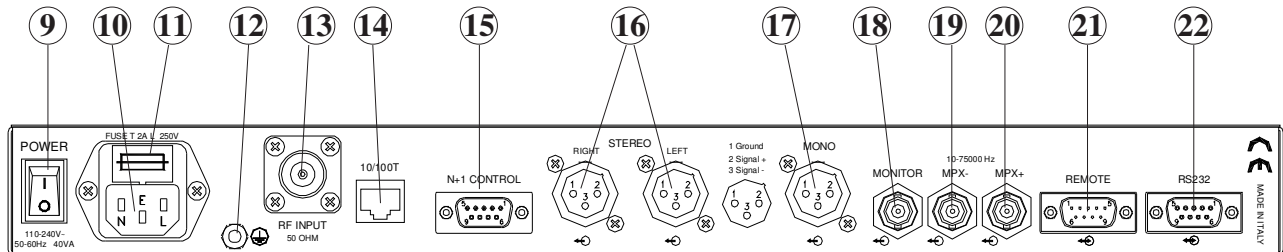
RECEIVER FRONT VIEW



The Receiver front panel accommodates the user control interface, few status LEDs, an IF monitor output and a headphone jack

- 1 Alphanumeric display
- 2 Single control knob. Clockwise or counterclockwise rotation shifts the menu tree or the selected function or character in the row. A short pressure on the central knob (<1sec) cause an "Enter" which confirms the selection or descend in the menu hierarchy. A longer pressure (>1sec) means "Escape" and discards the command or selection or raises in the menu hierarchy.
- 3 *Modulation* red LED: signals modulation absent or excessive
- 4 *Alarm* red LED: signals a generic alarm
- 5 *Field* LED. Lights in green when the received field is good, yellow/red when too low
- 6 *Lock* LED. Shall be green during regular operation
- 7 IF Monitor output. IF test output, 10.7MHz / 0dBm on BNC connector
- 8 Stereo headphone output, 1/4" jack

REAR VIEW



All the Receiver I/O connectors but the IF monitor output are on the rear panel:

- 9 Mains power supply switch
- 10 IEC320 mains socket
- 11 Fuse holder with internal reserve fuse
- 12 Additional earth screw
- 13 RF antenna, N-type connector
- 14 10/100T LAN port
- 15 "N+1" parallel optional control port, on a Dsub9 female type connector
- 16 Stereo decoded output (optional), on XLR balanced male connectors
- 17 Monophonic filtered output, on XLR balanced male connector
- 18 LF Monitor output, on BNC-type connector. May be internally connected as an additional MPX composite or wide-band or mono signal output.
- 19 Main MPX output reversed in phase, on BNC-type connector
- 20 Main MPX output, on BNC-type connector
- 21 Parallel Remote Control port, on a Dsub9 male type connector
- 22 Serial RS232 Remote Control port, on a Dsub9 female type connector

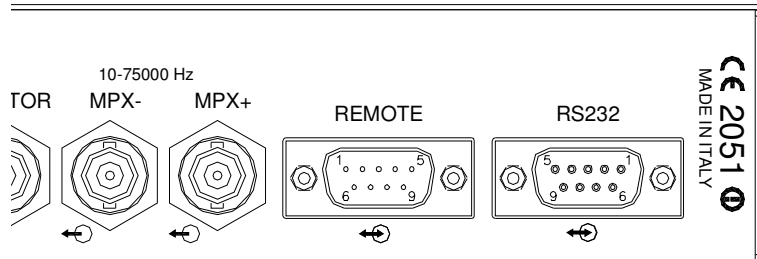
TECHNICAL SPECIFICATIONS

- Frequency range: 88.50÷108.00 Mhz
- Synthesis step: 10kHz
- Noise figure: ≤9 dB
- RF input: N connector, 50 ohm
- Image frequency rejection: ≥60 dB 70 typ.
- Dynamic selectivity: >+10dB typ @ ΔF=300 kHz
>+35dB typ @ ΔF=500 kHz
>+45dB typ @ ΔF=1.0 MHz
- AM suppression: >45 dB
- Usable input level: -90÷-10dBm
(7μV÷70mV)
- Sensitivity (typical): Sin=-90dBm (7μV) mono
(S/N=60dB) Sin=-70dBm (70μV) stereo
- IF monitor output: 10.7 MHz/0dBm
- Mpx composite output response:
15 Hz ÷ 67 kHz +0.1/-0.5dB
<-6 dB @ 100 kHz
<-20 dB @ 125 kHz
- Monitor output wide-band response:
15 Hz ÷ 100 kHz +0.1/-1.5dB
-3 dB typ. @ 125 kHz
-6 dB typ. @ 160 kHz
- Mono/stereo decoded response:
30 Hz ÷ 15 kHz ±0.1dB
- Out-of-band mono or stereo audio response:
>50 dB @ F≥19 kHz
- Stereo crosstalk (typical): >50 dB (400÷10000 Hz)
>40 dB (30÷15000 Hz)
- De-emphasis time constant: 0/50/75μs ±2%
- Wide-band demodulated output level: +6dBm
- MPX/Mono output level: -1.5 ÷ +12 dBm,
0.5dB/step
- Headphone output: >100mW on 16 ohm
- S/N ratio (30÷20000Hz rms):
>75 dB, 80 typ. mono
>72 dB, 76 typ. stereo
- Modulation distortion (100% dev.):
@ 1 kHz/
mono ≤0.1% 0.07% typ.
stereo, 1 ch ≤0.30% 0.20% typ.
@ 30÷7500 Hz
mono ≤0.25% 0.15% typ.
stereo, 1 ch ≤0.30% 0.20% typ.
- I/O lines: LF disable, Low RF field, Alarm.
RS232 control and monitoring
- Operating temperature range:
0÷35° C recomb.
-10÷45 °C max.
- Mains absorption: 15 Wmax @ 90/260 Vac
- Dimensions, without handles: 19" 1 un. std. rack
483 x 43.5 x 320 mm

REMOTE CONTROL FUNCTIONS

Complete Receiver control is possible by remote through the serial RS232 port, which is located on the rear of the equipment. A parallel one is also provided, on which some signal and control are also wired.

Receiver serial and parallel remote control I/O ports



RS232 port

The RS232 port manages only Tx, Rx and Return data signals, with no handshake. Being the two former signals inverted wired to the port, it needs a simple straight wired serial cable with appropriate connectors to connect to a PC. A female DB9 or DB25 female goes to the PC port and a male DB9 connector to the Receiver end. Appropriate software is needed for communication which is not supplied by SIELCO: simple tests may be performed with standard Windows "Hyperterminal". Do not connect the cable with either the Receiver or the PC on. For the command protocol refer to the EXC/RTX19 RS232 control User Manual.

Parallel remote control port

This port accommodates some lines for simple direct control/monitor on a DB9 male connector. Many lines may be optionally assigned to different functions and logic polarity may be reversed from a dedicated setup menu. Default assignation is:

- Pins 1 & 5 *Ground*.
- Pin 2, "*modulation ok*" output. Open collector transistor circuit with a resistive pull-up: a low logic state signals modulation is present on the received signal. On the contrary, a high logic state, + 12V / 10k Ω , warns on modulation loss. As alternate function the pin may be assigned to signal "*remote lock*" status.
- Pins 3 & 8, "*field good*". The insulated contacts of a relay are wired to these pins: the relay is default driven by the received RF. When the field trespass the preset threshold, the relay is excited. The contacts may be chosen through an internal bridge to be "*normally open (n.o.)*" or "*normally closed (n.c.)*". Factory default is "*n.o.*". Alternatively the relay may be assigned to "*Alarm*"
- Pin 6, "*LF disable*" input. Base input of a common emitter transistor with a resistive pull-up. A shorted circuit to ground disables main LF outputs. Maximum voltage and current available are nearly +10V and 1mA. Alternate function is "*Remote lock*": when chosen, a shorted circuit disables front panel setup functions.
- Pin 7, *Alarm* output. Open collector transistor circuit with a resistive pull-up: a logic low signal means alarm condition. Correct functioning is signalled by +12V with 10k Ω impedance. Maximum current sinking capability <10mA. This pin may be alternatively assigned to signal "*Field good*"
- Pins 4 & 9: future upgrades

RX19 - rev. 1.00

FM BROADCAST RECEIVER MANAGEMENT FIRMWARE

INTRODUCTION

A modern microcontroller (CPU) controls all internal functions of the RTX19 Receiver, supervises the equipment and manages all the necessary tasks of measure, process and remote control. As far as possible great care was spent to simplify the software operations and to make it intuitive operation.

The internal microcontroller software or "*firmware*", is periodically revised to correct possible defects or to incorporate new functions and peripheral module control. The firmware updating can be done only at factory or at specially equipped laboratories by flashing a new program over the old one on the microcontroller without substituting any component. A special interface is required.

NOTE: while new software releases may be provided to take advantage of experience and to add new functions, factory supplied equipment always incorporate the latest stable firmware available at the time being. The customer of an equipment which do not incorporate the latest release do not need to change it unless there are explicit functional defects or needing of the new functions added.

SIELCO WILL NOT IN ANY CASE BE RESPONSIBLE OF POSSIBLE DAMAGES DUE TO THE DIFFERENT OPERATING MODE OF THE EQUIPMENT DUE TO CHANGE OF ITS INTERNAL CPU OR FIRMWARE RELEASE. WARRANTY, IN THIS CASE, IS LIMITED TO SUBSTITUTION OF THE CPU CONSIDERED AS NOT-FUNCTIONAL OR TO ITS REFUND.

PASSWORD ORGANISATION

The equipment software controls a complete password system, which permits to restrict the functions allowed at any level. A greater or lesser privacy is granted on information and equipment presets. The managing of these restricted functions is optional and we recommend its use only were strictly needed. As factory default, the equipment is delivered without any access restriction.

The password organisation is set in 3 security levels, each with its own password. A higher level permits to change the lower levels authorisations and passwords.

The password is composed by 4 alphanumeric characters, including extended capital and lower case ones and several special symbols. We suggest using a wide range of characters as the security level raises, to increase the possible combinations. No password is ever shown: it is always masked by dummy characters as "... " or "*****". Nevertheless it may be always changed with the higher level authorisation. Here is the purpose of each level:

Level 1: Lower security level. It is needed to access to most of the monitoring and control menu fields, not permitting to alter or programming any operating parameter. As factory default it is set to "off" state, permitting to anybody to freely navigate through equipment's monitoring menu information. We suggest leaving it in this state if a high privacy level is not needed.

If the level is set to "on" it will show the default menu field #00 (cf. menu tree), requiring password for any other information or pre-set. Failure to insert a correct password of any level will impede any other access to the commands for the time-out length (usually 3 minutes).

No change to the functioning mode is done in case of incorrect password input. No information is available on the display regarding the equipment functions.

Level 2: Service level. This password is needed for any functioning set-up as frequency and power, sensitivities, output level etc. Its use is reserved to service technicians who need wide access to the equipment presets and functions.

While the default factory state is "off", SIEL suggests changing the default state and password immediately at the first power on, to prevent to unauthorised people to tamper with commands, if the default word is known or the state is set to "off".

Level 3: Highest security level. It is always "on" by default and anyway reset to "on" after the display time-out, for security purpose. Its knowledge is deserved only to **very few** people and must be immediately registered after setup and kept in a secure place: **there is no way to read it** after you have setup and confirmed on the transmitter.

This password must be **immediately** changed at the first pre-set of the apparatus: if any unauthorised people tampers with it or you loose it, there is no way to change it if you do not know the correct word for security reasons and the apparatus may become unmanageable.

Gaining again access to the apparatus will require factory reprogramming or changing the internal CPU.

For practically any parameters that may require some setting in the field, the 2nd level password is enough and may be used for any standard service requirement. The main purpose of the existence of the 3rd level is a security assurance for the user if he loses control on the lower password levels.

