

Codice	TM050E_10	Quality Management System			
Tipo	Operation Manual	Rev.N° 10	0	del	19/03/2019
Titolo	A07EXXXX – 1 Unit Transmitters				



Eco line

Opera Plus Family

A07EXXXX

Prefix	One Unit Transmitters	
	XXXX	Watt
A07E	0011	10
	0021	20
	0031	30
	0051	50
	0101	100
	0201	200
	0251	250
	0301	300
	0401	400
	0501	500

Operation Manual



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All specifications, characteristics and circuit descriptions set forth in this manual are subject to change without notice.

1 Revision Index

Revision	date	Description	Revision Autor
0	04/11/2014	Original draft	Antonio Fiordelisi
01	03/02/2015	Rev.Cap 3.3 – 3.4 - 4.9	Antonio Fiordelisi
02	09/02/2015	Capter 4.11 page 18 & Rev.Pages 19-20	Antonio Fiordelisi
03	25/02/2015	Rev page 21-34-35	Antonio Fiordelisi
04	02/03/2015	Pag 08	Antonio Fiordelisi
05	22/05/2015	Pag 15-16-24	Antonio Fiordelisi
06	21/11/2016	Pag 14-15-16-25-36	Antonio Fiordelisi
07	02/06/2017	Pag 16-17-18-84-85-86-87-88	Antonio Fiordelisi
08	01/02/2018	Pag 21	Antonio Fiordelisi
09	25/02/2019	Pag 2-18-84-85-86-87-91-92-93-116-121	Antonio Fiordelisi
10	19/03/2019	Pag 1-19-20	Antonio Fiordelisi

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3 SAFETY INSTRUCTIONS

3.1 Introduction

T.E.M. has always managed to improve the safety standard of its transmitting and receiving equipment. All produced systems are tested in compliance with international rules.

Obviously this is not sufficient to avoid any accident during the installation and the use of our equipment in compliance with EN60215 rule, the radio transmitters and the auxiliary equipment must be used by qualified technical staff only and T.E.M. declines any responsibility for damages caused by an improper use or improper setting up performed by inexperienced staff, not qualified or operating with instruments or tools not in compliance with safety set of rules.

WARNING

- **CURRENT AND VOLTAGE WORKING IN THIS EQUIPMENT ARE DANGEROUS. THE STAFF MUST ALWAYS OBSERVE THE SAFETY RULES, INSTRUCTIONS AND NORMS CONTAINED HEREIN.**
- **THE INSTRUCTIONS CONTAINED IN THIS MANUAL MUST BE READ BEFORE SWITCHING ON OR SETTING THE TRANSMITTER**
- **ANY TRANSMITTER SERVICING, REPAIRING OR CHECKING OPERATION REQUIRING THE OPENING OF THE TOP OR BOTTOM COVER, MUST BE PERFORMED AFTER THE MAINS SUPPLY DISCONNECTION WITHOUT REMOVING THE EARTH CONNECTION WHICH THE EFFICIENCY MUST BE VERIFIED: THE CABLE MUST BE IN GOOD CONDITIONS AND WELL CONNECTED.**
- **STAFF OPERATING UPON THE TRANSMITTER SYSTEM MUST NOT BE TIRED: AFTER HEAVY WORKS OR CARRYING HEAVY MACHINES BY HAND, IT IS NECESSARY TO RESPECT A PERIOD OF REST BEFORE WORKING WITH SYSTEMS WHICH COULD HAVE DANGEROUS ELECTRIC VOLTAGE IF THEY ARE NOT DISCONNECTED.**
- **SEVERAL SYMBOLS, INSIDE THE TYPICAL TRIANGLE SHOWING DANGER, HAVE BEEN PRINTED ON SEVERAL TRANSMITTER PARTS. ATTENTION SHOULD BE PAID, BECAUSE THERE COULD BE THE DANGER DUE TO HOT SURFACES, ELECTRIC VOLTAGE HIGHER THAN 50VOLT OR OTHER SPECIFIED DANGERS.**

Certain devices (for example the RF final circuits mosfets) contain Beryllium Oxide BeO; these components must not be broken, crashed or heated. This oxide passes through the common systems of filtering, including the respiratory apparatus. The prolonged inhalation at high degrees causes poisoning with respiratory apparatus paralysis, till death.

WARNING

**ALL THE MODULES CONTAINING BeO ARE MARKED WITH THE TRIANGULAR WARNING SYMBOL
INDICATING THE NOTICE:**

WARNING !**TOXIC HAZARD****THESE DEVICES CONTAIN BERYLLIUM OXIDE****OBSERVE SAFETY INSTRUCTIONS !**

The staff in charge, besides being technically qualified, must have a practice of the first aid in case of emergency or accident (reanimation, heart massage, mouth to mouth respiration, etc.).

Before going on with the operations to be performed, it is necessary to know the position of the general electric switch and the one of the extinguishers, which are to be used very quickly if necessary.

3.2 Safety suggestion

Regardless of how well electrical equipment is designed, personnel can be exposed to **dangerous electrical shock** when protective covers are removed for maintenance or other activities.

Therefore, it is incumbent in the user to see that all safety regulations are consistently observed and that each individual assigned to the equipment has a clear understanding of the first aid related to electrical shocks (see next pages).

In addition these safety practices must be followed:

- Do not attempt to adjust unprotected circuit controls or to dress leads with power on.
- Always avoid placing parts of the body in series between ground and circuit points.
- To avoid burns, do not touch heavily loaded or overheated components without precautions.
- Remember that some semiconductor cases and solid-state circuits carry high voltages.
- Do not assume that all danger of electrical shock is removed when the power is off.

Charged capacitors can retain dangerous voltages for a long time after power is turned off.

These capacitors should be discharged through a suitable resistor before any circuit points are touched.

- Don't take chances. Be fully trained.

TEM Italia equipment should be operated and maintained by fully qualified personnel.

- Do not service alone and do not perform internal adjustments of this unit unless another person capable of rendering first aid and resuscitation is present.

Some components used in the construction of this equipment contain Beryllium Oxide (BeO).

This substance is harmless as it is, but becomes highly dangerous if it is ground to powder.

Special procedures of disposal must be observed in case of failure of these devices.

NOTE: This section is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this electronic equipment or others.

TEM shall not be responsible for injury or damage resulted from improper procedures or from using it by improperly trained or inexperienced personnel.

3.3 General safety recommendations

When connecting the equipment to the power , please follow these important recommendations:

- This product is intended to operate from a power source that will not apply more than 10% of the voltage specified on the rear panel between the supply conductors or between either supply conductor and ground.

A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

- This equipment is grounded through the grounding conductor of the power cord.

To avoid electrical shock, plug the power cord into a properly wired socket before connecting to the product input or output terminals.

- Upon loss of the protective-ground connection, all accessible conductive parts (including parts that may appear to be insulating) can render an electric shock.
- To avoid fire hazard, use only the fuse of correct type, voltage rating, and current rating.

Refer for use replacement to qualified service personnel.

- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- To avoid personal injury, do not remove the product covers or panels.

Do not operate the product without the covers and panels properly installed.

3.4 Good practices

In maintaining the equipment covered in this manual, please keep in mind the following, standard good practices:

- At regular intervals, the condition of the equipment and the correct functioning of protective and safety devices shall be checked by a skilled person approved by the appropriate authority for this duty.

Functional checks shall be carried out on interlocking systems of doors, mechanical interlocks, isolating switches, earthing switches, parallel resistances and protective devices against over-voltages and over-currents.

The above checks shall also be carried out after the protective and safety devices have operated under fault conditions.

The safety devices shall not be altered or disconnected except for replacement, nor shall the safety circuit be modified without specific approval of the appropriate authority in each case.

- When connecting any instrument (wattmeter, spectrum analyzer, etc.) to a high frequency output, use the appropriate attenuator or dummy load to protect the final amplifiers and the instrument input.
- When inserting or removing printed circuit boards (PCBs), cable connectors, or fuses, always turn off power to the affected portion of the equipment.

After power is removed, allow sufficient time for the power supplies to bleed down before reinserting PCBs.

- When troubleshooting, remember that FETs and other metal-oxide semiconductor (MOS) devices may appear defective because of leakage between traces or component leads on the printed circuit board.

Clean the printed circuit board and recheck the MOS device before assuming it is defective.

- When replacing MOS devices, follow standard practices to avoid damage caused by static charges and soldering.
- When removing components from PCBs (particularly ICs), use care to avoid damaging PCB traces.

3.5 Procedure for establish the absence of voltage

Follow these simple steps for establish the absence of voltage:

- Before starting work on the equipment, it shall be isolated from the mains supply.

This disconnection shall always be checked by visual inspection.

Further precautions shall be taken to ensure that the mains supply cannot be restored whilst work is being carried out.

After the mains supply has been disconnected, all other lines such as control, interlocking and modulation lines shall be disconnected if they carry dangerous voltages.

Moreover, the antenna or the antenna transmission line shall be disconnected from the antenna terminal device to prevent the introduction of dangerous voltages due to antenna pick-up.

When disconnection of the antenna or antenna transmission line is not possible, other suitable precautions shall be taken, for example, earthing, when necessary at several places, to establish absence of voltage.

These earthing connections shall be very short compared with the wave-length.

- Capacitors which are connected to a circuit isolated from its supply shall be discharged and have their terminals permanently short-circuited and the casing earthed during the whole period of the work.
- The electrical charge retained by electrical machinery when stopped may, in certain cases, be sufficient to cause a severe shock.

This shall be taken into account when making connections to an apparently "dead" machine.

Therefore all machinery shall be discharged and earthed using an adequately insulated lead for this purpose.

The discharge operation shall be repeated several times.

- Before any maintenance work is carried out on automatic or remote controlled equipment, the remote switching circuits shall be made inoperative.

3.5.1 Procedure for determination of the absence of voltage

After the equipment has been isolated according to the standard EN60215, the absence of voltage shall be determined at the work place.

This may be done by the use of voltage indicators, measuring instruments, glow discharge lamps for indicating radio-frequency voltage or other suitable means.

3.6 First aid in case of electrical shock

If someone seems unable to free himself while receiving an electric shock, **turn power off** before rendering aid.

**DO NOT TOUCH VICTIM OR HIS CLOTHING BEFORE
POWER IS DISCONNECTED OR YOU CAN ALSO BECOME
A SHOCK VICTIM**

A muscular spasm or unconsciousness can make a victim unable to free himself from the electrical power.

If power cannot be turned off immediately, **very carefully** loop a length of dry non-conducting material (such as a rope, insulating material, or clothing) around the victim and pull him free of the power.

Carefully avoid touching him or his clothing until free of power.

3.7 Emergency resuscitation technique



Step 1

Check the victim for unresponsiveness. If there is no response, immediately call for medical assistance, and then return to the person.



Step 2

Position the person flat on their back. Kneel by their side and place one hand on the forehead and the other under the chin. Tilt the head back and lift the chin until teeth almost touch. Look and listen for breathing.



Step 3

If not breathing normally, pinch the nose and cover the mouth with yours. Give two full breaths. The person's chest will rise if you are giving enough air.



Step 4

Put the fingertips of your hand on the Adam's apple, slide them into the groove next to the windpipe. Feel for a pulse. If you can not feel a pulse or are unsure, move on to the next step.



Step 5

Position your hands in the center of the chest between the nipples. Place one hand on top of the other.



Step 6

Push down firmly two inches. Push on chest 15 times.

CONTINUE WITH TWO BREATHS AND 15 PUMPS UNTIL HELP ARRIVES.

3.7.1 Treatment for burns

- Continue treat victim for electrical shock.
- Check for points of entry and exit of current.
- Cover burned surface with a clean dressing.
- Remove all clothing from the injured area, but cut around any clothing that adheres to the skin and leave it in place.
Keep the patient covered, except the injured part, since there is a tendency to chill.
- Splint all fractures.
(Violent muscle contractions caused by the electricity may result in fractures.)
- Never permit burned surfaces to be in contact with each other, such as: areas between the fingers or toes, the ears and the side of the head, the undersurface of the arm and the chest wall, the folds of the groin, and similar places.
- Transport to a medical facility

3.8 Electric safety precautions

All the parts making up the equipment have got danger identification tags (with a yellow background) to highlight the parts dangerous for the operator that has access to the system.



Presence of hazardous energy levels

A hazardous energy level is defined as a stored energy level of 20 J or more, or an available continuous power level of 240 VA or more, at a potential of 2 V or more.

3.9 Electrostatic precautions

Before removing or replacing any PCB assembly within the equipment, make sure that all precautions comply with ESD protections (ESD = Electro Static Discharge).

Make sure that electrostatic discharge protections are reset after maintenance and/or measurement operations.



This ATTENTION tag is used for the majority of electronic devices that are sensitive to electrostatic discharges.

If electronic parts have to be touched during installation or repair, please observe the following precautions.

Operators must be equipped with anti-static protection devices such as:



Elastic wrist band. To be fixed on the operator's wrist.



Flexible cord. To be connected to the elastic wrist band and the special plug on the shelf highlighted with the ESD warning label.

3.10 Waste electrical and electronic equipment (WEEE)



The purpose of the DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE) is, as first priority, the prevention of waste electrical and electronic equipment and, in addition, the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste.

To do this, remember to collect separately all the electronic material.

4 ELECTRICAL SPECIFICATION

4.1 FREQUENCY - POWER

Frequency range-----	87.5 to 108.0MHz
Frequency setting -----	10 KHz steps
Internal setting mode -----	by keys
External setting mode-----	by Optional remote control (GSM-TCP/IP-RS232-RS485)
Frequency stability-----	±500Hz/year
Frequency generation-----	PLL synthesizer
Modulation type-----	direct VCO frequency modulation
Nominal frequency deviation -----	±75KHz
RF output power -----	0 to 10-20-50-100-200-250-300-400-500W
Power resolution setting -----	1-5W
Power control stability-----	< 0.2dB
Reverse output power control limit -----	1 to 30W
Harmonics emission -----	<-70dBc
Spurious emission-----	<-95dBc
Carrier reduction power (carrier enable off)-----	>70dBc

4.3 MODULATION CAPABILITY

MONO (left or right) -----	30Hz to 15KHz
STEREO (by internal stereo generator OPT)-----	30Hz to 53KHz
MPX1 & MPX2 (opt) COMPOSITE (MONO or STEREO +RDS+ SCA)-----	30Hz to 75KHz
AES-EBU up to 192KHz or IP Audio (opt) -----	30Hz to 53KHz
SCA (opt) -----	30Hz to 100KHz
RDS Ext -----	30Hz to 100KHz
RDS Int (by internal RDS generator OPT) -----	57KHz

4.4 CHARACTERISTICS IN MPX

Signal input -----	MPX Unbalanced
Input impedance -----	600Ω or 10kΩ
Input level-----	0/+6/+12/dBm or Variable input level capability
Audio frequency response (50Hz to 57KHz) -----	±0.5dB
Total Harmonic Distortion THD -----	<0.02%
Signal to noise referred at deviation of 75KHz-----	>80dB

4.5 CHARACTERISTICS IN MONO

Signal input -----	Left or Right
Input impedance -----	600Ω (balanced) or 10kΩ
Unbalance rejection -----	>40dB
Input level-----	0/+6/+12/dBm or Variable input level capability
Pre-emphasis-----	std.50μs (opt 75uS)
Audio frequency response (50Hz to 15KHz) -----	±0.5dB
Total Harmonic Distortion THD -----	<0.02%
Signal to noise referred at deviation of 75KHz-----	>82dB

4.6 CHARACTERISTICS IN STEREO

Signal inputs	Left & Right
Input impedance	600Ω (balanced) or 10kΩ
Unbalance rejection	>40dB
Input level	0/+6/+12/dBm or Variable input level capability
Pre-emphasis	std.50μs (opt 75uS)
Audio frequency response (30Hz to 15KHz)	<0.25dB
Cross-talk between left and right channel	>50dB
Total Harmonic Distortion THD	<0.1%
Signal to noise referred at deviation of 75KHz	>77dB
Suppression of 38KHz	>70dB
Spurious suppression outside band	.in according to ETS 300-384
Pilot reference for RDS encoder (19 KHz out)	1Vpp

4.7 SCA-Ext RDS CHARACTERISTICS

Input (SCA1)	BNC unbalanced
Input impedance	10KΩ
Frequency response (50KHz to 100KHz)	±0.2dB
Modulation capability	0 to 10%

4.8 REMOTE CONTROL

AUX I/O on DB15 TC-TS rear panel connector Interface	
LAN on front panel (OPT)	TCP-IP Web-Server/SNMP/SMTP
RS485 on rear panel	
Internal GSM Modem (OPT)	SMS

4.9 POWER SUPPLY AND TEMPERATURE RANGE

Nominal Operating AC Mains Voltage	-----230V _{AC} ±10 %
AC Mains protection fuses	-----2xT 8 AL 250V
50W Model Line Power	-----<120VA @ 50W RF Output Power
100W Model Line Power	----- <175VA @ 100W RF Output Power
300W Model Line Power	----- <450VA @ 300W RF Output Power
500W Model Line Power	----- <710VA @ 500W RF Output Power
Nominal temperature range	----- -5° to 45°C
Operating temperature range	----- -10° to 50°C
Storage temperature range	----- -40° to 50°C

4.10 MECHANICAL SPECIFICATION

1 unit rack 19"	-----485x44.4x545mm
10-20-50W model Weight	----- <6.0Kg
100W model Weight	----- <7.5Kg
300W model Weight	----- <8.0Kg
500W model Weight	----- <8.0Kg

4.11 INTERNAL MAIN MODULES

Exciter module -----	13M7EXC1
Audio Connection Board Module -----	13M31640
Front Panel Interface Module -----	13M31800
RF 100-200-250 Module Amplifier -----	13M3188B-C
RF 300-400-500W Module Amplifier -----	13M72387B
Power Supply Module for 500W Model -----	13MPWRSP100048
Service Power Supply Module -----	13MPWRS7524
Current Meter Sensor Module (only for 500W model) -----	13M31810
Universal Current Meter Sensor Module (for all 1 Unit Rack TX models) -----	13M32110

4.12 OPTIONS

Option A -----: Internal Stereo generator Module -----	44C01180
Option B :-----Internal RDS Encoder-----	13M7MINIRDS
Option C :----- AES-EBU Digital Input Interface-----	13MAESEBU0
Option D : --- Automatic Frequency Deviation Control Card-----	13M5804A
Option E :----- GSM by SMS Remote Control-----	13KGSM05
Option F :----- TCP-IP Web Server/SNMP/SMTP Remote Control Card-----	13KTCPIP2
Option G : -- GSM & TCP-IP Web Server/SNMP/SMTP Remote Control Card-----	13KTCPIP3

5 Dichiarazione di Conformità UE

La presente dichiarazione di conformità è rilasciata sotto l'esclusiva responsabilità del fabbricante:

Produttore: **Telecomunicazioni Elettroniche Milano Srl** - Via Copernico, 11 - 20082 Binasco (MI)

Apparecchio radio Marca: **TEM** Trasmettitore VHF FM Modello **A07E0501** – Potenza **RF 500W** N° serie: Vedi Etichetta applicata

Configurabile nei seguenti tagli di potenza da Software con i relativi codici

Codici	A07E0501	A07E0401	A07E0301	A07E0251	A07E0201	A07E0101	A07E0051	A07E031	A070021	A07E0011
Potenza	500 W	400 W	300 W	250 W	200 W	100 W	50 W	30 W	20 W	10 W

Versione software: **L.27.XX**



L'immagine rappresenta il modello **A07E0501**


"La potenza di uscita di ogni singolo apparato è certificata dalla presenza di uno dei suddetti codici sull'etichetta apposta sull'apparato stesso e sulla presente Dichiarazione di Conformità."

L'oggetto della dichiarazione è conforme alla pertinente normativa di armonizzazione dell'Unione:

Direttiva 2014/53/UE

Norma applicata	Data	Emesso da
EN 302 018 V2.1.1	29/11/18	TEM 28/11/18
EN 301 489-1 V1.9.2	26/11/14	NEMKO N° 273431TRFEMC
EN 301 489-11 V1.3.1	26/11/14	NEMKO N° 273431TRFEMC
EN 60215 Ed.1989 +A1:1992+A2:1994	04/02/15	NEMKO N° 273431TRFSAF

Firmato a nome e per conto di (Signed for and on behalf of):

<h1>CE 0470</h1> <p>Luogo (Place): Binasco Data (Date): 29/11/18</p>	<p>Posizione (Position): Amministratore Nome (Name): Antonio Fiordelisi Firma (Signature):</p> <p style="text-align: right;">  TELECOMUNICAZIONI ELETTRONICHE MILANO SRL Via Copernico n. 11 20082 BINASCO (MI) </p>
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6 EU Declaration of Conformity (DoC)

We, as producer, **Telecomunicazioni Elettroniche Milano Srl** - Via Copernico, 11 - 20082 Binasco (MI)
 Declare that the DoC is issued under our sole responsibility and belongs to the following product:

Radio Equipment Brand: **TEM**: Transmitter VHF FM Model **A07E0501** – RF Power **500W** S/N: See Applied Label

RF power Sectable as by Software with following code

Code	A07E0501	A07E0401	A07E0301	A07E0251	A07E0201	A07E0101	A07E0051	A07E031	A070021	A07E0011
Power	500 W	400 W	300 W	250 W	200 W	100 W	50 W	30 W	20 W	10 W

Firmware **L.27.XX**



The Picture represent the A07E0501 Label



"The output power of each individual is certified by the presence of one of the aforementioned codes on the label
 affixed to the apparatus itself and to this Declaration of Conformity. "

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

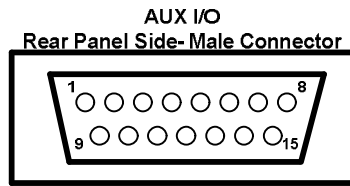
Directive 2014/53/UE RED

Standard	Date	From
EN 302 018 V2.1.1	29/11/18	TEM 28/11/18
EN 301 489-1 V1.9.2	26/11/14	NEMKO N° 273431TRFEMC
EN 301 489-11 V1.3.1	26/11/14	NEMKO N° 273431TRFEMC
EN 60215 Ed.1989 +A1:1992+A2:1994	04/02/15	NEMKO N° 273431TRFSAF

Firmato a nome e per conto di (Signed for and on behalf of):

<div style="font-size: 2em; font-weight: bold; margin-bottom: 20px;">CE 0470</div> <p>Luogo (Place): Binasco Data (Date): 29/11/18</p>	<p>Posizione (Position): Amministratore Nome (Name): Antonio Fiordelisi Firma (Signature):</p> <div style="text-align: right; margin-top: 20px;"> <p style="font-size: 0.8em; margin: 0;">TELECOMUNICAZIONI ELETTRONICHE MILANO SRL Via Copernico n. 11 20082 BINASCO (MI)</p> </div>
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7.0 AUX I/O Rear Panel Interface DB15-DB09 Connector Description



DB15 VERSION

Pin 1: External Carrier Enable On-Off ► @ Floating = ON / @GND=OFF

Pin 2: NOT USED

Pin 3: NOT USED

Pin 4: NOT USED

Pin 5: Alarm 2 Relay Common Contact (internally GND or Free contact selection) Factory set is GND by JP23

Pin 6: NOT USED Forward Power DC Voltage ► @ Nominal Power =+5Vdc

Pin 7: GND

Pin 8: GND

Pin 9: 19KHz Pilot Sync Output (Only with Internal Stereo Encoder module present)

Pin 10: +24V Out (limited current)

Pin 11: Alarm 1 N.O. Contact

Pin 12: Alarm 1 N.C. Contact

Pin 13: Alarm 2 Relay Common Contact (internally GND or Free contact selection) Factory set is GND by JP22

Pin 14: Forward Power DC Voltage ► @ Nominal Power =Internally adjustable

Pin 15: GND

DB09 VERSION

Pin 1: +24V Out (limited current)

Pin 2: Alarm 1 N.O. Contact

Pin 3: Alarm 1 N.C. Contact

Pin 4: Alarm 1 Relay Common Contact (internally GND or Free contact selection) Factory set is GND by JP23

Pin 5: GND

Pin 6: External Carrier Enable On-Off ► @ Floating = ON / @GND=OFF

Pin 7: 19KHz Pilot Sync Output (Only with Internal Stereo Encoder module present)

Pin 8: Forward Power DC Voltage ► @ Nominal Power =Internally adjustable

Pin 9: GND

7 GENERAL DESCRIPTION

7.1 Main features

A07E0XXX TEM Opera Plus Family is an excellent FM band broadcasting transmitter with modern conceiving and technology, which by a simple design produces an output radio signal with high characteristics of quality, reliability and security.

The simple manufacturing obtained with a high integration of functions, has allowed to create a machine with few controls and connections.

One of the most important characteristics is done by the high quality of the frequency modulation and the high signal-to-noise ratio; moreover, the modulation is typically constant within 0.2dB throughout the whole FM band (88–108MHz).

The transmitter can be set like a modern signals generator so the output power is completely managed by a Microcontroller device which guarantees that the values of forward power, reflected power, maximum output power versus the temperature and loading conditions. All parameters (frequency, levels, mono/stereo, pre-emphasis, power) can be set by the keyboard and stored in E²PROM in order to be kept even without electric supply. A great number of events and alarms can be stored. Each alarm is distinguished by a starting and an ending alarm date.

8 INSTALLATION

8.1 Unpacking and inspection

Immediately, after the transmitter has been delivered, please carefully check the package to verify possible damages caused by shipment. Should be found some damages, please immediately contact the T.E.M. dealer.

It is recommended to keep the original package for a future shipment due to, for instance, repairing or setting. A return with a package which is different from the original one will make the warranty rights lost.

8.2 Installation

The transmitters A07E0XXX are composed of a 19 inches width rack which takes 1 unit in height in a vertical rack mount.

It is recommended to use 4 fixing plastic washers in order to avoid damages to the front panel varnishing. We remind to carefully connect the earth both to the transmitter and to the rack mount- never disconnect it without having switched the supply voltage off by the mains switch.

Design has considered the new rules concerning the electromagnetic compatibility so there aren't problems to locate systems CE marked nearby.

8.3 Power supply

AC power supply at 50Hz can be at 230V_{AC} single phase.

The switching on control is placed for security reasons on the rear panel with exciter protection fuse, which must have the value 5A (50-100W Models), 8A (300-500W Models) and delayed type.

BEFORE SWITCHING THE TRANSMITTER ON, MAKE SURE THAT:

THE AC MAINS POWER SUPPLY IS CORRECT,

THE GROUND CONNECTION IS PRESENTE AND CONNECT

THE RIGHT LOAD OR ANTENNA!

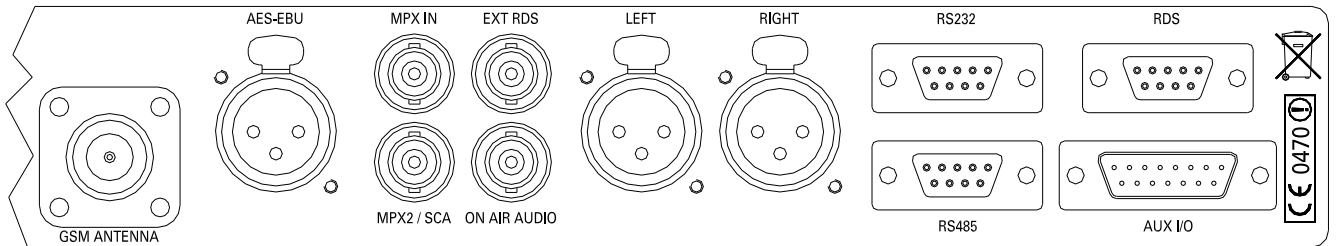
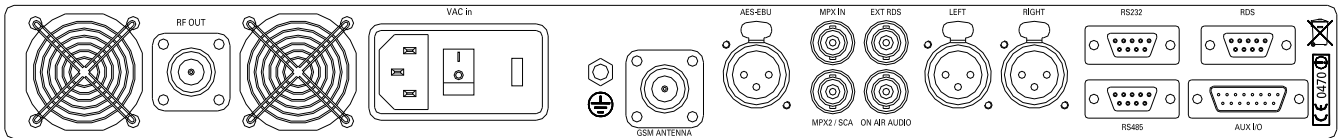
8.4 Ground loops

Sometimes connecting various ground sockets having different potentials may produce some unwanted loops, which may create hum in the modulation: in this case it is essential to firstly identify the origin of these currents, which normally spring from the antenna ground, mains supply ground or from the input low frequency signals ground.

8.5 Rear Panel Description

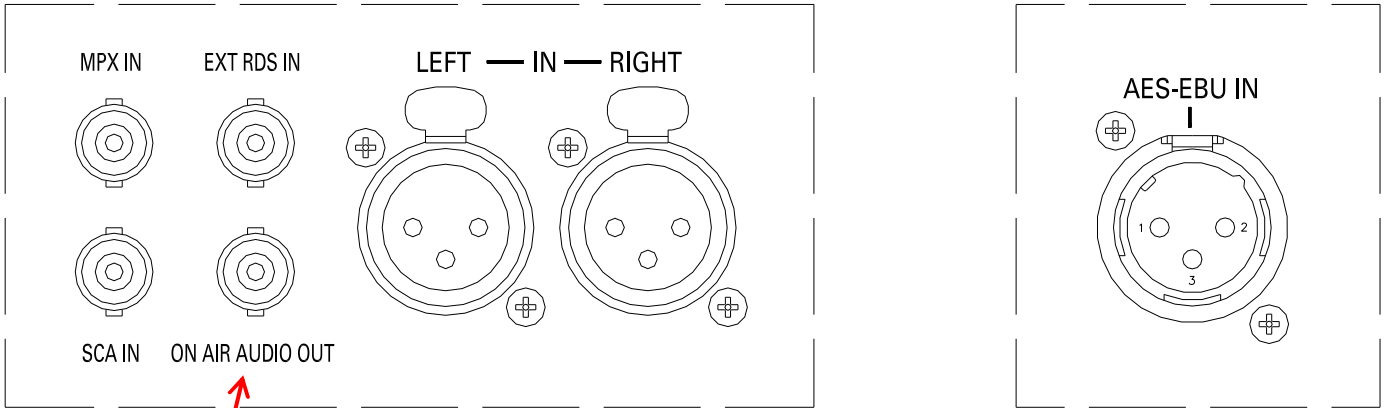
Here the back side of transmitters is described. The rear panel support the Ventilation Fan, the Different Audio input/output connectors, the different logic and TC-TS connectors, the RDS Programming input port, the GSM Antenna Connector (Optional), the RS485 connector, and the AC Mains Switch.

Audio & Logic input-output connectors



8.6 Audio Inputs Connectors Description

Here is possible to see the particular of Audio Input/Output connectors. When the desired audio input is selected by front panel Menù (see the following pages) one of the shown input connectors is activate.



An " ON AIR OUTPUT" connector is present. Here will be present the MPX Audio baseband signal, taken just before the internal FM Modulator. It means that if MPX input is selected, here the MPX signal will be present, but for example if Stereo L+R is selected , this connector will reply a MPX signal generated by internal Stereo Encoder. The same will happen in case of AES-EBU audio input selection

8.7 Audio Alarm Detector & Automatic Audio Changerover Description

A07E0XXX TEM Opera Plus Family Transmitters are internally equipped with AUDIO ALARM DETECTOR and AUTOMATIC AUDIO CHANGEROVER .

This feature is the ideal solution to know, by the Audio Alarm Detector, if the Main Audio program source is present or not. It is possible to select a minimum FM deviation level (15-30KHz) and time threshold/Audio return (FAST or 45-60-150-180-360 Seconds) to consider the Main Audio program as KO. In case of alarm, text message on display along with red led indication on the front panel will be present. If A07E0XXX TEM Opera Plus Family Transmitters are equipped with remote control telemetry, you will receive the signalization (sms, trap, email, TC-TS.).

It is also possible to enable the Automatic Audio Changerover. It is based on the Audio Alarm detector signalization. To take advantage of this feature it is necessary to have a Reserve Audio Program available .In case of alarm the changerover will automatically switch to this reserve source. The system will return to the main Audio Source automatically as soon as available.

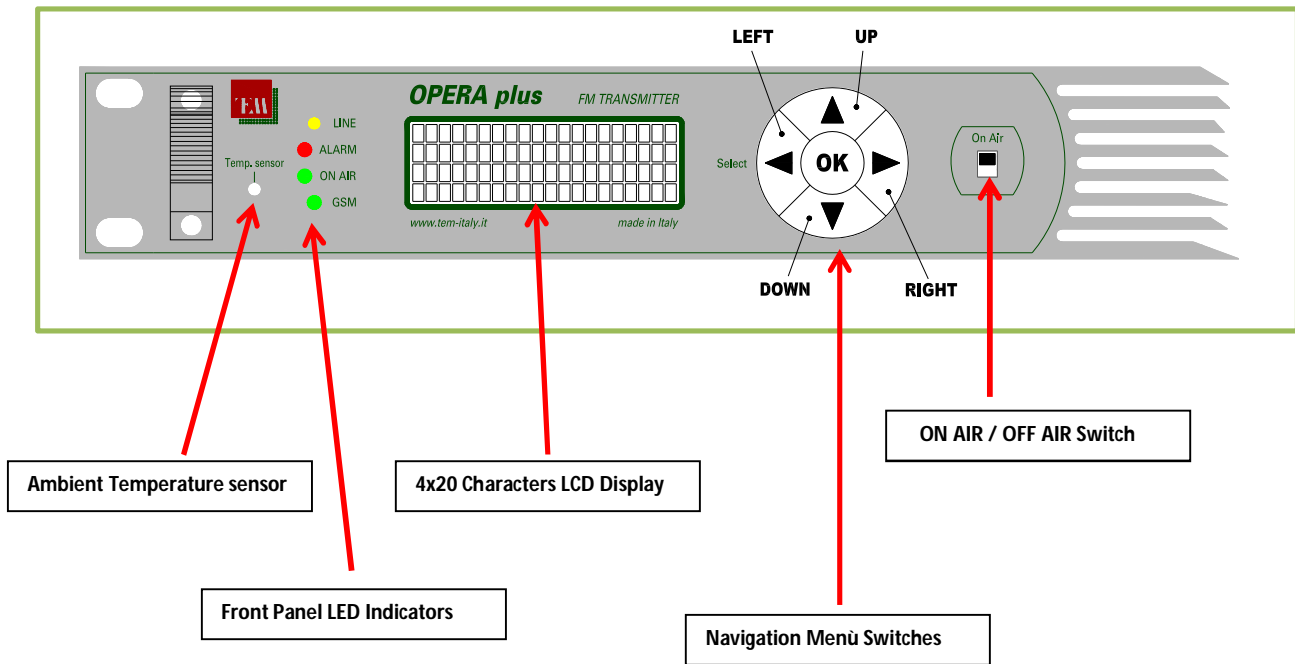
It is possible to select the Audio Alarm detector signalization ON-OFF and select the Audio Input Source priority for the Automatic Audio Changerover. The possible priority are Stereo L-R Vs. MPX or MPX Vs. Stereo L-R.

