

OfficeServ 12

Service Manual



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INTRODUCTION

Purpose

This manual provides service information such as specifications, disassembly and reassembly, troubleshooting, exploded view, parts list, H/W block diagram, schematic description, and PCB Diagram of the OfficeServ 12 system.

Document Content and Organization

This manual is composed of 5 chapters and annex and abbreviation as follows.

CHAPTER 1. System Specifications

This chapter introduces the hardware and specifications of the OfficeServ 12 system.

CHAPTER 2. Disassembly and Reassembly

This chapter describes how to disassemble the OfficeServ 12 system.

CHAPTER 3. Troubleshooting

This chapter describes problems that may occur while using the OfficeServ 12 system and the solutions to such problems.

CHAPTER 4. H/W Block Diagrams and Schematic Description

This chapter describes the hardware block diagrams and provides a schematic description of the OfficeServ 12 system.

CHAPTER 5. Exploded View and Parts List

This chapter describes the exploded view and parts list of the OfficeServ 12 system.

ANNEX A. PCB Component Layout

This annex describes the solder side and component side layout of the OfficeServ 12 system.

ABBREVIATION

Describes the acronyms used in this manual.

Conventions

The following types of paragraphs contain special information that must be carefully read and thoroughly understood. Such information may or may not be enclosed in a rectangular box, separating it from the main text, but is always preceded by an icon and/or a bold title.



WARNING

Provides information or instructions that the reader should follow in order to avoid personal injury or fatality.



CAUTION

Provides information or instructions that the reader should follow in order to avoid a service failure or damage to the system.



CHECKPOINT

Provides the operator with checkpoints for stable system operation.



NOTE

Indicates additional information as a reference.

Reference

OfficeServ 12 Intallation Guide

This guide is an installer's guide containing information on system specification, how to install and set up the OfficeServ 12 system and how to connect the additional equipment.

Revision History

EDITION	DATE OF ISSUE	REMARKS
00	10. 2004.	First Edition
01	05. 2005.	The information about 4TRK Board is added.

SAFETY CONCERNS

For product safety and correct operation, the following information must be given to the operator/user and shall be read before the installation and operation.

Symbols

**Caution**

Indication of a general caution

**Restriction**

Indication for prohibiting an action for a product

**Instruction**

Indication for commanding a specifically required action



WARNING



Precautions for connecting door phone

- Do not directly connect the LOCK port of DPIM(Door Phone Interface Module) to a commercial AC power supply to prevent fire and immediate breakdown of the OfficeServ 12 system.
- Connect a DPIM to a DLI port only after connecting a door phone to the DPIM.
- The LOCK port of DPIM is standardized so that it is used only for controlling a low voltage relay. Standard values are 5 VDC and 40 mA.



Do not install the system in a location near a heat source such as a heater.

This is to prevent fire.



Precaution for cleaning

Do not spray directly on the unit, and do not clean the unit with benzene, thinner or alcohol to prevent fire and electric shock.



Do not wire the system during a lightning storm.

This is to prevent electric shocks caused by lightning.



Do not directly connect the external paging equipment or a common bell to a commercial AC power supply.

This is to prevent fire and immediate breakdown of the OfficeServ 12 system.



Check whether the power is on before connecting a cable for battery connection.

Connecting the battery while the power is off may cause sparks, which can be very dangerous.



Unplug the AC power cable before grounding the system.

Grounding the system while the AC power cable is plugged in may cause high voltage, which can result in critical damage.

**Cautions when repairing the product**

- Unplug the power cable before repairing the product.
- Use standard parts for replacements.
- Do not turn off the power during program upgrades.

**Follow the instructions below before disassembling the OfficeServ 12 system.**

- Unplug the AC power cable and turn off the OfficeServ 12 system power.
- Remove the cables of external devices such as phone and external battery from the OfficeServ 12 system.
- Wear wrist straps and ground the straps before handling boards or parts of the OfficeServ 12 system.



CAUTION



Caution for using battery

DC 48 V(6~40 AH) batteries should be used for OfficeServ 12. If the capacity of the battery is too great, system malfunction may occur. If the capacity is too small, the system may not operate properly during a power failure.



Precaution for wall mounting

- If the wall is made of plaster or brick, or if the building is a prefabricated one, you should place a 2 cm thick wood plate on the wall to prevent damaging the wall.
- It may be difficult to drive a screw directly into a concrete wall. In such cases, make a hole using an electric drill and insert a bushing into the hole first, and then insert the screw into the bushing. This is to prevent the system from falling and breaking.



Do not install the system places subject to moisture or wetness.