Only very few critical parameters, usually factory presets, require this password.

FACTORY DEFAULT PASSWORDS

These are the factory default password:

Level 1:	P001
Level 2:	P002
Level 3:	ABCD

For what previously said, be sure to change at least the 3rd and possibly the 2nd level as soon as you receive and turn on the apparatus.



PASSWORD ENABLING MAY LEAD TO SERIOUS EQUIPMENT ACCESS LIMITATION TO ANYBODY WHO IS NOT CUSTOMED TO INSERT AND MANAGE THE PASSWORD SYSTEM. WE RECOMMEND HENCE TO LIMIT THE PASSWORD USE ONLY WHERE STRICTLY REQUIRED.

MENU AND COMMANDS DESCRIPTION

The menu tree is composed by two separate parallel branches. Navigation through the menu fields is straightforward and natural, with the jog knob. Rotating the knob counterclockwise or clockwise will scroll up and down the menu fields in both the measure and setup branch. A quick push on the knob will act as "enter" or confirm while a longer push will be interpreted as "escape", aborting the operation.

Choosing between the measure and setup branch is immediately proposed after the display of the default field, which reports the equipment model and the firmware revision. At any time, repeatedly "escaping" will return back to the default field. It is not possible to pass from the measure branch directly to the setup without passing through this field.

In the setup menu, the "enter" key changes from scrolling to program mode. Program mode is signalled by highlighting and flashing of the variable words. When in program mode, rotating the knob will change the characters or the options in the local field. Pushing "enter" will confirm the input data while "escaping" will abort it.

A local input time-out will automatically escape the command mode resetting input data if this is not confirmed in 60 seconds after the last variation. In the same manner, 3 minutes later of the last input in the setup menu, a local time-out will reset the menu and enter into the modulation control field.

Navigation on the menu tree is subjected to the security authorisation by the password management system. In order to navigate in the measure/control branch, only the first level of authorisation is required. If the security option is enabled, at least the first password must be input. Factory default preset state is "disabled".

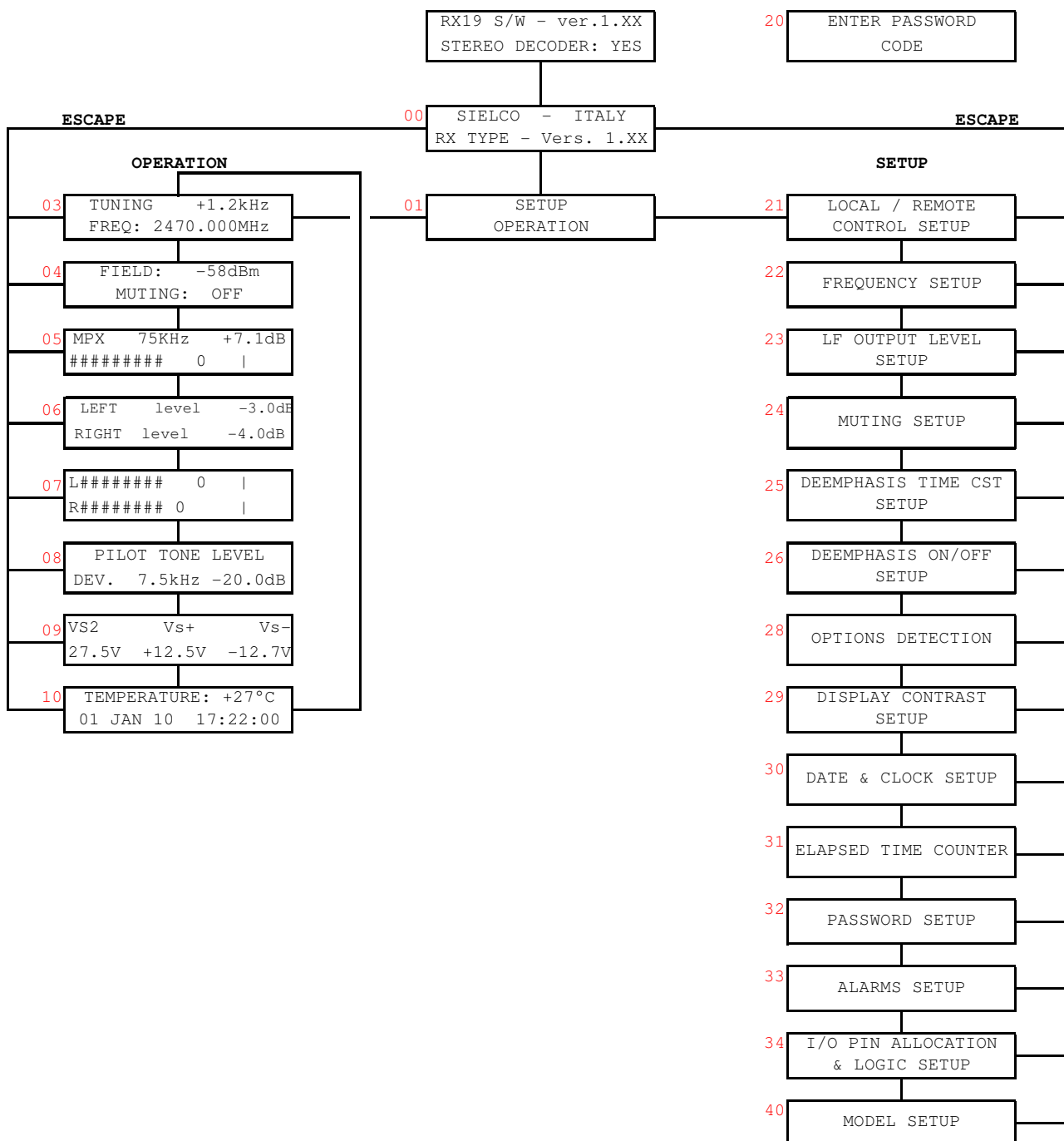
In the same manner, to access to the setup branch, the second level of authorisation is required or the input of the second level password. Again, factory default preset state is "disabled". Only some hardware or factory presets require the third level authorisation. This is also the case of the edition of the Organisation name on the first row of the default menu field.

Few minutes of experiments will enable most users to gain confidence with control keys and menu and to be able to access all main features of the transmitter, without any previous training.

The hierarchical trees of the menus are shown in a table before detailing each submenu field of both the transmitter and the receiver, with a small number near the left side of each field for easy reference. In the following pages we will examine each menu field and option, with reference to these numbers.

RECEIVER MENU

Menu tree



Start menu

The start menu field is the unnumbered one on the top of the menu tree. It is shown only at the initialisation step, when the apparatus is turned on from mains or software reset and all the leds and the display will be turned on and off for testing purpose. It will show the kind of the apparatus, the software release and the presence of some particular internal options.

```
RTX19  SW rev. 1.XX  
STEREO DECODER: YES
```

In this case, immediately after the initialization, the receiver will briefly show the presence (YES) or not (NO) of the internal Stereo Decoder, avoiding to open the apparatus to visually inspect. From this field, if the security allows, it will pass directly to the next menu field.

Field #00: Default Message

```
SIELCO - ITALY  
RTX19  -  rev. 1.XX
```

This field shows again the apparatus model, the software release and the manufacturer's name. This is the field to which we always return back if we will press the escape key once or twice.

If the 3rd level authorisation is granted (see later "password setup and input"), by previously input "enter", it is possible to change the Manufacture's name to any user defined alphanumeric 20 characters string, as in the following example:

```
NORTH-WEST RADIO  
RTX19  -  rev. 1.XX
```

If the security authorisation is granted at least for the first level, rotating the jog will give access to the subsequent menu field #01. Otherwise a valid password will be requested (see #20).

Field #20: Initial Password

ENTER PASSWORD

This field requests to input a valid password code. When the input is confirmed by "enter", the word will be compared with the memorised password table and, if recognised, the corresponding security level will be allowed. If the password is incorrect or the input is terminated by an "escape", the password will be signalised as invalid and the security level allowed will be that actually in memory, i.e. 0 (no permission at all), 1 or 2.

The security level is as factory pre-set to "off" for the 1st and the 2nd level: in this case, which is the most common, there is no need to input any password to freely navigate in the menu tree and to change most parameters. This field will not be displayed if not expressly required by setup field #32 (see later).

When the password is recognised as valid and the corresponding level is displayed, press on the escape key to turn on the first menu field #01.

Field #01: Operation and setup menus

SETUP OPERATION

As the title suggests, this field permits to chose to operation (default choice) or setup menu branches. Pressing the "enter", the highlighted one will be chosen.

Field #03: Reception Frequency setup

TUNING	+1.2kHz
FREQ.	98.100MHz

This is the first control field and shows the receiver preset frequency and the centre tuning of the received signal. In case of absence or very weak received signal (< -90dBm), the tuning indication is casual. The received signal is correctly tuned when its centre frequency is comprised in ± 6.0 kHz.

Field #04: Received RF field and muting

FIELD	-58dBm
MUTING	OFF

Here are shown the received signal field in dBm and the possible muting intervention in case of weak field or severe mistuning.

Field #05: LF Output level

MPX	75.0kHz + 0.0dB
#####0	

This field shows the actual frequency deviation of the received signal due to the whole multiplex modulation, as shown on the corresponding transmitter field.

Take care that while deviation reading is very precise with clean channel reception, in the absence of received field or with very weak field a big amount of noise will be displayed which will show up a much wide deviation than real.

Fields #06 & #07: Left and Right decoded Output levels

<p>LEFT level - 3.0dB RIGHT level - 4.5dB</p>

<p>L##### 0 R##### 0 </p>

As in the previous field, here are shown the modulation level separately due to the Left and Right stereo channels. expressed in dB, where 0dB refers to 75kHz-peak deviation. The bottom field (#7) shows the same information as an analog moving bar.

These fields are shown only if the optional internal stereo decoder is present.

Field #08: Stereo Pilot Frequency level

<p>PILOT TONE LEVEL DEV. 7.5kHz -20.0dB</p>

This field too is shown only in case of presence of the optional stereo decoder board. Here it is shown the modulation due only to the stereo pilot 19kHz tone embedded in the multiplex signal, in any moment and with excellent precision. There is no need to mute the modulation or to do any special action to measure it.

Field #9: Internal Voltages

<p>Vbat Vs+ Vs - +27.8V +12.5V -12.4V</p>

This field shows the internal regulated voltages. Voltages on the EXC19 transmitter's family are nominally equal to: Vs+ = +12.5 ±0.3V, Vs- = -12.4V (+1/-2V).

The battery voltage usually reads Vbat= +27.4 ±0.4V, when the battery is completely charged and mains is on. In case of battery operation, the equipment works satisfactory at any level comprised in 22 to 28V.

Field #10: Temperature, Data and Clock

T (A/H) : +30 °C n.a.
31 JAN 10 13:45:00

This field shows the internal temperature in Celsius centigrade (°C). The ambient temperature sensor is placed just behind the front panel. It may even be up to 5 - 6 °C higher than the external temperature at full output power: i.e. nearly +50 to +51 °C assuming an external temperature of +45 °C (the maximum allowed). The field supports heatsink temperature reading (Th) which is not measured on these equipment.

There is not a Temperature management: only an alarm is issued since reduction in power do not permit power saving, so user is full advised to not trespass temperature limits.

Bear in mind that the higher the ambient temperature, the lower the MTBF. As rule of thumb the life is halved each 10 °C the temperature is increased. Assuming 10 years operating life at +25 °C, which is not unrealistic, it may become 2.5 years at +45 °C.