It is also possible to configure different thresholds for audio alarm level, time, restoration intervention, and the reduction RF Power in case of NO Audio Programs available condition

8.8 Transmitter power up

After making sure about the proper earth socket connection, correct power supply and connection of the load on the antenna output, the equipment can be switched on.

8.9 Front Panel Description



8.10 Transmitter settings (referred A07E0501 model)

An easy and intuitive settings menu is present in the Opera Plus family FM Transmitters.

By the five front panel switch (Up – Down – Left – Right – OK) will be possible to set and check all the parameters.

An ON-AIR / OFF-AIR switch is present on the front panel. Is not possible to set this switch with fingers, must be selected by use of a little screw- driver. This is a security necessary to avoid involuntary settings.

At the switching on, the display will glow giving for few seconds the following screen shot

*	*		T	E	M		I	T	A	L	Y		S	r	I		*	*	*
O	P	E	R	A		p	l	u	s		F	M		F	A	M	I	L	Y
	M	O	D	E	L		:	A	0	7	E	0	5	0	1				
	F	W	:	1	.	7	6		S	/	N	:	0	0	0	1	1		

This is the 01 page where the transmitter status is displayed. In this example the transmitter in in CE OFF by the front panel switch (carrier Enable OFF), is set to 98.00MHz output frequency, and no Forward and Reflected power are present

0	1			M	A	I	N		S	T	A	T	U	S					
		S	T	A	T	U	S		=		C	E		O	F	F			
F	r	e	q	u	e	n	c	y	=		9	8	.	0	0	M	H	Z	
F	w	r	=	0	0	0	W			R	e	f	=	0	0	0	W		↑

Setting ON AIR by the front panel switch is possible to see the changes in the displayed information.

The transmitter is ON AIR and the forward power is 500W.

0	1			M	A	I	N		S	T	A	T	U	S					
		S	T	A	T	U	S		=		O	N		A	I	R			
F	r	e	q	u	e	n	c	y	=		9	8	.	0	0	M	H	z	
F	w	r	=	5	0	0	W			R	e	f	=	0	0	0	W		↑

Pressing the UP Switch the 02 page will be shown where the frequency setting menu is available

0	2			F	r	e	q	u	e	n	c	y			S	e	t		
		F	r	e	q			=		9	8	.	0	0	M	H	z		
*	*	*													*	*	*		

Pressing the OK Switch will be show the possible SET frequency and the Actual Frequency.

0	2			F	r	e	q	u	e	n	c	y			S	e	t		
		S	e	t				=		1	0	2	.	0	0	M	H	z	
		F	r	e	q			=		9	8	.	0	0	M	H	z		
*	*	*													*	*	*		

After the new frequency selection , press the OK switch to confirm

0	2			F	r	e	q	u	e	n	c	y			S	e	t		
		F	r	e	q			=		1	0	2	.	0	0	M	H	z	
*	*	*													*	*	*		

Now the frequency is changed

Pressing the UP Switch the 03 page will be shown where the RF Output Power setting menu is available

Pressing the OK Switch a flashing cursor will be enabled and by the others Switches will be possible to set the new RF Power Out.

0	3			R	F			P	o	w	e	r			S	e	t		
F	r	w		P	w	r		S	e	t		=	3	0	0	W			
F	r	w		P	w	r		O	u	t		=	5	0	0	W			
R	e	f		P	w	r		O	u	t		=	0	0	0	W			

After selection will be necessary to confirm with OK switch to change finally the RF Output power

0	3			R	F			P	o	w	e	r			S	e	t		
F	r	w		P	w	r		S	e	t		=		3	0	0	W		
F	r	w		P	w	r		O	u	t		=		3	0	0	W		
R	e	f		P	w	r		O	u	t		=		0	0	0	W		

Pressing the UP Switch the 04 page will be shown where a Temporary RF Power Reduction menu is displayed. In this page, it is possible to reduce or increase the output power once in a day .This allows, for example, a night-time energy savings if during that time the output power is reduced.

0	4			P	o	w	e	r		R	e	d	u	c	t	i	o	n		
S	t	a	t	u	s		=			O	F	F								
S	t	a	r	t			=					1	2	:	0	0				
S	t	o	p				=					1	3	:	0	5				

Press the OK switch and a flashing cursor will be active on the first "Status" line

0	4			P	o	w	e	r		R	e	d	u	c	t	i	o	n		
S	t	a	t	u	s		=		█			O	F	F						
S	t	a	r	t			=					1	2	:	0	0				
S	t	o	p				=					1	3	:	0	5				

By Right switch the flashing cursor will be move to the "OFF" indication,

0	4			P	o	w	e	r		R	e	d	u	c	t	i	o	n		
S	t	a	t	u	s		=		█		█	O	F	F						
S	t	a	r	t			=					1	2	:	0	0				
S	t	o	p				=					1	3	:	0	5				

When cursor is on "OFF" indication, selecting the UP switch the "OFF" is disabled and now "ON" is enabled. Note that when "ON" is enabled is possible to move with Right and Left switches the cursor so will be possible to select the Reduction power level, in the example is 125W

0	4		P	o	w	e	r		R	e	d	u	c	t	i	o	n			
S	t	a	t	u	s	=	■		■	O	N			■	1	■	2	■	5	W
S	t	a	r	t		=						1	2	:	0	0				
S	t	o	p			=						1	3	:	0	5				

By Down switch the flashing cursor will be move to the Second " Start" Line, and with the Right and Left switches the cursor can be placed on the Numbers so will be possible to program the Start Time of reducing Power, in the example 23:00 (11:00 pm)

0	4		P	o	w	e	r		R	e	d	u	c	t	i	o	n		
S	t	a	t	u	s	=			O	F	F								
S	t	a	r	t		=	■					■	2	■	3	:	0	0	
S	t	o	p			=						1	3	:	0	5			

By Down switch once again the flashing cursor will be move to the Third " Stop" Line, and with the Right and Left switches the cursor can be placed on the Numbers so will be possible to program the Stop Time of reducing Power, in the example 05:30 (11:00 pm)

0	4		P	o	w	e	r		R	e	d	u	c	t	i	o	n		
S	t	a	t	u	s	=			O	F	F								
S	t	a	r	t		=						2	3	:	0	0			
S	t	o	p			=	■					■	0	■	5	:	3	0	

When all the settings are done, press the "OK" switch and no more flashing cursor must be visible. Power reduction is active.

Pressing the UP Switch the 05 page will be shown where some transmitter RF Amplifier are displayed. The DC amplifier power supply and Current and Heatsink RF Power Amplifier temperature are present. It is also present the Ambient temperature

0	5			V	/	I	/	T	S	t	a	t	u	s				
		V	=	4	1	.	2	V			T	r	f	=	4	5	°	C
		I	=	1	5	.	1	A			T	e	x	=	2	5	°	C

Pressing the UP Switch the 06 page will be shown where the Audio Input selection sources are available. In this example the transmitter is set in External MPX signal In with RDS encoder in OFF

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s		
		A	u	d	i	o	I	n	=			M	P	X				
		I	n	t		R	D	S	=			O	F	F				
*	*	*														*	*	*

Pressing the OK Switch this page will be displayed.

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s		
		A	u	d	i	o	I	n	=			M	P	X				
		S	t	e	r	e	o		=			O	F	F				
		I	n	t		R	D	S	=			O	F	F				

Pressing the RIGTH Switch will be possible to select the different available Audio Input source .

In this example the AES-EBU Mono is selected

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s			
		A	u	d	i	o	I	n	=			A	E	S	-	E	B	U	M
		S	t	e	r	e	o		=			O	F	F					
		I	n	t		R	D	S	=			O	F	F					

In this example the AES-EBU Stereo is selected

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s			
		A	u	d	i	o	l	i	n	=			A	E	S	-	E	B	U
		S	t	e	r	e	o		=				O	N					
		I	n	t		R	D	S	=				O	F	F				

In this example the MONO is selected

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s		
		A	u	d	i	o	l	i	n	=			M	O	N	O		
		S	t	e	r	e	o		=				O	F	F			
		I	n	t		R	D	S	=				O	F	F			

In this example the L+R Stereo is selected

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s		
		A	u	d	i	o	l	i	n	=			L	+	R			
		S	t	e	r	e	o		=				O	N				
		I	n	t		R	D	S	=				O	F	F			

In this example the L+R Stereo is selected with Internal RDS ON. To set The Internal RDS Encoder ON or OFF is necessary to press the UP or DOWN Switches, and confirm by OK Switch

0	6			A	u	d	i	o	S	e	t	t	i	n	g	s		
		A	u	d	i	o	l	i	n	=			L	+	R			
		S	t	e	r	e	o		=				O	N				
		I	n	t		R	D	S	=				O	N				

Pressing the UP Switch the 07 page will be shown where the transmitter's Audio status is displayed. In this example the transmitter in in MPX Input, with presence of signal.

Note: the +0.1dB indication has reference to the nominal input level to obtain 100% of Modulation ($\pm 75\text{KHz}$), for example +4dBm. It means that the input signal is now 4.1dBm

0	7			A	u	d	i	o		S	t	a	t	u	s				
		A	u	d	i	o	l	n	=			M	P	X					
		M	P	X		L	E	V	=			+	0	.	1	D	B		
[?	?	?	?	?	?	?	?	?	□	?	-	-	-	-	-	-	-

In this example the transmitter is in MONO Left or Right Input level , with presence of signal.

To select Left or Right is necessary to press the ◀ or ▶ switch

Left Level measure is select

0	7			A	u	d	i	o		S	t	a	t	u	s				
		A	u	d	i	o	l	n	=			M	O	N	O				
		L		L	E	V	E	L	=			+	0	.	1	d	B		
[?	?	?	?	?	?	?	?	?	□	?	-	-	-	-	-	-	-

Right Level measure is select

0	7			A	u	d	i	o		S	t	a	t	u	s				
		A	u	d	i	o	l	n	=			M	O	N	O				
		R		L	E	V	E	L	=			+	0	.	2	d	B		
[?	?	?	?	?	?	?	?	?	□	?	-	-	-	-	-	-	-

Note: In Mono setting mode to have the $\pm 75\text{KHz}$ FM Deviation level is possible to use Left or Right input mono channel with the previous input nominal level (example 0dBm). If the Audio sources is less(example -6dBm) is possible to use Left and Right

Pressing the UP Switch the 08 page will be shown where the transmitter FM Deviation frequency can be displayed and if it is necessary adjusted. In this example the transmitter has $\pm 75\text{KHz}$ deviation frequency.

0	8			M	o	d	u	l	a	t	i	o	n							
		M	o	d		L	e	v	e	l		=			7	5		K	H	z
		M	o	d			A	d	j			=			0	0		K	H	z
[?	?	?	?	?	?	?	?	?	□	?	-	-	-	-	-	-	-	-

Note: is possible that the available audio program sources such as Microwave Links, Satellite receivers, audio IP coder, or other are not perfectly set to the same input audio level of FM Opera plus Transmitter. In this menu will be possible to optimize many possible difference between Audio Program Sources and Transmitter Audio Input

Pressing the OK Switch will be possible to increase or decrease with 1KHz steps de FM Deviation Frequency

In this example the deviation is 69KHz, and no increasing FM deviation frequency steps are included

0	8			M	o	d	u	l	a	t	i	o	n							
		M	o	d		L	e	v	e	l		=			6	9		K	H	z
		M	o	d			A	d	j			=			0	0		K	H	z
[?	?	?	?	?	?	?	?	-	□	-	-	-	-	-	-	-	-	-

Now +6 steps increasing FM deviation frequency are included, and the output total FM deviation is $\pm 75\text{KHz}$

0	8			M	o	d	u	l	a	t	i	o	n							
		M	o	d		L	e	v	e	l		=			7	5		K	H	z
		M	o	d			A	d	j			=		+	0	6		K	H	z
[?	?	?	?	?	?	?	?	?	□	?	-	-	-	-	-	-	-	-

Pressing the UP Switch the 09 page will be shown where the Audio Changeover menu is present. **NOTE:** this page use a scrolling lines sub-menu enabled by OK switch. Once select the line with UP or DOWN switches, press OK switch and the cursor will be in the selection mode. To change the parameters use the ◀ or ▶ switch

Note: Audio Alarm & Changeover are disable during pages 7 and 8 of transmitter main menu are displayed

0	9	A	u	d	i	o	&	C	n	g	O	v	r	A	l	r
1	)	M	o	d		A	l	r		=				D	I	S
2	)	P	W	R		v	s	A	l	r		=		O	N	
3	)	M	i	n		D	e	v	A	l	r	=		1	5	K
4		T	i	m	e	+	/	-	2	0	%	=		0	0	5
5	)	C	h	a	n	g	e	o	v	e	r	=		D	I	S
6	)	P	r	i	o	r	i	t	y	=		L	R	M	P	X
7	)	R	e	s	e	t	A	l	a	r	m	&	C	O		
8	)	E	x	i	t											

The 1 sub-menu "Mod Alr" is used to enable [ENA] or disable [DIS] the low modulation alarm detector. If this is disable the following Audio changeover CO (sub-menu 6) will not operate.

The 2 sub-menu "PWR vs Alr" select the RF Output power ON or OFF AIR in case of presence of low modulation alarm

The 3 sub-menu "Min Dev Alr" select the minimum FM deviation threshold to consider true the low modulation alarm. Two selections are available: 15 and 30 KHz

The 4 sub-menu "Time +/- 20%" is the selectable Changeover & Audio Alarm time .It is possible to select FAST or 45-60-150-180-360 seconds for Audio alarm or to switch the audio Main to Reserve (selectable in the 7 sub-menu) after the presence of low modulation alarm.

Note: in case of Audio Reserve source is not present, the changeover will return to the Main audio source.

The 5 sub-menu "Changeover" is used to enable [ENA] or disable [DIS] the audio Changeover

The 6 sub-menu "CO Priority" is used to select the Main and Reserve Audio sources, LR to MPX ,MPX to LR, MPX1 to MPX2 or MPX2 to MPX1 (not available in all models), LR to AES-EBU or AES-EBU to LR (not available in all models) or), LR to IP or IP to LR (not available in all models).

Note: Audio Changeover Operate with two possible Priority.

The 7 sub-menu "Reset Alarm & CO" is used to erase storages alarms and reset the audio Changeover.It is advisable to reset every time before exit.

The 8 sub-menu " Exit" once selected return to the main menu.

Pressing the UP Switch the 10 page will be shown where the Date&Time setting are present

1	0			D	a	t	e	&	T	i	m	e	A	d	j		
---	---	--	--	---	---	---	---	---	---	---	---	---	---	---	---	--	--

	1	1	/	0	2	/	1	4	=			1	0	:	3	0	:	2	2	
*	*	*																*	*	*

Pressing the OK Switch a flashing cursor will be enabled and by the others Switches will be possible to set Date and Time. Will be necessary to confirm with OK switch

1	0			D	a	t	e	&	T	i	m	e		A	d	j				
A	d	j	=		1	1	/	0	2	/	1	4		1	0	:	3	0		
	1	1	/	0	2	/	1	4	=			1	0	:	3	0	:	2	2	
*	*	*																*	*	*

Pressing the UP Switch the 11 page will be shown where the Alarms & Event are present. In this example 5 Alarms are storage.

1	1			A	l	a	r	m	s		&		E	v	e	n	t	s		
		0	5		A	l	a	r	m	s		S	t	o	r	e	d			
*	*	*																*	*	*

Pressing the OK Switch a new menu will be enabled and by the others Switches will be possible to select the different functions.

1	1			A	l	a	r	m	s		&		E	v	e	n	t	s	
1	.			S	h	o	w		L	i	s	t							
2	.			D	e	l	e	t	e		L	i	s	t					
3	.			E	x	i	t												

In this example the 1. Show List is selected and by Up and Down Switches is possible to check the different alarms or Events.

*	*	*		A	l	a	r	m		L	i	s	t				*	*	*
			A	l	a	r	m		N	u	m	b	e	r		0	3		

		A	I	a	r	m	=	R	F	3	d	B						
	0	3	/	0	2	/	1	4	=		1	5	:	4	5	:	2	2

Pressing the UP Switch the 12 page will be shown where the Remote Control Menu is displayed

1	2			R	e	m	o	t	e		C	o	n	t	r	o	l		
				N	o	t				P	r	e	s	e	n	t			
*	*	*															*	*	*

Note: Remote Control is not available in all models

Pressing the UP Switch the 13 page will be shown where the Info & Options are available

1	3			I	n	f	o		&		O	p	t	i	o	n	s		
F	w	:	1	.	8	9		M	:	A	0	7	E	0	5	0	1		
S	t	e	r	e	o			E	n	c	=			Y	e	s			
		R	D	S				E	n	c	=			Y	e	s			

Pressing the Right switch other information are displayed

1	3			I	n	f	o		&		O	p	t	i	o	n	s		
S	t	e	r	e	o			E	n	c	=			Y	e	s			
		R	D	S				E	n	c	=			Y	e	s			
A	E	S	-	E	B	U		D	e	c	=			Y	e	s			

Pressing once again the Right switch other information are displayed

1	3			I	n	f	o		&		O	p	t	i	o	n	s		
		R	D	S				E	n	c	=			Y	e	s			

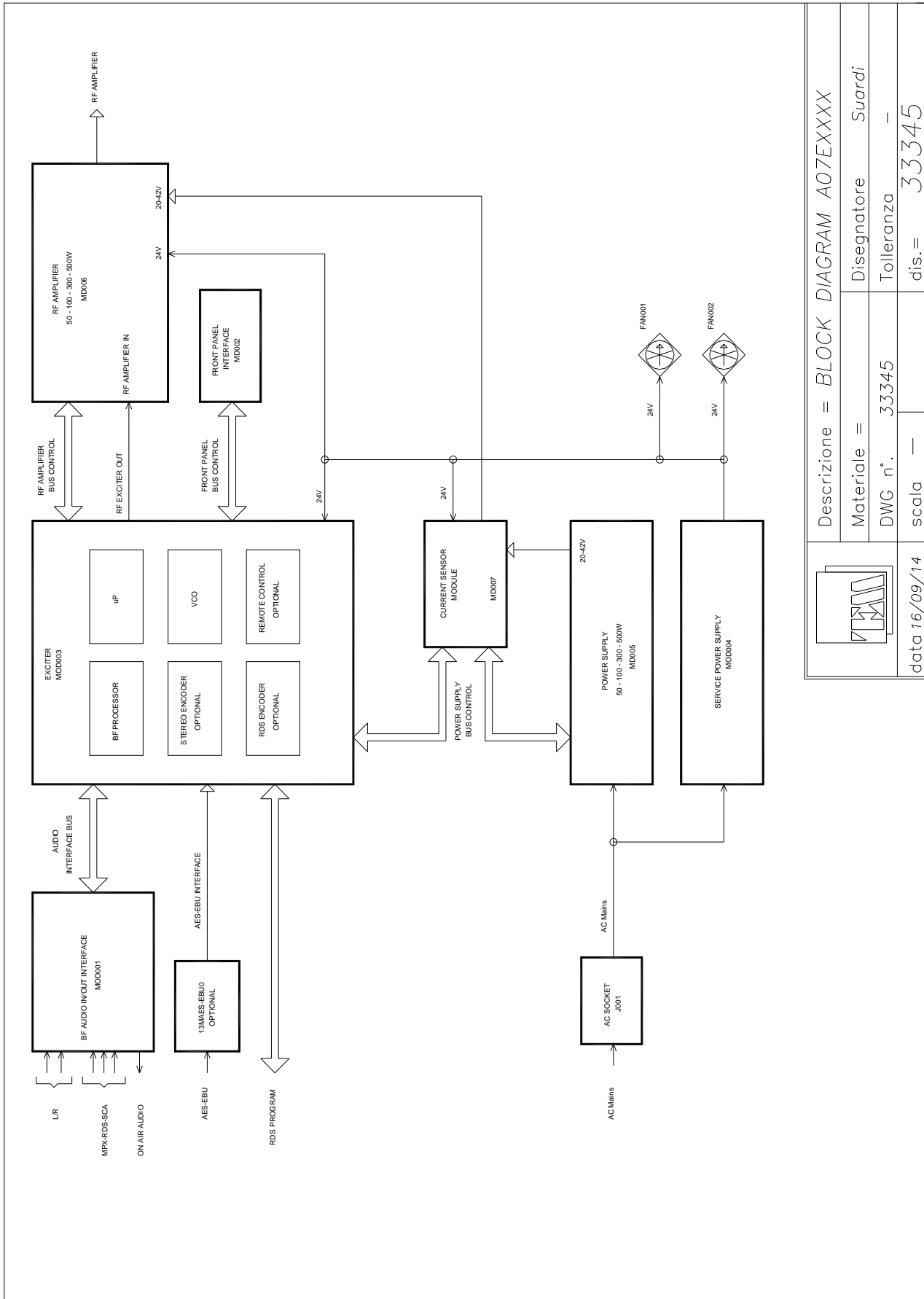
A	E	S	-	E	B	U		D	e	c	=			Y	e	s		
D	e	v		L	i	m	i	t	e	r	=			N	o			

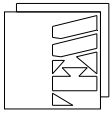
After some minutes of front panel menu inactivity the light display will be switched off and the displayed message will be the following

*	*		T	E	M		I	T	A	L	Y		S	r	I		*	*	*
*		W	W	W	.	T	E	M	-	I	T	A	L	Y	.	I	T		*
	T	E	L	:	+	3	9	.	0	2	9	2	2	7	0	0	3	3	
F	:	1	.	8	9		M	:	A	0	7	E	0	5	0	1			

9 DIAGRAMS AND PART LIST

A07EXXX - 10-20-50-100-200-250-300-400-500W Block Diagram Transmitter



		Descrizione = BLOCK DIAGRAM A07EXXX	
		Disegnatore	Suardi
		DWG n°	33345
		Tolleranza	-
		scala	dis.= 33345
		data 16/09/14	

A07E0011-A07E0021-A07E0051 Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 10-11-2014 09:27

Pag. 1

Distinta Base Riferimenti Schema		Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
A07E0051				OPERA PLUS 50W FM TRANSMITTER	MPX INPUT	NR	1
KIT001		13KCAV/OPERAPLUS01	01	KIT CAVI TX OPERA PLUS 500W 1 UNITA'		NR	1
J001		13KEL0001	01	PSOSXDS6A PRESA AC 6A RHS 6-6609107-7		NR	1
MOD006		13M01500	01	FM RF MODULE AMPLIFIER 50 W OUTPUT		NR	1
MOD001		13M31640	01	AUDIO CONNECTION BOARD		NR	1
MOD002		13M31800	01	OPERA PLUS FRONT PANEL INTERFACE		NR	1
MOD007		13M31810	01	CURRENT METER SENSOR		NR	1
MOD003		13M7EXC1	01	FM 88-108MHZ OPERA PLUS EXCITER MODULE		NR	1
MOD005		13MPW-R8-150-24	01	ALIMENTATORE 24V 150W		NR	1
MOD004		13MPW-R8-75-24	01	ALIMENTATORE 24V-75W		NR	1
KIT002		36ND0251	01	KIT MECCANICO RACK 1 UNITA' OPERA PLUS		NR	1
ZM001	ZM002	49V00720	01	GRIGLIA PER VENTOLA 40X40 MFD40-13		NR	2
FAN001	FAN002	49V00740	01	VENTOLA 40X40 24V 0.18A 25MQH		NR	2

A07E0101 Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 10-11-2014 09:26

Pag. 1

Distinta Base		Lista Parti				
Riferimenti Schema	Codice Parte	Livello	Descrizione	UM	Quantità	
A07E0101		OPERA PLUS 100W FM TRANSMITTER MPX INPUT			NR	1
KIT001	13KCAV/OPERAPLUS01	01	KIT CAVI TX OPERA PLUS 500W 1 UNITA'	NR	1	
J001	13KEL0001	01	PSOSXDS6A PRESA AC 6A RHS 6-6609107-7	NR	1	
MOD001	13MG1640	01	AUDIO CONNECTION BOARD	NR	1	
MOD002	13MG1800	01	OPERA PLUS FRONT PANEL INTERFACE	NR	1	
MOD007	13MG1810	01	CURRENT METER SENSOR	NR	1	
MOD006	13M72387AHG	01	500W RF AMPLIFIER HIGH GAIN VERSION	NR	1	
MOD003	13M7EXC1	01	FM 88-108MHZ OPERA PLUS EXCITER MODULE	NR	1	
MOD004	13MPW-RB-75-24	01	ALIMENTATORE 24V-75W	NR	1	
MOD005	13MPW-USP-225-24	01	ALIMENTATORE MEANWELL USP-225-24	NR	1	
KIT002	36K00251	01	KIT MECCANICO RACK 1 UNITA' OPERA PLUS	NR	1	
ZM001	ZM002	49V00720	01	GRIGLIA PER VENTOLA 40X40 MFD40-13	NR	2
FAN001	FAN002	49V00740	01	VENTOLA 40X40 24V 0.18A 25MQH	NR	2

A07E0201-A07E0251-A07E0301 Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 10-11-2014 09:25

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Distinta Base				Lista Parti			
Riferimenti Schema	Codice Parte	Livello	Descrizione	UM	Quantità		
A07E0301			OPERA PLUS 300W FM TRANSMITTER MPX INPUT	NR	1		
KIT001	13KCAV/OPERAPLUS01	01	KIT CAVI TX OPERA PLUS 500W 1 UNITA'	NR	1		
J001	13KEL0001	01	PSOSXDS6A PRESA AC 6A RHS 6-6609107-7	NR	1		
MOD001	13MB1640	01	AUDIO CONNECTION BOARD	NR	1		
MOD002	13MB1800	01	OPERA PLUS FRONT PANEL INTERFACE	NR	1		
MOD007	13MB1810	01	CURRENT METER SENSOR	NR	1		
MOD006	13M72387AHG	01	500W RF AMPLIFIER HIGH GAIN VERSION	NR	1		
MOD003	13M7EXC1	01	FM 88-108MHZ OPERA PLUS EXCITER MODULE	NR	1		
MOD004	13MPW-RS-75-24	01	ALIMENTATORE 24V-75W	NR	1		
MOD005	13MPW-GP-480-48	01	ALIMENTATORE 48V-480W	NR	1		
KIT002	36K00251	01	KIT MECCANICO RACK 1 UNITA' OPERA PLUS	NR	1		
ZM001	ZM002	49V00720	01	GRIGLIA PER VENTOLA 40X40 MFD40-13	NR	2	
FAN001	FAN002	49V00740	01	VENTOLA 40X40 24V 0.18A 25MQH	NR	2	

A07E0401-A07E0501 Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 16-09-2014 14:46

Pag. 1

Distinta Base Riferimenti Schema		Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
A07E0501				OPERA PLUS 500W FM TRANSMITTER MPX INPUT		NR	1
KIT001		13KCA/IOPERAPLUS01	01	KIT CAVI TX OPERA PLUS 500W 1 UNITA'		NR	1
J001		13KEL0001	01	PSOSXDS6A PRESAAC 6A RHS 6-6609107-7		NR	1
MOD001		13M31640	01	AUDIO CONNECTION BOARD		NR	1
MOD002		13M31800	01	OPERA PLUS FRONT PANEL INTERFACE		NR	1
MOD007		13M31810	01	CURRENT METER SENSOR		NR	1
MOD006		13M72387AHG	01	500W RF AMPLIFIER HIGH GAIN VERSION		NR	1
MOD003		13M7EXC1	01	FM 88-108MHZ EXCITER MODULE		NR	1
MOD004		13MPW-RS-75-24	01	ALIMENTATORE 24V-75W		NR	1
MOD005		13MPW-RSP-1000-48	01	ALIMENTATORE 48V-1000W		NR	1
KIT002		36K00251	01	KIT MECCANICO RACK 1 UNITA' OPERA PLUS		NR	1
ZM001	ZM002	49V00720	01	GRIGLIA PER VENTOLA 40X40 MFD40-13		NR	2
FAN001	FAN002	49V00740	01	VENTOLA 40X40 24V 0.18A 25MQH		NR	2

FM EXCITER MODULE 13M7EXC1

13M7EXC1 Part list

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Distinta Base
Riferimenti Schema

Codice Parte

Livello

Descrizione

Lista Parti

Pag. 1

UM Quantità

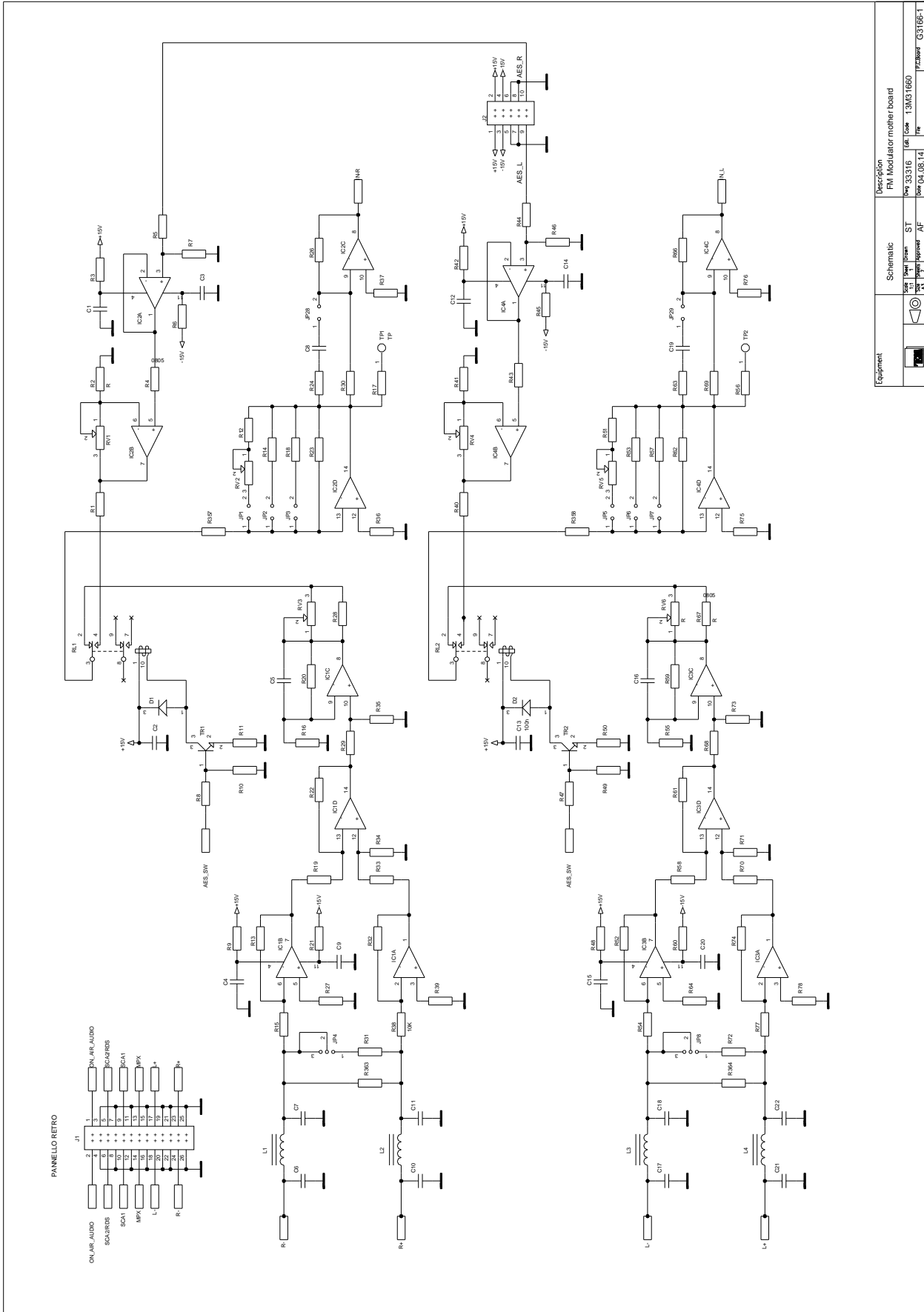
13M7EXC1

FM 88-108MHZ EXCITER MODULE

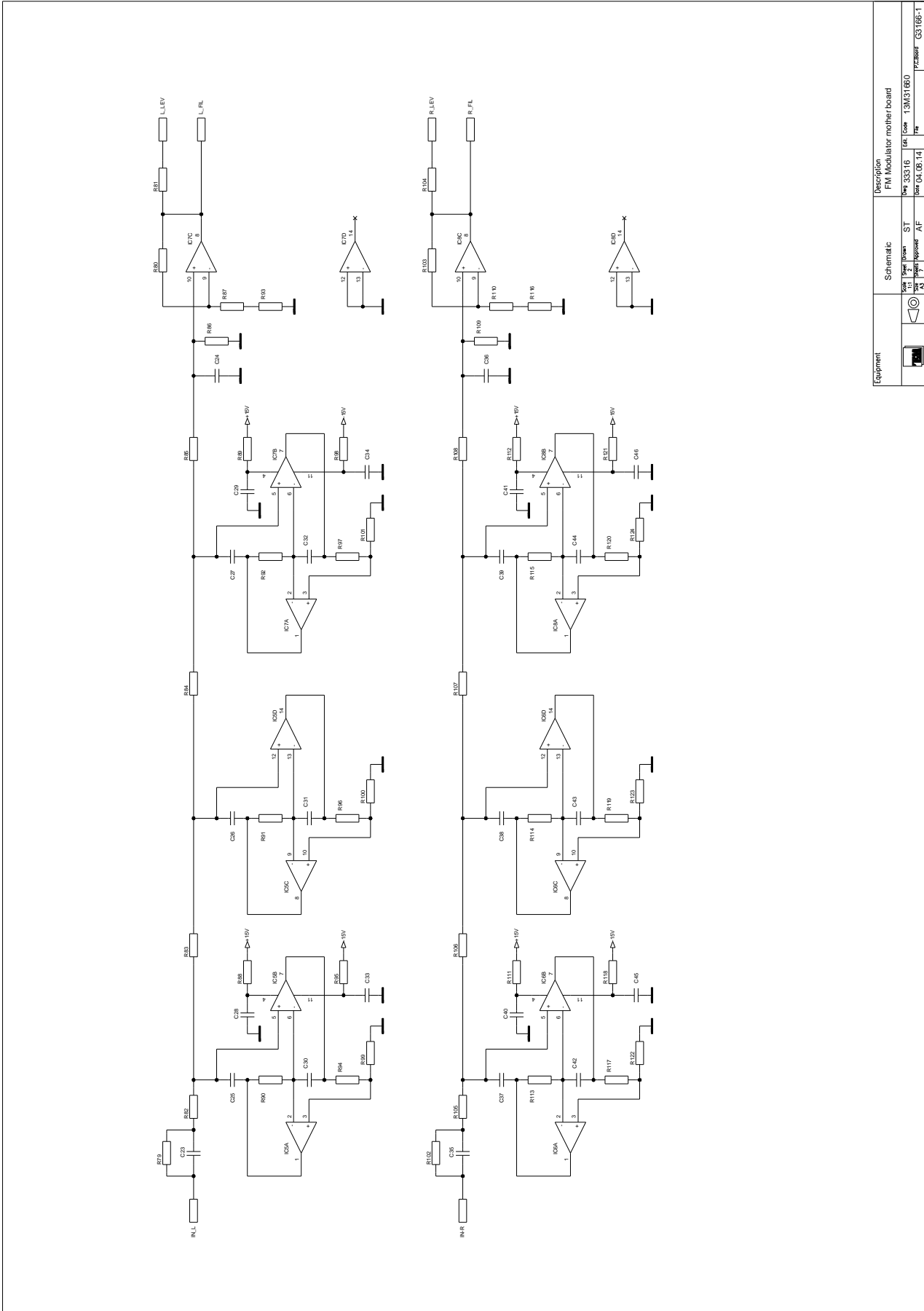
NR 1

MOD001	13M31620	01	88-108MHZ FM VCO MODULE BOARD	NR	1
MOD005	13M31660	01	FM MOTHER BOARD MODULATOR	NR	1
KIT001	36K00244	01	13M7EXC1 MECHANICAL KIT	NR	1