Do not install the system near a bathtub, wash-bowl, kitchen sink, and laundry tub, in a damp basement or near a swimming pool. Doing so may cause a malfunction or shorten the life span of parts.



Do not disassemble, repair or modify at your discretion.

Contact your service center when repair is required.



Use only the power cable and battery indicated by this manual.

Use of an alternative power cable and battery may result in serious damage, which will not be covered by the product warranty.



Connect the OfficeServ 12 system to an independent AC outlet.

Sharing AC power with other devices can cause noise or malfunction due to voltage drop.

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ABBREVIATION		I
A ~ D		I
F ~ M		II
N ~ S		III
T ~ W		IV

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System Specifications

This chapter introduces the hardware and specifications of the OfficeServ 12 system.



Compliance with local standards

OfficeServ 12 is designed to comply with the standard of the corresponding country.

1.1 Hardware Descriptions

This section introduces each view and part descriptions of the OfficeServ 12 system.

1.1.1 Front View

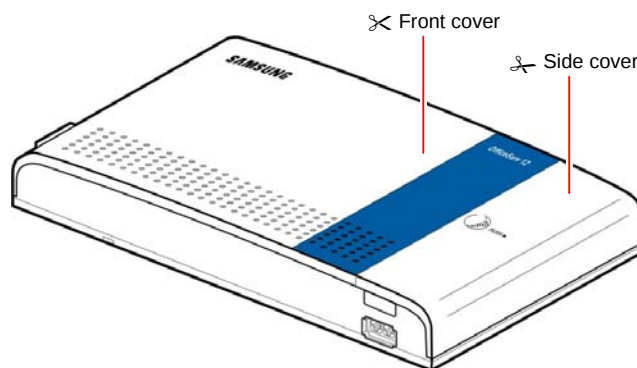


Figure 1.1 Front View of the OfficeServ 12

Table 1.1 Front/Side Cover

Item	Description
✂ Front Cover	The front cover must be removed to view the boards or internal cables of the system or to disassemble the system.
✂ Side Cover	The side cover must be removed to view the ports and switches of the system.

1.1.2 Ports and Switch (After Removing Side Cover)

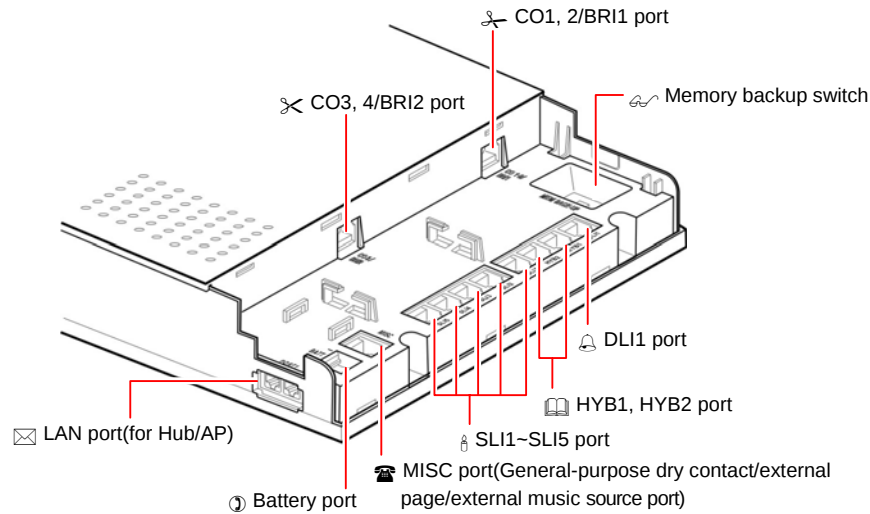


Figure 1.2 Ports and Switch of the OfficeServ 12

Table 1.2 Ports and Switch Descriptions

Item	Description
✂ CO3, 4/BRI2 port	When the 2BRI(Basic Rate Interface) board is installed in the system, this port is for BRI2 port. When the 3TRK board is installed in the system, this port is for CO(Central Office)3 port only. When the 4TRK board is installed in the system, this port is for CO3 or CO4 port.
✂ CO1,2/BRI1 port	When the 2BRI board is installed in the system, this port is for BRI1 port. When the 3/4TRK board is installed in the system, this port is for CO1 or CO2 port.
🔌 Memory backup switch	This switch is for using the battery and supplying the power to the OfficeServ 12 system when power is interrupted to keep data for a predetermined time. The switch must be turned 'ON' after the data is input.
🔔 DLI1 port	DLI1(Digital Line Interface 1) port is for connecting a digital phone exclusively used for the OfficeServ 12 system to which the phone is interlocked.
📖 HYB1, HYB2 port	HYB1(Hybrid1), HYB2(Hybrid2) ports are for connecting a digital phone or analog phone.
🔌 SLI1~SLI5 port	SLI(Single Line Interface) port is for connecting an analog phone generally used at home or office.
☎ MISC port	MISC(Miscellaneous) port is for connecting an external paging device. MOH(Music On Hold), general purpose dry contact.
🔋 Battery port	Battery port is for connecting a backup battery.
✉ LAN port	LAN(Local Area Network) port is for connecting a hub or AP(Access Point).