SETUP MENU**Field #21: Local/Remote control setup**

SETUP CONTROL
LOCAL & REMOTE

The apparatus may be controlled either locally from the front panel or remotely from the I/O lines and RS232 serial port. It is possible to permit concurrently control as default shown (remote I/O lines may be prevalent in case of any function disable) or only local or by remote. So the highlighted line may be changed in

or

LOCAL ONLY
REMOTE ONLY

In case the apparatus is remotely locked, any temptative to access to setup menu will show the following message:

REMOTELY LOCKED
PRESET TO LOCAL!

Pushing twice "Enter" on the control jog will select the "SETUP CONTROL" menu and highlight the upper field ("REMOTELY LOCKED") permitting to change it to "LOCAL & REMOTE" or "LOCAL ONLY" if required.

Field #22: Frequency setup

FREQ. 98.100 MHz
F= -55dBm T=+ 1.2kHz

Here it is possible to preset the received frequency in a similar manner as in the transmitters. In the receiver the frequency is changed in real time with editing, whenever possible.

The bottom line shows the associated received field and center tuning. Bear in mind that very often major frequency changes requires several seconds to be effective and during this time the information on the bottom line is meaningless.

Field #23: LF Output level setup

LF out lev. + 2.5dBm
Nom. level: + 6.0dBm

It is here possible to vary at the same time the level of the main LF outputs, either the Multiplex (Mpx) and Mono signals. In the first row it is shown the actual level in dBm, while in the bottom row it is shown and may be preset the nominal output level referred to 75kHz deviation. Preset range is comprised in -1.5 and +12dBm.

Field #24: Useful Received Field and Muting setup

MUTING SETUP
level: -75dBm / OFF

From this field the user may vary the insertion level of the muting circuit and its intervention. Suitable levels are -70 to -80dBm for stereo signals and -85 to -90dBm for mono signals, depending on the received signal strength. The muting level is unrelated to the field alarm level which may be differently preset by its own menu (see alarm setup, menu #32)

By pre-setting "ON" or "OFF", the muting circuit may be enabled or disabled either by "mistuning alarm" or remote control function.

Fields #25 & #26: De-emphasis setup

```
DEEMPHASIS TIME CST .  
50 us
```

```
DEEMPHASIS ON/OFF  
MONO: on STEREO: on
```

It is here possible to vary the de-emphasis time-constant between 0, 25, 50 and 75 μ s. The de-emphasis function may be separately preset on the mono and the decoded stereo outputs, if present.

Field #28: Optional internal boards detection

```
OPTIONS :  
STEREO DECODER: NO
```

On this field it is shown the software detection of possible optional internal boards, avoiding to open or internally preset the equipment. Stereo decoder board is the main option in the receiver; other boards may be added in the future.

Field #29: Display contrast setup

```
DISPLAY CONTRAST  
SETUP 3
```

From here it is possible to vary the display contrast to permit the best reading in different environment situation or to compensate variation with components, temperature and aging. A number 0 to 7 shows the preset level.

Field #30: Time & date setup

```
DATE & CLOCK SETUP
31 JAN 10   13:45:00
```

This field permits to edit either date and time

Field #31: Elapsed Time

```
ELAPSED TIME
000356 HOURS
```

This field shows the elapsed time for service purpose whether the transmitter is on the air or in stand-by with the mains applied. There is no way to change the reading.

Field #32: Password Management

```
PASSWORD LEVEL X
code=**** status=OFF
```

This field shows the password status and permits to change the code and/or the status in command mode, when in possession of the necessary level authorisation for that level or a higher one. No code is ever shown and no access is permitted to a level higher than the current authorisation.

Hence, if the password is unknown, lost or tamperers changed it, it is possible to change status and code when in possession of the higher password. In this case the lower level password code must be changed and confirmed: no possibility still being to know what was the old password. This means that it is always possible to change the 1st or 2nd level password, even if they are unknown, if respectively the 2nd or 3rd level passwords are correctly set when requested.

If the code or the status is changed, it is always required to confirm the correct password for that level:

```
CONFIRM PASSWORD
. . . .
```

When the 3rd level password is input, the operation with that security level is allowed as long as 3 minutes after the last key input. So it prolongs as soon as navigation and action is performed on the display and keyboard, but will be reset anyway later the last command.

When even the first security level is enabled, the equipment stops every access following the time-out. This is explicitly done to impede to unauthorised personnel to display equipment parameters, if required. The functioning of the equipment is not influenced by this state. Any attempt to access to the equipment will cause the request of a correct password. Failure to do so will cause a time-out process during which no command will be recognised by the equipment. At the end of this time, it will be possible to retry to input a valid password.

This display stops input mode for 5 second and than permits to exit (and possibly to try again) by escaping.

INVALID PASSWORD!

. . . .

Field #33: Alarm setup and display

It is here possible to see and partially edit the various alarm conditions which may be associated to the general alarm signalling. The following table lists the possible alarms for the receiver:

ALARM SETUP	
TEMPERATURE:	ON
PLL UNLOCK:	ON
LOW RF INPUT:	ON/OFF
MISTUNING:	ON/OFF
NO MODULATION:	ON/OFF
OVERMODULATION:	ON/OFF
HIGH TEMPERAT.:	55°C
LOW RF INPUT:	-xxdBm
NO MOD. LEV.:	-15.9dB
NO MOD. TIME:	90sec
UNLOCK TIME:	60sec

Field #34: I/O pin allocation and logic level setup

I/O PIN ALLOCATION & LOGIC LEVELS SETUP
--

As described in the remote control port section, there are at least 4 I/O lines which may be associated to corresponding pins of the parallel remote I/O connector on the rear panel. This submenu permits to chose the corresponding function to associate to the pins with the following options:

Inputs:

PIN 6: AUDIO MUTING
REMOTE LOCK

Outputs:

PIN 2: MODULATION OK
REMOTE LOCKED

PIN 7: ALARM
FIELD GOOD

PIN 3,8: FIELD GOOD
ALARM

The factory default is the first line for each pin. All of these lines may be preset active high or low in the same menu.

When "Remote Locked", the apparatus cannot be changed in its presets from front panel knob before exciting from this condition. The input pin #6 may be associated to a function which force this status ("Remote Locked"). In this case every temptative to change the setup will invoke menu field #21 to permit local control.

FACTORY MENU

Factory menu enables some internal presets, which are not permitted to the user and must not be altered. There is only one distinct exception, in the case the CPU control board is changed with a new one or the internal firmware is upgraded with a new version. In this unique case, it is possible to choose the equipment model to control, with its specific frequency range, as further described.

Field #40: Model and Frequency range setup

EQUIPMENT MODEL SET FM STL Rx 87.5-108

In this field it is possible to choose either the type of the receiver to control and its frequency range. There is absolutely no need to access here on normal use, but it is important to correctly set the model to which the apparatus corresponds. Service personnel may access to this field with 3rd level keyword permission.

The equipment model set is limited to an internal list for which the controller is preset. This field proposes some ten frequency choices. Choosing an incorrect frequency range **will surely impede** the equipment to work.

SERVICE AND MAINTENANCE

The Receiver is contained in a completely closed cabinet and do not require any special maintenance. No internal cleaning is required. The apparatus may be externally cleaned with a wet cloth always after it have been removed from mains.

Install the apparatus on a stable stand/rack, in such a way to permit good ventilation. Other than this, because of the high-quality materials used in their manufacture, if it is correctly installed in an adequately protected environment it will not require special maintenance for quite some time. Internal presets are very stable and we don not recommend tampering with them if not in specially equipped laboratories.

Extimate service life is in excess of 10 years on continuous duty.

Never change the internal calibrations to avoid altering the declared performances.

GUARANTEE

Like all SIELCO's solid state continuous duty equipment, this apparatus carries a one-year guarantee on all components.

This guarantee is null and void if the apparatus is tampered with or if failure is due to improper use, wrong installation or external causes, such as mains or antenna overvoltage.

This guarantee covers work done exclusively in our laboratories and in those of our agreed representatives.

The goods shall be delivered carriage prepaid to the laboratory and shall be returned freight forward.

This guarantee does not cover any consequential damage due to non-operation or faulty operation.

SERVICE MANUAL



THIS SECTION IS ONLY AIMED TO GENERAL EXPLANATION, REFERENCE AND SERVICE PURPOSE BY SKILLED PERSONNEL. AS EXPLAINED IN THE PREVIOUS SECTIONS, INTERNAL ADJUSTMENTS ARE NOT REQUIRED DURING NORMAL OPERATION. TAMPERING WITH INTERNAL SETTINGS VOIDS THE WARRANTY, MAY HARM THE APPARATUS AND JEOPARDIZE THE GUARANTEED PERFORMANCE. COMPONENT VALUES SHOWN MAY ACTUALLY VARY FOR PRODUCTION REQUIREMENTS.

DUE TO THE TECHNOLOGY USED, MOST MODULES AND ESPECIALLY THOSE IN SMT ARE NOT INTENDED TO BE REPAIRED IN CASE OF FAILURE AND MUST BE REPLACED WITH NEW ONES.

INTERNAL RECEIVER DESCRIPTION

The RTX19/1 receiver comprises as much as 8 internal modules, as can be seen in the drawing "General view" and in the "General wiring diagram". They are:

- The regulated power supply
- The auxiliary regulator and battery charger board
- The CPU controller and display board
- The Front-end, synthesised LO and mixer
- The FI amplifier and FM demodulator board
- The LF interface and control main-board
- The stereo-decoder module (optional)
- The N+1 parallel control board (optional)

For the electrical diagrams and component layout of most board, refer to the relevant section of the service manual.