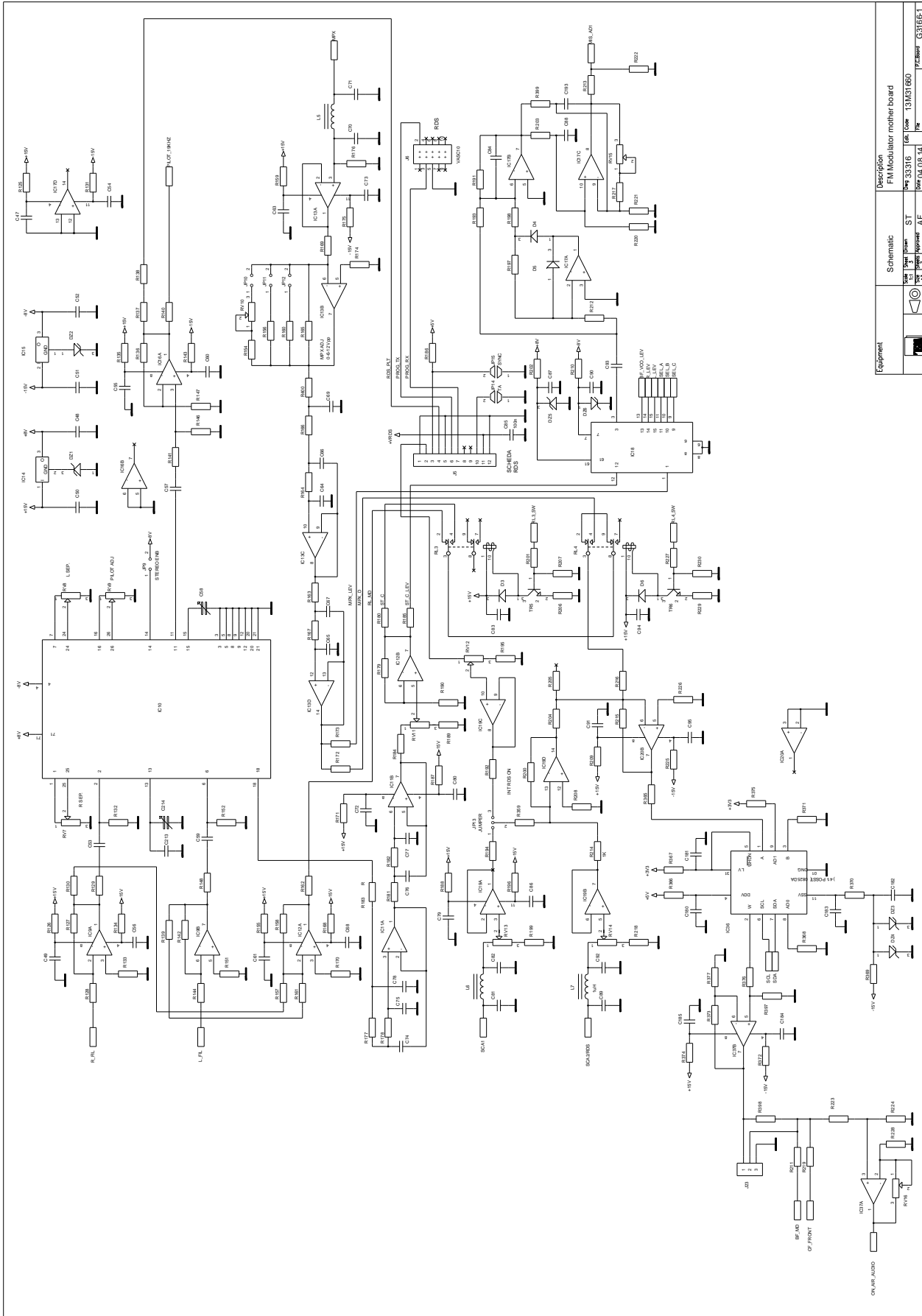
MOTHER BOARD MODULATOR MODULE 13M31660



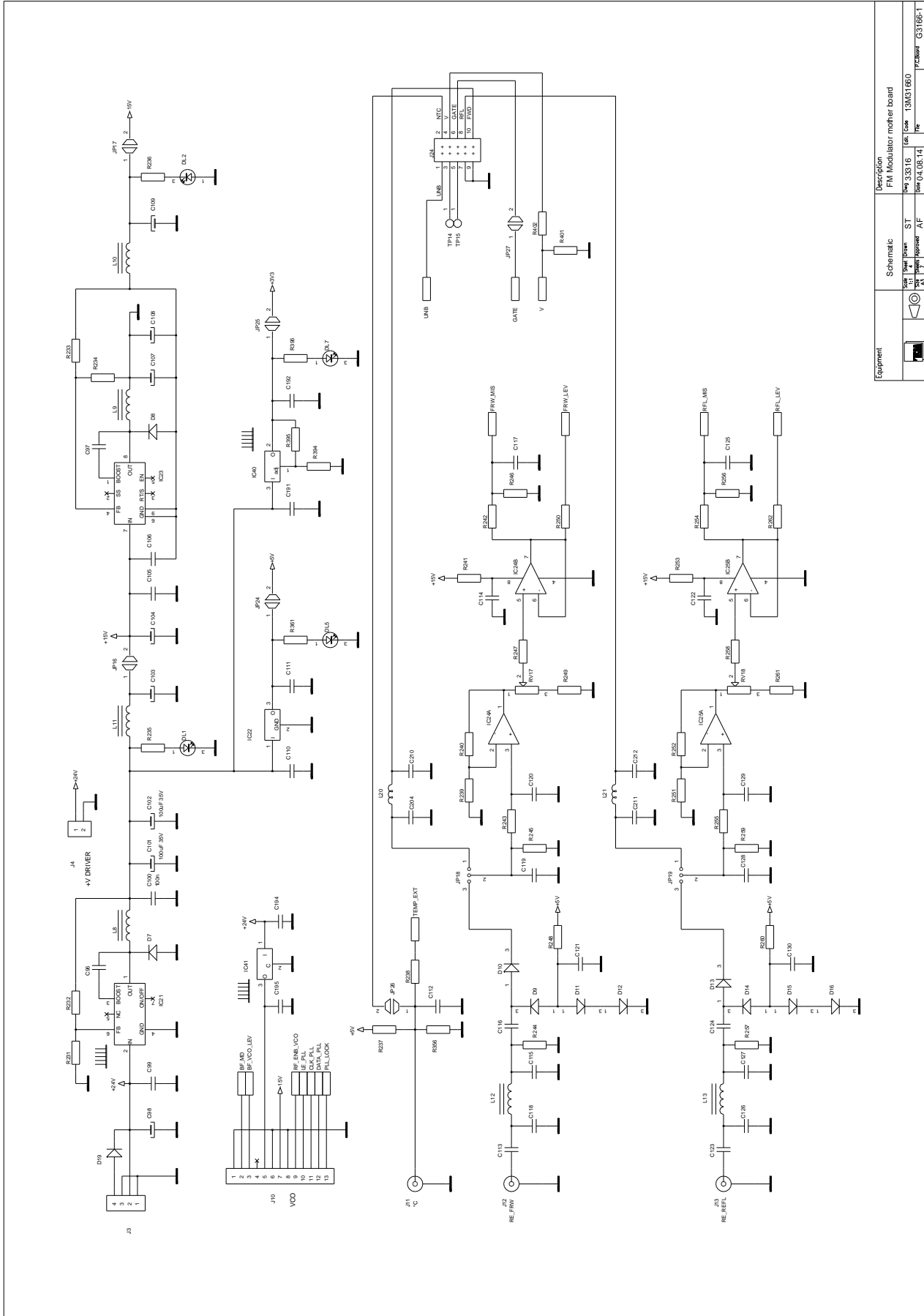
Equipment	Schematic	Description
	13M31660	PM Modulator mother board
Rev	04	Rev
Doc	04_08_14	Doc
Project	AF	Project
File	13M31660	File
Part	04_08_14	Part
Page	49	Page
Sheet	13M31660-1	Sheet



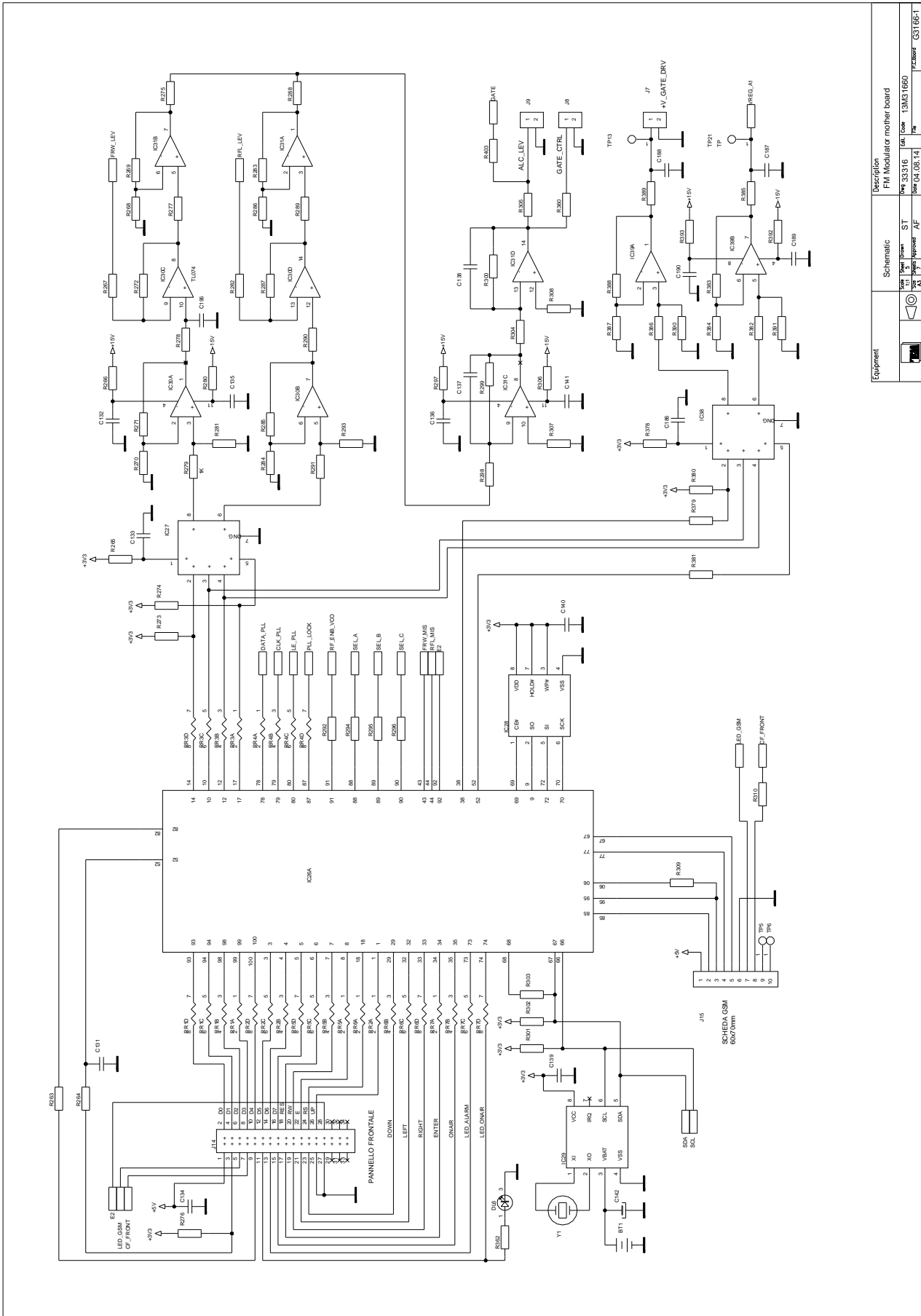
Equipment	Schematic	Description
		FM Modulator mother board
		Rev 33316
		04/06/14
		04/06/14
		13M31660
		Transmitter G3T166-1






Equipment	Schematic	Description
13M3160	FM Modulator mother board	13M3160
Rev 04.08.14	Rev 04.08.14	Rev 04.08.14

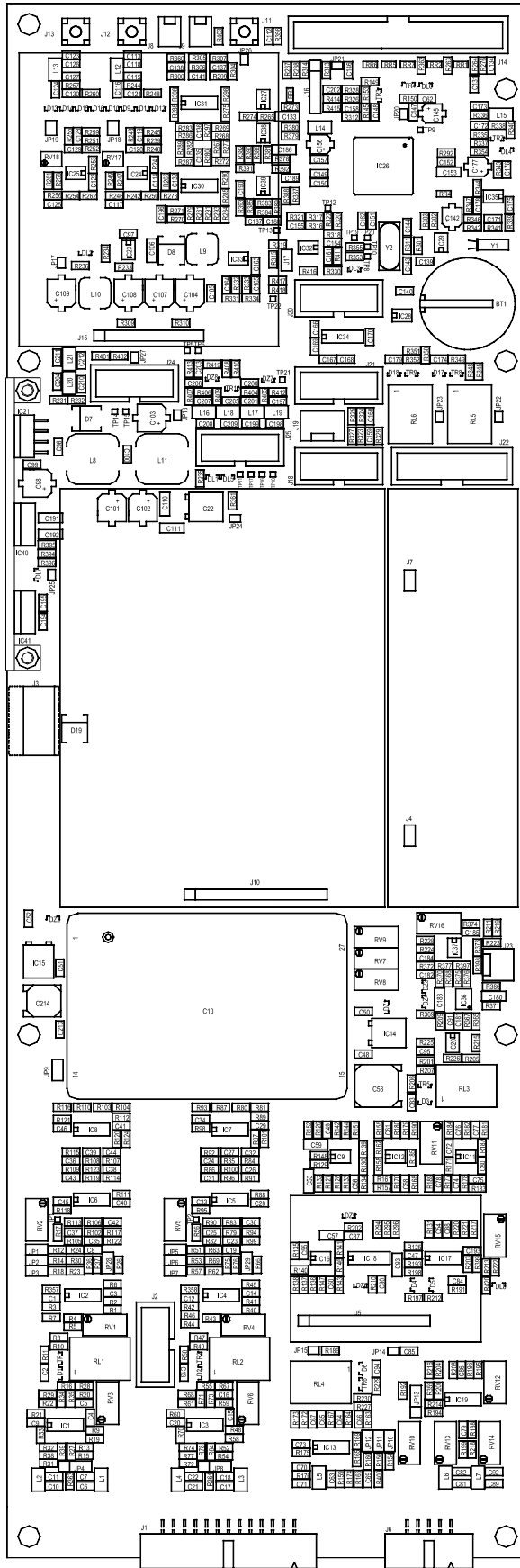


Equipment	Schematic	Description
13M31660	AF	FM Modulator mother board
13M31660	AF	Rev. 3.35.16
13M31660	AF	Rev. 04.08.14
13M31660	AF	Rev. 04.08.14
13M31660	AF	Rev. 04.08.14



Equipment	Description
	FVI Modulator mother board

Schematic	Description
	Rev: 1.0
	ST
	13M31660
	04/08/14
	AF
	13M31660
	13M31660
	03186CT



Equipment	Parts Placement	Description		
		FM MODULATOR PCB MOTHER BOARD		
	Scale: Sheet 1 of 1 Size: A3	Drawn: ST	Edt: Code	13M31660
		Sheet Approved: AF	Date: 30.07.14	File: P.C.Board
				G3166-1

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Distinta Base				Lista Parti				
Riferimenti Schema	Codice Parte			Livello	Descrizione	UM	Quantità	
13M31660				FM MOTHER BOARD MODULATOR		NR	1	
KIT001	13KCOMP13M31660			01	KIT TERZISTA 13M31660 FM MOTHER BOARD MODULATOR	NR	1	
PBT001	16000030			01	PORTABATTERIA BOTTONE 16MM PIN 502 MOUSER 534-502	NR	1	
CS001	21G31661			01	FM MODULATOR PCB MOTHER BOARD	NR	1	
C058	23500060			01	THIN TR. 2222 809 08003 5-60pF FRN1685440 RS127307	NR	1	
C214	23500070			01	THIN TR. 2222 809 09006 2-18pF	NR	1	
J011	J012	J013		24800175	01	SMB C.S.DIR.MASCH.R114 426 TC-1202-0,8-T	NR	3
J023				24X01370	01	CONN.M.CS 3PIN 6410-03-A - 2.54MM	NR	1
J022				24X01670	01	CONN. VASCH. FLATCABLE 16PIN MRC3-017-824	NR	1
J002	J018	J020	J021	24X01930	01	CONN.VASCH.10PIN C.S.MRC3-017-820	NR	6
J024	J025							
J019				24X02360	01	CONN.MAS.CS DIR. 6410-04-A	NR	1
J008	J009			24X02560	01	CONN.M.CS 2PIN 6410-02-A	NR	2
J016	J017	JP001	JP002	24X02570	01	CONNETTORE CS MALE STRIP MRC 3-016-545	NR	1
JP003	JP004	JP005	JP006					
JP007	JP008	JP009	JP010					
JP011	JP012	JP013	JP028					
JP029								
J005	J010	J015		24X02680	01	CONN.F.CS 36 PIN STRIP MRC 3-001-445	NR	1
J004	J007			24X0268F04	01	CONN. FEM. 4 PIN STRIP 4/G-7	NR	1
J014				24X02850	01	CONN. VASCH. 34PIN AWHW34G MRC 03-017-830	NR	1
J003				24X02960	01	MORSETTO M.4P STL1550/4/3.81V	NR	1
J006				24X02980	01	CONN.CS90q 10PIN CO4-10AG1-10	NR	1
J001				24X03020	01	CONN CS 90q 26PIN IDCML26 MRC 03017788	NR	1
ZM001				36070770	01	SQUADRETTA SUPPORTO REGOLATORI MODULATORE	NR	1
ZM002	ZM003	ZM004	ZM005	3609089010	01	COLONN.FF3H10 MRC 2-039-055	NR	14
ZM006	ZM007	ZM008	ZM009					
ZM010	ZM011	ZM012	ZM013					
ZM014	ZM015							
Y002				39QTX4.915MHZ	01	XT 4.915MHZ SMD HC49-US RS 703-7096	NR	1
Y001				39QXT32.768MHZ	01	XTAL 32.768MHZ RS 6727590	NR	1
RL001	RL002	RL003	RL004	40001670	01	RELE TQ2 12VMRC 3-043-205	NR	6
RL005	RL006							
IC041				44E00230	01	INTEG. REGOL. u 7815 (TO 220) MRC 1-049-350	NR	1

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Distinta Base				Lista Parti				
Riferimenti Schema				Codice Parte	Livello	Descrizione	UM	Quantità
13M31660				FM MOTHER BOARD MODULATOR				
							NR	1
IC040				44E00550	01	INT.REG.ADJ. LMB177 TO220AB 1.5A RS 8100063	NR	1
IC021				44E00760	01	LM2678T-ADJ TO220-7 FRN9486186 RS5335294	NR	1
ZM016				44Z00380	01	ISOLANTE TO220 2007210+2007181	NR	1
BT001	L012	L013		DEFINIRE	01	COMPONENTE DA DEFINIRE	NR	3
RV011				RE002200	01	MULT.VERT.1K MRC 3-028-712	NR	1
RV003	RV006			RE002300	01	MULT.VERT.2K.3296W-1-202 MRC3028714	NR	2
RV001	RV002	RV004	RV005	RE002500	01	MULT.VERT.10K MRC 03-028-718	NR	11
RV009	RV010	RV012	RV013					
RV014	RV015	RV016						
RV007	RV008			RE002700	01	MULT.VERT.50K.3296W-1-503 MRC 03028724	NR	2
L001	L002	L003	L004	SM29A035	01	IND. 1uH 10% SIMD02 1210 FRNL 3877190RL	NR	11
L005	L006	L007	L016					
L017	L018	L019						
L014	L015	L020	L021	SM29A043	01	IND. 4.7uH 10% SIMD 02 1210 FRN 1888842RL	NR	4
L009	L010			SM29C0007	01	IND SMD 100UH-1A 7.5X7.5 MM	NR	2
L008	L011			SM29C0009	01	IND.SMD EPCOS-WURTH 47UH-3A RS4961965	NR	2
DL001	DL002	DL003	DL004	SM300002	01	DIODO LED VERDE SOT23 MRC 1-057-222	NR	7
DL005	DL006	DL007						
DL008				SM300003	01	DIODO LED GIALLO SMD SOT-23 MRC 1-057-224	NR	1
D001	D002	D003	D006	SM43A011	01	DIODO A COPPIA BAV 99 SMD	NR	6
D017	D018							
D004	D005			SM43A025	01	BAT17 (SOT23) RS288-446 FRN1081187	NR	2
D009	D010	D011	D012	SM43A028	01	BAT54A 2DIODI 200MA SOT23 RS6887285 FRN1621833	NR	8
D013	D014	D015	D016					
D007	D008	D019		SM43A038	01	MBR5340 4A 40V CASE DO214AB(SMC)	NR	3
DZ001	DZ002			SM43D007	01	DIODO ZENER 2,7V 14W SMD FRN1651582RL RS6450602	NR	2
DZ005	DZ006			SM43D016	01	DIODO ZENER 5,1V SOT23 BZX84	NR	2
DZ003	DZ004			SM43D018	01	DIODO ZENER 5,6V SOT 23 RS7384986	NR	2
DZ007	DZ008			SM43D027	01	DIODO ZENER 3,9V SOT 23	NR	2
IC024	IC025	IC032	IC035	SM44C012	01	LM 358 D DUAL OP-AMP RS 526-262	NR	4
IC009	IC011	IC012	IC016	SM44C0440	01	INT. OPER. SMD TL072D (SO8) RS 528331	NR	7
IC020	IC037	IC039						
IC001	IC002	IC003	IC004	SM44C0470	01	CIRC.INTEGRATO TL074 D - RS 714-7487	NR	13
IC005	IC006	IC007	IC008					

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Distinta Base				Lista Parti			
Riferimenti Schema		Codice Parte	Livello	Descrizione	UM	Quantità	
13M31660				FM MOTHER BOARD MODULATOR	NR	1	
IC013 IC031	IC017	IC019	IC030				
IC018			SM44C1350	01 CD4051BM96G4 SOIC 16 MUX-DEMUX ANA	NR	1	
IC026			SM44D018	01 SST25VF080B (SO-8)	NR	1	
IC029			SM44D019	01 M41T81	NR	1	
IC033			SM44D020	01 SN65HVD12D RTX RS 485	NR	1	
IC026			SM44D021	01 PIC32MX795F512L-80/PF 14X14	NR	1	
IC027	IC038		SM44D022	01 MCP4822-E/SN DAC	NR	2	
IC036			SM44D023	01 AD5280BRUZ20 DIG.POT 20K TSSOP 14	NR	1	
IC034			SM44D024	01 MAX 3232CDRG4 2X TR/TX/RX RS 660-8215	NR	1	
IC014	IC022		SM44E008	01 7805CDT DPAK RS6889294	NR	2	
IC015			SM44E018	01 MC79M05 D-PACK	NR	1	
IC023			SM44E026	01 LM22672MRE-ADJ/NOPB	NR	1	
C153			SMCE2010210074	01 COND CER 10UF 10V C1206 RS 766-1071	NR	1	
C145	C156		SMCEL0064707B	01 SMD COND EL WX 47UF 6,3V CASE B RS 747-8823	NR	2	
C142	C177		SMCEL02511007B	01 COND. 10 UF 25V CELEB ALL5X5.4 CASE B	NR	2	
C104	C107	C108	C109	SMCEL02514707D	01 SMD COND EL 47UF 25V CASE D R87472869 FRN1973326RL	NR	4
C096	C101	C102	C103	SMCEL03511006G	01 SMD COND EL 100UF 35V CELED ALL 6.3X5.4/5.8 CASE D	NR	4
RR001 RR005	RR002 RR006	RR003 RR007	RR004	SMRD0612101	01 4X100 OHM 0612 ARRAY RS522-5399	NR	7
RV017	RV018		SMRE0002	01 POTENZ.MULTIG.10K OHM RS 669-6691 (PVG5A)	NR	2	

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Pag. 1

Distinta Base				Lista Parti		UM	Quantità
Riferimenti	Schema	Codice Parte	Livello	Descrizione			
13KCOMP13M31660				KIT TERZISTA 13M31660 FM MOTHER BOARD MODULATOR		NR	1
C005	C016	C115	C118	DEFINIRE	01 COMPONENTE DA DEFINIRE	NR	22
C126	C127	C137	C138				
C154	C196	C202	R028				
R067	R168	R268	R282				
R386	R387	R388	R390				
R402	R420						
C065	C067	C069	C074	N0000	01 COMPONENTE NON MONTATO	NR	17
C075	C078	C088	C213				
R203	R205	R221	R244				
R257	R286	R287	R288				
R411							
Q001	Q002	Q003	Q004	SM44A003	01 TRANS.BC847C SMD RS 4367953	NR	10
Q005	Q006	Q007	Q008				
Q009	Q010						
C143	C144			SMCE00503180N3	01 COND.CER. 18PF NP0 5% 0805 50V	NR	2
C110	C111	C133	C186	SMCE010UF025	01 COND.CER.10UF 25V SMD 1206 RS7588093	NR	6
C191	C192						
C002	C013	C048	C050	SMCE1050210093	01 COND.CER. 100nF COG 50V 0805	NR	51
C051	C052	C062	C065				
C087	C090	C099	C100				
C105	C112	C114	C122				
C131	C132	C134	C135				
C136	C139	C140	C141				
C146	C147	C148	C149				
C150	C151	C152	C155				
C161	C162	C163	C166				
C167	C168	C169	C170				
C171	C174	C175	C176				
C178	C179	C181	C182				
C194	C195	C203					
C008	C019	C096	C097	SMCE10502100H3	01 COND.CER. 10nF COG 50V 0805	NR	6
C120	C129						
C113	C116	C117	C119	SMCE10502100L3	01 COND.CER. 1nF COG 50V 0805	NR	30
C121	C123	C124	C125				
C128	C130	C157	C158				
C172	C173	C187	C188				
C197	C198	C199	C200				
C201	C204	C205	C206				
C207	C208	C209	C210				
C211	C212						
C006	C007	C010	C011	SMCE10502100M3	01 COND.CER. 100pF COG 50V 0805	NR	18
C017	C018	C021	C022				
C070	C071	C081	C082				
C089	C092	C159	C160				
C164	C165						

13KCOMP13M31660 Part List - page 2 of 4

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Distinta Base Riferimenti Schema				Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
13KCOMP13M31660						KIT TERZISTA 13M31660 FM MOTHER BOARD MODULATOR		NR	1
C001	C003	C004	C009	SMCE1050222093	01	COND.CER. 220nF COG 50V 0805		NR	38
C012	C014	C015	C020						
C028	C029	C033	C034						
C040	C041	C045	C046						
C047	C049	C054	C055						
C056	C060	C061	C063						
C068	C072	C073	C079						
C080	C083	C086	C091						
C094	C095	C184	C185						
C189	C190								
C064	C077			SMCE10502330M3	01	COND.CER. 330pF COG 50V 0805		NR	2
C023	C024	C025	C026	SMCE10502470L3	01	COND.CER. 4,7nF COG 50V 0805		NR	16
C027	C030	C031	C032						
C035	C036	C037	C038						
C039	C042	C043	C044						
C066	C076			SMCE10502560N3	01	COND.CER. 56pF COG 50V 0805		NR	2
C084	C193			SMCE2050200183	01	COND.CER. 1uF X7R 50V 0805		NR	2
C053	C057	C059	C093	SMCE4E7UF025	01	COND.CER.4,7UF 25V SMD 1206 RS7661100		NR	6
C180	C183								
C106				SMCE4E7UF050	01	COND.CER.4,7UF 50V SMD 1206 RS6911224		NR	1
R093	R116	R138	R157	SMRB00003A	01	RES.SMD 0 OHM 5% 1/10 W 0805		NR	17
R161	R163	R167	R177						
R220	R269	R263	R307						
R308	R398	R400	R403						
R412									
R129	R140	R148	R178	SMRB10003A	01	RES.SMD 100 OHM 5% 1/10W 0805		NR	19
R211	R213	R216	R238						
R264	R267	R312	R314						
R326	R365	R371	R376						
R382	R385	R389							
R001	R017	R040	R056	SMRB10013A	01	RES.SMD 1K OHM 5% 1/10W 0805		NR	64
R081	R104	R130	R137						
R139	R150	R158	R162						
R170	R172	R173	R180						
R183	R184	R185	R186						
R192	R194	R195	R199						
R214	R215	R218	R219						
R223	R224	R226	R233						
R235	R236	R239	R243						
R249	R250	R251	R255						
R261	R262	R275	R277						
R279	R289	R291	R305						
R310	R317	R319	R322						
R338	R343	R345	R350						
R353	R354	R355	R369						
R360	R369	R409	R410						

13KCOMP13M31660 Part List - page 3 of 4

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 05-11-2014 09:55

Pag. 3

Distinta Base						Lista Parti		
Riferimenti Schema		Codice Parte		Livello	Descrizione		UM	Quantità
13KCOMP13M31660					KIT TERZISTA 13M31660 FM MOTHER BOARD MODULATOR	NR		1
R004	R005	R007	R010	SMRB10025A	01 RES.SMD 10K OHM 1% 1/10W 0805	NR		105
R013	R015	R016	R018					
R019	R020	R022	R023					
R029	R032	R033	R034					
R035	R038	R043	R044					
R046	R049	R052	R054					
R055	R057	R058	R059					
R061	R062	R068	R070					
R071	R073	R074	R077					
R080	R087	R103	R110					
R127	R128	R136	R141					
R142	R144	R146	R147					
R153	R160	R164	R165					
R166	R169	R176	R181					
R182	R191	R193	R204					
R207	R222	R230	R234					
R242	R246	R254	R256					
R271	R273	R274	R281					
R285	R293	R298	R299					
R300	R313	R318	R321					
R328	R335	R336	R340					
R341	R342	R348	R351					
R356	R363	R364	R368					
R373	R375	R380	R383					
R384	R391	R399	R401					
R086	R109	R245	R259	SMRB10033A	01 RES.SMD 100K OHM 5% 1/10W 0805	NR		8
R344	R346	R347	R397					
R011	R050	R149	R189	SMRB100A3A	01 RES.SMD 10 OHM 5% 1/10W 0805	NR		16
R206	R229	R303	R309					
R311	R329	R331	R334					
R349	R352	R379	R381					
R100	R123			SMRB13515A	01 RES.SMD 1350 OHM 1% 1/10W 0805	NR		2
R003	R006	R009	R021	SMRB15003A	01 RES.SMD 150 OHM 5% 1/10W 0805	NR		36
R042	R045	R048	R060					
R088	R089	R095	R098					
R111	R112	R118	R121					
R125	R126	R131	R134					
R135	R143	R155	R159					
R171	R175	R187	R188					
R196	R209	R225	R241					
R253	R372	R374	R392					
R217				SMRB15023A	01 RES.SMD 15K OHM 5% 1/10W 0805	NR		1
R099	R101	R122	R124	SMRB15415A	01 RES.SMD 1540 OHM 1% 1/10W 0805	NR		4
R002	R008	R041	R047	SMRB22013A	01 RES.SMD 2,2K OHM 5% 1/10W 0805	NR		25
R090	R091	R092	R094					
R096	R097	R113	R114					