1.1.3 Bottom View

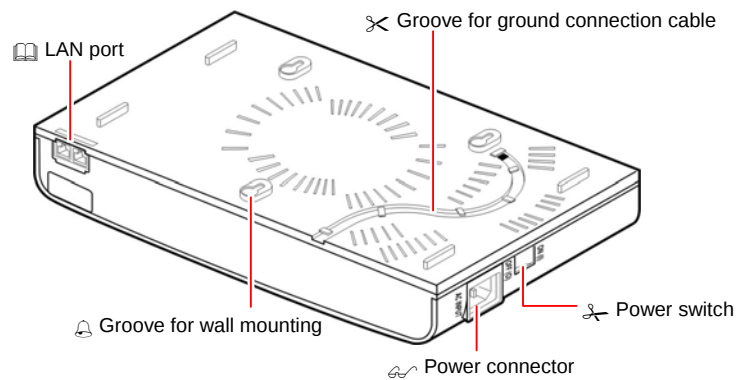


Figure 1.3 Bottom View of the OfficeServ 12

Table 1.3 Bottom View Descriptions

Item	Description
✂ Groove for ground connection cable	A groove for grounding.
✂ Power switch	A switch for turning On/Off the AC power.
🔌 Power connector	A port for connecting the power adaptor plug.
🔌 Groove for wall mounting	A groove for wall mounting.
📶 LAN port	A port for connecting a hub or AP.

1.2 Specifications

The specifications of the OfficeServ 12 system are as follows:

1.2.1 CPU, Memory, Switch

Table 1.4 CPU, Memory, Switch

Item	Specification	
CPU	MPC855T	
Memory	Boot ROM	512 KB
	Flash ROM	8 MB
	SRAM	2 MB
	SDRAM	64 MB
Switch Structure	256 × 256 Time Slot	

1.2.2 System Capacity

Table 1.5 System Capacity

Item		Specification
Trunk	3TRK	3 Analog trunk lines(with Caller ID)
	4TRK	4 Analog trunk lines(with Caller ID)
	2BRI	2 Digital trunk lines(4 channels)(CO3/BRI2 line(2 Channels) can be substituted for ISDN station lines)
Station		8 lines(1 line for digital phone, 2 hybrid, and 5 lines for analog phones)
Music-on-hold/ Background music channel		1(internal or external)
General-purpose dry contact		1
External Page		1
AP(for WLAN)		1
WIP-5000M phone		4



NOTE

The OfficeServ 12 system provides 8 station lines(1 DLI port, 2 HYB ports, and 5 SLI ports).

DLI port supports 2B(KDB-D, KDB-S) and hybrid port supports analog phone and digital phone(DLI max configuration: 3 ports, SLI max configuration: 7 ports).

1.2.3 Power Specifications

Table 1.6 Power Specifications

Item	Specification
AC Input	220~240 VAC, 50 Hz, 1.6 A
Maximum Power Consumption	55 Watts

1.2.4 Environment Specifications

Table 1.7 Environment Specifications

Item	Specification
Operating Temperature	0~40 °C(32~104 °F)
Relative Humidity	10~90 %
Temperature(Storage)	-10~50 °C(14~122 °F)

1.2.5 Cable Specifications

Table 1.8 Cable Specifications

Item	Specification
Digital Phone	2-line cable, maximum 400 m(1300 Ft)(AWG #24)
Analog Phone	2-line cable, maximum 1 km(3000 Ft)(AWG #24)
DPIM	2-line cable, maximum 300 m(1000 Ft)(AWG #24)
Door Phone	2-line cable, maximum 100 m(330 Ft)(AWG #24)
LAN	RJ-45

1.2.6 Dimensions

Table 1.9 Dimensions

Item	Height(mm)	Width(mm)	Depth(mm)	Mass(kg)
OfficeServ 12	190	350	60	2.0
DPIM	29	90	120	0.2

1.2.7 Others

Table 1.10 Other Specifications

Item	Specification
External music source input characteristics	Impedance: 600 ohm Voltage: Maximum 350 mV
External Page	Impedance: 600 ohm



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Disassembly and Reassembly

This chapter introduces how to disassemble the OfficeServ 12 system.
You can reassemble the OfficeServ 12 system by following the steps in reverse order.