INTENTIONALLY BLANK PAGE

RTX19/1

FM BROADCAST RECEIVER

87.5 ÷ 108 MHz

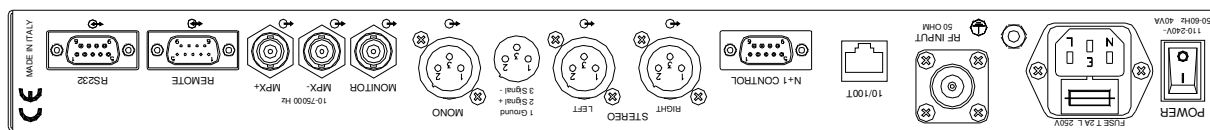
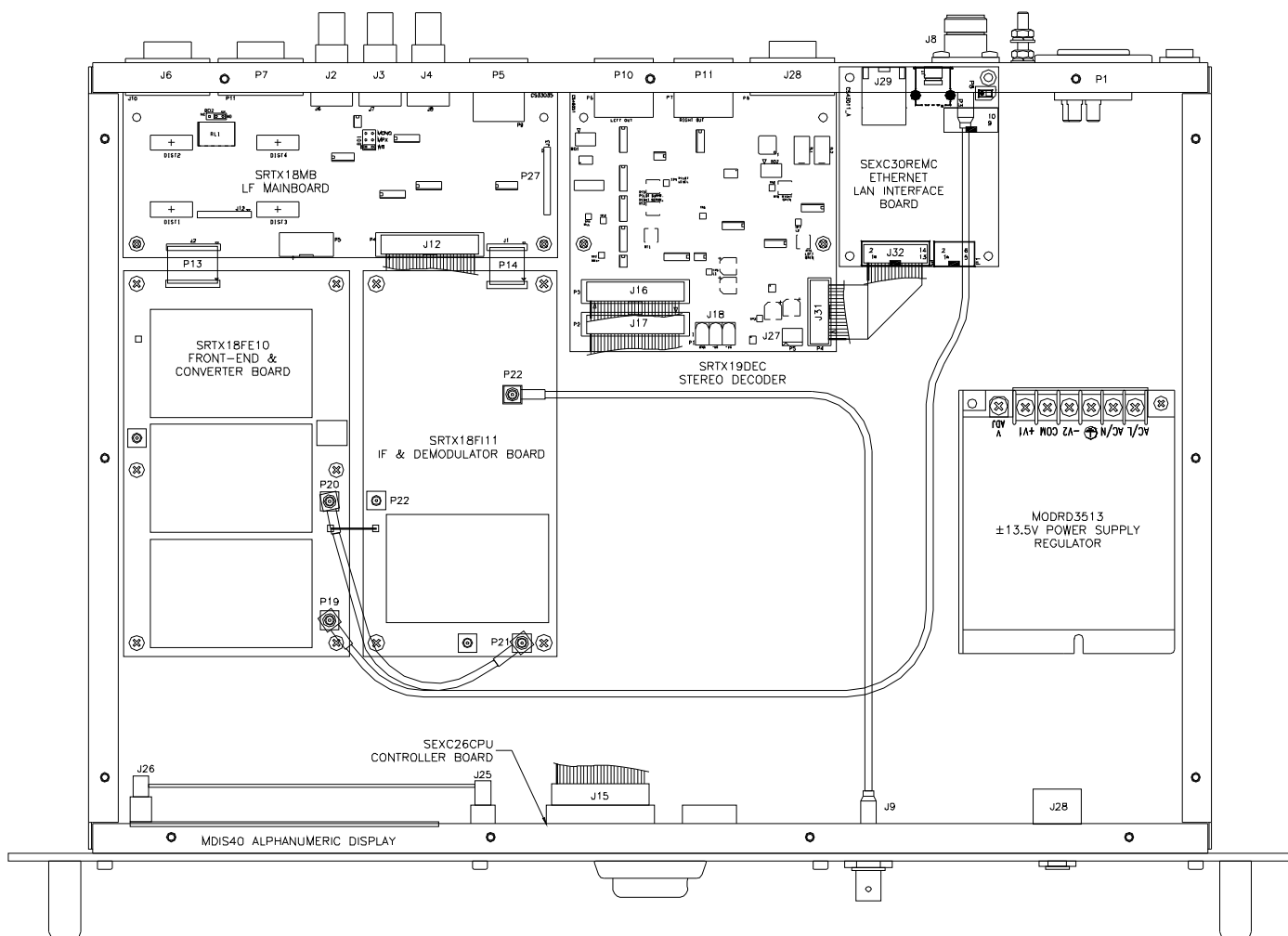
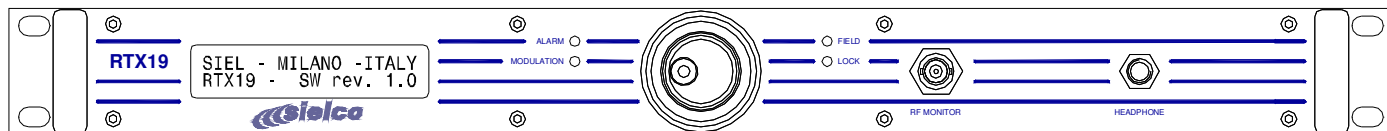
DIAGRAMS AND COMPONENT LAYOUT

Notes:

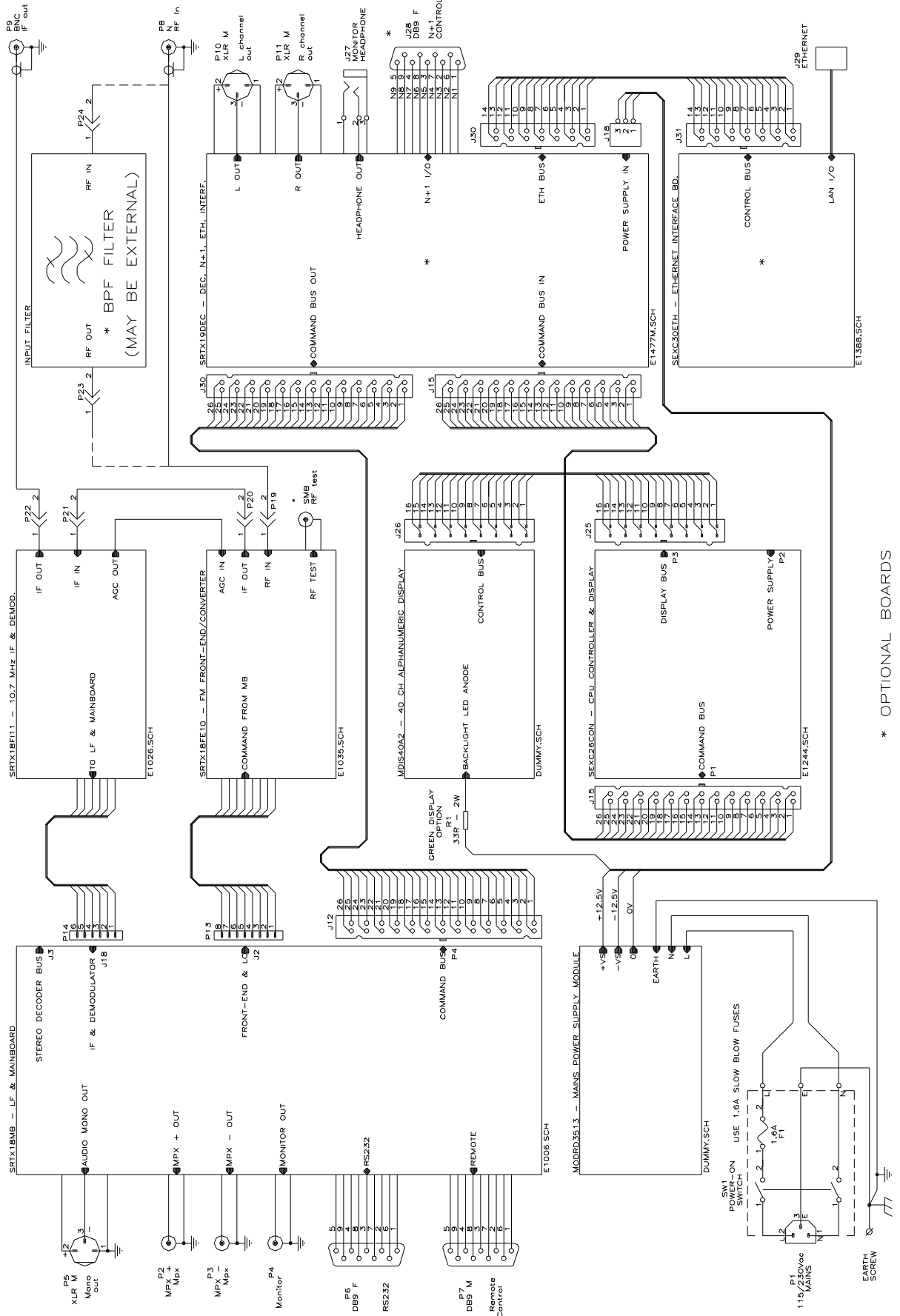
All components and values in the schematics are for reference only. SIELCO grants the right to change them as required in the manufacturing process or to improve the overall performance

All symbols used in schematics are in accordance to IEC 60617:2012. Refer to the above mentioned standard for their comprehension.

RTX19/1 RECEIVER - MECHANICAL ASSEMBLY VIEW

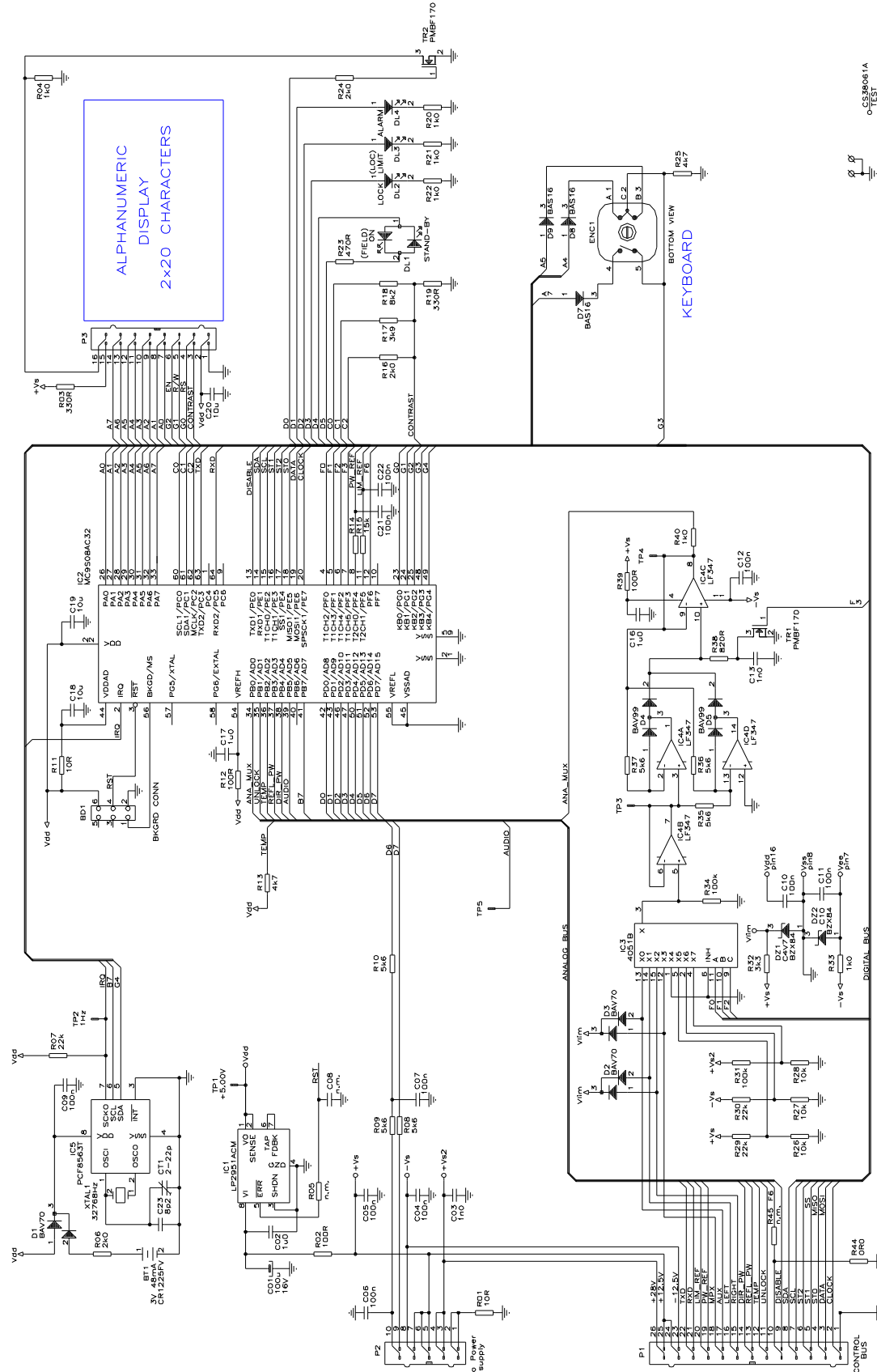


RTX19/1 RECEIVER - E1491 Electrical wiring diagram



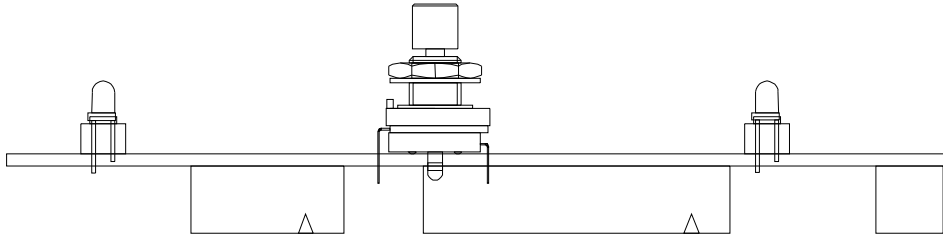
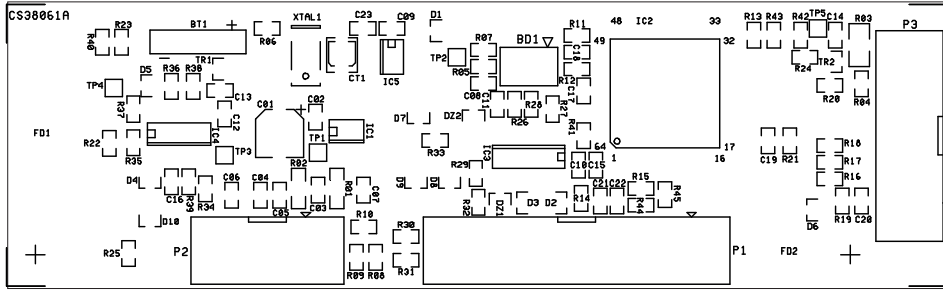
* OPTIONAL BOARDS