13KCOMP13M31660 Part List - page 4 of 4

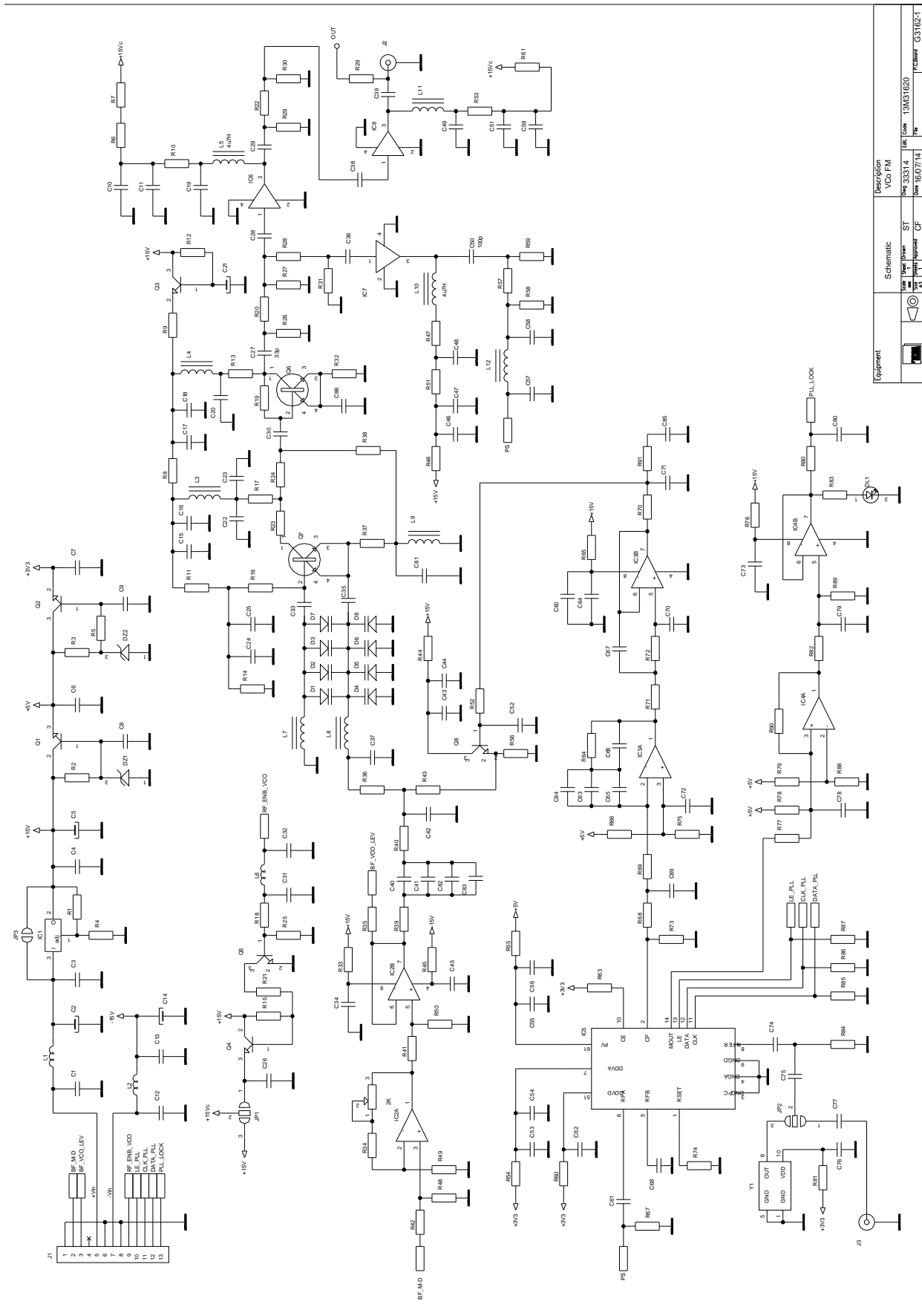
Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 05-11-2014 09:55

Pag. 4

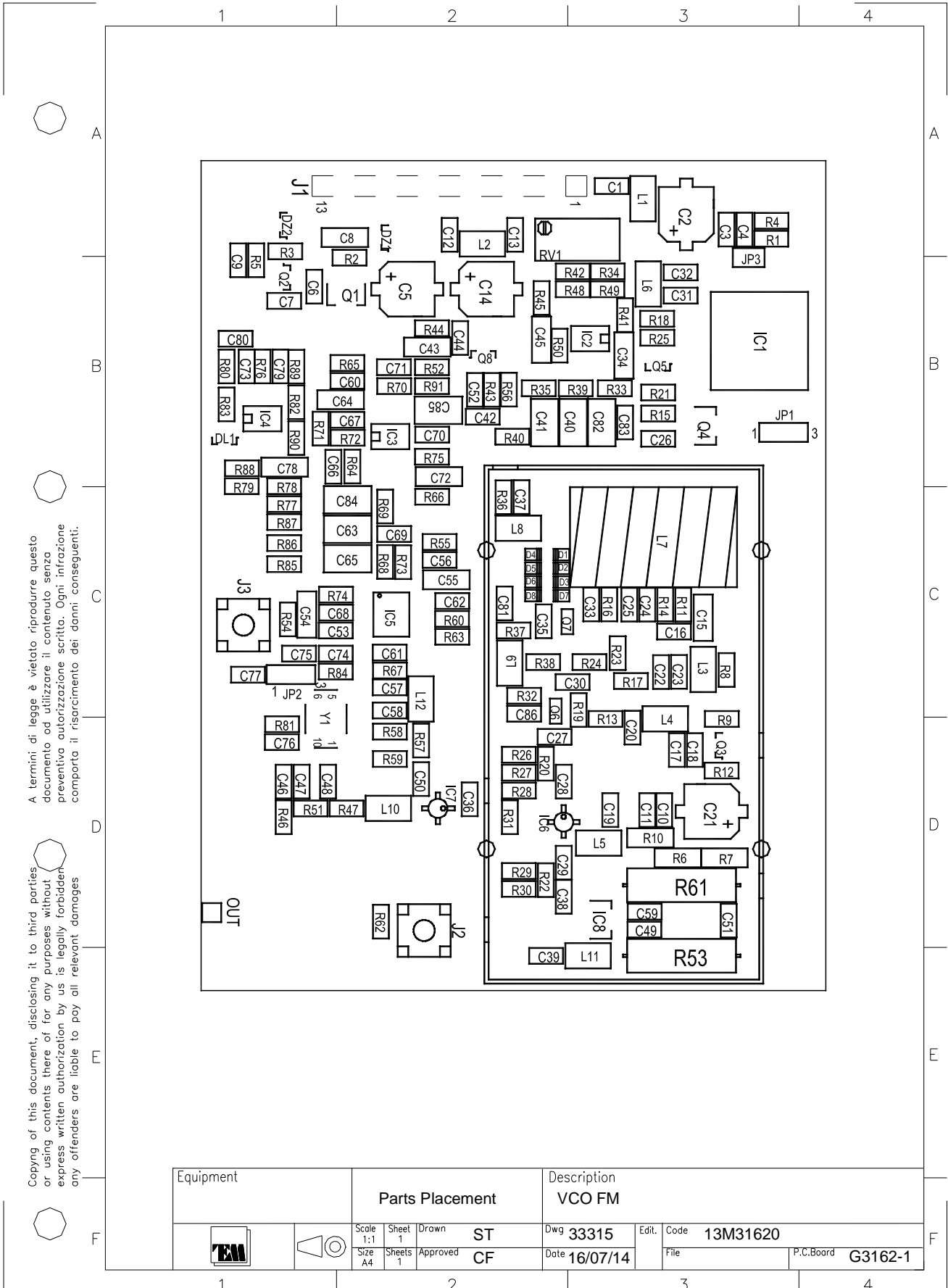
Distinta Base Riferimenti Schema				Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
13KCOMP13M31660						KIT TERZISTA 13M31660 FM MOTHER BOARD MODULATOR	NR	1	
R115	R117	R119	R120						
R145	R179	R190	R201						
R208	R227	R240	R252						
R316									
R304				SMRB22023A	01	RES.SMD 22K OHM 5% 1/10W 0805	NR	1	
R367				SMRB220A3A	01	RES.SMD 22 OHM 5% 1/10W 0805	NR	1	
R082	R085	R105	R108	SMRB22115A	01	RES.SMD 2210 OHM 1% 1/10W 0805	NR	4	
R037	R076			SMRB27013A	01	RES.SMD 2,7K OHM 5% 1/10W 0805	NR	2	
R278				SMRB27033A	01	RES.SMD 270K OHM 5% 1/10W 0805	NR	1	
R231	R396			SMRB33003A	01	RES.SMD 330 OHM 5% 1/10W 0805	NR	2	
R247	R258	R263	R266	SMRB330A3A	01	RES.SMD 33 OHM 5% 1/10W 0805	NR	18	
R280	R292	R294	R295						
R296	R297	R306	R325						
R327	R330	R332	R333						
R337	R339								
R014	R053	R156		SMRB33215A	01	RES.SMD 3320 OHM 1% 1/10W 0805	NR	3	
R024	R063	R393	R395	SMRB39003A	01	RES.SMD 390 OHM 5% 1/10W 0805	NR	4	
R232	R301	R302		SMRB39013A	01	RES.SMD 3,9K OHM 5% 1/10W 0805	NR	3	
R083	R084	R106	R107	SMRB432152	01	RES.SMD 4320 OHM 1% 1/4W	NR	4	
R027	R036	R039	R064	SMRB47013A	01	RES.SMD 4,7K OHM 5% 1/10W 0805	NR	22	
R075	R078	R132	R133						
R151	R152	R174	R197						
R198	R200	R212	R228						
R270	R276	R284	R320						
R323	R324	R240							
R248	R260	R315		SMRB47023A	01	RES.SMD 47K OHM 5% 1/10W 0805	NR	3	
R026	R030	R066	R069	SMRB49915A	01	RES.SMD 4990 OHM 1% 1/10W 0805	NR	4	
R265	R366	R370	R378	SMRB510A3A	01	RES.SMD 51 OHM 5% 1/10W 0805	NR	4	
R202	R210			SMRB56003A	01	RES.SMD 560 OHM 5% 1/10W 0805	NR	2	
R237				SMRB56013A	01	RES.SMD 5,6K OHM 5% 1/10W 0805	NR	1	
R031	R072	R361	R362	SMRB68003A	01	RES.SMD 680 OHM 5% 1/10W 0805	NR	5	
R394									
R012	R051	R154	R377	SMRB68013A	01	RES.SMD 6,8K OHM 5% 1/10W 0805	NR	4	
R272				SMRB68023A	01	RES.SMD 68K OHM 5% 1/10W 0805	NR	1	
R079	R102			SMRB86625A	01	RES.SMD 86,6K OHM 1% 0,1W 0805	NR	2	
R357	R358			SMRB90915A	01	RES.SMD 9090 OHM 1% 1/4W 0805	NR	2	

**FM 87.5÷108MHz VCO MODULE
13M31620**

13M31620 FM 87.5÷108MHZ VCO - Schematic Diagram



13M31620 FM 87.5÷108MHZ VCO - Part Placement Layout



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Equipment		Parts Placement			Description			
					VCO FM			
		Scale 1:1	Sheet 1	Drawn ST	Dwg 33315	Edit.	Code 13M31620	P.C.Board G3162-1
		Size A4	Sheets 1	Approved CF	Date 16/07/14	File		

13M31620 Part list page 1 of 2

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 17-09-2014 10:50				Pag. 1				
Distinta Base				Lista Parti				
Riferimenti Schema				UM	Quantità			
Codice Parte				NR	1			
13M31620				88-108MHZ FM VCO MODULE BOARD				
Livello				Descrizione				
KIT001			13KCOMP13M31620	01	KIT TERZISTA 13M31620 VCO FM	NR	1	
CS001			21G31621	01	88-108MHZ FM VCO PCB BOARD	NR	1	
J002	J003		24800175	01	SMB C.8.DIR.MASCH.R114 426 TC-1202-0,8-T	NR	2	
J001			24X02570	01	CONNETTORE CS MALE STRIP MRC 3-016-545	NR	1	
L007			29A0810580	01	BOBINA SPECIFICA 1058	NR	1	
ZM001			36070750	01	SCATOLA SCHERMO SCHEDA VCO G3162	NR	1	
ZM002			36070760	01	COPERCHIO SCATOLA SCHERMO SCHEDA VCO G3162	NR	1	
XTAL001			39QTXCO10MHZ	01	TXCO 10 MHZ SMD 2PPM RS7099259	NR	1	
C066	C067	C070	C081	N000	01	COMPONENTE NON MONTATO	NR	10
C086	IC001	R038	R062					
R073	R090							
RV001			RE002300	01	MULT.VERT.2K.3296W-1-202 MRC3028714	NR	1	
L012			SM29A023	01	IND.SMD 100nH 10% SIMID-02	NR	1	
L001	L002		SM29A035	01	IND. 1uH 10% SIMID02 1210 FRNL 3877190RL	NR	2	
L003	L004	L005	L006	SM29A043	01	IND. 4.7uH 10% SIMID 02 1210 FRN 1888842RL	NR	8
L008	L009	L010	L011					
DL001			SM300002	01	DIODO LED VERDE SOT23 MRC 1-057-222	NR	1	
D001	D002	D003	D004	SM43C005	01	DIODO VARICAP BB153 RS 626-1942 FRN1349654RL	NR	8
D005	D006	D007	D008					
DZ001			SM43D018	01	DIODO ZENER 5,6V SOT 23 RS7384986	NR	1	
DZ002			SM43D027	01	DIODO ZENER 3,9V SOT 23	NR	1	
Q002	Q003	Q005	Q008	SM44A003	01	TRANS.BC847C SMD RS 4367953	NR	4
IC006	IC007			SM44A054	01	MONOLITICO ERA-3	NR	2
Q001	Q004			SM44A058	01	BCX54 -TRANSISTOR RS 657-1845	NR	2
Q006	Q007			SM44A059	01	BFG540-W 9GHZ WB TRANS. RS4842448	NR	2
IC008				SM44A060	01	GALI 74+ DC-1GHZ AMPLIFIER	NR	1
IC004				SM44C012	01	LM 358 D DUAL OP-AMP RS 526-262	NR	1
IC002	IC003			SM44C0440	01	INT. OPER. SMD TL072D (SO8) RS 528331	NR	2
IC005				SM44C1330	01	ADF4110BRUZ PLL	NR	1
C0064	C085			SMCE010UF025	01	COND.CER.10UF 25V SMD 1206 RS7588093	NR	2
C040	C041	C082		SMCE022UF015	01	COND.CER.22UF 16V SMD 1210 RS6911240 FRN1759466	NR	3

13M31620 Part List page 2 of 2

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 17-09-2014 10:50

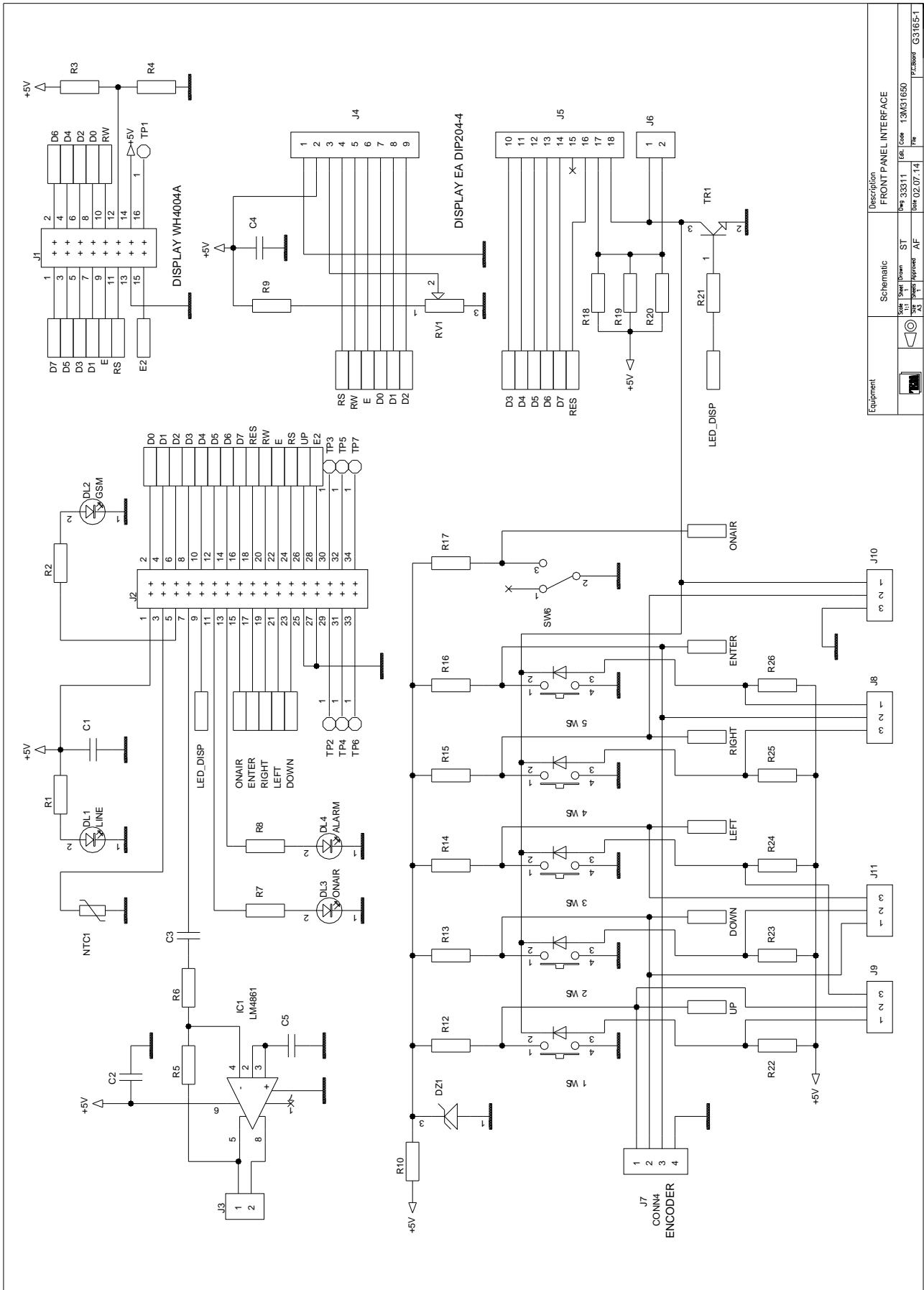
Pag. 2

Distinta Base				Lista Parti			
Riferimenti Schema		Codice Parte	Livello	Descrizione		UM	Quantità
13M31620				88-108MHZ FM VCO MODULE BOARD		NR	1
C063	C065	C064		SMCE047UF016	01 COND.CER.47UF 16V SMD 1210 R88030065 FRN1838761	NR	3
R029	R058			SMRB30003A	01 RES.SMD 300 OHM 5% 1/10W 0805	NR	2
R008	R055	R067	R064	SMRB510A3A	01 RES.SMD 51 OHM 5% 1/10W 0805	NR	4

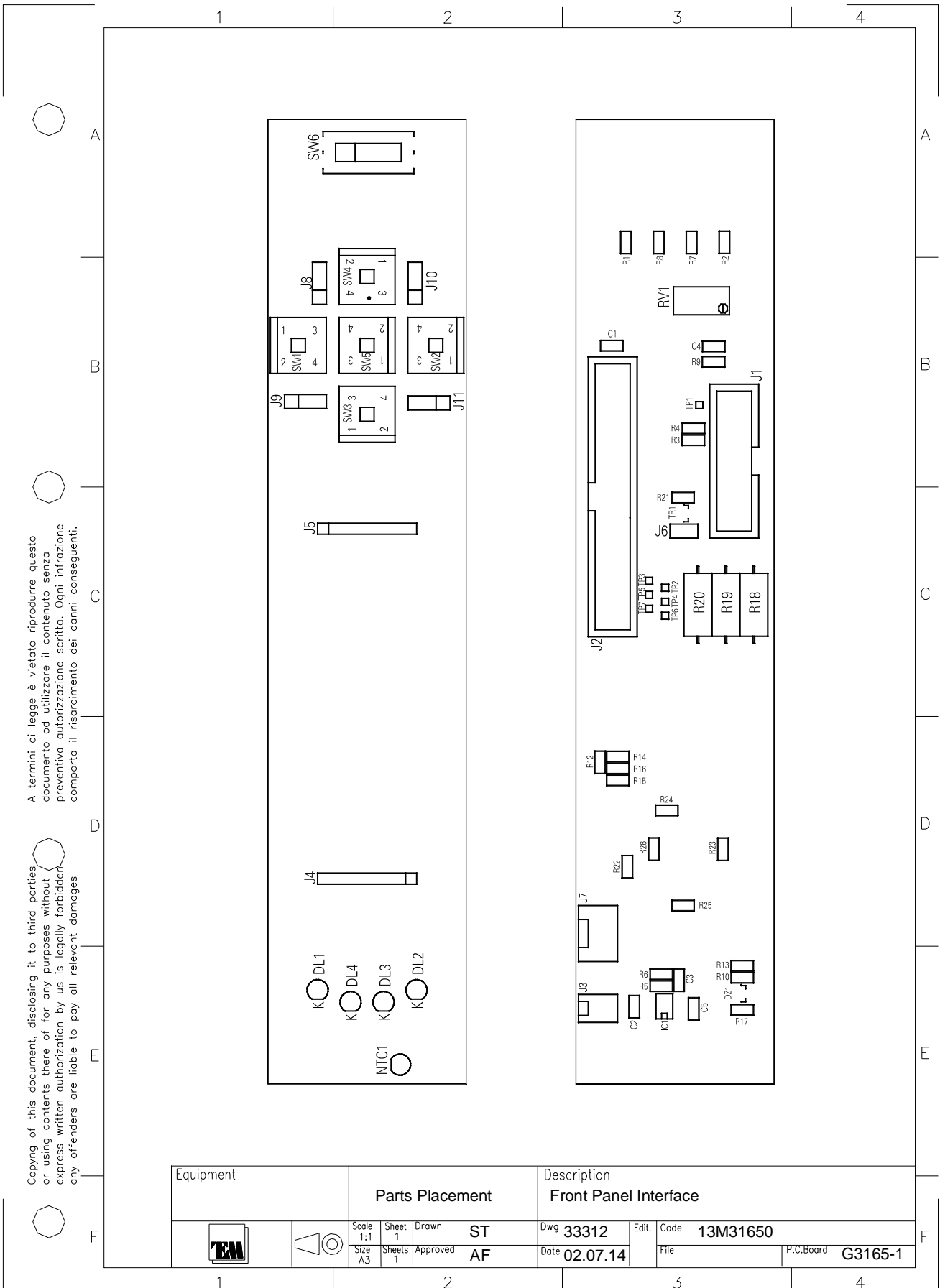
FRONT PANEL MODULE INTERFACE

13M31650

13M31650 Front Panel Interface - Schematic Diagram





13M31650 Front Panel Interface - Part Placement Layout



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Equipment		Parts Placement			Description Front Panel Interface		
		Scale 1:1	Sheet 1	Drawn ST	Dwg 33312	Edit.	Code 13M31650
		Size A3	Sheets 1	Approved AF	Date 02.07.14	File	P.C.Board G3165-1

13M31650 Part List

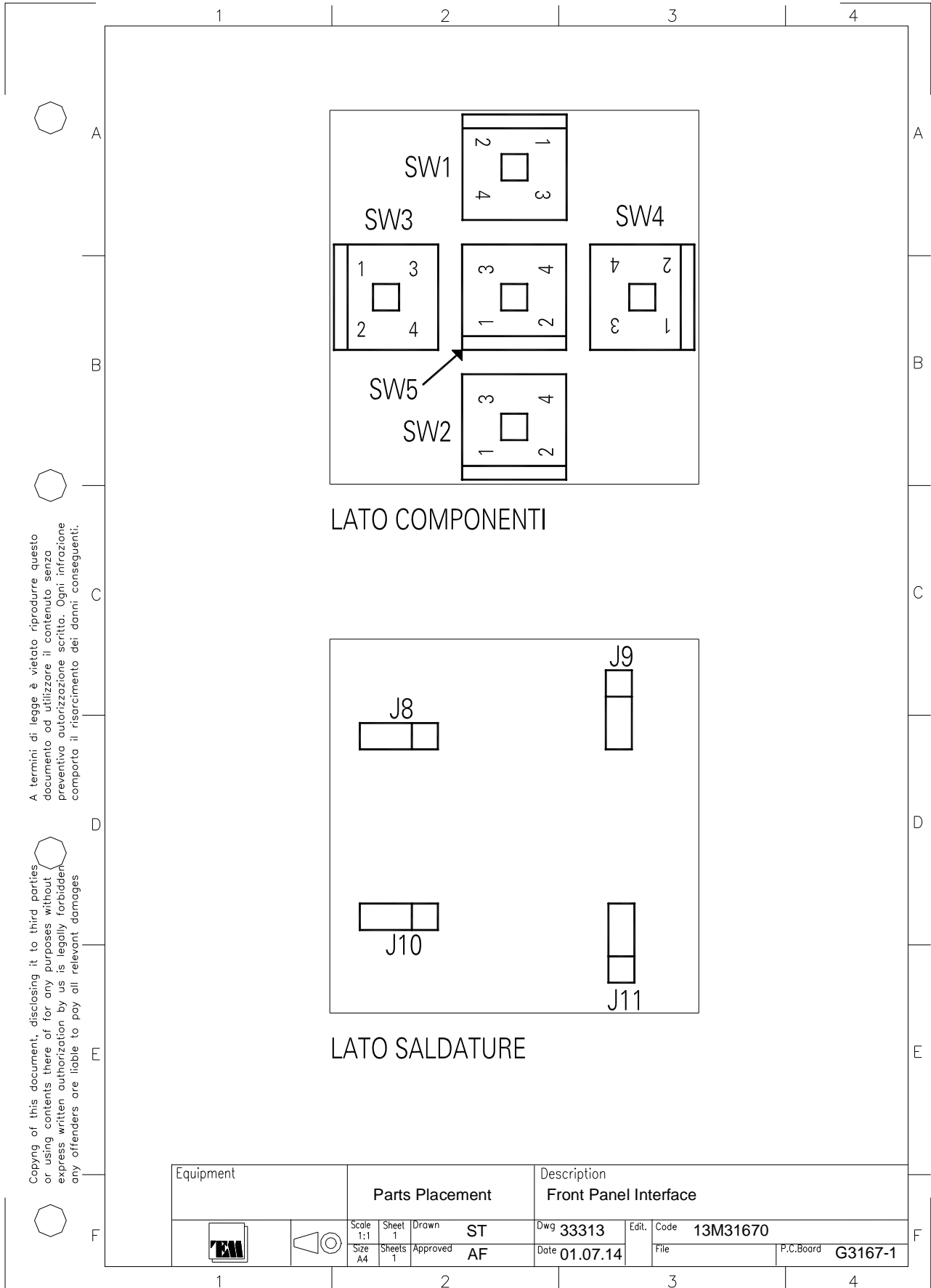
Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 17-09-2014 11:12

Pag. 1

Lista Parti

Distinta Base Riferimenti Schema			Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
13M31650					FRONT PANEL LCD INTERFACE		NR	1
KIT001			13KCOMP13M31650	01	KIT TERZISTA 13M31650 FRONT PANEL INTERFACE A-B		NR	1
CS001			21G31651	01	FRONT PANEL INTERFACE A-B PCB		NR	1
SW006			22A00560	01	DEV..SLID ELEDIS 7A11-A1U2SE2		NR	1
NTC001			22A01220	01	NTC 5K A GOCCIA RS7062771P		NR	1
J001			24X01670	01	CONN. VASCH. FLATCABLE 16PIN MRC3-017-824		NR	1
J007			24X02360	01	CONN.MAS.CS DIR. 6410-04-A		NR	1
J006			24X02670	01	CONNETTORE CS MALE STRIP MRC 3-016-545		NR	1
J002			24X02850	01	CONN. VASCH. 34PIN AWHW34G MRC 03-017-830		NR	1
J003			24X03980	01	PRESABF JACK PANN. 3,5 STEREO MRC 2-030-038		NR	1
J8-9-10-1			24X04030	01	STRIP FEMALE BASSA DA CS 16 POLI		NR	1
J004-005			24X04070	01	STRIP FEMALE P.2MM - 50P FRN9728937 11P RS 7020650		NR	1
STR001			45000990	01	LICD DISPLAY 4X20 YELLOW-GREEN		NR	1
R018	R019	R020	RB470A34	01	RESIST. 47.00 OHM 1W 5%		NR	3
RV001			RE002500	01	MULT.VERT.10K MRC 03-026-718		NR	1
DZ001			8M430015	01	DIODO ZENER 3,3V SOT 23		NR	1
TR001			8M44A003	01	TRANS.BC847C SMD RS 4367953		NR	1
IC001			8M44C1340	01	LM4861 - AUDIO AMPLIFIER RS5343374		NR	1

FRONT PANEL SWITCH SUPPORT MODULE INTERFACE 13M31670



LATO COMPONENTI

LATO SALDATURE

Equipment		Parts Placement			Description Front Panel Interface			
		Scale 1:1	Sheet 1	Drawn ST	Dwg 33313	Edit.	Code 13M31670	
		Size A4	Sheets 1	Approved AF	Date 01.07.14		File	P.C.Board G3167-1

13M31670 Part list

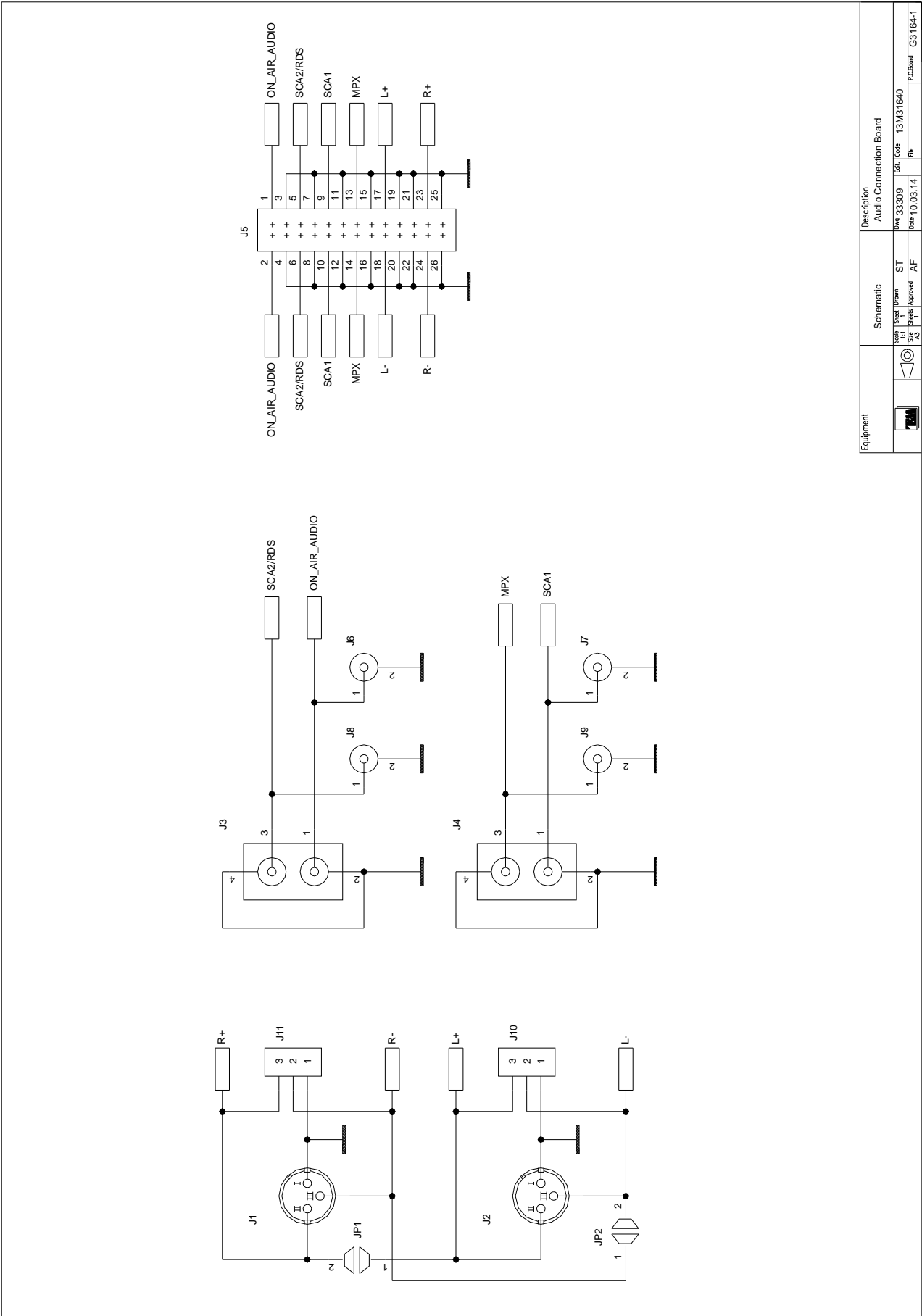
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Pag. 1

Distinta Base		Riferimenti Schema		Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
		13M31670				SWITCH MODULE KEYS		NR	1
CS001				21G31671		01 SWITCH SUPPORT MODULE PCB		NR	1
SW001	SW002	SW003	SW004	22A01230		01 PULSANTE ILLUMINATO VERDE 5GTH93522- R87651598		NR	5
SW005									
ZM001	ZM002	ZM004	ZN003	22A01240		01 CAPS PER SWITCH ILLUMINATO - 12B160LMA1		NR	4
ZM005				22A01250		01 CAPS PER SWITCH ILLUMINATO MOD 12CS16LMC2		NR	1
J001-2-3-				24XD4040		01 STRIP MALE BASSA DA CS 16 POLI		NR	1