2.1 Boards and PSU

OfficeServ 12 is composed of the base board, 3/4TRK board, 2BRI board, MGI(Media Gateway Interface) board, and PSU(Power Supply Unit).

2.1.1 When 3/4TRK is Equipped

The following figure shows the board configuration of OfficeServ 12 when the 3/4TRK analog trunk daughter board is equipped on the base board:

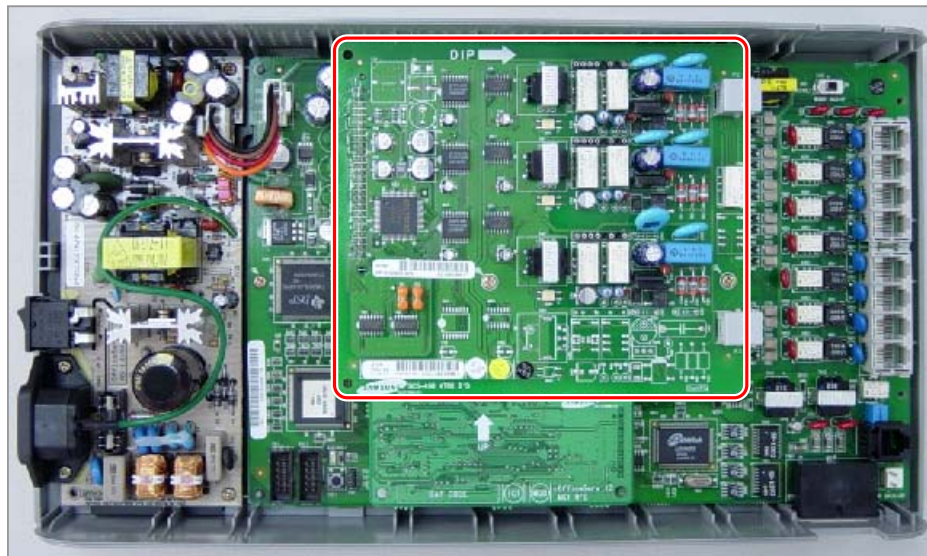


Figure 2.1 OfficeServ 12 Board Configuration (When 3/4TRK is Equipped)

2.1.2 When 2BRI is Equipped

The following figure shows the board configuration of OfficeServ 12 when the 2BRI digital trunk daughter board is equipped on the base board:

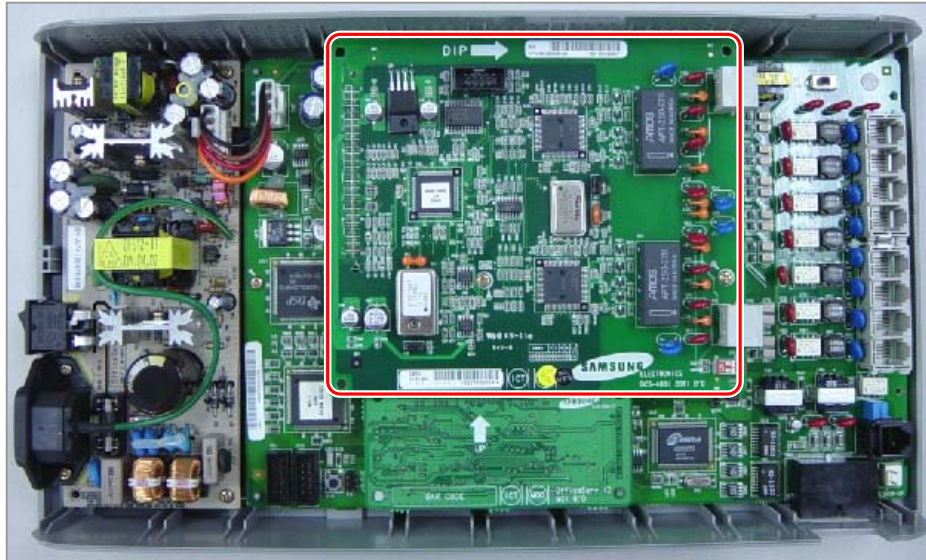


Figure 2.2 OfficeServ 12 Board Configuration (When 2BRI is Equipped)

2.2 Disassembly Procedure

This section introduces how to disassemble the OfficeServ 12 system.



Reassembly

You can reassemble the OfficeServ 12 system in the reversed procedure of the disassembly.