SEXC26CON - CPU CONTROLLER & DISPLAY BOARD, E1244 electrical diagram

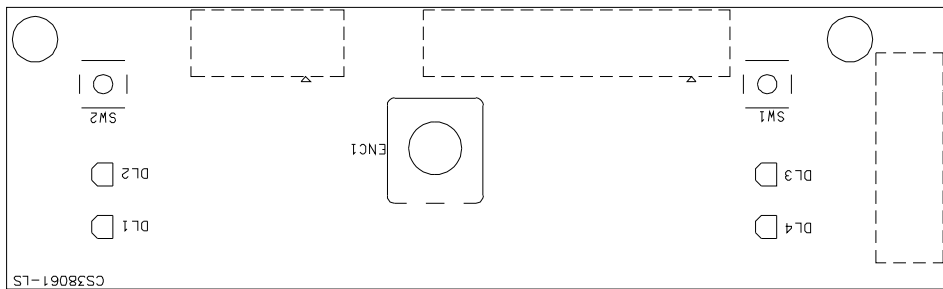


SEXC26CON - CPU CONTROLLER & DISPLAY BOARD, CS38061A component layout

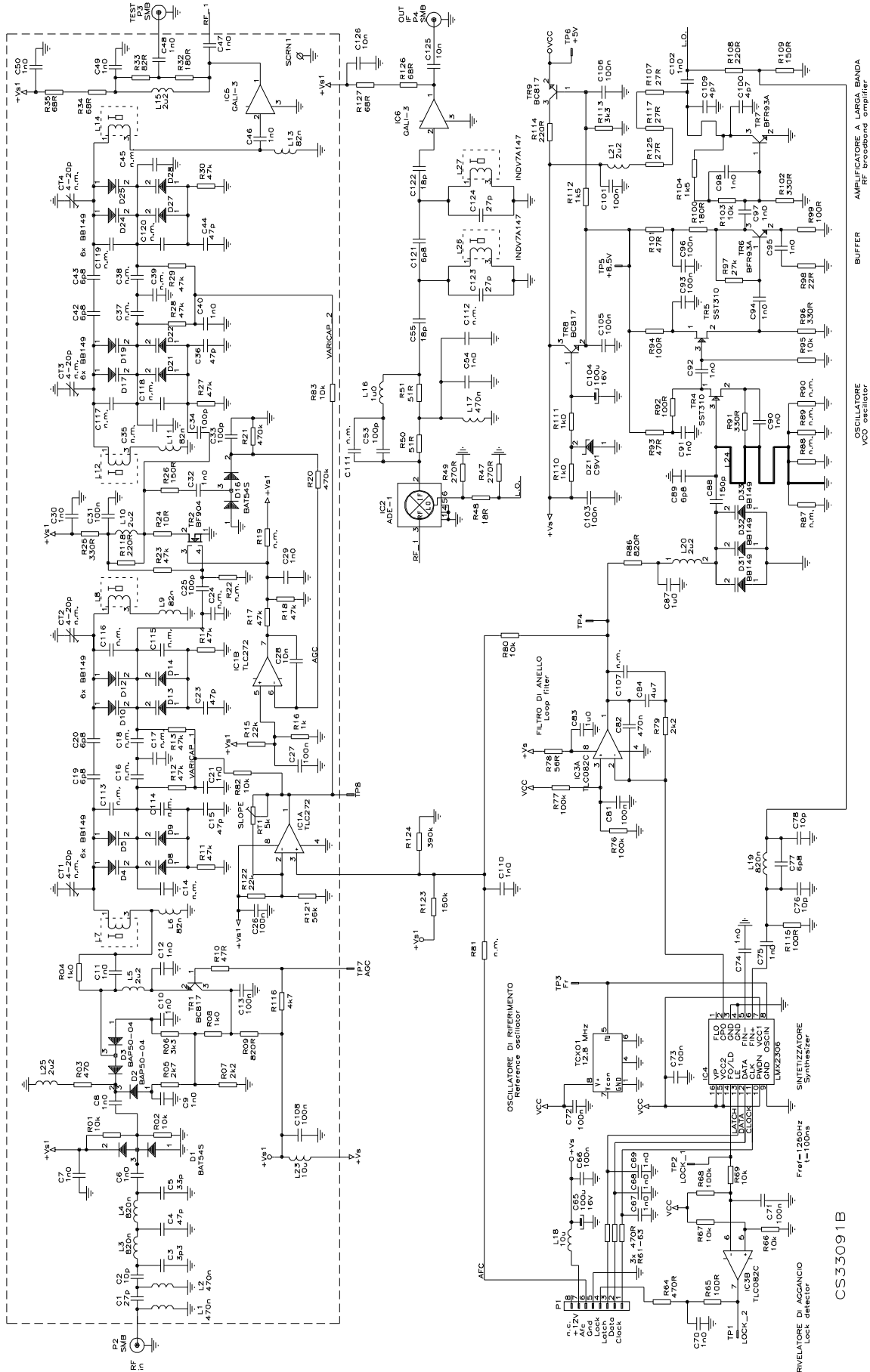
COMPONENT SIDE



SOLDER SIDE

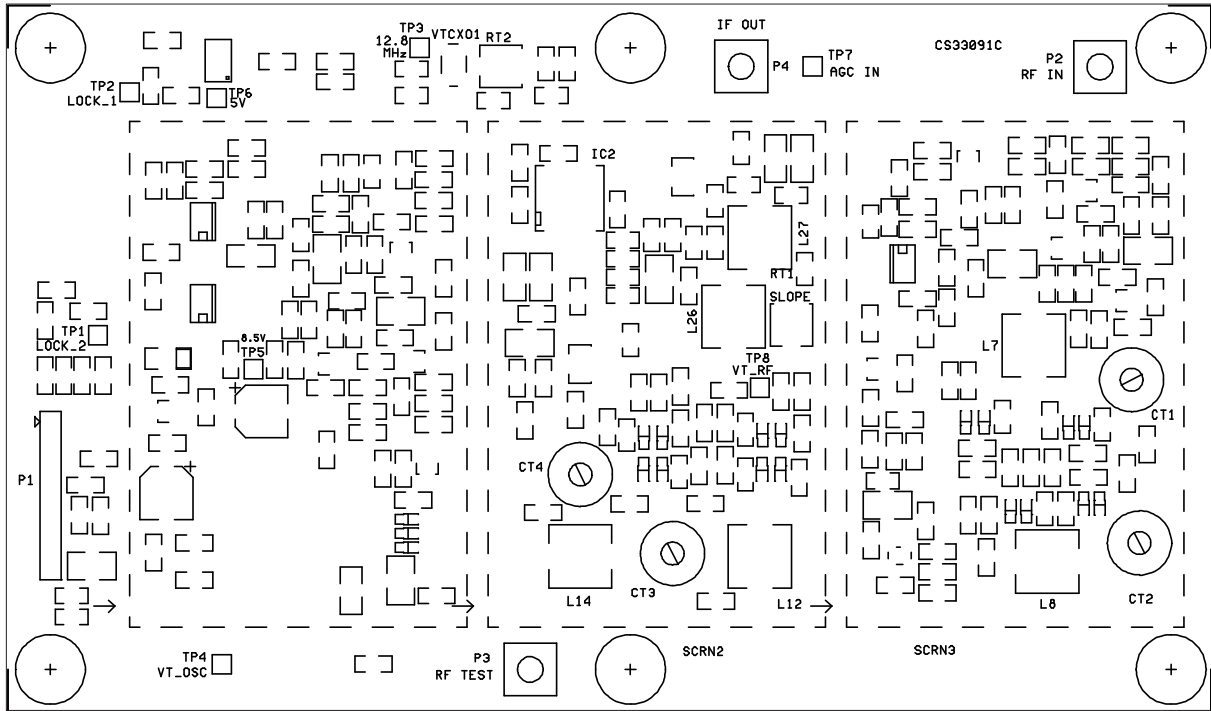


SRTX18FE10 - FRONT-END CONVERTER, E1035 electrical diagram

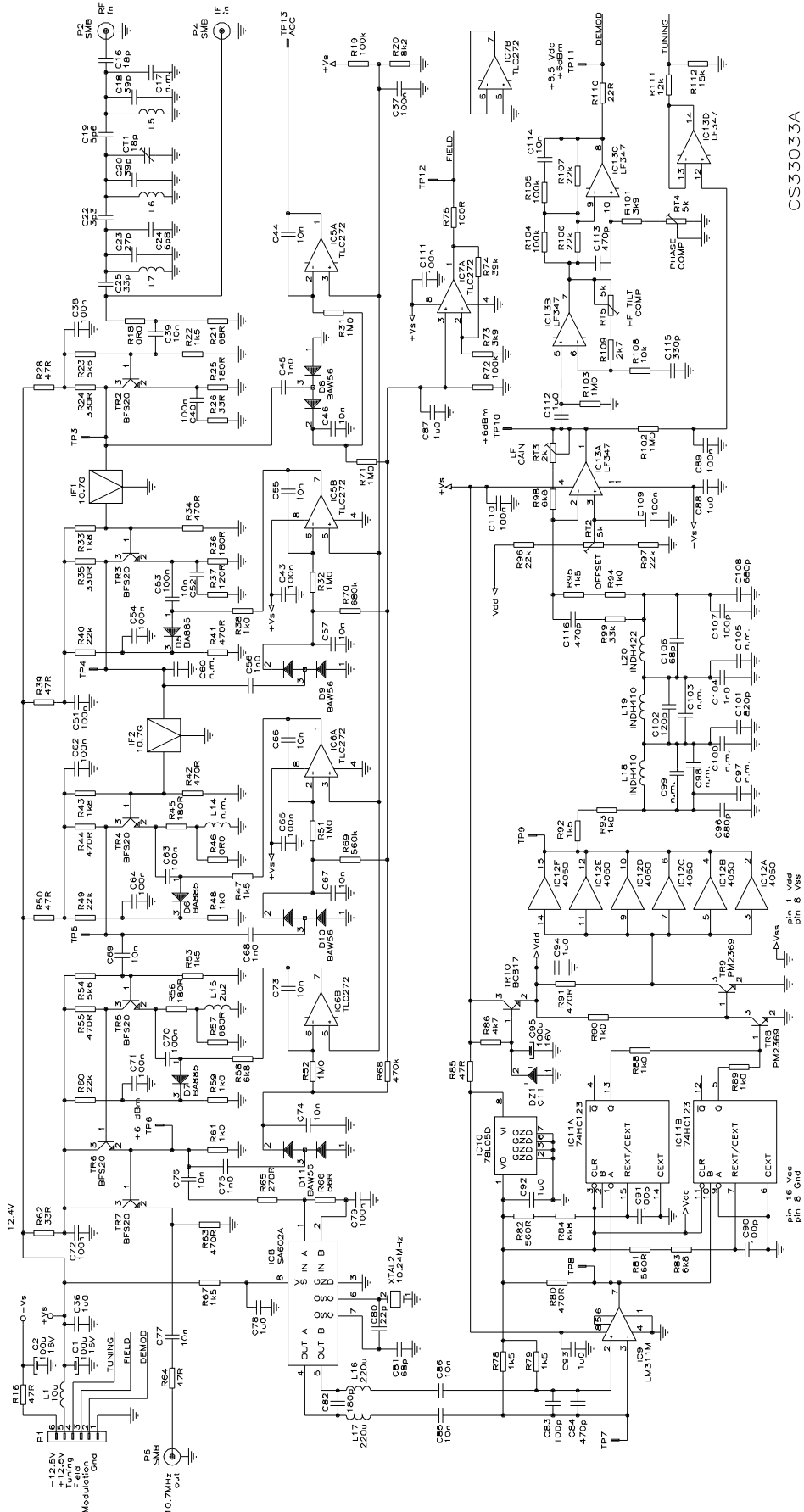


CS33091B

SRTX18FE10 – FRONT-END CONVERTER, CS33091 component layout