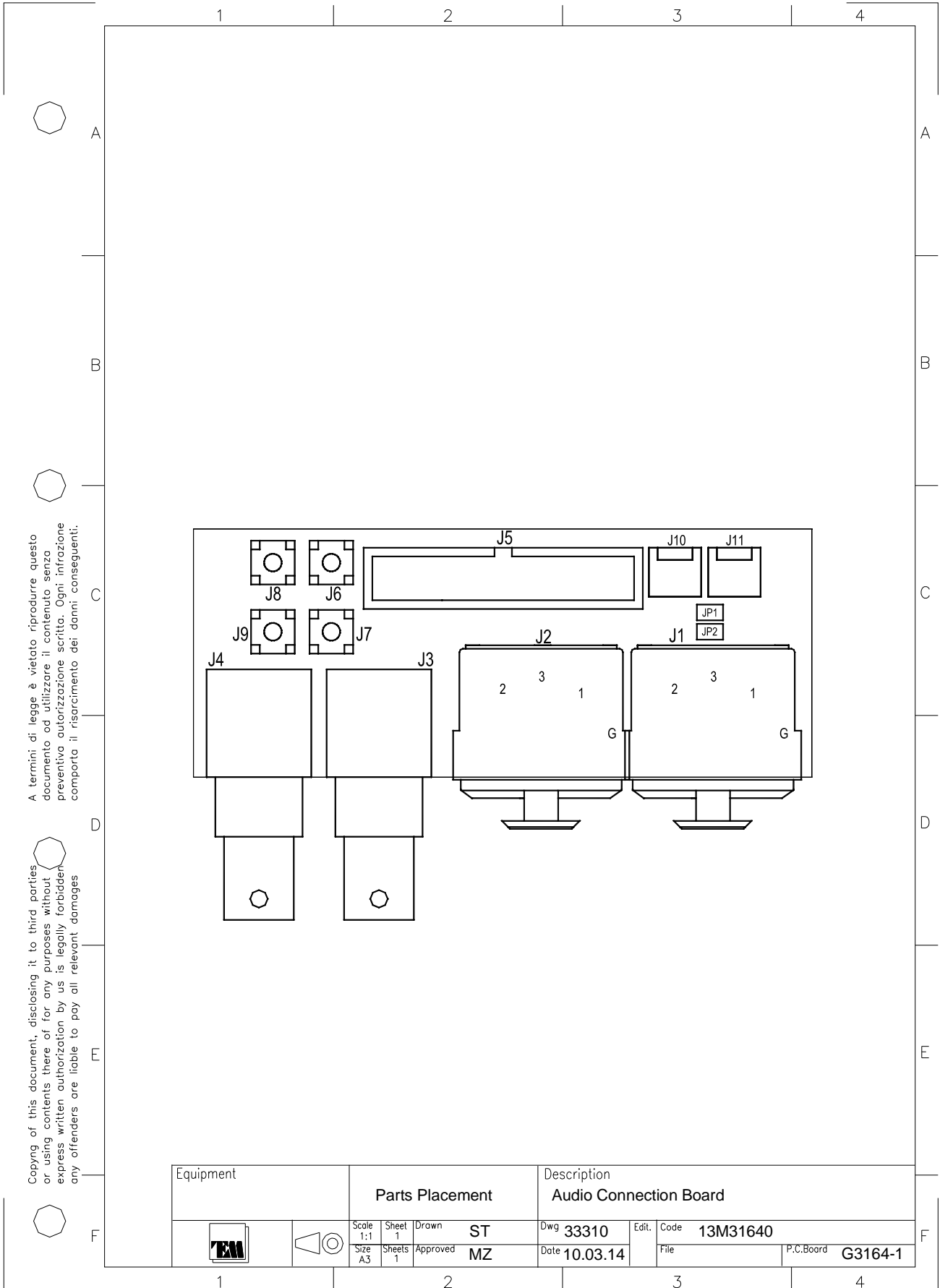
AUDIO INPUT CONNECTORS MODULE INTERFACE 13M31640

13M31640 Audio Connection Board - Schematic Diagram



Equipment	Schematic	Description
	13M31640	Audio Connection Board
Doc No	Rev	Edn
10.03.14	33309	1
Doc	Code	File
10.03.14	13M31640	GS164-1
Doc	Code	File
10.03.14	13M31640	GS164-1

13M31640 Audio Connection Board - Part Placement Layout



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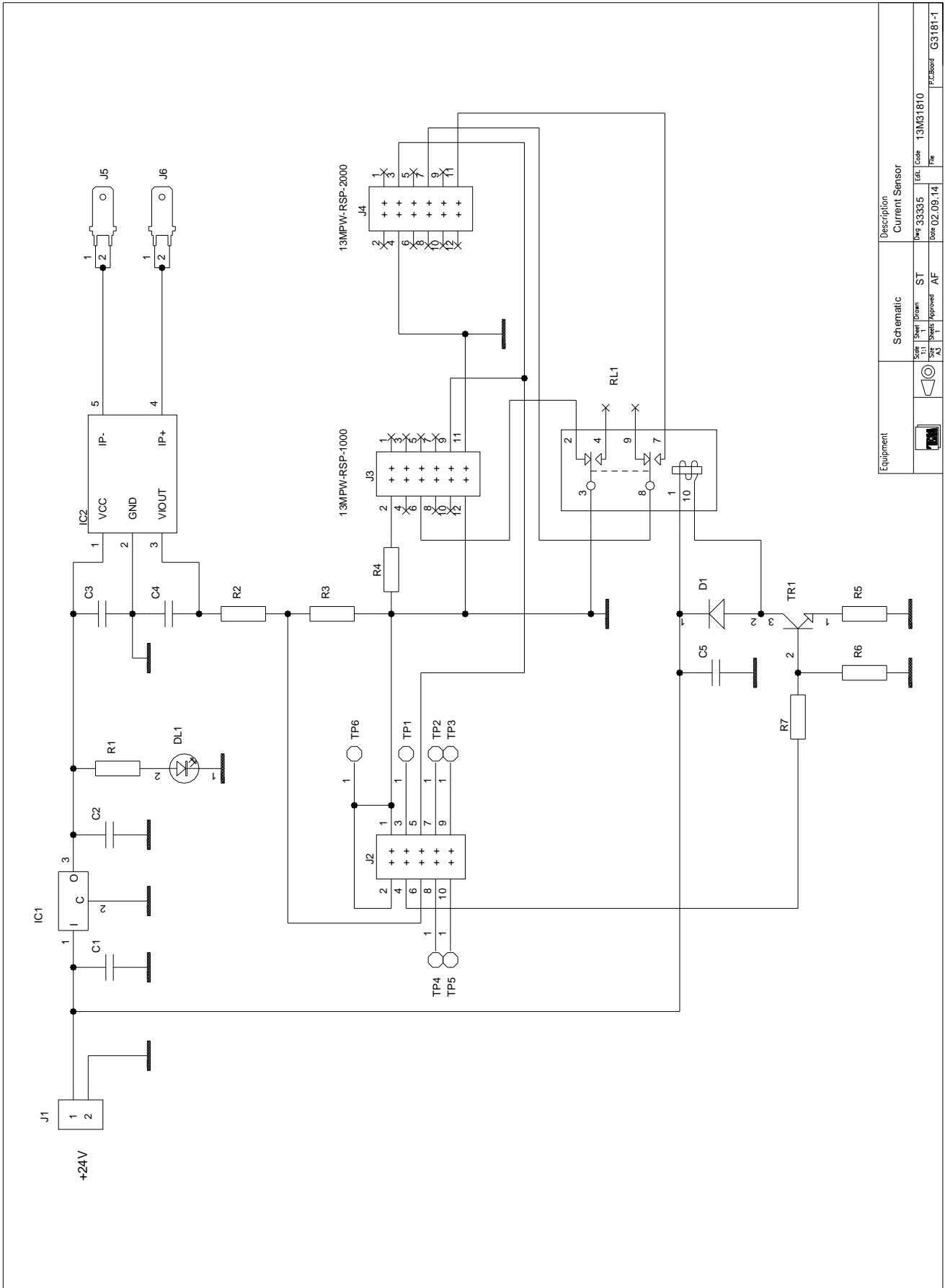
13M31640 Part List

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Pag. 1

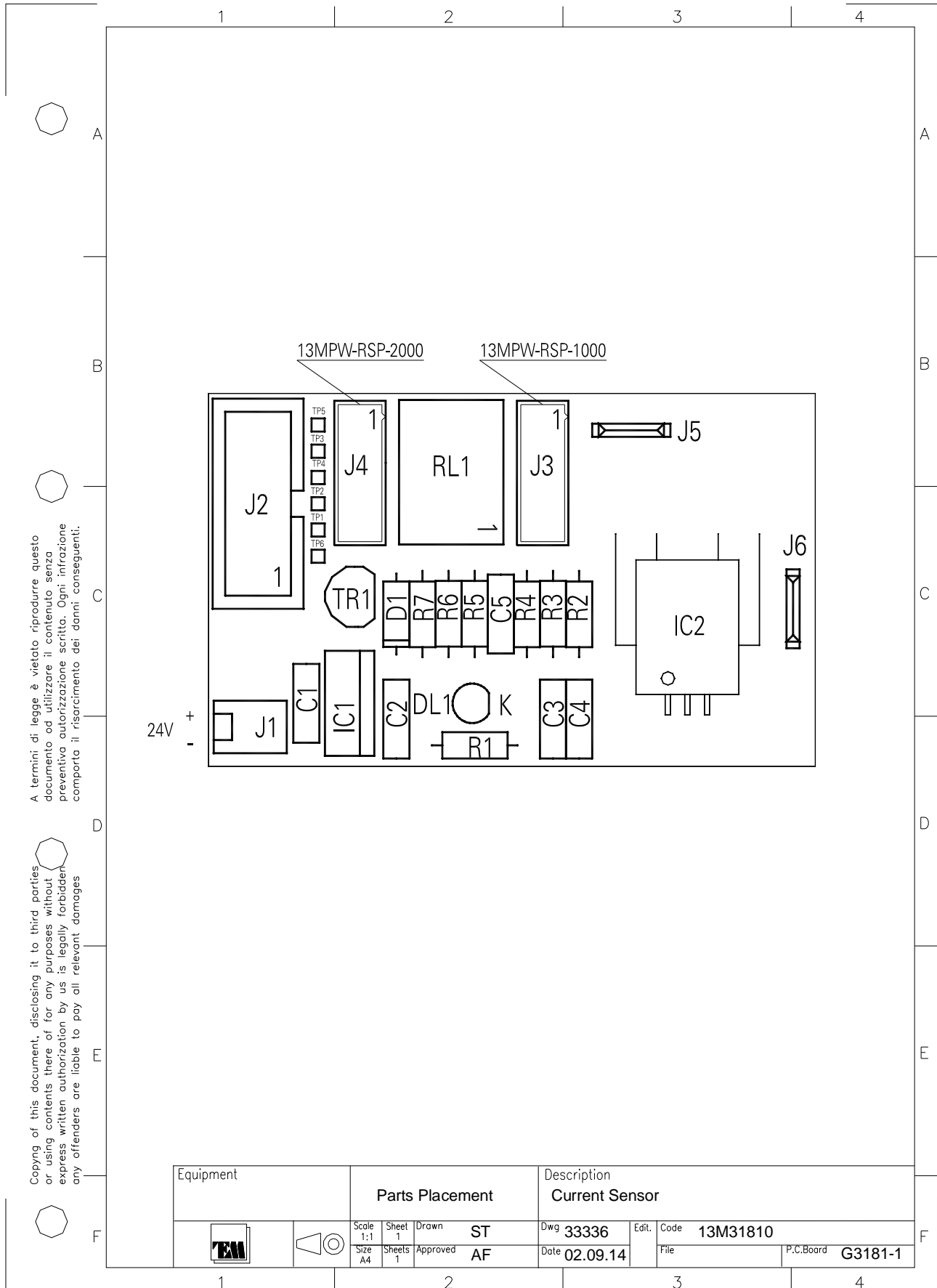
Distinta Base				Lista Parti				
Riferimenti Schema				Codice Parte	Livello	Descrizione	UM	Quantità
13M31640						AUDIO CONNECTION BOARD	NR	1
CS001			21G31641		01	AUDIO CONNECTION BOARD PCB	NR	1
J006	J007	J008	J009	24800175	01	SMB C.S.DIR.MASCH.R114 425 TC-1202-0,8-T	NR	4
J003	J004			24C00465	01	DUAL PORT BNC C.S. AMPHENOL 112561	NR	2
J010	J011			24XD1370	01	CONN.M.CS 3PIN 6410-03-A - 2.54MM	NR	2
J005				24XD2690	01	CONN. VASCH. FLATCABLE 26PIN MRC3-017-828	NR	1
J001	J002			24XD4010	01	XLR FEMALE CS NC3FAH1 FRN724518	NR	2

**RF CURRENT AMPLIFIER SENSOR
MODULE 13M31810
(2014-2019 Version)**



Equipment		Description	
[Image of Component]		Current Sensor	
Scale	Spec	Drawn	ST
1:1			
AF		Parts Approved	AF
Date: 02.09.14		Rev: 33335	
Part Code: 13M31810		File	
Revision: G3181-1			

13M31810 RF Current Amplifier Sensor - Part Placement Layout



13M31810 Part list

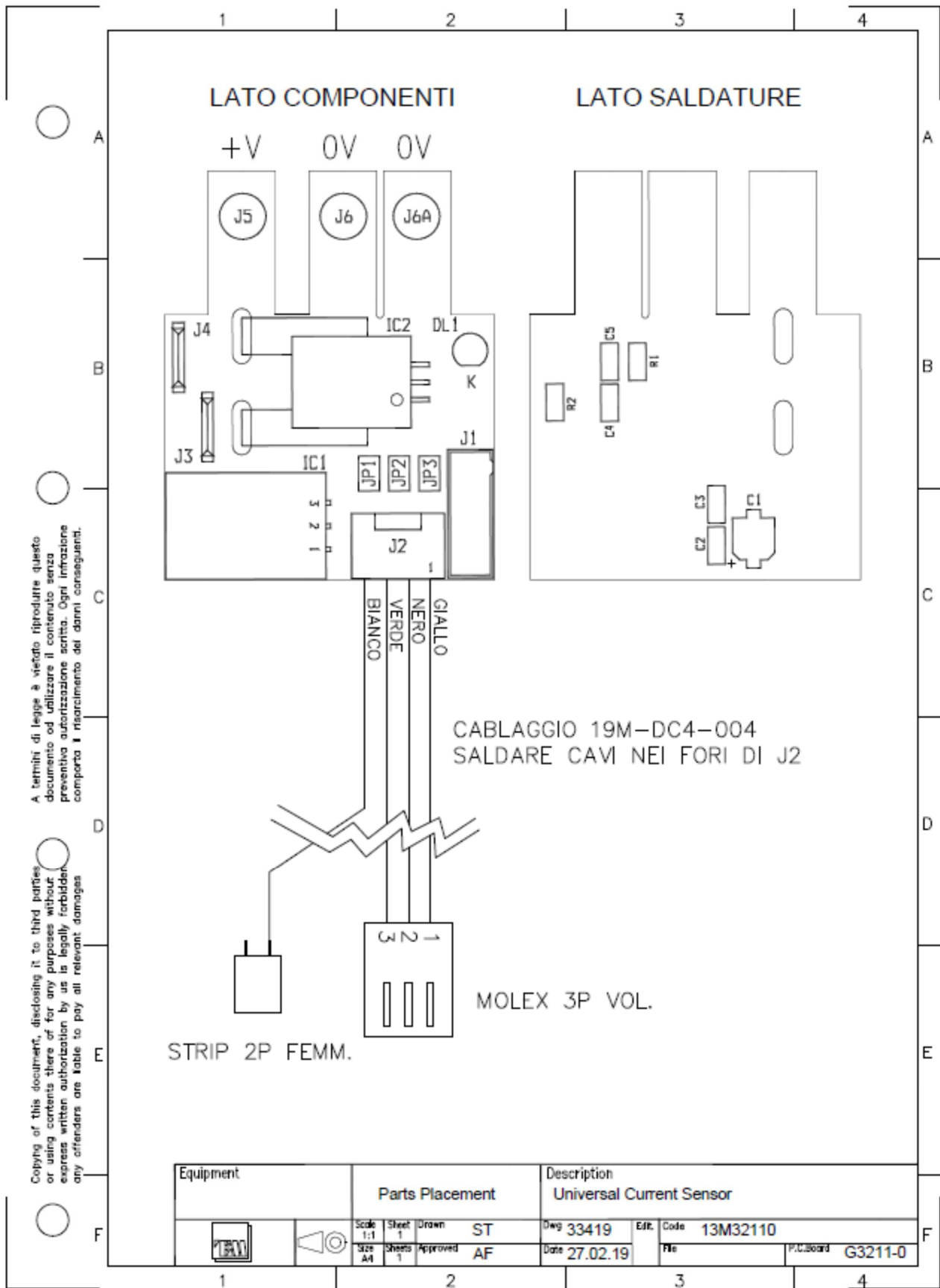
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Pag. 1

Distinta Base				Lista Parti				
Riferimenti Schema	Codice Parte	Livello	Descrizione	UM	Quantità			
13M31810				NR	1			
				CURRENT METER SENSOR				
CS001	21G31811	01	CURRENT SENSOR PCB MODULE	NR	1			
J002	24XD1930	01	CONN.VASCH.10PIN C.S.MRC3-017-820	NR	1			
J001	24XD2560	01	CONN.M.CS 2PIN 6410-02-A	NR	1			
J003	J004	24XD4130	01	CONN.VASCH. JST 12PIN C.S.PAS802 FRN1830789	NR	2		
DL001	30000020	01	LED VERDE mm3 L-934GD MRC 1-057-502	NR	1			
J005	J006	32A00220	01	MASCHIO FASTON FRN 4215618	NR	2		
ZM001	ZM002	3609089010	01	COLONN.FF3H10 MRC 2-039-055	NR	2		
RL001	40001620	01	RELE' TQ2-24V	NR	1			
D001	43A00030	01	DIODO RETTIFICATORE 1N4148 MRC 1-004-800	NR	1			
Q001	44A01780	01	TRANSIST. NPN 2N3904	NR	1			
IC002	44C01190	01	AC8756KCA HALL EFF.CURRENT SENSOR FRN211-2639	NR	1			
IC001	44E00100	01	INTEG. REG. LM 7805 T TO220	NR	1			
C001	C002	C003	C004	CCPSM0631L1009	01	COND.CER.PIAS. 100nF 63V MRC 3-022-446	NR	5
R003	R006	N0000	01	COMPONENTE NON MONTATO	NR	2		
R002	R004	RB000032	01	RESISTENZA 0 OHM 1/4W 5%	NR	2		
R007	RB100032	01	RESIST.100 OHM 1/4W 5%	NR	1			
R005	RB100A32	01	RESIST. 10 OHM 1/4W 5%	NR	1			
R001	RB150132	01	RESIST. 1.50 kOHM 1/4W 5%	NR	1			

**RF CURRENT AMPLIFIER SENSOR
MODULE 13M32110
(2019→Universal Version)**

13M32110 Universal RF Current Amplifier Sensor – Pert Placement Layout



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13M32110 Part List

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Pag. 1

Distinta Base

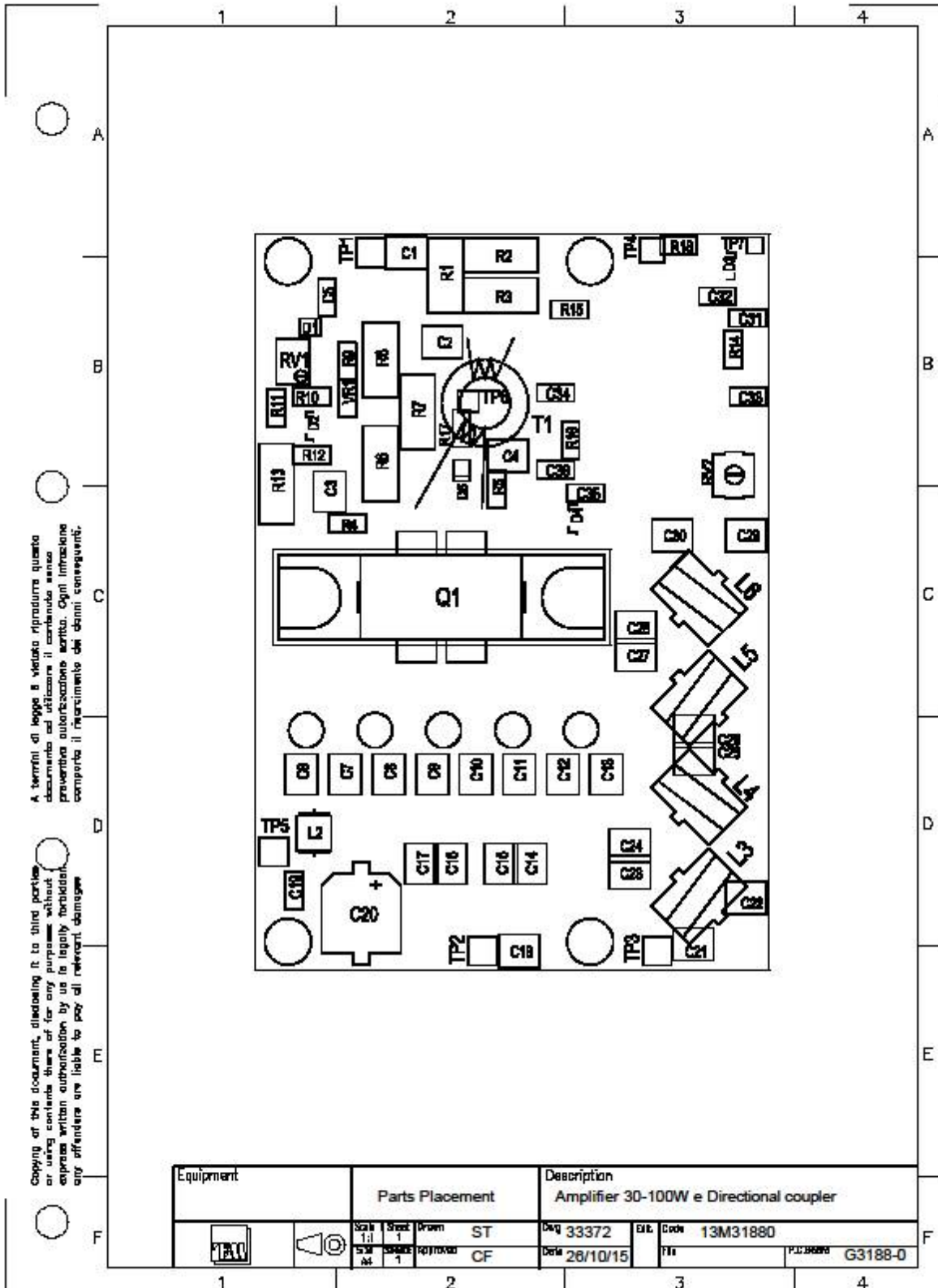
Lista Parti

Riferimenti Schema	Codice Parte	Livello	Descrizione	UM	Quantità		
	13M32110		UNIVERSAL CURRENT SENSOR	NR	1		
KIT001	13KCOMP13M32110	0	KIT TERZISTA UNIVERSAL CURRENT SENSOR	NR	1		
JC001	19M-DC4-004	0	CAVO QUADRIPOLARE SEMI INTESTATO	NR	1		
CS001	21G32110	0	CS UNIVERSAL CURRENT SENSOR	NR	1		
J001	24X04130	0	CONN.VASCH. JST 12PIN C.S.PASSO2 FRN1830789	NR	1		
IC002	44C01210	0	ACS770LCB-050B-HALL EFF.CURRENT SENSOR RS 866-071	NR	1		
IC001	44E00790	0	R-78HB5.0-05 - 9->72 TO5V0 SW.REG. RS 416-874	NR	1		
J002	J003	J004	N0000	0	COMPONENTE NON MONTATO	NR	3

**RF20-50-100-200-250W POWER
AMPLIFIER
MODULE 13M3188B-C**

13M31880B-C RF 20-50-100-200-250W Power Amplifier Module—Parts Placement Layout

Note1: The diagram below is a representative of the 13M3188 Family amplifier used also in other RF power levels



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Equipment		Parts Placement		Description			
				Amplifier 30-100W e Directional coupler			
		Scale	Sheet	Drawn	ST	Doc	33372
		Scale	Sheet	Checked	CF	Date	28/10/15
				Code	13M31880		
				File	G3188-0		

13M31880B - Part list

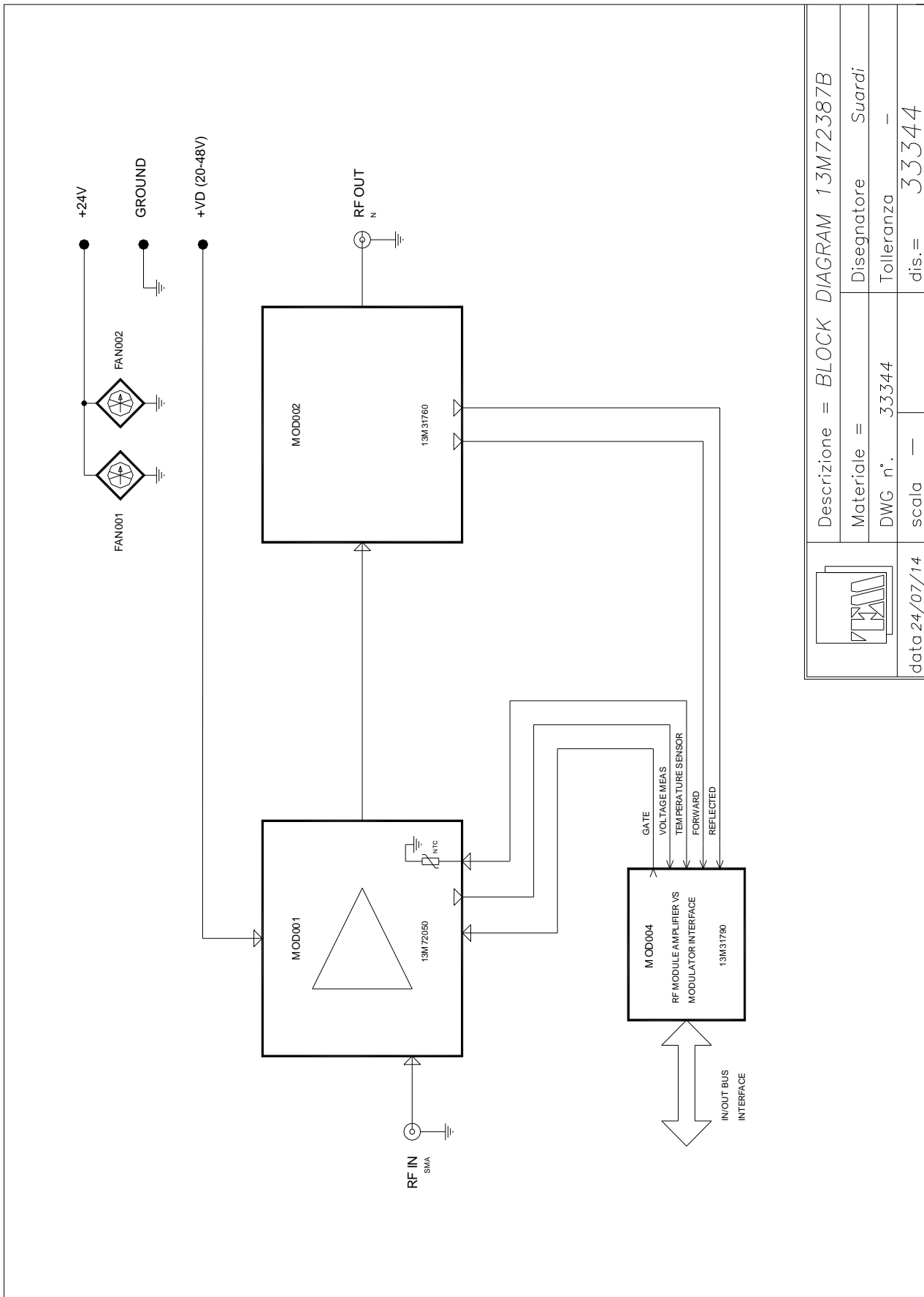
Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 06-02-2017 10:30


Pag. 1

Distinta Base		Lista Parti				UM	Quantità
Riferimenti	Schema	Codice Parte	Livello	Descrizione			
		13M31880B		20 TO 100W RF MODULE AMPLIFIER	NR	1	
MOD002		13M31790	0	EASY INTERFACE CONTROL SIGNAL AMPLIFIER	NR	1	
MOD001		13M31880	0	20 TO 250W RF BASIC MODULE AMPLIFIER	NR	1	
		19R178XXCDXXCD008	0	CAVO RG178 CODINO A SILDARE-CODINO A SALD	NR	2	
		19R178XXCDXXCD026	0	CAVO RG178 CODINO A SILDARE-CODINO A SALD	NR	1	
		19R178XXCDXXCD034	0	CAVO RG178 CODINO A SILDARE-CODINO A SALD	NR	2	
NTC001		22A01030	0	NTC (DISCO) K164/2,2K 5% RS191-2241	NR	1	
C001	C002	23100030	0	COND. 1K VITE-2425-001-XSU-102P (1250-003)	NR	2	
J001		24A00225	0	SMA PAN.FEMM.R124 464 270	NR	1	
J003		24B00045	0	SMB PANN.FIL POST.R114 553 TC-1210-T	NR	1	
J002		24N00075	0	N PAN. FEM.FL.Q.RID. AMPH. N6551E1-NT3G-50	NR	1	
ZM001		36071260	0	DISSIPATORE AMPLIFIER 20 TO 200W	NR	1	
ZM002		36071270	0	TESTATA INPUT AMPLIFIER 20 TO 200W	NR	1	
ZM003		36071280	0	TESTATA OUTPUT AMPLIFIER 20 TO 200W	NR	1	
ZM004		36071290	0	COPERCHIO AMPLIFIER 20 TO 200W	NR	1	
ZM006	ZM007	3609088008	0	COLONN MF3H08 COD-UD10E3050 08 MRC02-039-	NR	2	
Q001		44A02404	0	MOSFET FREESCALE MRF65VP5150NR1 TO270WE	NR	1	
ZM005		44A02406	0	CLAMPING DEVICE FOR MOSFET TO270WE	NR	1	

**RF 300-400- 500W POWER
AMPLIFIER MODULE 13M72387B**

RF 100-200-250-300-400-500W Power Amplifier - Block Diagram 13M72387B



				Descrizione = <i>BLOCK DIAGRAM 13M72387B</i>			
		Materiale =		Disegnatore <i>Suardi</i>			
		DWG n° <i>33344</i>		Tolleranza <i>-</i>			
		scala <i>-</i>		dis. = <i>33344</i>			
data 24/07/14							

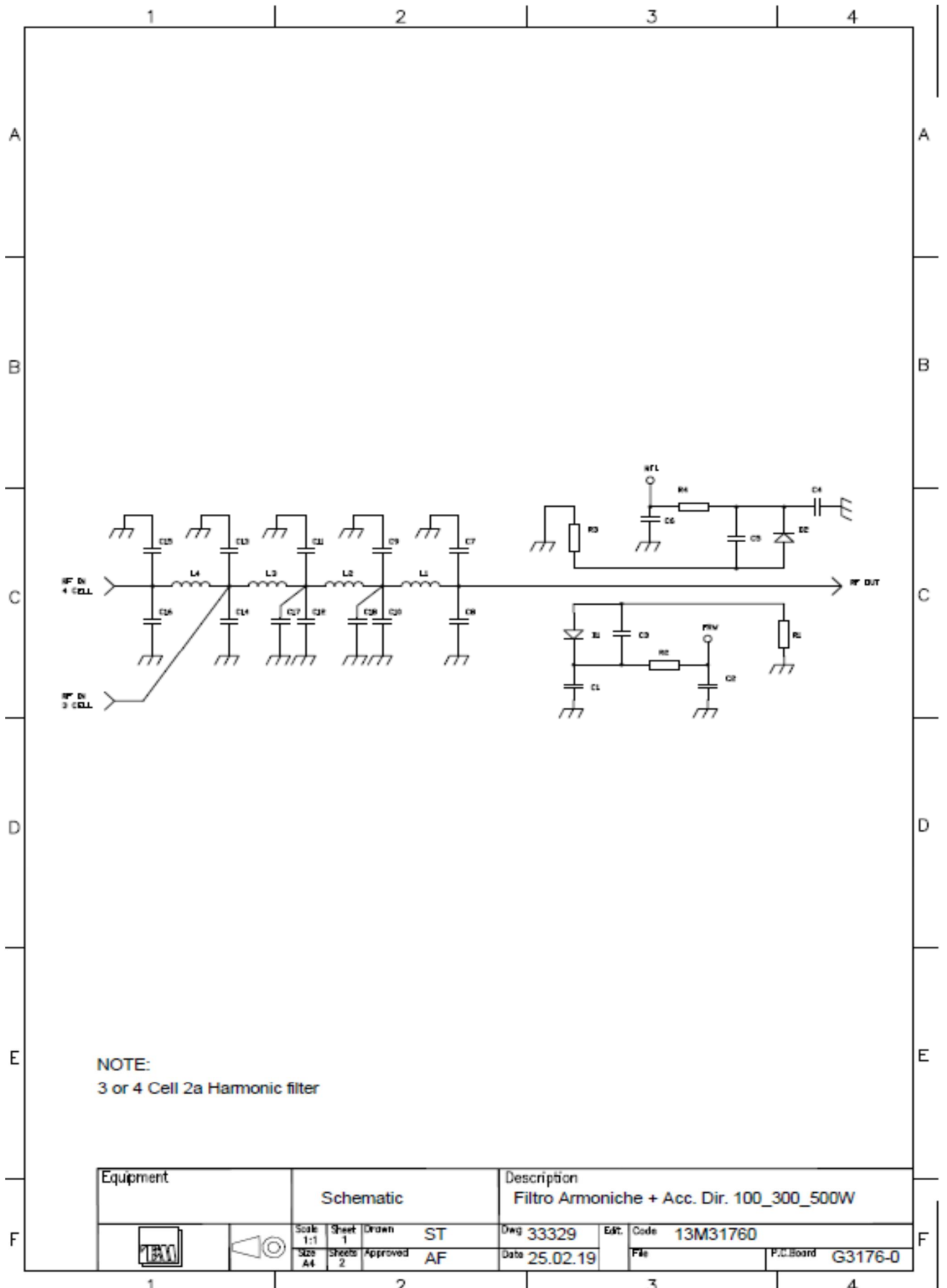
13M72387B Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 05-11-2014 14:05

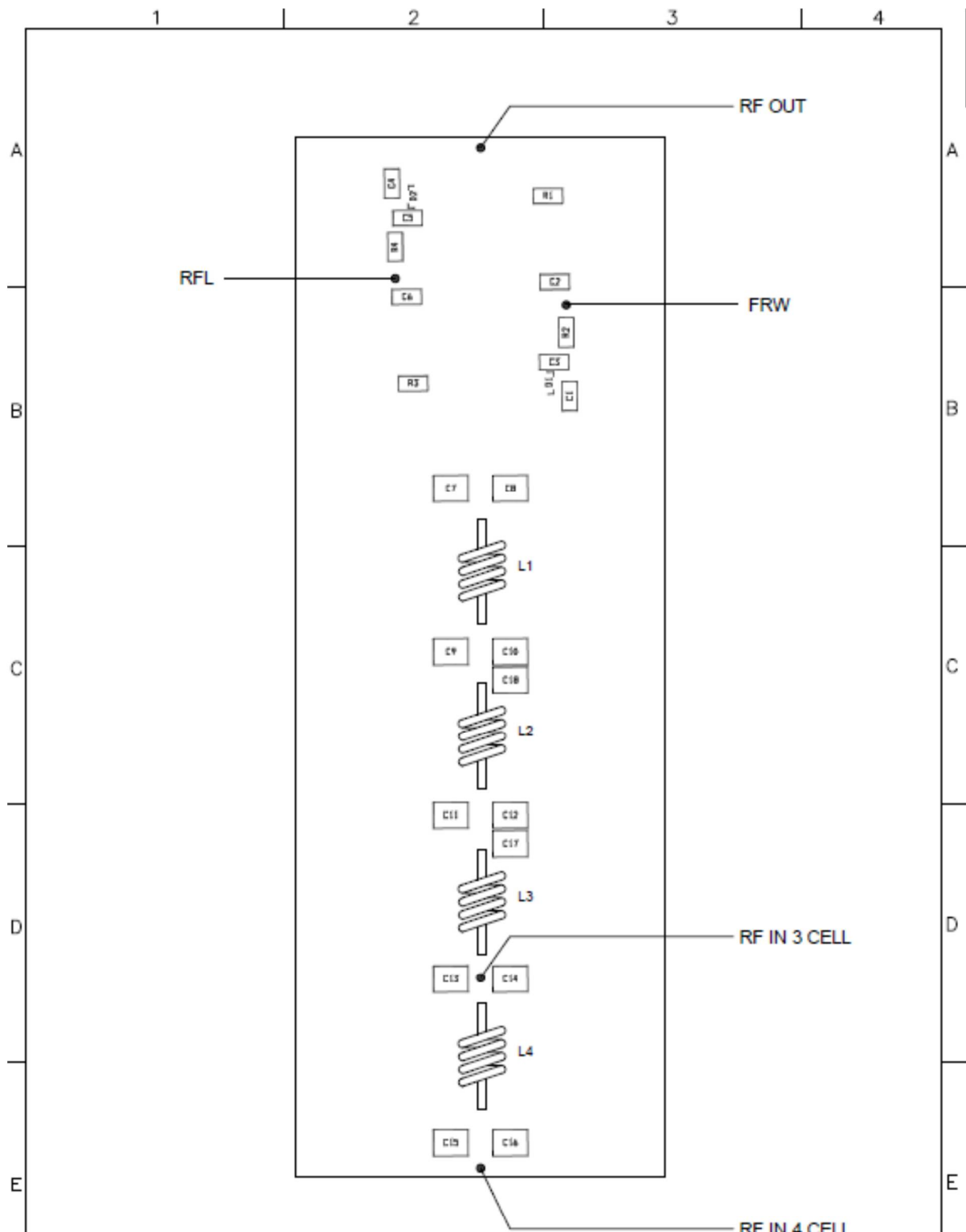
Pag. 1

Distinta Base				Lista Parti			
Riferimenti Schema	Codice Parte	Livello	Descrizione	UM	Quantità		
	13M72387B		FM 100/300/500W AMPLIFIER MODULE (1UNIT)	NR	1		
MOD001	13M31760	01	FM HARMONICS FILTER & DIRECTIONAL COUPLER 500W	NR	1		
MOD003	13M31790	01	EASY INTERFACE CONTROL SIGNAL AMPLIFIER	NR	1		
MOD002	13M720500	01	500W FM PALLET AMPLIFIER	NR	1		
CP001	CP002	23100030	COND. 1K VITE-2425-001-X5U-102P (1250-003)	NR	2		
J001		24A00225	SMA PAN.FEMM.R124 464 270	NR	1		
J002		24N00075	N PAN. FEM.FL.Q.RID. AMPH. N6551E1-NT3G-50	NR	1		
ZM005		36067131	SUPPORTO RESISTENZE DI RETROAZIONE	NR	1		
ZM001		36070651	DISSIPATORE AMPLI 100/300/500W NEW	NR	1		
ZM002		36070661	TESTATA INGRESSO AMPLI 100/300/500W 13M72387B	NR	1		
ZM003		36070670	TESTATA USCITA AMPLI 100/300/500W NEW	NR	1		
ZM004		36070680	COPERCHIO MODULO AMPLI 100/300/500W NEW	NR	1		
ZM006	ZM007	49V00720	GRIGLIA PER VENTOLA 40X40 MFD40-13	NR	2		
FAN001	FAN002	49V00740	VENTOLA 40X40 24V 0.18A 25MQH	NR	2		

13M31760 FM HARMONICS FILTER & DIRECTIONAL COUPLER - Schematic Diagram



13M31760 FM HARMONICS FILTER & DIRECT. COUPLER - Parts Placement Layout



NOTE:
3 or 4 Cell 2a Harmonic filter

Equipment		Parts Placement		Description FILTRO ARMONICHE + ACC. DIR. 100/500W			
		Scale 1:1	Sheet 1	Drawn ST	Dwg 33328	Edt.	Code 13M31760
		Size A4	Sheets 2	Approved AF	Date 25.02.19	File	P.C.Board G3176-0

13M31760 Part list

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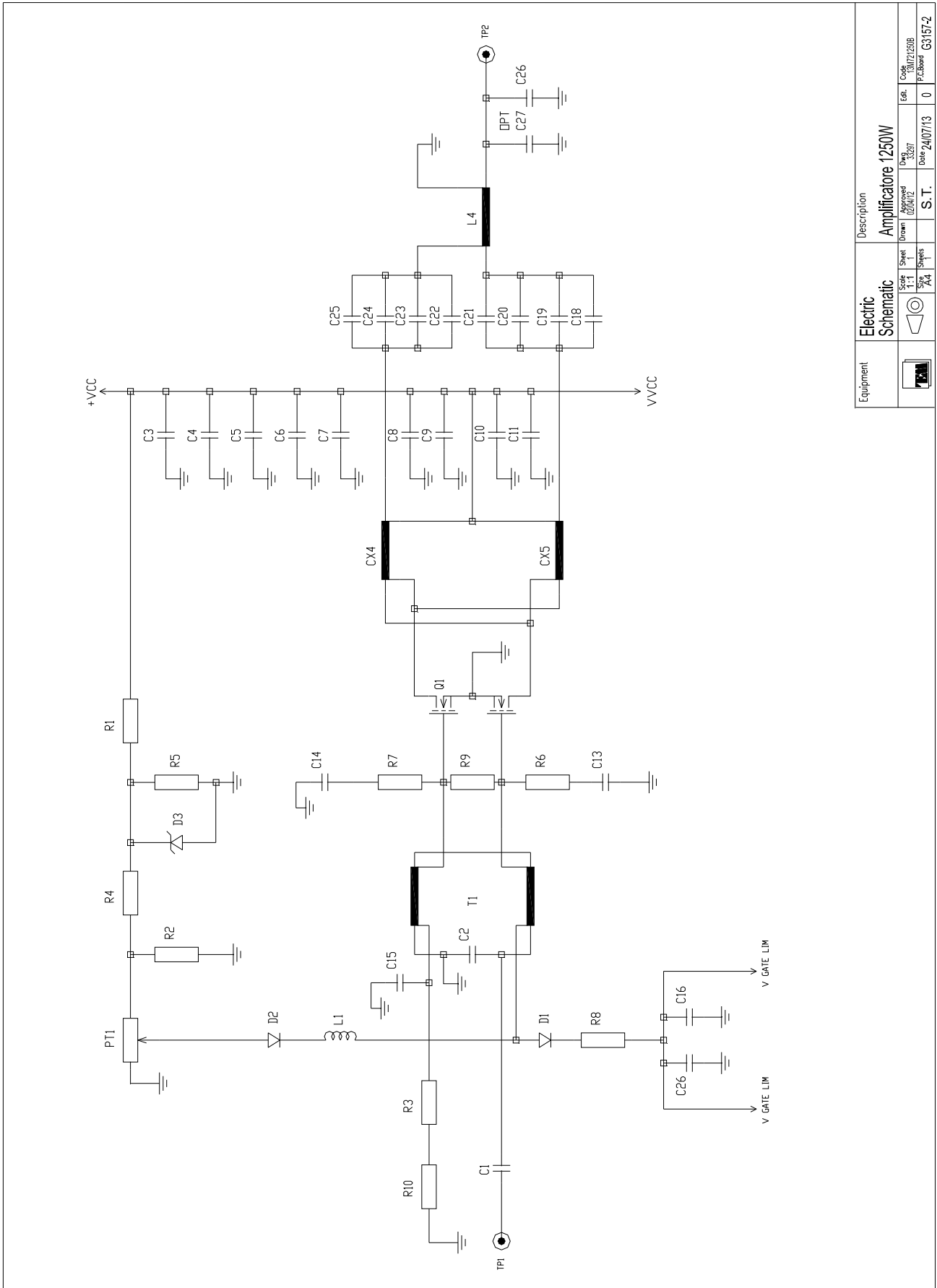
Pag. 1

Distinta Base

Lista Parti

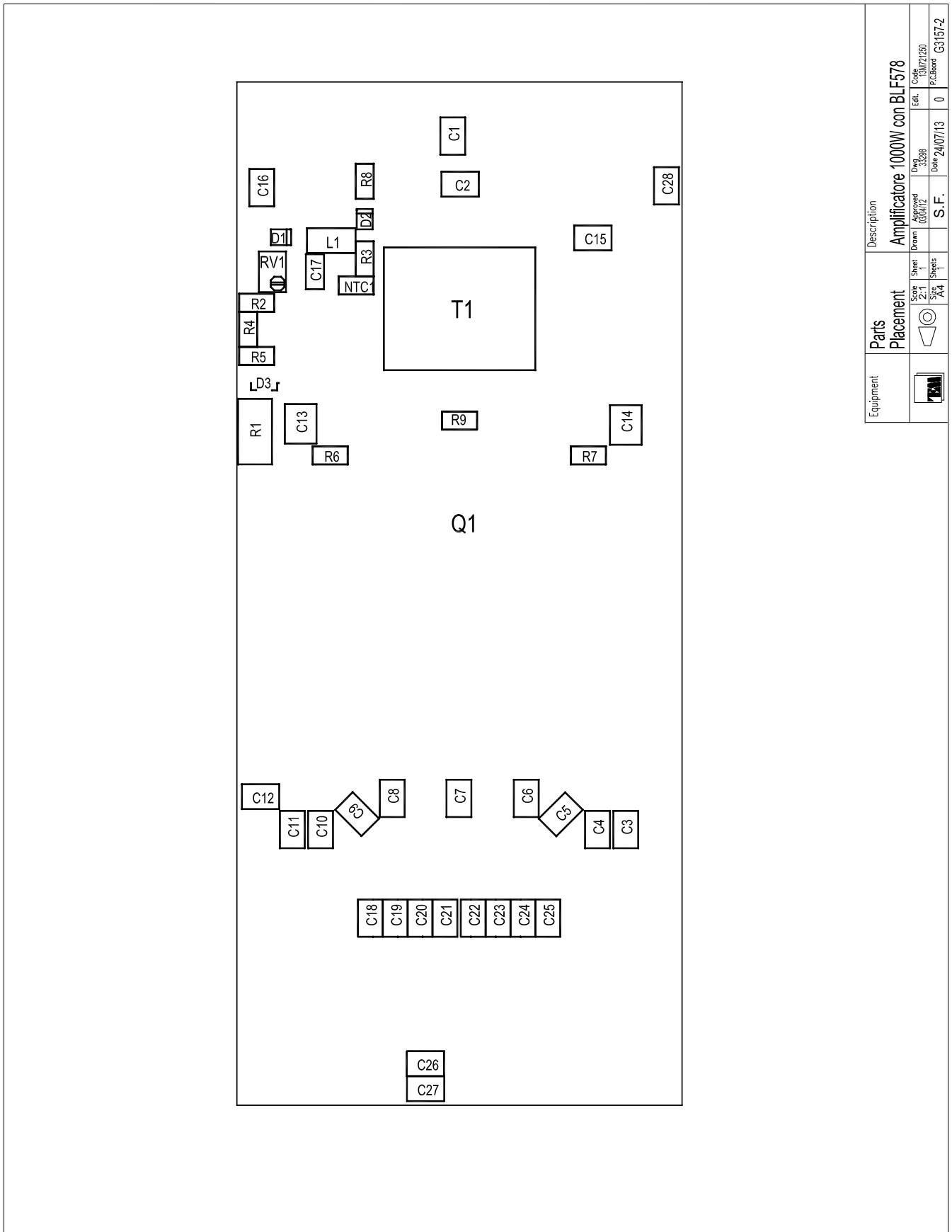
Riferimenti Schema	Codice Parte	Livello	Descrizione	UM	Quantità			
	13M31760		FM HARMONICS FILTER & DIRECTIONAL COI	NR	1			
KIT001	13KCOMP13M31760	0	KIT TERZISTA FM HARMONICS FLT & DIRECT COUPLER500	NR	1			
CS1	21G31760	0	CS FILTRO ARMONICHE + ACC. DIREZ. 100/300/500W	NR	1			
L001	L003		29AOB10550	0	BOBINA SPECIFICA 1055	NR	2	
L002			29AOB10560	0	BOBINA SPECIFICA 1056	NR	1	
C001	C002	C004	C006	CACTE05033100L	0	COND.CER.CHIP HQ 1000pF 50V	NR	4
C007	C009	C010	C011	CACTE50033270N1	0	COND.CER.CHIP HQ 27PF 500V TOLL.1%	NR	6
C012	C013							
C014	C017	C018		CACTE500XX680P	0	COND.CER.CHIP HQ-B 6.8pF 500V ATC 100B6R8JT500XT	NR	3
C008	C015	C016	L004	N0000	0	COMPONENTE NON MONTATO	NR	4
D1	D2			SM43A018	0	DIODO SCHOTTKY HSMS2800 (SOT23) RS 812-0540	NR	2
R1				SMRB150033	0	RES.SMD 150 OHM 1/2W 5% 2010	NR	1

13M720500 500W FM PALLET AMPLIFIER- Schematic Diagram



Equipment	Electric Schematic	Description	Amplificatore 1250W
	Sheet 01 of 02	Drawn	02/07/13
	Sheet 01 of 02	Eng	02/07/13
	Sheet 01 of 02	Gen.	02/07/13
	Sheet 01 of 02	Date	24/07/13
	Sheet 01 of 02	PC Board	G3157-2
	Sheet 01 of 02	S.T.	0

13M720500 500W FM PALLET AMPLIFIER- Parts Placement Layout



Equipment	Parts Placement	Description			
		Amplificatore 1000W con BLF578			
Equipment	Parts Placement	Drawn	Checked	Eng.	Comp.
		06/01/12	06/01/12	06/01/12	06/01/12
Equipment	Parts Placement	Sheet	Revis	Date	Rev.
		A4	0	24/07/13	0
		S.F.		G3157-2	

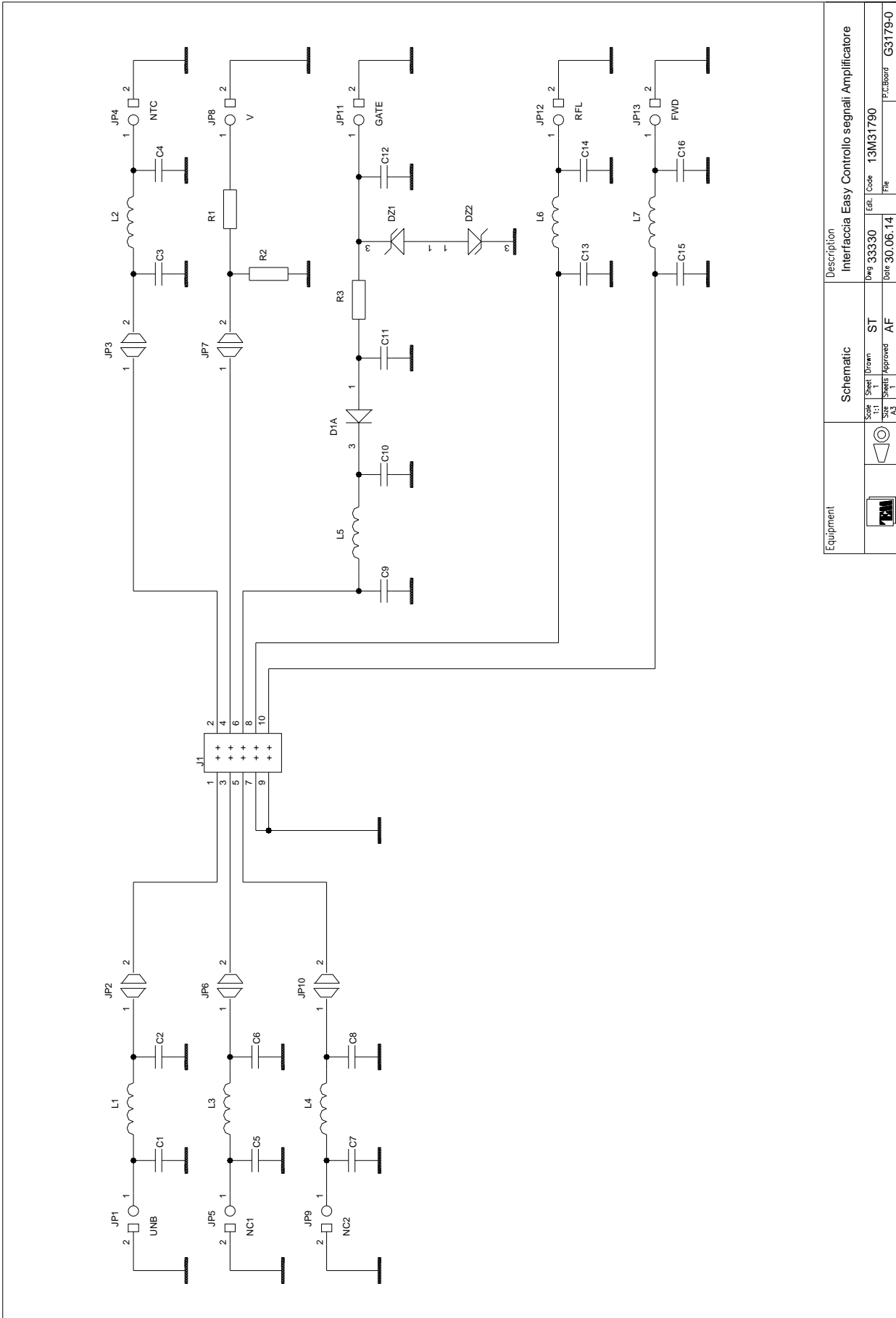
13M720500 Part list

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Pag. 1

Distinta Base Riferimenti Schema				Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità						
13M720500						500W FM PALLET AMPLIFIER		NR	1						
CS1				21G31572	01	CS X PALLET 13M721250		NR	1						
R010				22A01200	01	NTC SMD 10K RS191-2342 FRN679-549		NR	1						
T001				29A0810400	01	BOBINA SPECIFICA 1040		NR	1						
L002	L003			29A0810410	01	BOBINA SPECIFICA 1041		NR	2						
L004				29A0810570	01	BOBINA SPECIFICA 1057		NR	1						
L001				29C01030	01	INDUTT. CHOKE VEMATRON 1955 D1RN1 A62		NR	1						
ZM004	ZM005	ZM006	ZM007	36069740	01	RONDELLA ISOLANTE TEFLON		NR	4						
Q001				44A02402	01	MOSFET BLF174XR NXP-PHILIPS		NR	1						
C001	C003	C004	C005	CACTE05033100L	01	COND.CER.CHIP HQ 1000pF 50V		NR	26						
C006	C007	C008	C009												
C010	C011	C012	C013												
C014	C015	C016	C018												
C019	C020	C021	C022												
C023	C024	C025	C028												
C029	C030														
C026	C027									CACTE50033180N	01	COND.CER.CHIP HQ 18pF 500V		NR	2
C002										CACTE50033270N	01	COND.CER.CHIP HQ 27pF 500V		NR	1
R009				RB560A35	01	RESIST. 56.00 OHM 2W 5% RS 707-8811		NR	1						
D001	D002			SM43A039	01	DIODO BAT42 MINIMELF RS6870864		NR	2						
D003				SM43D023	01	DIODO ZENER 7.5V SOT23 RS6878206		NR	1						
C017				SMCE010NFD63	01	COND.CER.NPO 10nF 63V SMD 1206		NR	1						
R002	R004	R005		SMRB15013A	01	RES.SMD 1,5K OHM 5% 1/10W 0805		NR	3						
R008				SMRB220032	01	RES.SMD 220 OHM 5% 1/4W 1206		NR	1						
R001				SMRB330134	01	RES.SMD 3,3K OHM 5% 1W 2512		NR	1						
R003				SMRB47013A	01	RES.SMD 4,7K OHM 5% 1/10W 0805		NR	1						
R006	R007			SMRB470A32	01	RES.SMD 47 OHM 1/4W 5% 1206		NR	2						
PT001				SMRE0008	01	POTENZ.5K OHM MULT. SMD RS 669-6682 FRN 1520662		NR	1						

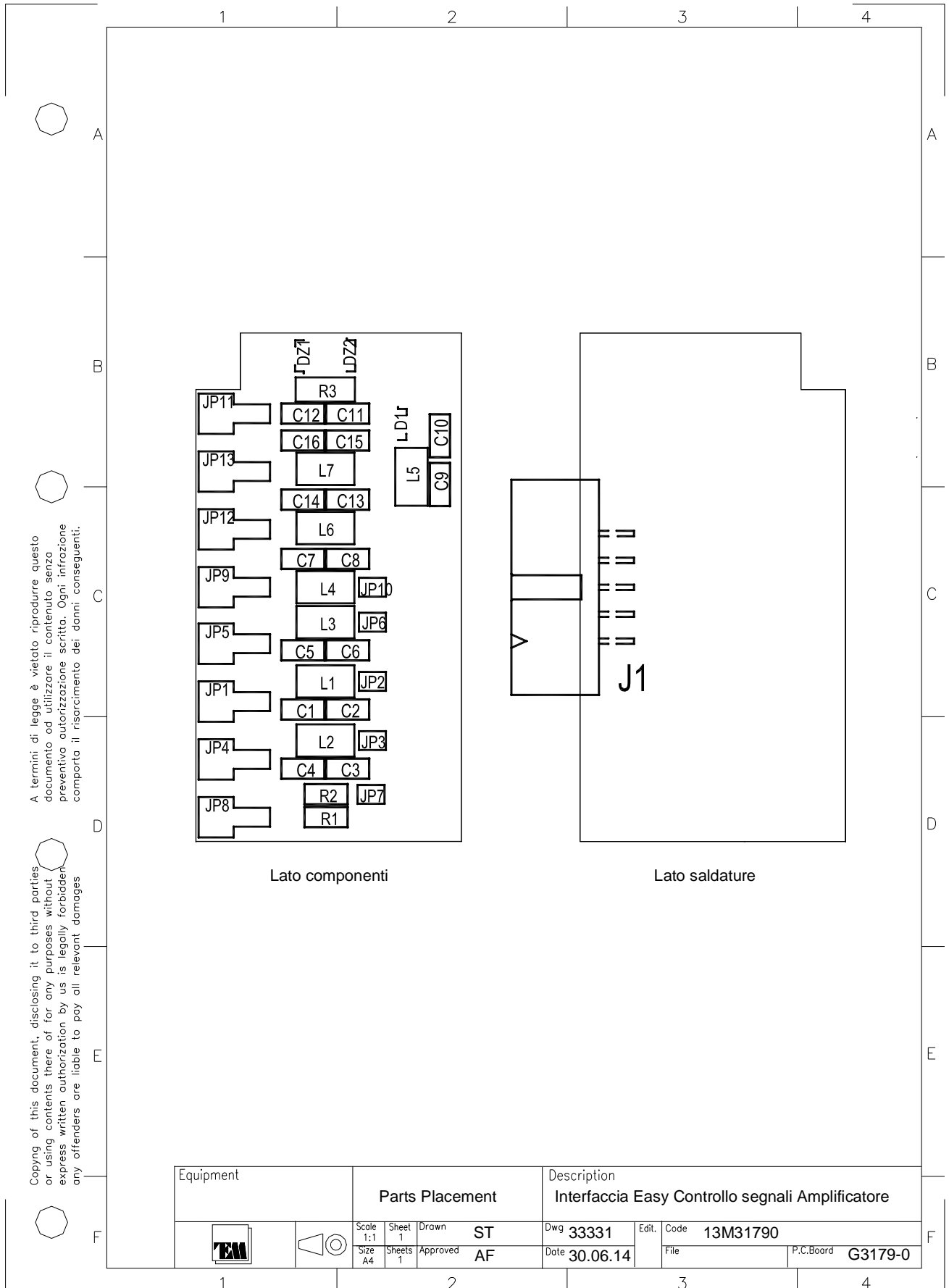
13M31790 EASY INTERFACE CONTROL SIGNAL AMPLIFIER - Schematic Diagram



Equipment	Description
	Interraccia Easy Controllo segnali Amplificatore
	Dwg 33330
	Edi. Code 13M31790
	Date 30.06.14
	File
	P.C.Board G3179-0

Schematic	Sheet	Drawn	ST
	L1		
	A3		
			AF

13M31790 EASY INTERFACE CONTROL SIGNAL AMPLIFIER - Parts Placement Layout



13M31790 Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 17-09-2014 13:15

Pag. 1

Distinta Base Riferimenti Schema				Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
13M31790						EASY INTERFACE CONTROL SIGNAL AMPLIFIER		NR	1
CS001				21G31790	01	CS INTERFACCIA EASY CONTROLLO SEGNALI AMPLIFICAT.		NR	1
J001				24X02980	01	CONN.CS90q 10PIN CO4-10AG1-10		NR	1
L001 L005	L002 L006	L003 L007	L004	SM29A035	01	IND. 1uH 10% SIMD02 1210 FRNL 3877190RL		NR	7
D001				SM43A001	01	DIODO A COPPIA BAV 70 SMD		NR	1
D2001	D2002			SM43D011	01	DIODO ZENER 4,7V 1/2W BZX84		NR	2
C012				SMCE1050210093	01	COND.CER. 100nF COG 50V 0805		NR	1
C001 C005 C009 C014	C002 C006	C003 C007 C011 C016	C004 C008 C013	SMCE10502100L3	01	COND.CER. 1nF COG 50V 0805		NR	15
R002				SMRB18013A	01	RES.SMD 1,8K OHM 5% 1/10W 0805		NR	1
R001				SMRB18023A	01	RES.SMD 18K OHM 5% 1/10W 0805		NR	1
R003				SMRB220032	01	RES.SMD 220 OHM 5% 1/4W 1206		NR	1

**RF HIGH GAIN 500W POWER AMPLIFIER
MODULE 13M72387AHG
(OPT)**

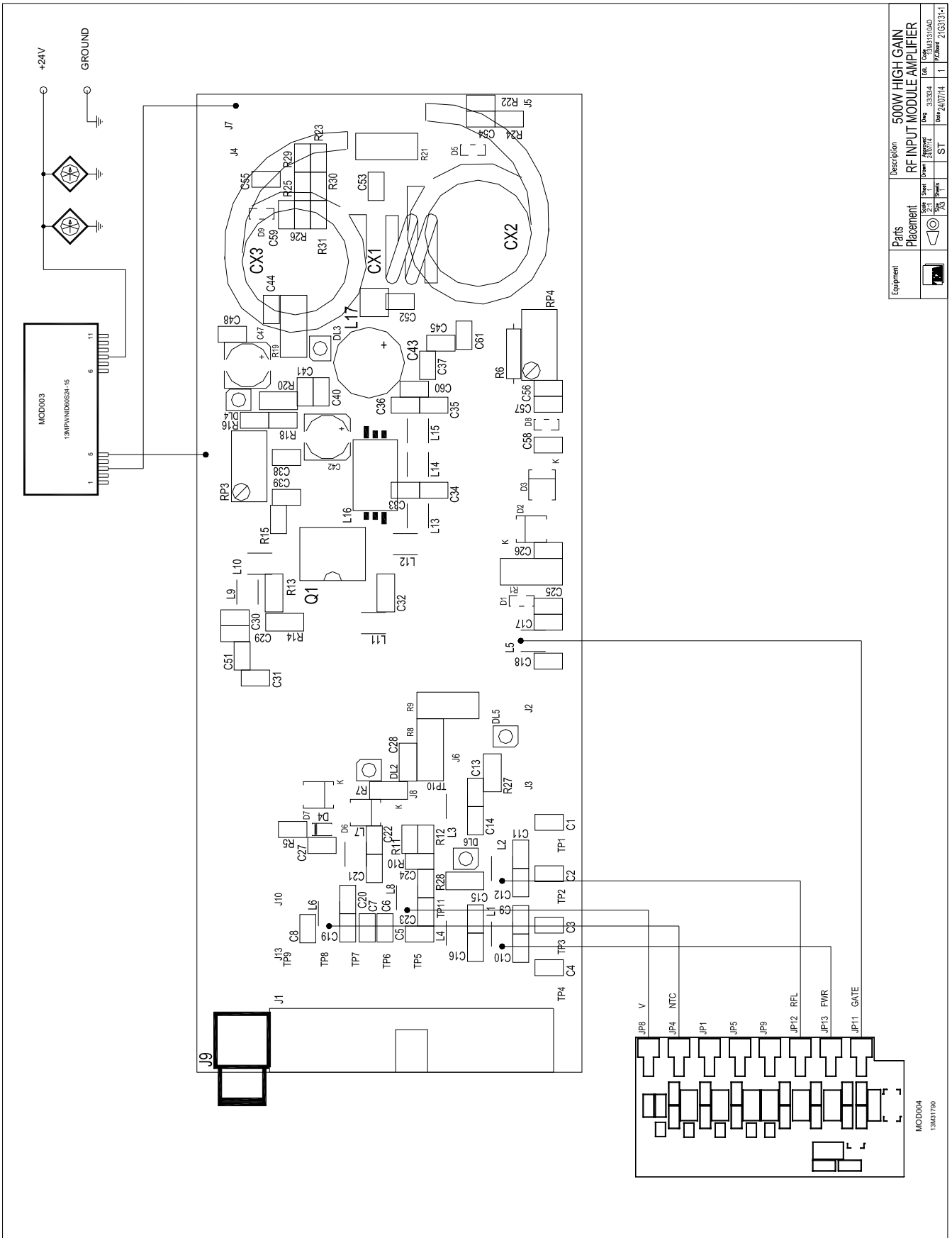
13M72387AHG Part list

Az.:005 TELECOMUNICAZIONI ELETTR. MILANO SRL 12-11-2014 10:09

Pag. 1

Distinta Base					Lista Parti		
Riferimenti	Schema	Codice Parte	Livello	Descrizione		UM	Quantità
		13M72387AHG		500W RF AMPLIFIER HIGH GAIN VERSION		NR	1
MOD001		13M1310AD	01	SCHEDA ING. MOD. 500W 13M72387A DRIVER		NR	1
MOD002		13M1321A	01	SCHEDA USCITA MOD. 500W 13M72387A 2AV.		NR	1
MOD004		13M1790	01	EASY INTERFACE CONTROL SIGNAL AMPLIFIER		NR	1
MOD003		13MPWNDS24-15	01	DC-DC CONV. 60W MEAN.20-50 TO 15		NR	1
ZM001		36069432	01	PRESSORE MOSFET 600-800-1000W		NR	1
KIT001		36K00242	01	KIT MECCANICO AMP.FM.100/300W 1 UNITA'		NR	1
Q001		44A02401	01	MOSFET BLF178XR NXP-PHILIPS		NR	1

13M31310AD RF High Gain Amplifier Input Board - Parts Placement Layout



Equipment	Parts Placement	Description	500W HIGH GAIN RF INPUT MODULE AMPLIFIER
Sheet No.	Sheet	Drawn	Rev
73	73	24/07/14	1
Doc No.	Doc	Proj No.	Proj Name
2163131-4	2163131-4	2163131-4	2163131-4

MOD004
13M31790

13M31310AD Part list

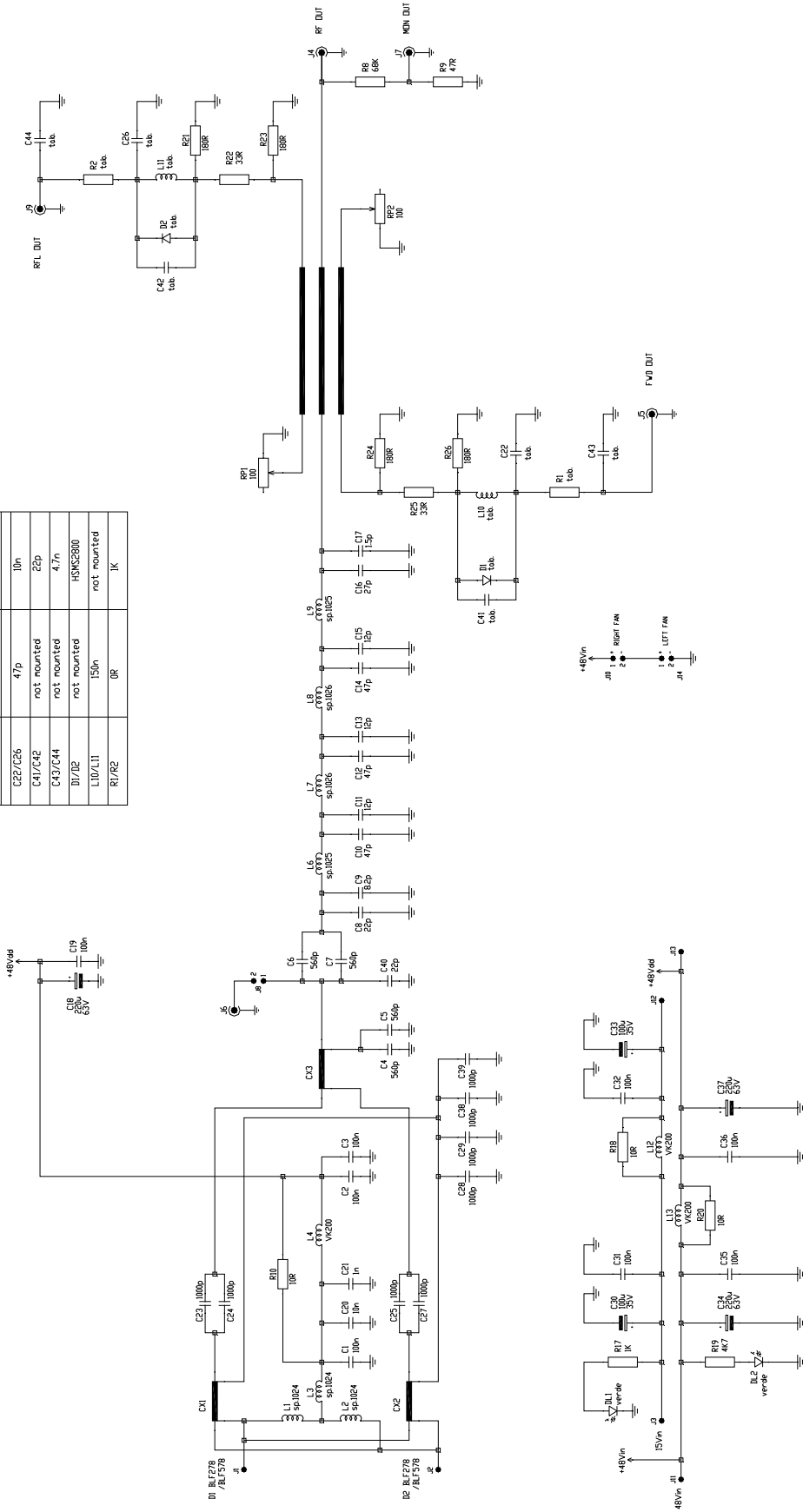
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Pag. 1