SRTX18FI11 - IF AMPLIFIER/ LF DEMODULATOR, E1026 electrical diagram

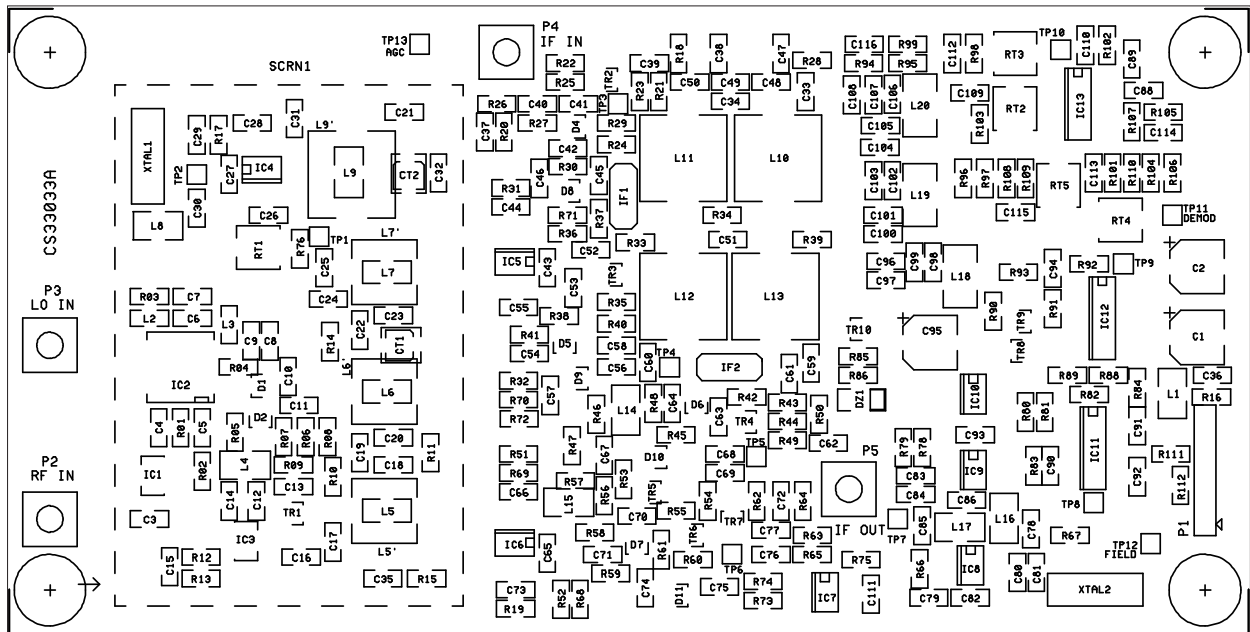


CS33033A

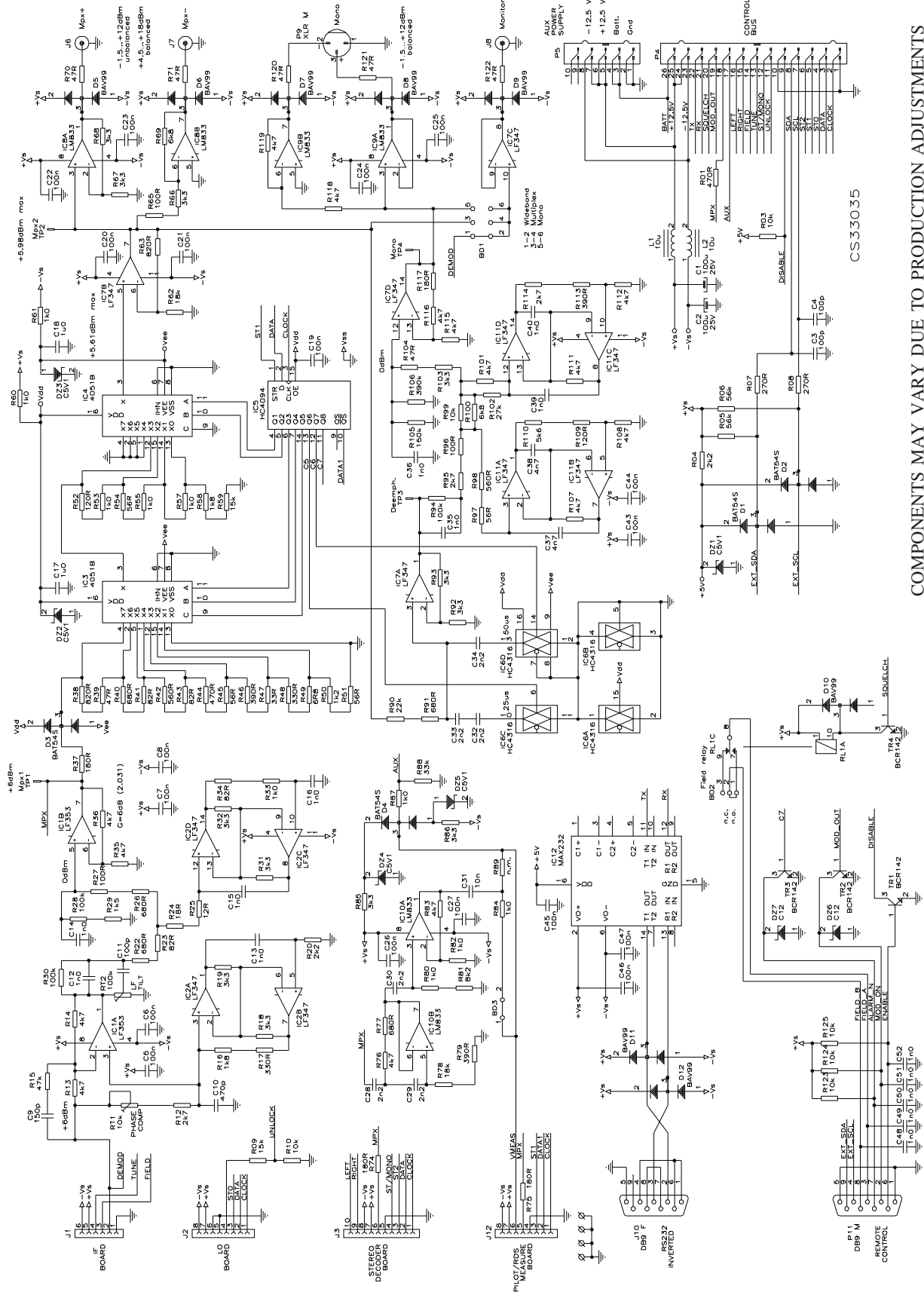
COMPONENTS SHOWN ARE ONLY EXEMPLIFICATIVE AND MAY VARY IN PRODUCTION

COMPONENTS MAY VARY DUE TO PRODUCTION ADJUSTMENTS

SRTX18FI11 - IF AMPLIFIER/LF DEMODULATOR, CS33033A component layout

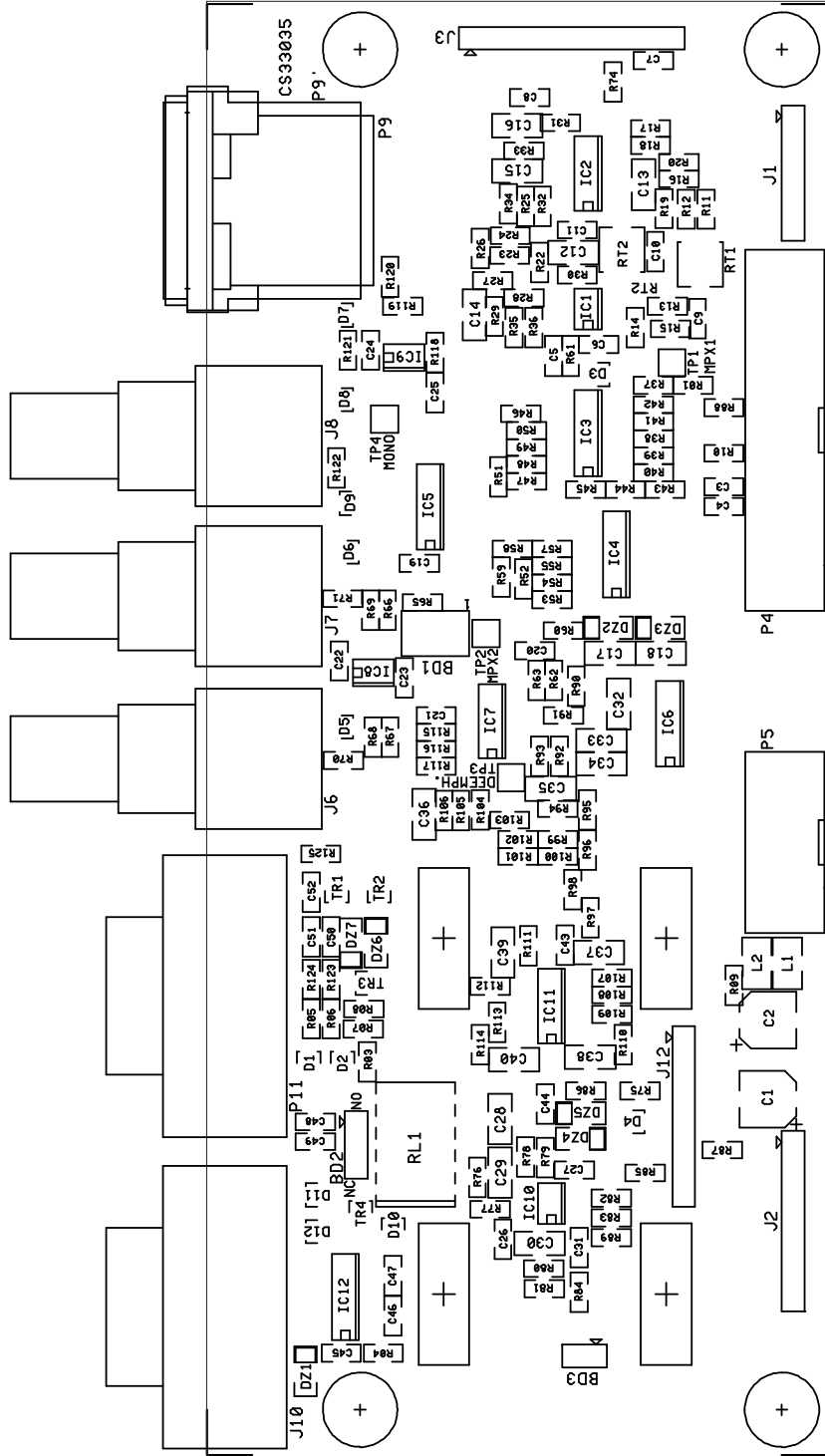


SRTX18MB - LF & I/O MAINBOARD, E1006 electrical diagram

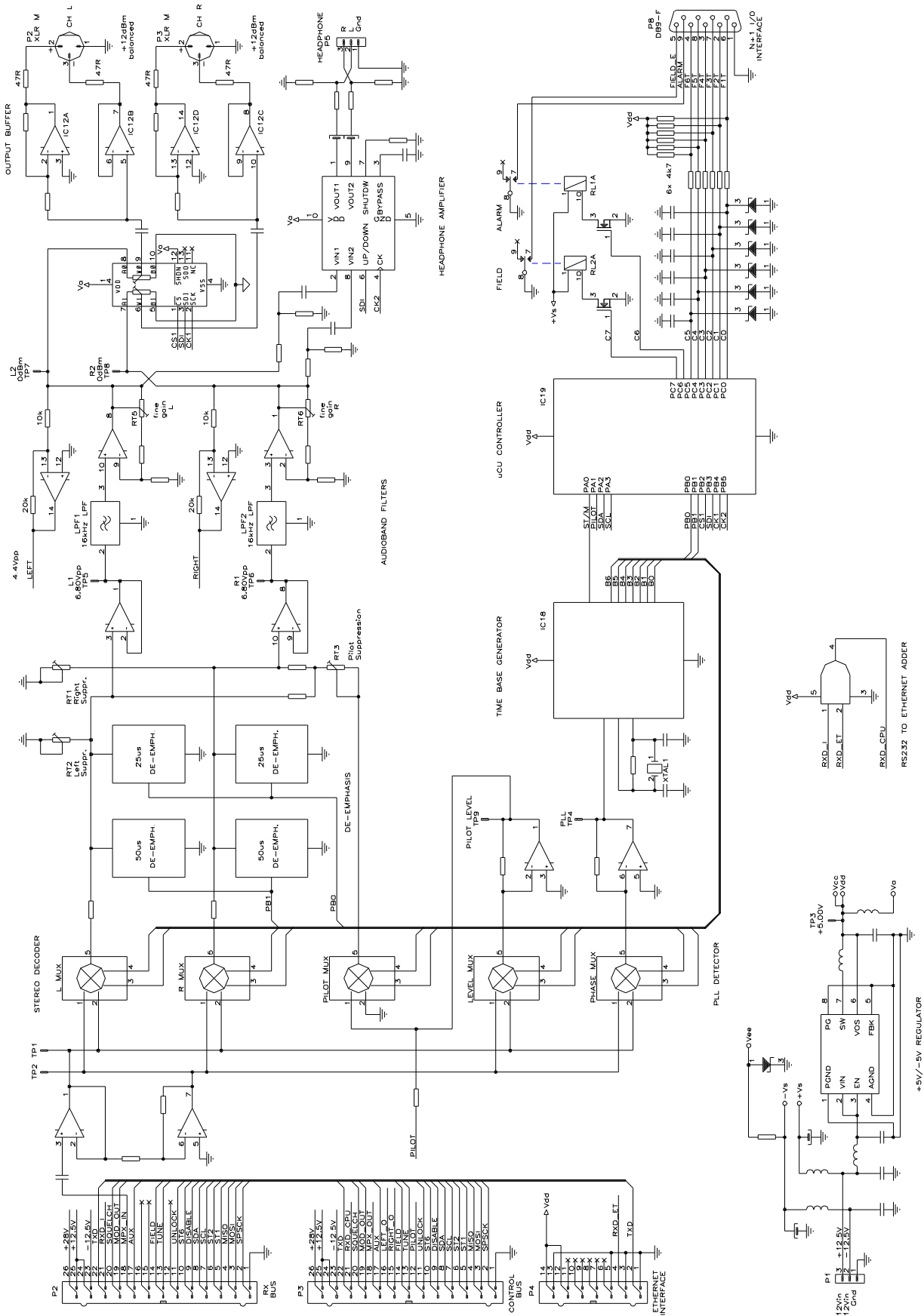