Distinta Base Riferimenti Schema				Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
13M31310AD						SCHEDA ING. MOD. 500W 13M72387A DRIVER		NR	1
				13KCOMP		13KCOMP13M31310	01 KIT TERZISTA 13M31310	NR	1
				MOD004		13M31790	01 EASY INTERFACE CONTROL SIGNAL AMPLIFIER	NR	1
				MOD003		13MPWIND60824-15	01 DC-DC CONV. 60W MEAN.20-50 TO 15	NR	1
				ZP 001		21G31311	01 INTERFACCIA DC+INGRESSO RF	NR	1
				J 009		24A01035	01 SMA C.S.F90q SMA6252A23GT50G50	NR	1
				J 001		24X03020	01 CONN CS 90q 26PIN IDCML26 MRC 03017788	NR	1
	CX 002		CX 003			29A0B10270	01 CAVETTO COAX. 25 OHM SPEC 1027	NR	2
	CX 001					29A0B10280	01 CAVETTO COAX. SPEC 1028	NR	1
	L 017					29C01030	01 INDUTT. CHOKE VEMATRON 1955 01RN1 A62	NR	1
	L 016					29C01040	01 IND.VK-200 4312 020 36642	NR	1
	C 043					CEVNC0632L2206	01 COND ELETTR PW 220 U 63V 105°C RS7111609P	NR	1
	RP003					RE002000	01 MULT.VERT.200 OHM MRC 3-028-708	NR	1
	RP004					RE002800	01 MULT.VERT.100K MRC 03-028-726	NR	1
	L 012	L 015				SM29A013	01 IND 0,015uH=15NH 1210 FRN 1644353	NR	2
	L 013					SM29A015	01 IND. 0.022uH = 22NH 1210 FRN 1644355	NR	1
	L10	L9				SM29A017	01 IND.0.033uH SMD 1210 EPC882422A3330J100	NR	2
	L 014					SM29A021	01 IND.0.068uH 10% SMD1210 EPC882422A3680K100	NR	1
	L001					SM29A025	01 IND.SMD 0.15uH 1210 EPC882422A3151K100	NR	1
	L 001 L 005	L 002 L 006	L 003 L 007	L 004 L 008		SM29A039	01 IND. 2,2 uH 10% SMD1210 EPC882422-A1222-K100	NR	8
	DL 003	DL 004				SM300004	01 LED SMD VERDE R8654-4275 MRC01-057-202(422)	NR	2
	DL 002	DL 005	DL 006			SM300005	01 LED SMD GIALLO OSRAM LYT67K RS 654-5587	NR	3
	D 001	D 005	D 008	D 009		SM43A011	01 DIODO A COPPIA BAV 99 SMD	NR	4
	D 006	D 007				SM430013	01 DIODO ZENER 9.1V 1/2W SMD RS 634-6992	NR	2
	D 002	D 003				SM430022	01 DIODO ZENER 4,7V FRNL1431139	NR	2
	D 004					SM430026	01 DIODO ZENER SMD 10V RS 545-3128	NR	1
	Q1					SM44A052	01 MOSFET RF 12W 500MHZ PD55003-E FRN2341739	NR	1

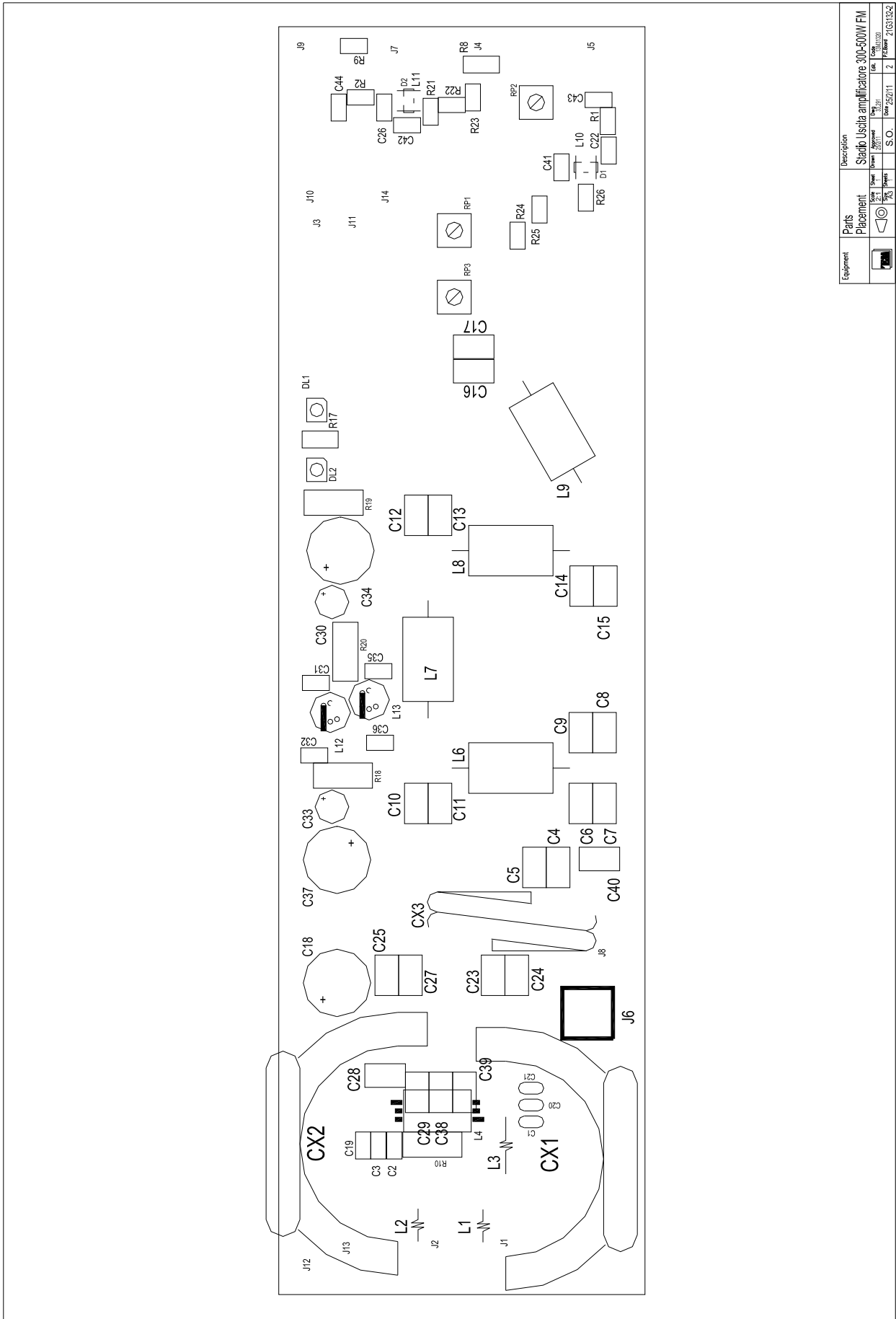
13M31321A RF High Gain Amplifier Output Board - Schematic Diagram

REFERENCE DESIGNATOR	RF OUTPUT VALUE	DC OUTPUT VALUE
C22/C26	47p	10n
C41/C42	not mounted	22p
C43/C44	not mounted	4.7n
D1/D2	not mounted	HMS2800
L10/L11	150n	not mounted
R1/R2	0R	1K



Equipment:	Description:
Electric Schematic	Stadio Uscita amplificatore 300-500W FM
	File: 13M31321A Project: 252211 Date: 25/02/11 S.O.

13M31321A RF High Gain Amplifier Output Board - Part Placement Layout



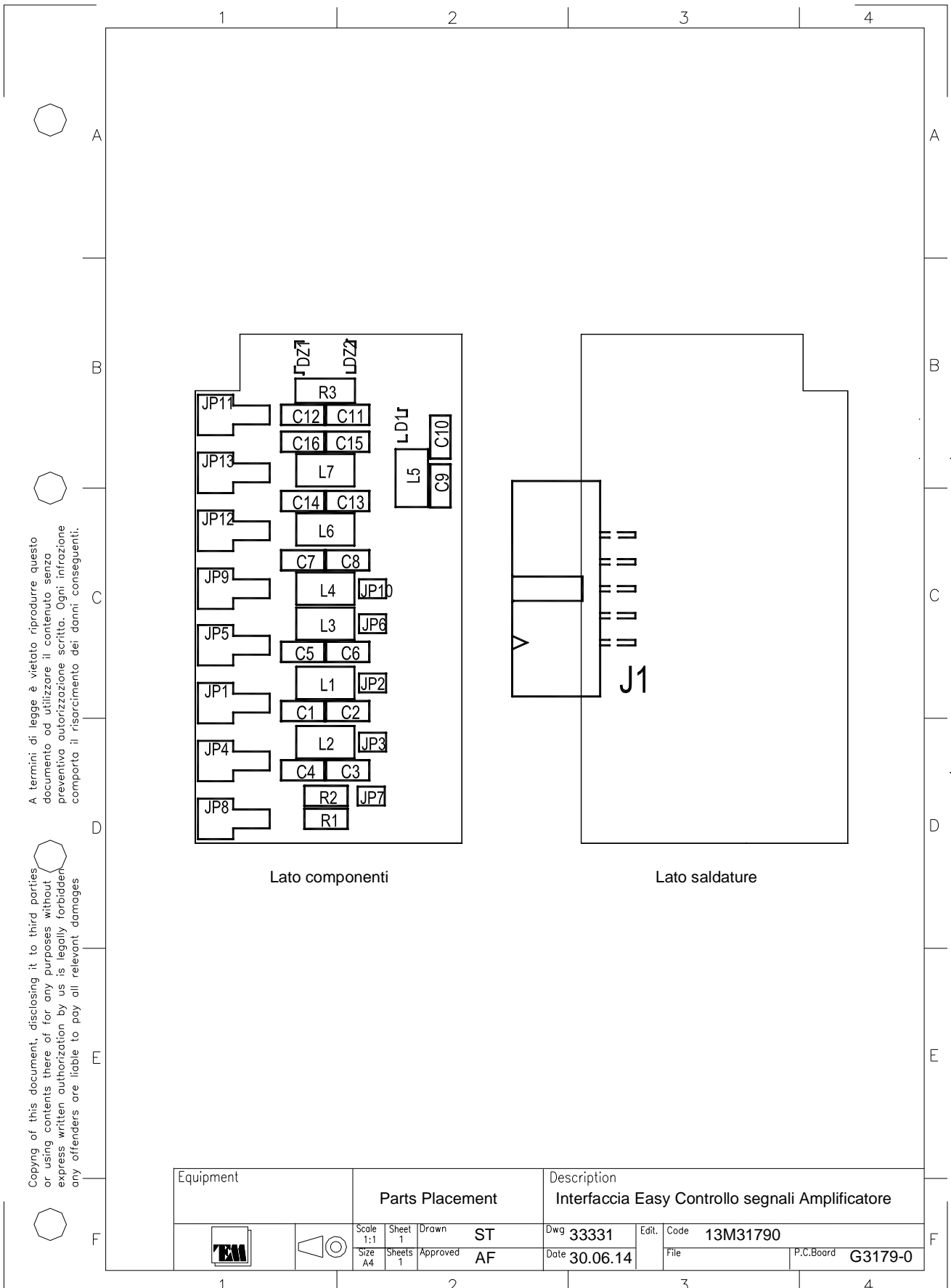
13M31321A Part List

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Pag. 1

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13M31321A						SCHEDA USCITA MOD. 500W 13M72387A 2AV.		NR	1
1KTERZ				13KCOMP13M31320	01	KIT TERZISTA 13M31320		NR	1
ZM001				21G31322	01	CS 3132-2 RF OUT+FILTRO+ACCOPP.		NR	1
J 005				24A00465	01	SMA C.S. FEMM. TC-713-T		NR	1
L 006	L 009			29A0810250	01	BOBINA SPEC. 1025		NR	2
L 007	L 008			29A0810260	01	BOBINA SPEC. 1025		NR	2
CX 001	CX 002			29A0810340	01	BOBINA SPEC. 1034		NR	2
CX003				29A0810440	01	BOBINA SPECIFICA 1044		NR	1
C004	C005	C006	C007	CACTE50033100L	01	COND.CER.CHIP HQ 1000pF 50V		NR	12
C023	C024	C025	C027						
C026	C029	C038	C039						
C 011	C 013	C 015			CACTE50033120N	01	COND.CER.CHIP HQ 12pF 500V	NR	3
C 008				CACTE50033220N	01	COND.CER.CHIP HQ 22pF 500V		NR	1
C 016				CACTE50033270N	01	COND.CER.CHIP HQ 27pF 500V		NR	1
C 010	C 012	C 014			CACTE50033470N	01	COND.CER.CHIP HQ 47pF 500V	NR	3
C 017				CACTE500XX150P	01	COND.CER.CHIP HQ 1,5pF 500V		NR	1
C 009				CACTE500XX270P	01	COND.CER.CHIP.HQ 2,7pF 500V		NR	1
C 020				CCPSM06311100H	01	COND.CER.PIAS. 10nF 63V 132901X7R103K50		NR	1
C 001				CCPSM0631L1009	01	COND.CER.PIAS. 100nF 63V MRC 3-022-446		NR	1
C 021				CCPSM06333100L	01	COND.CER. COG 1000 PF 63V 131COG.102J50		NR	1
C 030	C 033			CEVT0352L1006	01	COND.ELETT.VER. 100uF 35V MRC 3-018-442		NR	2
C 018	C 034	C 037			CEVNC0632L2206	01	COND ELETTR PW 220 U 63V 105°C R67111609P	NR	3
LD10	L011			SM29A025	01	IND.SMD 0.15uH 1210 EPCB82422A3151K100		NR	2
DL 001	DL 002			SM300004	01	LED SMD VERDE R8654-4275 MRC01-057-202(422)		NR	2
D 001	D 002			SM43A018	01	DIODO SCHOTTKY HSMS 2800 RS 2509649465		NR	2

13M31790 RF High Gain Amplifier Easy Interface – Part Placement Layout



13M31790 Part list

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Pag. 1

Distinta Base				Lista Parti				
Riferimenti Schema				Codice Parte	Livello	Descrizione	UM	Quantità
13M31790						EASY INTERFACE CONTROL SIGNAL AMPLIFIER	NR	1
CS001				21G31790	01	CS INTERFACCIA EASY CONTROLLO SEGNALI AMPLIFICAT.	NR	1
J001				24XD2980	01	CONN.CS90q 10PIN CO4-10AG1-10	NR	1
L001	L002	L003	L004	SM29A035	01	IND. 1uH 10% SIMD02 1210 FRNL 3877190RL	NR	7
L005	L006	L007						
D001				SM43A001	01	DIODO A COPPIA BAV 70 SMD	NR	1
DZ001	DZ002			SM43D011	01	DIODO ZENER 4,7V 1/2W BZX84	NR	2
C012				SMCE1050210093	01	COND.CER. 100nF COG 50V 0805	NR	1
C001	C002	C003	C004	SMCE10502100L3	01	COND.CER. 1nF COG 50V 0805	NR	15
C005	C006	C007	C008					
C009	C010	C011	C013					
C014	C015	C016						
R002				SMRB18013A	01	RES.SMD 1,8K OHM 5% 1/10W 0805	NR	1
R001				SMRB18023A	01	RES.SMD 18K OHM 5% 1/10W 0805	NR	1
R003				SMRB220032	01	RES.SMD 220 OHM 5% 1/4W 1206	NR	1

POWER SUPPLIES MODULES

- **13MPWRS7524**
- **13MPWRS15024(on request)**
- **13MPWUSP22524(on request)**
- **13MPWSP48048(on request)**
 - **13MPWRSP50048**
 - **13MPWRSP100048**
- **13MPWRSP200048(on request)**
 - **13MPWNID60S4824**

13MPWRS7524 Exciter & Services AC-DC Power Supply Module



75W Single Output Switching Power Supply

RS-75 series



■ Features :

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage
- Cooling by free air convection
- LED indicator for power on
- 100% full load burn-in test
- All using 105°C long life electrolytic capacitors
- Withstand 300VAC surge input for 5 second
- High operating temperature up to 70°C
- Withstand 5G vibration test
- No load power consumption < 0.5W
- High efficiency, long life and high reliability
- 3 years warranty



SPECIFICATION

MODEL	RS-75-3.3	RS-75-5	RS-75-12	RS-75-15	RS-75-24	RS-75-48	
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V
	RATED CURRENT	15A	12A	6A	5A	3.2A	1.6A
	CURRENT RANGE	0 – 15A	0 – 12A	0 – 6A	0 – 5A	0 – 3.2A	0 – 1.6A
	RATED POWER	49.5W	60W	72W	75W	76.8W	76.8W
	RIPPLE & NOISE (max.) ^{Note2}	80mVp-p	80mVp-p	120mVp-p	120mVp-p	120mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	3V – 3.6V	4.75 – 5.5V	10.8 – 13.2V	13.5 – 16.5V	22 – 27.6V	42 – 54V
	VOLTAGE TOLERANCE ^{Note3}	±1.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION ^{Note4}	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION ^{Note5}	±2.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	500ms, 30ms/230VAC 1200ms, 30ms/115VAC at full load					
HOLD UP TIME (Typ.)	60ms/230VAC 14ms/115VAC at full load						
INPUT	VOLTAGE RANGE	88 – 264VAC 125 – 373VDC (Withstand 300VAC surge for 5sec. Without damage)					
	FREQUENCY RANGE	47 – 63Hz					
	EFFICIENCY (Typ.)	75%	75%	84.5%	86%	88.0%	89.0%
	AC CURRENT (Typ.)	2A/115VAC 1.2A/230VAC					
	INRUSH CURRENT (Typ.)	COLD START 40A/230VAC					
	LEAKAGE CURRENT	<2mA/240VAC					
PROTECTION	OVERLOAD	110 – 150% rated output power Protection type: Hiccup mode, recovers automatically after fault condition is removed					
	OVER VOLTAGE	3.8 – 4.45V	5.75 – 6.75V	13.8 – 16.2V	17.25 – 20.25V	27.6 – 32.4V	55.2 – 64.8V
ENVIRONMENT	WORKING TEMP.	-25 – +70°C (Refer to "Derating Curve")					
	WORKING HUMIDITY	20 – 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 – +85°C, 10 – 95% RH					
	TEMP. COEFFICIENT	±0.03%/°C (0–50°C)					
	VIBRATION	10 – 500Hz, 5G 10min./1cycle, period for 60min. each along X, Y, Z axes					
SAFETY & EMC (Note 6)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 approved					
	WITHSTAND VOLTAGE	IP-O/P:3KVAC IP-FG:1.5KVAC O/P-FG:0.9KVAC					
	ISOLATION RESISTANCE	IP-O/P, IP-FG, O/P-FG:100M Ohms/ 500VDC/25°C/70% RH					
	EMC EMISSION	Compliance to EN60222 (CISPR22) Class B, EN61000-3-2, -3					
OTHERS	EMC IMMUNITY	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN61000-6-2 (EN60822), heavy industry level, criteria A					
	MTBF	25K hrs min. MIL-HDBK-217F (25°C)					
	DIMENSION	129*97*38mm (L*W*H)					
	PACKING	0.41Kg; 30pcs/13.3Kg/0.86CUFT					
NOTE	<p>1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.</p> <p>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel cap/d/c.</p> <p>3. Tolerance : includes set up tolerance, line regulation and load regulation.</p> <p>4. Line regulation is measured from low line to high line at rated load.</p> <p>5. Load regulation is measured from 0% to 100% rated load.</p> <p>6. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMC testing of component power supplies." (as available on http://www.meanwell.com)</p>						

13MPWRS15024 RF Power Amplifier AC-DC Power Supply Module



150W Single Output Switching Power Supply

RS-150 series



- Features :
 - Functions: Short circuit / Overload / Over voltage
 - Cooling by free air convection
 - LED indicator for operation
 - 100% full load burn in test
 - All using 100% long life electrolytic capacitors
 - Withstand 300VAC surge input for 5 second
 - High operating temperature up to 70°C
 - Withstand 5G vibration test
 - High efficiency, long life and high reliability
 - 3 years warranty



SPECIFICATION

MODEL	RS-150-1.0	RS-150-3	RS-150-12	RS-150-15	RS-150-24	RS-150-48	
OUTPUT	DC VOLTAGE	1.8V	3V	12V	15V	24V	48V
	RATED CURRENT	30A	45A	14.0A	10A	6.2A	3.3A
	CURRENT RANGE	0-30A	0-45A	0-14.0A	0-10A	0-6.2A	0-3.3A
	RATED POWER	54W	135W	168W	150W	156W	159.6W
	RIPPLE & NOISE (max.) Rms	40mVp-p	40mVp-p	140mVp-p	120mVp-p	120mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	0.2V - 0.9V	4.75 - 5.5V	11.4 - 13.2V	14.25 - 16.5V	22.0 - 26.4V	45.6 - 52.7V
	VOLTAGE TOLERANCE Max.	±0.3%	±0.3%	±1.0%	±0.9%	±1.0%	±1.0%
	LINE REGULATION Max.	±0.03%	±0.1%	±1.0%	±0.03%	±0.1%	±0.03%
	LOAD REGULATION Max.	±0.03%	±0.1%	±1.0%	±0.03%	±0.1%	±0.03%
	SETUP / RESET TIME	500ms / 20ms/20VAC	100ms / 50ms/15VAC	100ms/15VAC	100ms/15VAC	100ms/15VAC	100ms/15VAC
HOLD UP TIME (Typ.)	21ms/20VAC	20ms/15VAC	20ms/15VAC	20ms/15VAC	20ms/15VAC	20ms/15VAC	
INPUT	VOLTAGE RANGE	65 - 132VAC/115V - 500ms/100ms/100ms	65 - 132VAC/115V - 500ms/100ms/100ms	65 - 132VAC/115V - 500ms/100ms/100ms	65 - 132VAC/115V - 500ms/100ms/100ms	65 - 132VAC/115V - 500ms/100ms/100ms	65 - 132VAC/115V - 500ms/100ms/100ms
	FREQUENCY RANGE	47 - 50Hz	47 - 50Hz	47 - 50Hz	47 - 50Hz	47 - 50Hz	47 - 50Hz
	EFFICIENCY (Typ.)	77%	76%	73%	74%	76%	77%
	AC CURRENT (Typ.)	0.44A/15VAC	0.47A/15VAC	0.47A/15VAC	0.47A/15VAC	0.47A/15VAC	0.47A/15VAC
	INRUSH CURRENT (Typ.)	1.0A/15VAC	1.0A/15VAC	1.0A/15VAC	1.0A/15VAC	1.0A/15VAC	1.0A/15VAC
IF PACKAGE CURRENT	0.50A/15VAC	0.50A/15VAC	0.50A/15VAC	0.50A/15VAC	0.50A/15VAC	0.50A/15VAC	
PROTECTION	OVERLOAD	110% - 150% (short-term) 100%	Protection type / Hiccup mode, recovers automatically after fault condition is removed				
	OVER VOLTAGE	3.3V - 1.40V	5.75 - 6.75V	13.0 - 16.2V	17.25 - 20.25V	27.5 - 32.4V	55.0 - 64.8V
ENVIRONMENT	WORKING TEMP.	25 - +70°C (normal) / Derating (0.5W)					
	WORKING HUMIDITY	20 - 90% RH (non-condensing)					
	STORAGE TEMP. HUMIDITY	-40 - +85°C, 10 - 90% RH					
	TEMP COEFFICIENT	±0.05%/°C (0 - +70°C)					
	VIBRATION	10 - 200Hz, 1G (rms) 100ms, pulse for 50ms, duty cycle 50%					
SAFETY & EMC (Class B)	SAFETY STANDARDS	UL 60950-1, IEC 60950-1 Compliant					
	WITHSTAND VOLTAGE	3750V/30VAC, 3750V/1.5kVAC, 3750V/5kVAC					
	ISOLATION RESISTANCE	3750V/50VAC, 3750V/1.5kVAC/0.5ms/500VDC/25°C/25%RH					
	EMC EMISSION	Compliance in EN55022 / CISPR22 Class B, EN55024 Class B					
OTHERS	MTBF	3,425,000 hrs. (at 25°C/50% load) / 25°C					
	PACKAGING	169mm (6.65inch) x 110mm (4.33inch) x 40mm (1.57inch)					
NOTE	1. All parameters NOT steadily in engine temperature up to 200VAC input, input impedance 50Ω or higher, impedance 2. Ripple & noise are measured at 20MHz of bandwidth by average. 2-wired active terminated with a 0.1μF & 47μF parallel capacitor. 3. Temperature includes output tolerance, the regulation and load regulation. 4. Line regulation is measured from 100Vrms to 132Vrms. 5. Load regulation is measured from 25% to 100% rated load. 6. The above supply is considered a power source of which is regulated using the equation. The final output may be re-configured to suit these VDC outputs. For any other applications please refer to TEM factory or contact your local sales office. 7. Length of set up time is measured at cold start. Limiting ON/OFF the power supply will cause the load to increase on the set up time. 8. Extra consideration should be taken when selecting output wiring for 3.3V and 5V needs. Please provide the protection modes for overvoltage and short circuit from preventing common power.						

13MPWUSP22024 RF Power Amplifier AC-DC Power Supply Module



225W Single Output with PFC Function

USP-225 series



- Features :
 - Universal AC input : Full range
 - Built in active PFC circuit compliance to EN61000-3-2
 - Protection : Short circuit / Overload / Over voltage / Over temperature
 - Free air convection for 150W and forced air convection for 225W
 - High power density 4.7W/in³
 - Active AC surge current limiting
 - U-bracket, low profile 50mm
 - 3 years warranty



SPECIFICATION

MODEL		USP-225-3.3	USP-225-5	USP-225-12	USP-225-15	USP-225-24	USP-225-48
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V
	RATED CURRENT	40A	40A	18.7A	15A	9.4A	4.7A
	CURRENT RANGE	0 ~ 40A	0 ~ 40A	0 ~ 18.7A	0 ~ 15A	0 ~ 9.4A	0 ~ 4.7A
	RATED POWER	132W	200W	224.4W	225W	225.6W	225.6W
	RIPPLE & NOISE (max.) <small>Note.2</small>	100mVp-p	100mVp-p	100mVp-p	100mVp-p	150mVp-p	250mVp-p
	VOLTAGE ADJ. RANGE	2.97 ~ 3.6V	4.5 ~ 5.5V	10.8 ~ 13.2V	13.5 ~ 16.5V	21.6 ~ 26.4V	43.2 ~ 52.8V
	VOLTAGE TOLERANCE <small>Note.3</small>	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME	500ms, 30ms/230VAC 1200ms, 30ms/115VAC at full load					
HOLD UP TIME (Typ.)	22ms/230VAC 22ms/115VAC at full load						
INPUT	VOLTAGE RANGE	90 ~ 264VAC	127 ~ 370VDC				
	FREQUENCY RANGE	47 ~ 63Hz					
	POWER FACTOR (Typ.)	PF>0.93/230VAC		PF>0.97/115VAC at full load			
	EFFICIENCY (Typ.)	72%	77%	83%	84%	85%	86%
	AC CURRENT (Typ.)	115VAC	2.2A	3.3A			
		230VAC	1.1A	1.6A			
	INRUSH CURRENT (Typ.)	15A/115VAC 35A/230VAC					
PROTECTION	OVERLOAD	105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed					
	OVER VOLTAGE	3.6 ~ 4.4V	5.5 ~ 7.4V	13.2 ~ 16.3V	16.5 ~ 20.2V	26.4 ~ 32.4V	52.8 ~ 64.8V
		Protection type : Shut down o/p voltage, re-power on to recover					
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down					
ENVIRONMENT	WORKING TEMP.	-20 ~ +65 °C (Refer to "Derating Curve")					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85 °C, 10 ~ 95% RH					
	TEMP. COEFFICIENT	0.03%/ °C (0 ~ 50 °C)					
SAFETY & EMC <small>(Note 4)</small>	VIBRATION	10 ~ 500Hz, 2G 10min./cycle, 60min. each along X, Y, Z axes					
	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 approved					
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC					
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25 °C / 70% RH					
	EMC EMISSION	Compliance to EN55022 (CISPR22) Class B, EN61000-3-2, -3					
OTHERS	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, light industry level, criteria A					
	MTBF	220K hrs min. MIL-HDBK-217F (25 °C)					
	DIMENSION	202*101.5*38mm (L*W*H)					
NOTE	PACKING	0.85Kg; 16pcs/14.6Kg/0.76CUFT					
		1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25 °C ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 20-wired low-wire terminated with a 0.1µF & 47µF parallel capacitor. 3. Temperature includes output tolerance, line regulation and load regulation. 4. The above quality is based on a commercial when it is installed into the equipment. The real output must be recorded and tested from EMC emission. For a known failure to perform these EMC data please refer to "EMC testing method on power supplies" (See also a file on http://www.meawell.com)					

13MPWSP48048 RF Power Amplifier AC-DC Power Supply Module



480W Single Output with PFC Function

SP-480 series



Features :

- Universal AC input / Full range
- Built in active PFC function, PF>0.95
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Forced air cooling by built-in DC fan
- High power density 5.18W/in³
- Low profile 43mm thickness
- Built-in remote ON-OFF control
- Built-in remote sense function
- Active AC surge current limiting
- 3 years warranty



SPECIFICATION

MODEL	SP-480-3.3	SP-480-5	SP-480-12	SP-480-15	SP-480-24	SP-480-48	
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V
	RATED CURRENT	85A	85A	40A	32A	20A	10A
	CURRENT RANGE	0 ~ 85A	0 ~ 85A	0 ~ 43A	0 ~ 35A	0 ~ 22A	0 ~ 11A
	RATED POWER	280.5W	425W	480W	480W	480W	480W
	PEAK LOAD(10min.) <small>Note.5</small>	280.5W	425W	518W	525W	528W	528W
	RIPPLE & NOISE (max.) <small>Note.2</small>	80mVp-p	80mVp-p	120mVp-p	150mVp-p	150mVp-p	240mVp-p
	VOLTAGE ADJ. RANGE	2.9 ~ 3.6V	4.5 ~ 5.5V	10.8 ~ 13.2V	13.5 ~ 18V	22 ~ 27.6V	41 ~ 56V
	VOLTAGE TOLERANCE <small>Note.3</small>	±2.0%	±2.0%	±1.5%	±1.5%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.3%	±0.3%	±0.2%	±0.2%
	LOAD REGULATION	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%
SETUP, RISE TIME	1000ms, 80ms/230VAC 2500ms, 80ms/115VAC at full load						
HOLD UP TIME (Typ.)	18ms/230VAC 18ms/115VAC at full load						
INPUT	VOLTAGE RANGE <small>Note.7</small>	85 ~ 264VAC 120 ~ 370VDC					
	FREQUENCY RANGE	47 ~ 63Hz					
	POWER FACTOR (Typ.)	PF>0.99/230VAC PF>0.98/115VAC at full load					
	EFFICIENCY (Typ.)	73%	79%	85%	88%	87%	89%
	AC CURRENT (Typ.)	6.5A/115VAC 3.5A/230VAC					
	INRUSH CURRENT (Typ.)	20A/115VAC 40A/230VAC					
	LEAKAGE CURRENT	<2mA / 240VAC					
PROTECTION	OVERLOAD	87 ~ 103A	87 ~ 103A	45.15 ~ 58.05A	36.75 ~ 47.25A	23.1 ~ 29.7A	11.55 ~ 14.85A
	OVER VOLTAGE	3.8 ~ 4.45V	5.75 ~ 6.75V	13.8 ~ 16.2V	18 ~ 21V	28.8 ~ 33.6V	57.6 ~ 67.2V
	OVER TEMPERATURE <small>Note.4</small>	80°C (TSW1) detect on heatsink of power transistor 90°C (TSW2) detect on heatsink of power diode Protection type: Shut down o/p voltage, recovers automatically after temperature goes down					
FUNCTION	REMOTE CONTROL	RC+/RC-: 0 ~ 0.8V=power on; 4 ~ 10V=power off					
ENVIRONMENT	WORKING TEMP.	-20 ~ +60°C (Refer to output load derating curve)					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH					
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 50°C)					
	VIBRATION	10 ~ 800Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes					
SAFETY & EMC <small>(Note 6)</small>	SAFETY STANDARDS	UL80950-1, TUV EN60950-1 approved					
	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC I/P-F/G: 1.5KVAC O/P-F/G: Short					
	ISOLATION RESISTANCE	I/P-O/P, I/P-F/G: 100M Ohms / 500VDC / 28°C / 70% RH					
	EM CONDUCTION & RADIATION	Compliance to EN55022 (CISPR22) Class B					
	HARMONIC CURRENT	Compliance to EN61000-3-2, 3					
	EMS IMMUNITY	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11; EN50204, EN61000-6-2 (EN50082-2), light industry level, criteria A					
OTHERS	MTBF	120.5K hrs min. MIL-HDBK-217F (25°C)					
	DIMENSION	278*127*43mm (L*W*H)					
	PACKING	1.7Kg; 6pcs/11.3Kg/0.87CUFT					
NOTE	<p>1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.</p> <p>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor.</p> <p>3. Tolerance : includes set up tolerance, line regulation and load regulation.</p> <p>4. TSW1: Detect on heatsink of power transistor. TSW2: Detect on heatsink of output diode.</p> <p>5. 33% Duty cycle maximum within every 30 minute. Average output power should not exceed the rated power.</p> <p>6. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on http://www.meanwell.com)</p> <p>7. Derating may be needed under low input voltages. Please check the derating curve for more details.</p>						

13MPWRSP50048 RF Power Amplifier AC-DC Power Supply Module



500W Single Output with PFC Function

RSP-500 series



- Features :
- Universal AC Input / Full range
 - Built-in active PFC function, PF>0.95
 - Protections: Short circuit / Overload / Over voltage / Over temperature
 - Forced air cooling by built-in DC Fan with fan ON-OFF control function
 - 1U low profile 40.5mm
 - High efficiency up to 90.5%
 - Built-in remote ON-OFF control
 - Built-in remote sense function
 - LED indicator for power on
 - 3 years warranty



SPECIFICATION

MODEL	RSP-500-3.3	RSP-500-4	RSP-500-5	RSP-500-12	RSP-500-15	RSP-500-24	RSP-500-27	RSP-500-48	
OUTPUT	DC VOLTAGE	3.3V	4V	5V	12V	15V	24V	27V	48V
	RATED CURRENT	90A	90A	90A	41.7A	33.4A	21A	18.6A	18.5A
	CURRENT RANGE	0 - 90A	0 - 90A	0 - 90A	0 - 41.7A	0 - 33.4A	0 - 21A	0 - 18.6A	0 - 18.5A
	RATED POWER	297W	360W	450W	500.4W	501W	504W	502.2W	504W
	RIPPLE & NOISE (max.) <small>Notes 3</small>	120mVp-p	120mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p
	VOLTAGE ADJ. RANGE	2.8 - 3.6V	3.6 - 4.3V	4.5 - 5.5V	10 - 13.2V	13.5 - 18V	20 - 28.4V	26 - 30V	41 - 50V
	VOLTAGE TOLERANCE <small>Notes 1</small>	±2.0%	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.3%	±0.3%	±0.2%	±0.2%	±0.2%
	LOAD REGULATION	±1.0%	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	1500ms, 50ms/230VAC		3000ms, 90ms/115VAC at full load					
HOLD UP TIME (Typ.)	18ms/230VAC		14ms/115VAC at full load						
INPUT	VOLTAGE RANGE <small>Notes 4</small>	85 - 264VAC		120 - 370VDC					
	FREQUENCY RANGE	47 - 63Hz							
	POWER FACTOR (Typ.)	PF>0.95/230VAC		PF>0.95/115VAC at full load					
	EFFICIENCY (Typ.)	81%	83%	83%	83%	83%	83%	83.5%	83.5%
	AC CURRENT (Typ.)	4.2A/115VAC	2.1A/230VAC	5.3A/115VAC	2.68A/230VAC				
	INRUSH CURRENT (Typ.)	20A/115VAC	40A/230VAC						
	LEAKAGE CURRENT	<2mA/240VAC							
PROTECTION	OVERLOAD	105 - 188% rated output power Protection type: Constant current limiting, recovers automatically after fault condition is removed							
	OVER VOLTAGE	3.8 - 4.5V	4.5 - 5.3V	5.75 - 6.75V	13.8 - 16.2V	18.8 - 21.6V	27.6 - 32.4V	32.9 - 38.3V	58.4 - 60V
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down							
FUNCTION	REMOTE CONTROL	POWER ON open or 0-0.8VDC between RC+(Pin 4)&RC-(Pin 5) on CN100 POWER OFF: 4-10VDC between RC+(Pin 4)&RC-(Pin 3) on CN100							
	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.3V							
	FAN CONTROL (Typ.)	RTH2 ≥ 55°C ± 10°C Fan on; RTH2 ≤ 40°C ± 10°C Fan off							
ENVIRONMENT	WORKING TEMP.	-30 - +70°C (Refer to "Derating Curve")							
	WORKING HUMIDITY	20 - 90% RH non-condensing							
	STORAGE TEMP., HUMIDITY	-40 - +85°C, 10 - 95% RH							
	TEMP. COEFFICIENT	±0.03%/°C (0 - 50°C)							
SAFETY & EMC <small>(Notes 4)</small>	VIBRATION	10 - 500Hz, 20 10ms./1cycle, 50ms. each along X, Y, Z axes							
	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 approved							
	WITHSTAND VOLTAGE	IP-DIP:3KVAC IP-FG:2KVAC O/P-FG:0.5KVAC							
	ISOLATION RESISTANCE	IP-DIP, IP-FG, O/P-FG:100M Ohms / 500VDC / 25°C / 70% RH							
	EMC EMISSION	Compliance to EN55022 (DISPR22) Class B, EN61000-3-2,-3							
OTHERS	EMC IMMUNITY	Compliance to EN55024, EN55024, EN61000-6-2, EN55024-3 heavy industry level, criteria A							
	MTBF	187.7K hrs min. MIL-HDBK-217F (25°C)							
	DIMENSION	230*127*48.5mm (L*W*H)							
PACKING	1.3kg, 5pcs/12.7kg/0.70CUFT								
NOTE	<ol style="list-style-type: none"> 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Derating may be needed under low input voltages. Please check the derating curve for more details. 5. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies" (as available on http://www.meanwell.com) 								

13MPWRSP100048 RF Power Amplifier AC-DC Power Supply Module



1000W Single Output Power Supply

RSP-1000 series



- Features
 - * Universal AC input / Full range
 - * AC input active surge current limiting
 - * Built-in 5W/0.5A auxiliary power
 - * Built-in active PFC function, PFC>0.95
 - * Protection: Short circuit / Overload / Over voltage / Over temperature
 - * Output voltage can be trimmed between 40%~110% of the rated output voltage
 - * Forced air cooling by built-in DC fan
 - * High power density 10.2W/cm²
 - * Full load profile 40mm
 - * Active current sharing up to 4000W/30.1A(max)
 - * DC OK signal
 - * Built-in remote ON/OFF control
 - * Built-in remote sense function
 - * 5 years warranty



SPECIFICATION

MODEL	RSP-1000-12	RSP-1000-15	RSP-1000-24	RSP-1000-27	RSP-1000-48	
OUTPUT	DC VOLTAGE	12V	15V	24V	27V	48V
	RATED CURRENT	8.3A	10A	8.3A	10A	2.5A
	CURRENT RANGE	0~8.3A	0~10A	0~8.3A	0~10A	0~2.5A
	RATED POWER	100W	150W	200W	270W	120W
	RIPPLE & NOISE (max.) (Meas.)	100mVp-p	50mVp-p	100mVp-p	50mVp-p	100mVp-p
	VOLTAGE ADJ. RANGE	10~11.5V	15.5~16.5V	23~26.5V	27~30V	48~50V
	VOLTAGE TOLERANCE (Meas.)	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION	±1.5%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	500ms 50ms (full load)				
HOLD UP TIME (Typ.)	10ms@50% 10ms@100% (full load)					
	10ms@100% 10ms@50% (full load)					
INPUT	VOLTAGE RANGE (Meas.)	80~264VAC	80~264VAC	80~264VAC	80~264VAC	
	FREQUENCY RANGE	47~63Hz				
	POWER FACTOR (Typ.)	0.96@75% 0.98@100% (full load)				
	EFFICIENCY (Typ.)	93%	93%	93%	93%	93%
	AC CURRENT (Typ.)	10A@100V	8A@120V	8A@120V	8A@120V	2.5A
	INRUSH CURRENT (Typ.)	15A@120VAC	10A@120VAC	10A@120VAC	10A@120VAC	10A@120VAC
	LEAKAGE CURRENT	0.2mA@240VAC				
PROTECTION	OVERLOAD	105~125V (active output power) Protection: Load current limiting, recovery normal (active output power is reduced)				
	OVER VOLTAGE	120~140V	150~170V	200~220V	270~300V	480~600V
	OVER TEMPERATURE	Shut down (output, recovery normal) / 0 power (output)				
FUNCTION	AUXILIARY POWER (Aux.)	5W (0.5A@5V DC)				
	REMOTE SENSE CONTROL (Meas.)	Force on (set reference output) (pin 8) / Force off (set reference) (pin 9) / Force on (set reference) (pin 10) / Force off (set reference) (pin 11)				
	DC OK SIGNAL	The TTL signal, DC voltage range: 0~5V, 5~10V, 10~15V, 15~20V, 20~25V, 25~30V				
	OUTPUT VOLTAGE TRIM (Meas.)	Adjustment: Input of 1-pole active filter, power: 0~100W (reference value)				
ENVIRONMENT	CURRENT SENSING (Meas.)	100mA@120VAC (reference value)				
	WORKING TEMP.	40~60°C (reference value)				
	WORKING HUMIDITY	10~90% RH (reference value)				
	STORAGE TEMP., HUMIDITY	-40~85°C, 10~90% RH				
	TEMP. COEFFICIENT	±0.2%/°C (40~50°C)				
SAFETY & EMC	VIBRATION	10~100Hz: 0.1mm/s ² (avg.) 100~1000Hz: 0.5mm/s ² (avg.)				
	SAFETY STANDARDS	UL60651-1, TUV EN 60950 Type 2 lead				
	WITHSTAND VOLTAGE	1500VAC@1min, 1500VDC@1min, 1500VAC@1min				
	ISOLATION RESISTANCE	1MΩ@50VDC@1min, 10MΩ@250VDC@1min, 10MΩ@50VDC@1min				
OTHERS	EMC EMISSION	Compliance: EN60950-1, EN60950-2, EN60950-3, EN60950-4, EN60950-5, EN60950-6, EN60950-7, EN60950-8, EN60950-9, EN60950-10, EN60950-11, EN60950-12, EN60950-13, EN60950-14, EN60950-15, EN60950-16, EN60950-17, EN60950-18, EN60950-19, EN60950-20, EN60950-21, EN60950-22, EN60950-23, EN60950-24, EN60950-25, EN60950-26, EN60950-27, EN60950-28, EN60950-29, EN60950-30, EN60950-31, EN60950-32, EN60950-33, EN60950-34, EN60950-35, EN60950-36, EN60950-37, EN60950-38, EN60950-39, EN60950-40, EN60950-41, EN60950-42, EN60950-43, EN60950-44, EN60950-45, EN60950-46, EN60950-47, EN60950-48, EN60950-49, EN60950-50, EN60950-51, EN60950-52, EN60950-53, EN60950-54, EN60950-55, EN60950-56, EN60950-57, EN60950-58, EN60950-59, EN60950-60, EN60950-61, EN60950-62, EN60950-63, EN60950-64, EN60950-65, EN60950-66, EN60950-67, EN60950-68, EN60950-69, EN60950-70, EN60950-71, EN60950-72, EN60950-73, EN60950-74, EN60950-75, EN60950-76, EN60950-77, EN60950-78, EN60950-79, EN60950-80, EN60950-81, EN60950-82, EN60950-83, EN60950-84, EN60950-85, EN60950-86, EN60950-87, EN60950-88, EN60950-89, EN60950-90, EN60950-91, EN60950-92, EN60950-93, EN60950-94, EN60950-95, EN60950-96, EN60950-97, EN60950-98, EN60950-99, EN60950-100				
	EMC IMMUNITY	Compliance: EN60950-1, EN60950-2, EN60950-3, EN60950-4, EN60950-5, EN60950-6, EN60950-7, EN60950-8, EN60950-9, EN60950-10, EN60950-11, EN60950-12, EN60950-13, EN60950-14, EN60950-15, EN60950-16, EN60950-17, EN60950-18, EN60950-19, EN60950-20, EN60950-21, EN60950-22, EN60950-23, EN60950-24, EN60950-25, EN60950-26, EN60950-27, EN60950-28, EN60950-29, EN60950-30, EN60950-31, EN60950-32, EN60950-33, EN60950-34, EN60950-35, EN60950-36, EN60950-37, EN60950-38, EN60950-39, EN60950-40, EN60950-41, EN60950-42, EN60950-43, EN60950-44, EN60950-45, EN60950-46, EN60950-47, EN60950-48, EN60950-49, EN60950-50, EN60950-51, EN60950-52, EN60950-53, EN60950-54, EN60950-55, EN60950-56, EN60950-57, EN60950-58, EN60950-59, EN60950-60, EN60950-61, EN60950-62, EN60950-63, EN60950-64, EN60950-65, EN60950-66, EN60950-67, EN60950-68, EN60950-69, EN60950-70, EN60950-71, EN60950-72, EN60950-73, EN60950-74, EN60950-75, EN60950-76, EN60950-77, EN60950-78, EN60950-79, EN60950-80, EN60950-81, EN60950-82, EN60950-83, EN60950-84, EN60950-85, EN60950-86, EN60950-87, EN60950-88, EN60950-89, EN60950-90, EN60950-91, EN60950-92, EN60950-93, EN60950-94, EN60950-95, EN60950-96, EN60950-97, EN60950-98, EN60950-99, EN60950-100				
	MTBF	100,000 hours (MIL-HDBK-217F)				
OTHERS	DIMENSION	152x127x41mm (L*W*H)				
	PACKING	30x15x15mm (L*W*H)				
NOTE	1. All parameters (MT, especially mentioned one) measured at 25°C typical ambient temperature. 2. Ripple & noise are measured at 20% full load with 100μF by using a 12" twisted pair cable terminated with a 50Ω & 1μF load capacitor. 3. Efficiency includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be certified that it meets EMC directives. For guidance on how to perform these EMC tests, please refer to EMC testing of component power supplies. 4a. Detailed EMC test recommendations. 5. Testing may be measured under full input voltages. Please check the existing curves for more details. 6. The power supply will not work no output if the existing connection is not assembled. It contains two starting wires, one is for on/off (pin 1), the other is for on/off (pin 2). 7. In parallel connection, maybe only one unit operates if the total output load is less than 10% of rated load condition. 8. Please consult MEAN WELL for applications of more units connected in parallel.					

13MPWRSP200048 RF Power Amplifier AC-DC Power Supply Module



2000W Single Output Power Supply

RSP-2000 series



■ Features :

- Universal AC input / Full range
- Built-in 5V/0.3A, 12V/0.8A auxiliary power
- Built-in active PFC function, PF>0.97
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Forced air cooling by built-in DC fan with fan speed control
- Output voltage can be trimmed between 40-115% of the rated output voltage
- High Power density 21.4W/inch³
- 1U low profile 41mm
- Active current sharing up to 8000W(3+1)
- Built-in remote ON-OFF control
- Built-in remote sense function
- DC OK signal, OTP alarm signal
- 5 years warranty



SPECIFICATION

MODEL	RSP-2000-12	RSP-2000-24	RSP-2000-48	
OUTPUT	DC VOLTAGE	12V	24V	48V
	RATED CURRENT	100A	80A	42A
	CURRENT RANGE	0 – 100A	0 – 80A	0 – 42A
	RATED POWER	1200W	1920W	2016W
	RIPPLE & NOISE (max.) <i>Note.2</i>	150mVp-p	200mVp-p	300mVp-p
	VOLTAGE ADJ. RANGE	10.5 – 14V	21 – 28V	42 – 56V
	VOLTAGE TOLERANCE <i>Note.3</i>	±2.0%	±1.0%	±1.0%
	LINE REGULATION	±1.0%	±0.5%	±0.5%
	LOAD REGULATION	±1.0%	±0.5%	±0.5%
	SETUP, RISE TIME	1500ms, 80ms/230VAC at full load		
HOLD UP TIME (Typ.)	16ms/230VAC at 75% load 10ms/230VAC at full load			
INPUT	VOLTAGE RANGE <i>Note.4</i>	90 – 264VAC 127 – 370VDC		
	FREQUENCY RANGE	47 – 63Hz		
	POWER FACTOR (Typ.)	0.97/230VAC at full load		
	EFFICIENCY (Typ.)	87%	90.5%	92%
	AC CURRENT (Typ.) <i>Note.5</i>	13A/115VAC 7A/230VAC	16A/115VAC 10A/230VAC	16A/115VAC 10A/230VAC
	INRUSH CURRENT (Typ.)	GOLD START 50A		
LEAKAGE CURRENT	<2mA / 240VAC			
PROTECTION	OVERLOAD	105 – 125% rated output power Protection type : Constant current limiting, unit will shut down o/p voltage after 5 sec. re-power on to recover		
	OVER VOLTAGE	14.7 – 17.5V	29.5 – 35V	57.6 – 67.2V
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down		
FUNCTION	AUXILIARY POWER	5V @ 0.3A, 12V @ 0.8A		
	REMOTE ON/OFF CONTROL	By electrical signal or dry contact Power ON:open Power OFF:short, refer to function manual		
	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.5V, refer to function manual		
	DC OK SIGNAL	The isolated TTL signal out, refer to function manual		
	OUTPUT VOLTAGE TRIM	Adjustment of output voltage, possible between 40 – 115% of rated output, refer to function manual		
ENVIRONMENT	WORKING TEMP.	-35 – +70°C (Refer to "Derating Curve")		
	WORKING HUMIDITY	20 – 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 – +85°C, 10 – 95% RH		
	TEMP. COEFFICIENT	±0.03%/°C (0 – 50°C)		
SAFETY & EMC <i>(Note 4)</i>	SAFETY STANDARDS	UL00950-1, TUV EN50950-1 approved		
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC		
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC (25°C / 70% RH)		
	EMC EMISSION	Compliance to EN55022 (CISPR22) Conduction Class B, Radiation Class A ; EN61000-3-2,-3		
OTHERS	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,8,11, EN61000-6-2 (EN50082-2), heavy industry level, criteria A		
	MTBF	46.3Khrs min. MIL-HDBK-217F (25°C)		
	DIMENSION	295*127*41mm (L*W*H)		
	PACKING	1.95Kg; 8pcs/12.7Kg(1.15CUFT)		
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : Includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. 5. Derating may be needed under low input voltages. Please check the derating curve for more details. 6. Under parallel operation ripple of the output voltage may be higher than the SPEC at light load condition. It will go back to normal ripple level once the output load is more than 5%.			

13MPWNID60S4824 Internal RF Amplifier Services DC-DC Power Supply



20 ~ 60W DC-DC Non-isolated Single Output Converter

NID60 series

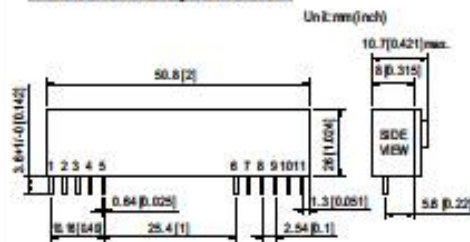


- Features :**
- Economical open frame design
 - Wide input range
 - High efficiency up to 96%
 - Built-in remote ON / OFF control
 - Compact size 2.0"x1.024"x0.421"(SIP package)
 - Cooling by free air convection
 - Protections: Short circuit / Overload / Over voltage
 - 100% burn-in test
 - Low cost / High reliability
 - 2 years warranty

SPECIFICATION

ORDER NO.		NID60S24-05	NID60S24-12	NID60S24-15	NID60S48-24	
OUTPUT	DC VOLTAGE	5V	12V	15V	24V	
	CURRENT RANGE	0 - 4A	0 - 4A	0 - 4A	0 - 2.5A	
	RATED POWER	20W	48W	60W	60W	
	RIPPLE & NOISE (max.) ^{Note.2}	100mVp-p	120mVp-p	150mVpp	200mVp-p	
	LINE REGULATION ^{Note.3}	±0.5%				
	LOAD REGULATION ^{Note.4}	±0.5%				
	VOLTAGE ACCURACY	±2.0%				
	SWITCHING FREQUENCY (Typ.)	25KHz				
INPUT	EXTERNAL CAPACITANCE LOAD(max.)	100uF / 25V low ESR	68uF/16V low ESR	47uF/50V low ESR		
	VOLTAGE RANGE	20 - 53VDC	20 - 53VDC	20 - 53VDC	30 - 53VDC	
	NORMAL VOLTAGE	24VDC (or 48VDC)	24VDC (or 48VDC)	24VDC (or 48VDC)	48VDC	
	EFFICIENCY (Typ.)	90%	95%	96%	95%	
	DC CURRENT	Full load	940mA	2120mA	2610mA	1320mA
		No load	20mA	30mA	30mA	50mA
	PROTECTION	Fuse recommended (5A)				
	PROTECTION	OVERLOAD (Typ.)	120 - 300% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed			
SHORT CIRCUIT		All output equipped with short circuit Protection type : Hiccup mode, recovers automatically after fault condition is removed				
OVER VOLTAGE		Protection type : Shut off o/p voltage, clamp by TVS diode				
ENVIRONMENT	WORKING TEMP.	-25 ~ +65°C (Refer to output load derating curve)				
	WORKING HUMIDITY	20% - 85% RH non-condensing				
	STORAGE TEMP., HUMIDITY	-25 ~ +105°C, 10 - 85% RH				
	TEMP. COEFFICIENT	±0.03% / °C (0 - 50°C)				
OTHERS	VIBRATION	10 - 500Hz, 2G 10min./1 cycle, period for 60min. each along X, Y, Z axes				
	REMOTE CONTROL	Power on : 3.3VDC < R.C - com < 12VDC or open circuit ; power off : R.C - com < 0.4VDC or short circuit (PIN5 & PIN11)				
	DIMENSION	50.8*26*10.7mm or 2.0"*1.024"*0.421"inch (L*W*H)				
	WEIGHT	15g				

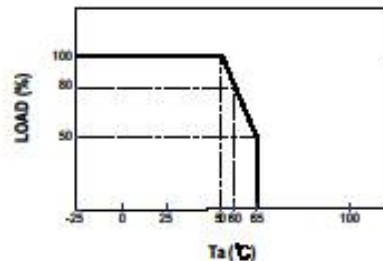
Mechanical Specification



Pin Configuration

Pin No.	Output
1, 2, 3, 4	+Vout
5, 6	Com
7, 8	+Vin
9, 10	N.C.
11	R.C.

Derating Curve

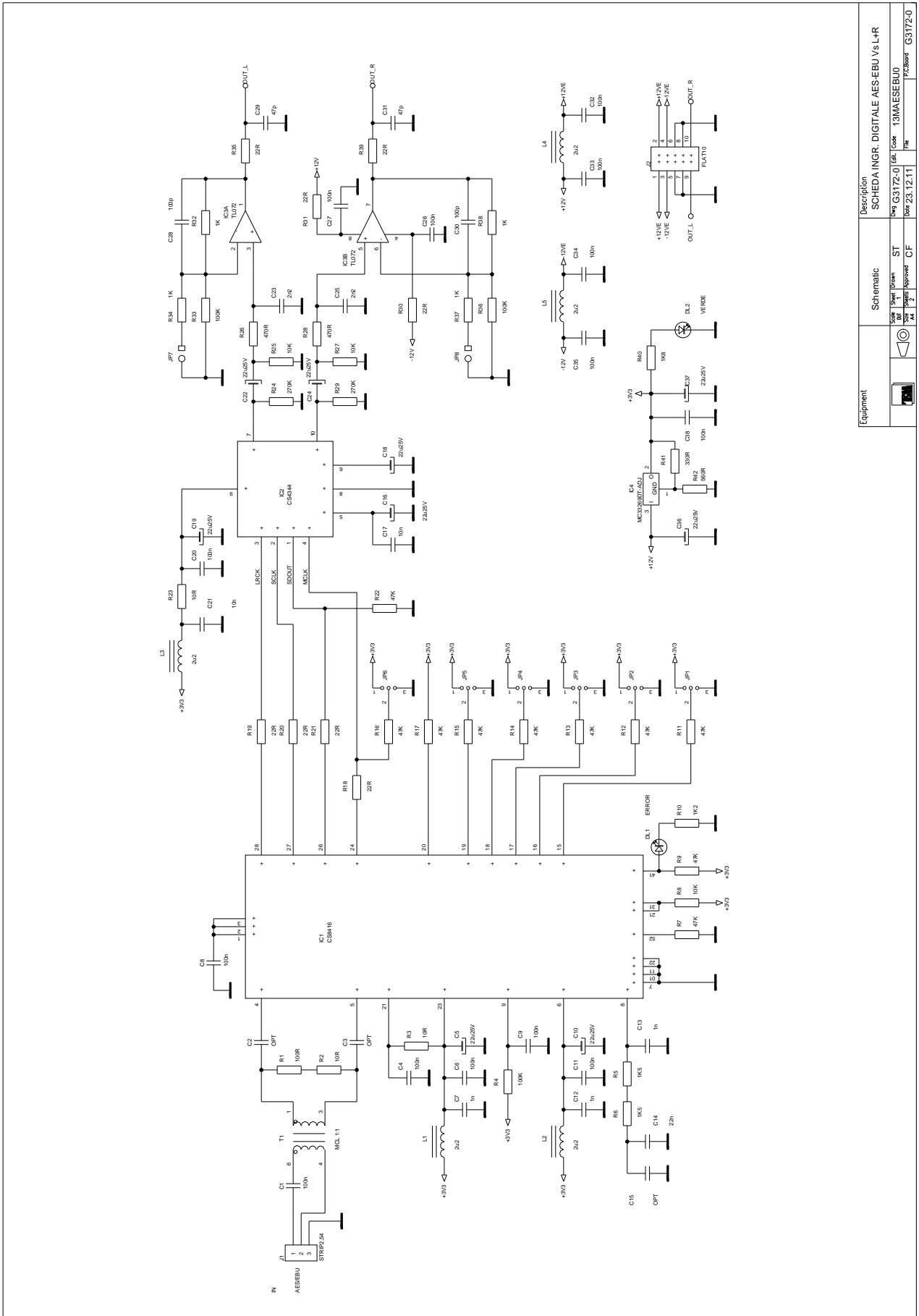


NOTE

1. All parameters are specified at normal input, rated load, 25°C, 70% RH Ambient.
2. Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1uF & 47uF capacitor.
3. Line regulation is measured from low line to high line at rated load.
4. Load regulation is measured from 10% to 100% rated load.

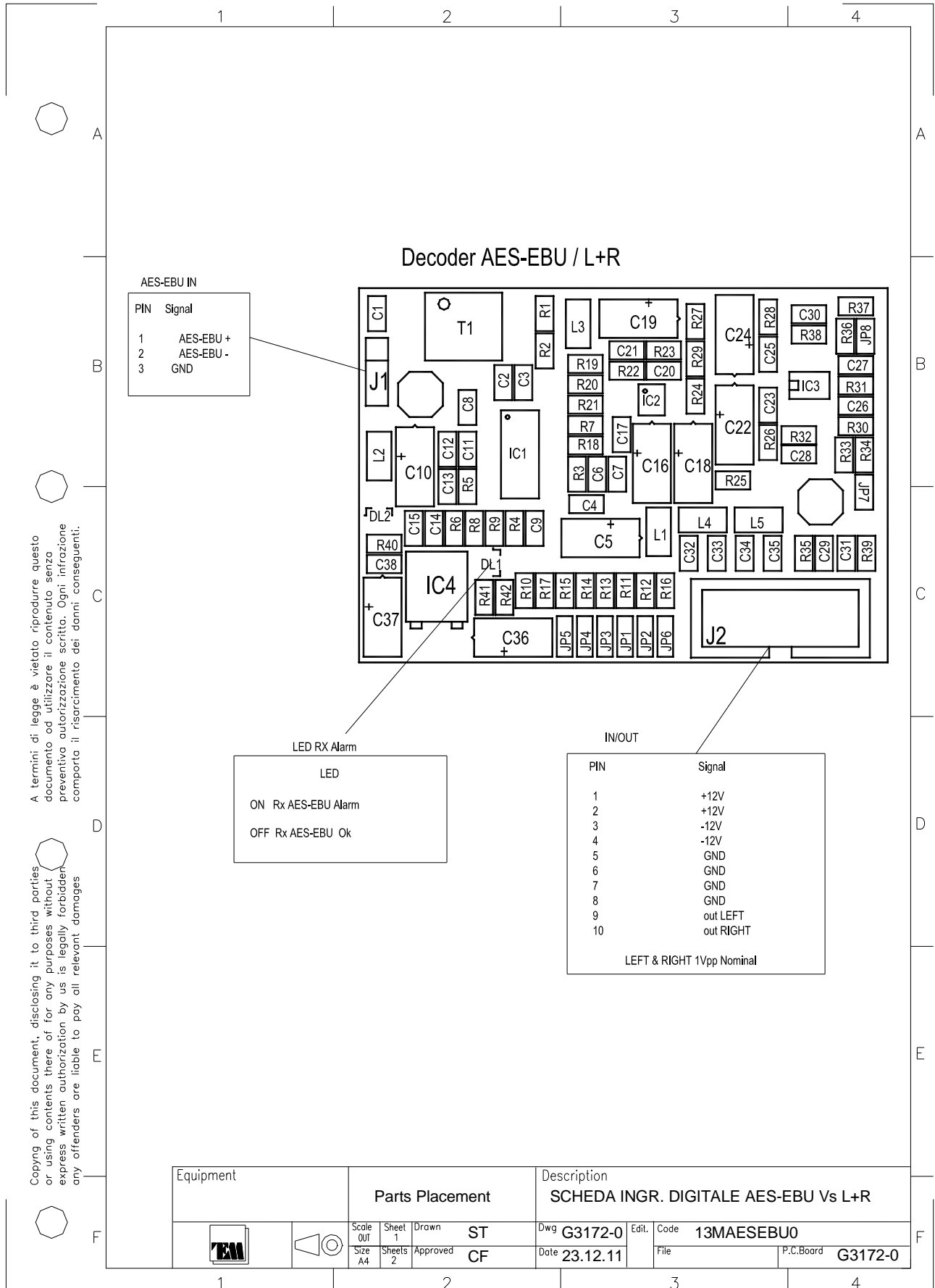
13MAESEBU0 AES-EBU TO L/R DECODER MODULE

13MAESEBU0 AES-EBU VS.L-R – Schematic Diagram



Equipment		Schematic		Description	
Rev	1	Rev	1	SCHEDA INGR. DIGITALE AES-EBU VS.L-R	
Appr		Appr		Rev G3172-0	Ed. Code 13MAESEBU0
Aut		Aut		Rev 2.3.12.11	Rev
Dis		Dis			Prodotto G3172-0

13MAESEBU0 AES-EBU VS.L-R – Part Placement Layout



13MAESEBU0 Part list page 1 of 2

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Pag. 1

Distinta Base Riferimenti Schema				Codice Parte	Livello	Descrizione	Lista Parti	UM	Quantità
13MAESEBU0						SCHEDA INGRESSO DIGITALE AES-EBU VS.L-R		NR	1
ZM001				21G31720	01	CS FOR 13MAESEBU0		NR	1
J001				24XD1370	01	CONN.M.CS 3PIN 6410-03-A - 2.54MM		NR	1
J002				24XD1930	01	CONN.VASCH.10PIN C.S.MRC3-017-820		NR	1
T001				29TO2062	01	TRANSFORMER FOR 13MAESEBU0 MODULE		NR	1
L001 L005	L002	L003	L004	SM29A039	01	IND. 2,2 uH 10% SMD1210 EPC82422-A1222-K100		NR	5
DL001				SM300001	01	DIODO LED ROSSO SOT23 MRC 1-057-220		NR	1
DL002				SM300002	01	DIODO LED VERDE SOT23 MRC 1-057-222		NR	1
IC003				SM44C0440	01	INT. OPER. SMD TL072D (SO8) RS 528331		NR	1
IC001				SM44D0025	01	C58416-C8Z DIGITAL AUDIO RECEIVER T8SOP		NR	1
IC002				SM44D0026	01	CS4344-CZZ DAC STEREO 105DB		NR	1
IC004				SM44E0020	01	MC33269 ADJ- RS785-2637		NR	1
C026	C030			SMCE00503100M3	01	COND.CER. 100PF NPO 5% 0805 50V		NR	2
C029	C031			SMCE00503470N3	01	COND.CER. 47PF NP 5% 0805 50V		NR	2
C001 C009 C027 C035	C004 C011 C032 C038	C005 C020 C033	C008 C026 C034	SMCE1050210093	01	COND.CER. 100nF COG 50V 0805		NR	14
C017	C021			SMCE10502100H3	01	COND.CER. 10nF COG 50V 0805		NR	2
C007	C012	C013		SMCE10502100L3	01	COND.CER. 1nF COG 50V 0805		NR	3
C014				SMCE10502220H3	01	COND.CER. 22nF COG 50V 0805		NR	1
C023	C025			SMCE10502220L3	01	COND.CER. 2,2nF COG 50V 0805		NR	2
C005 C019 C037	C010 C022	C016 C024	C018 C036	SMCEL03512207D	01	SMD COND EL WX 22uF 35V CAS D		NR	9
R001				SMRB10003A	01	RES.SMD 100 OHM 5% 1/10W 0805		NR	1
R032	R034	R037	R038	SMRB10013A	01	RES.SMD 1K OHM 5% 1/10W 0805		NR	4
R008	R025	R027		SMRB10023A	01	RES.SMD 10K OHM 5% 1/10W 0805		NR	3
R004	R033	R036		SMRB10033A	01	RES.SMD 100K OHM 5% 1/10W 0805		NR	3
R002	R003	R023		SMRB100A3A	01	RES.SMD 10 OHM 5% 1/10W 0805		NR	3
R010	R040			SMRB12013A	01	RES.SMD 1,2K OHM 5% 1/10W 0805		NR	2
R005	R006			SMRB15013A	01	RES.SMD 1,5K OHM 5% 1/10W 0805		NR	2

13MAESEBU0 Part list page 2 of 2

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Pag. 2

Distinta Base				Lista Parti		UM	Quantità
Riferimenti schema				Codice Parte	Livello	Descrizione	NR
13MAESEBU0				SCHEDA INGRESSO DIGITALE AES-EBU VS.L-R			
R018	R019	R020	R021	SMRB220A3A	01	RES.SMD 22 OHM 5% 1/10W 0805	NR 8
R030	R031	R035	R039				
R024	R029			SMRB27033A	01	RES.SMD 270K OHM 5% 1/10W 0805	NR 2
R041				SMRB33003A	01	RES.SMD 330 OHM 5% 1/10W 0805	NR 1
R026	R028			SMRB47003A	01	RES.SMD 470 OHM 5% 1/10W 0805	NR 2
R007	R009	R011	R012	SMRB47023A	01	RES.SMD 47K OHM 5% 1/10W 0805	NR 10
R013	R014	R015	R016				
R017	R022						
R042				SMRB56003A	01	RES.SMD 560 OHM 5% 1/10W 0805	NR 1