COMPONENTS MAY VARY DUE TO PRODUCTION ADJUSTMENTS

SRTX18MB - LF & I/O MAINBOARD, CS33035 component layout

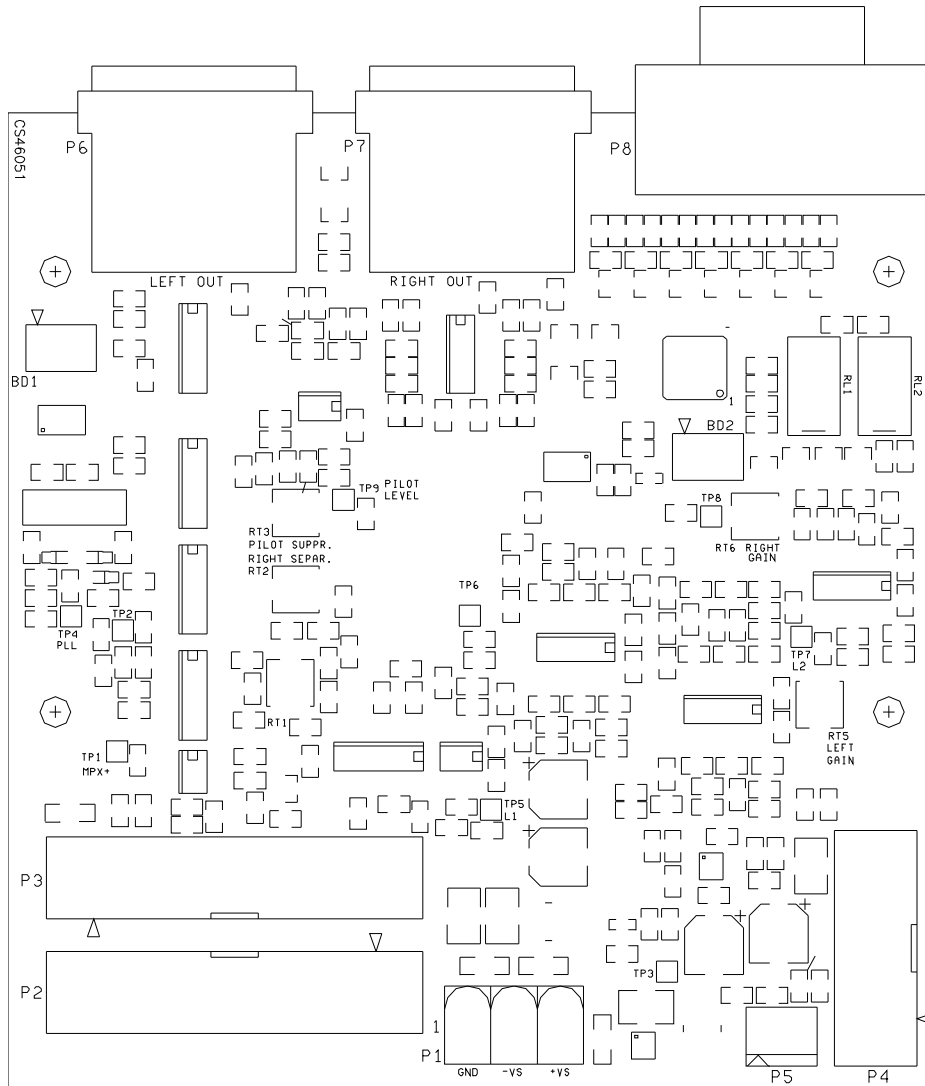


SRTX19DEC - STEREO DECODER, N+1, HP AMPLIFIER BOARD, E1477 block diagram

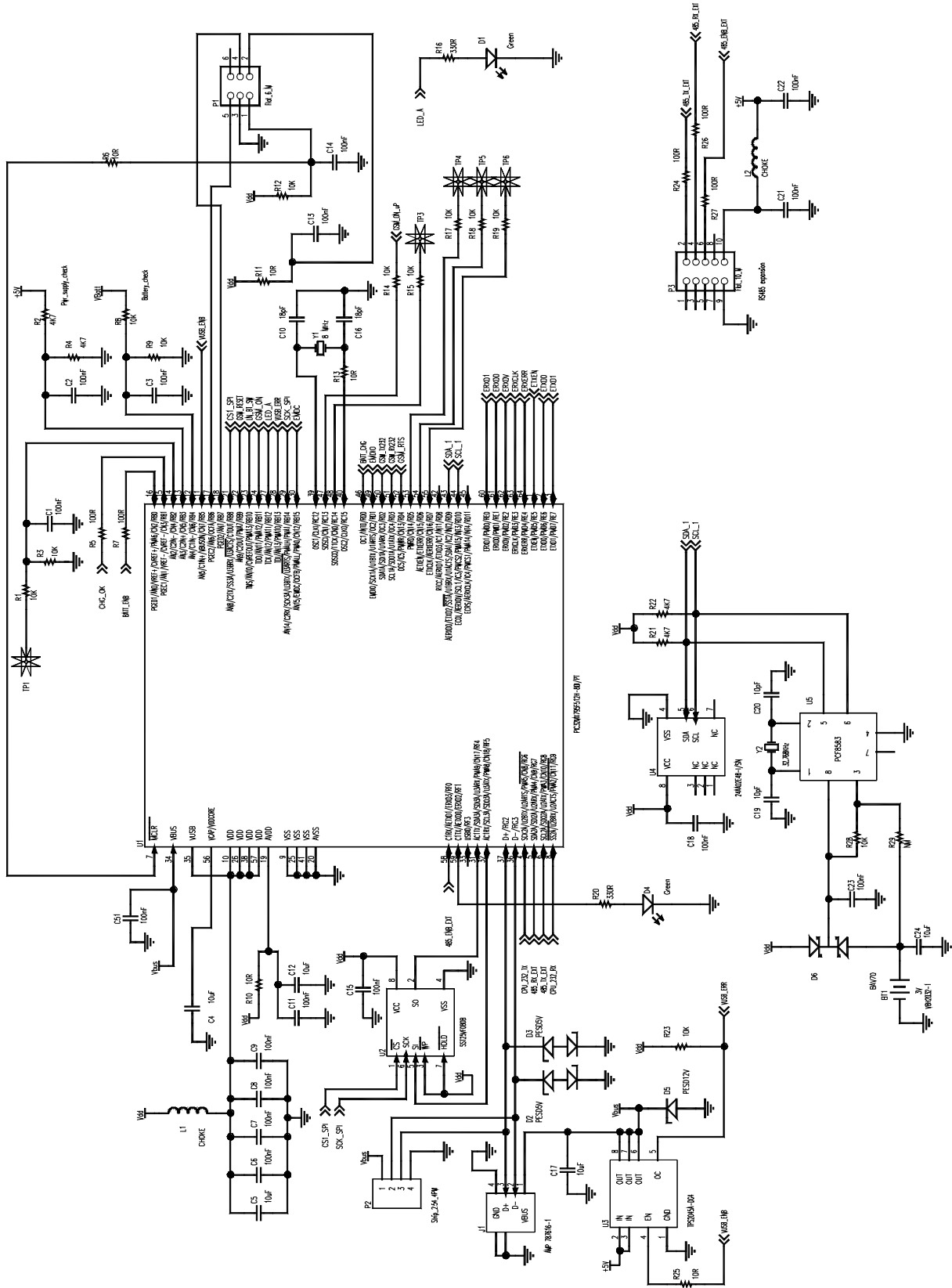


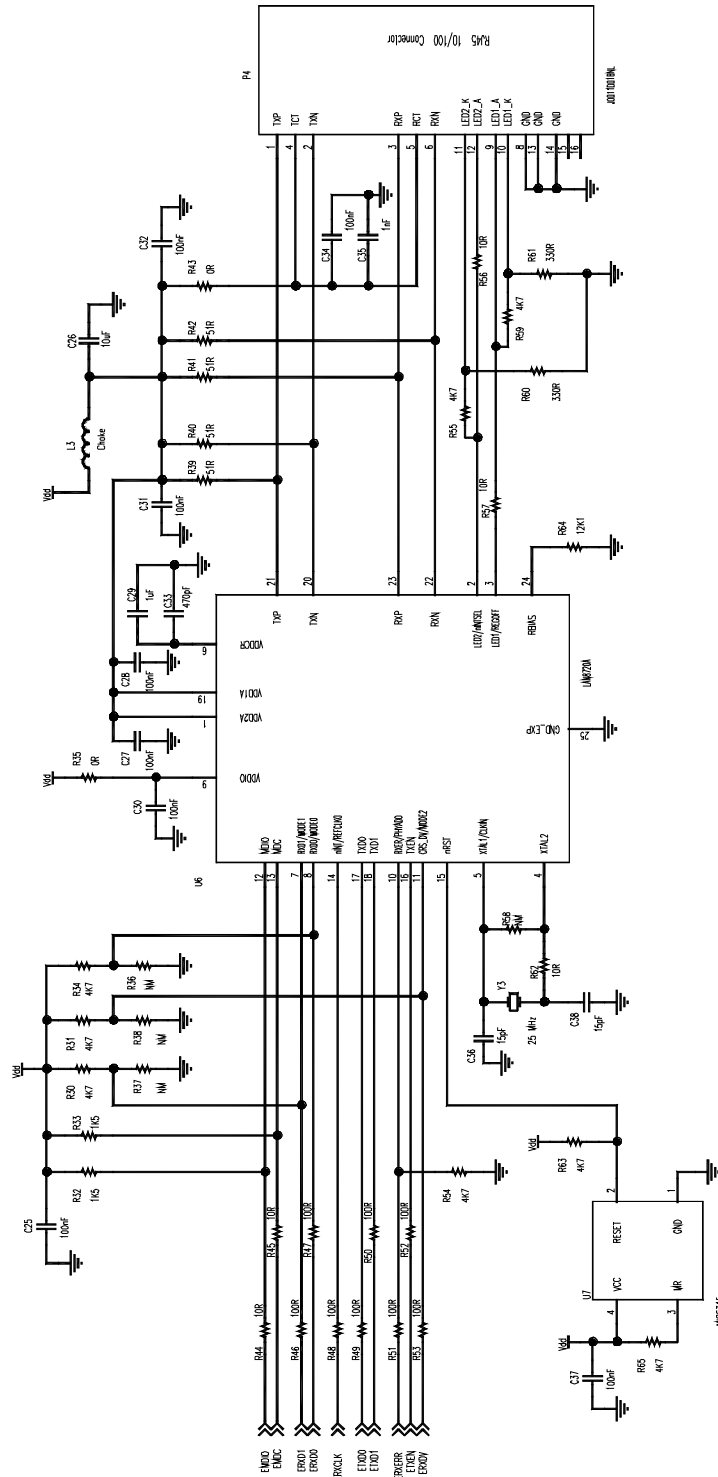
VALUES AND DIAGRAMS SHOWN ARE ONLY EXEMPLIFICATIVE AND DO NOT NECESSARILY REFLECT REAL COMPONENTS

SRTX19DEC - STEREO DECODER, N+1, HP AMPLIFIER BOARD, CS46051 component layout

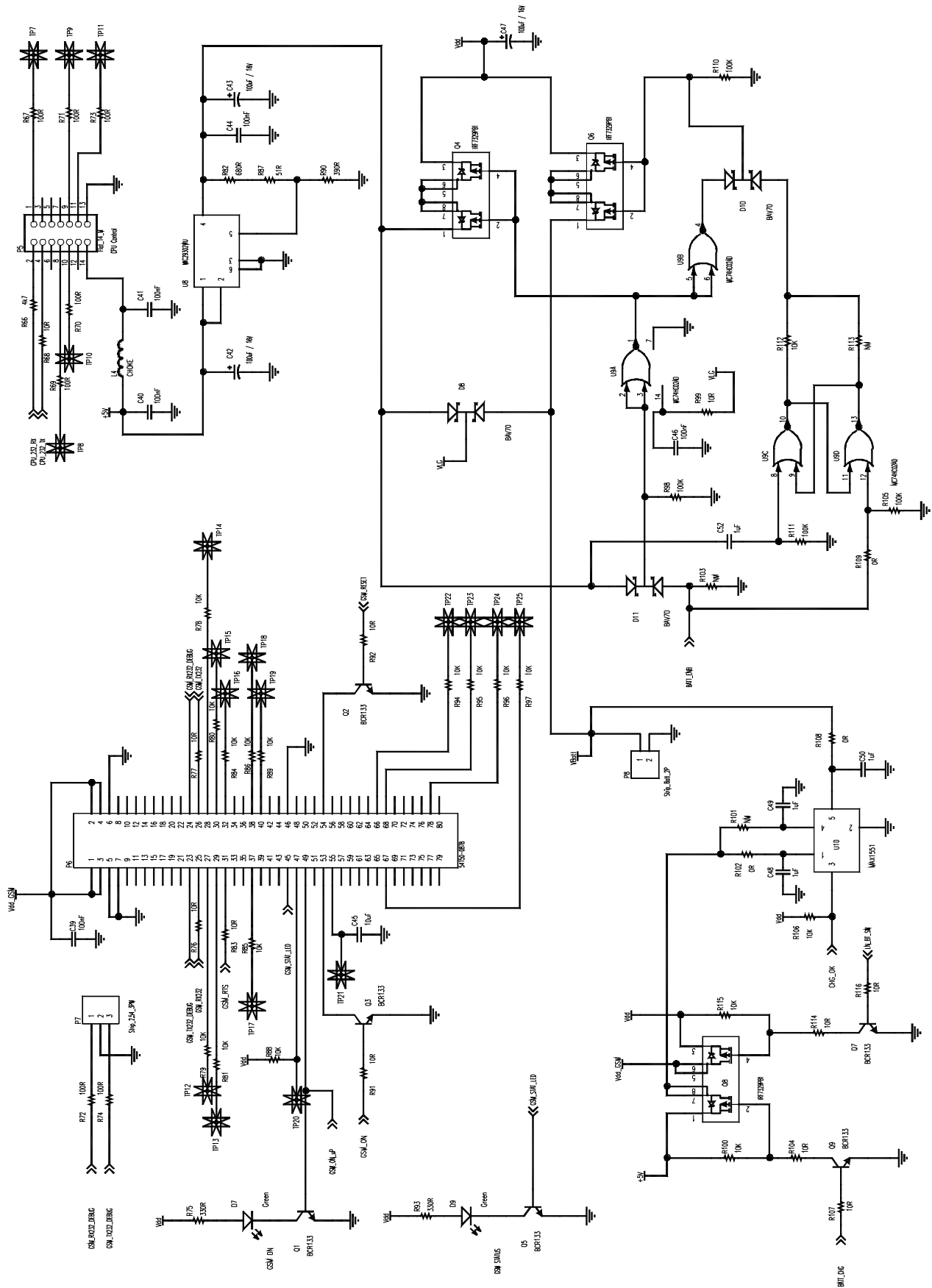


SEXC30REMC - ETHERNET BOARD, E1388 electric diagram page 1 of 3

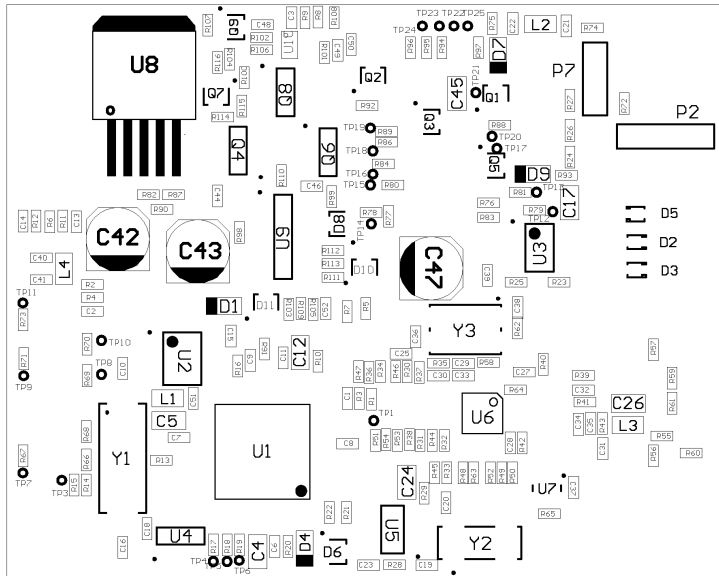




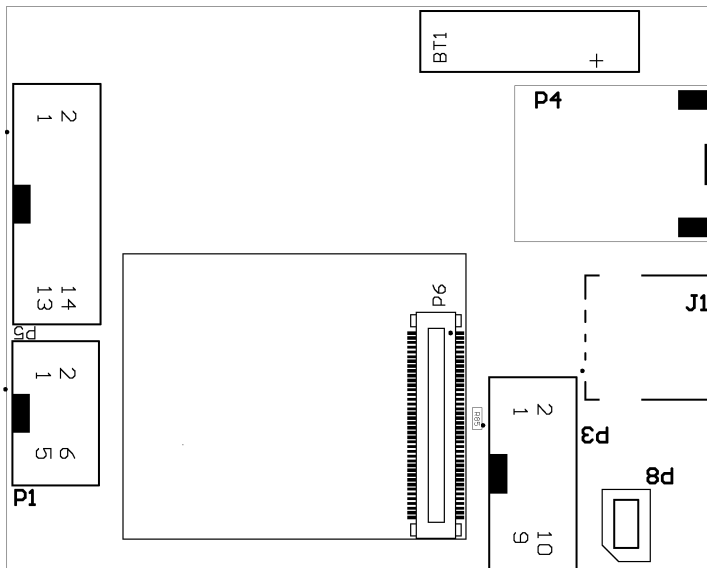
SEXC30REMC - ETHERNET BOARD, E1388 electric diagram page 3 of 3



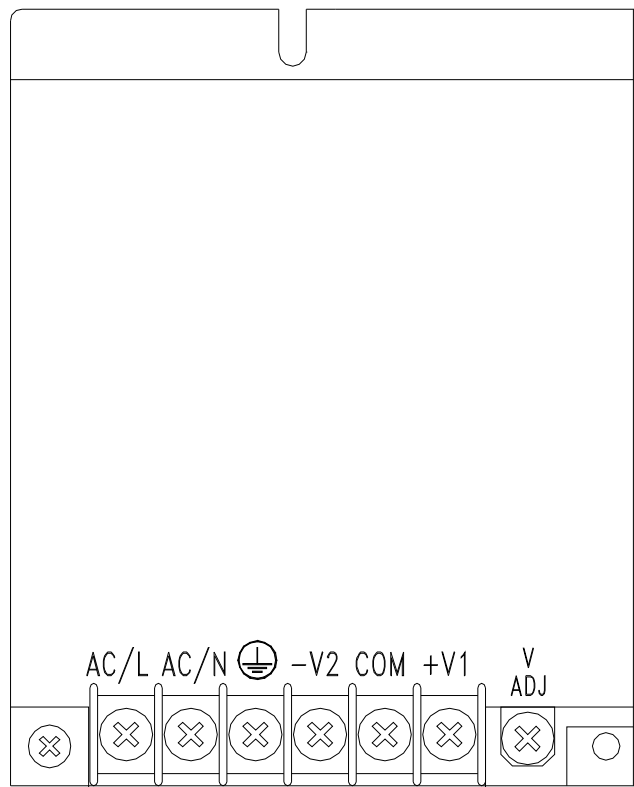
Bottom side



Top side



MODRD3513 - Mains power supply modules



SPECIFICATIONS:

Input: 90-260Vac 47/60Hz

Output: $\pm 13.5\text{Vdc}$ / 1.6A

Adjust to +12.5V