Disassemble the OfficeServ 12 system as following procedure.



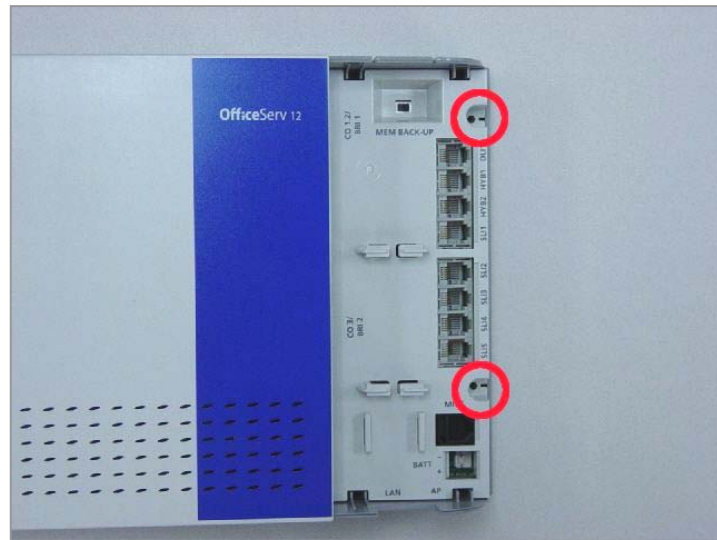
Follow the instructions below before disassembling the OfficeServ 12 system.

- Unplug the AC power plug from the wall outlet and turn the OfficeServ 12 system power switch off.
- Remove the cables of external devices such as phone and external battery from the OfficeServ 12 system.

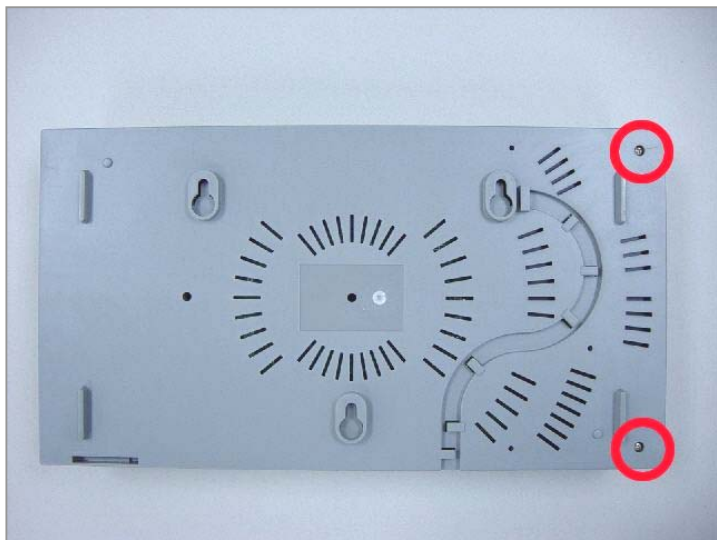
- 1) Remove the side cover by slightly pushing and pulling the upper part of the side cover.



-
- 2) Remove the two screws at the side of the system.



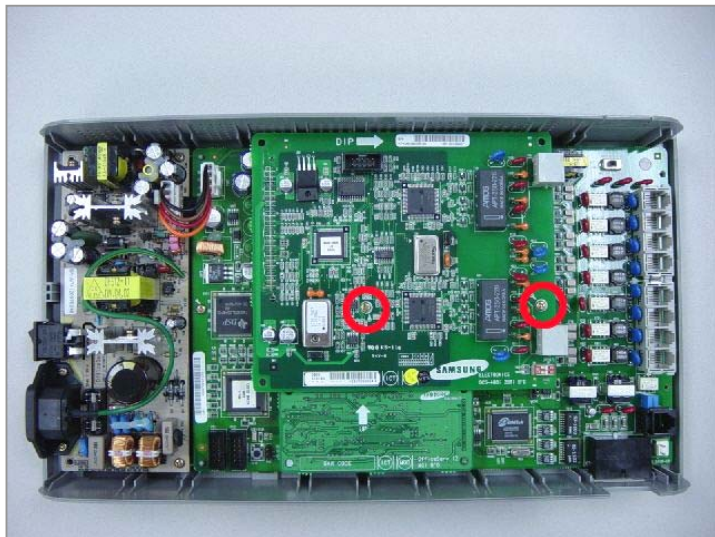
- 3) Remove the two screws at the bottom panel of the system.



-
- 4) Remove the top cover.



- 5) Remove the two screws marked below in order to separate the 3/4TRK board or 2BRI board:

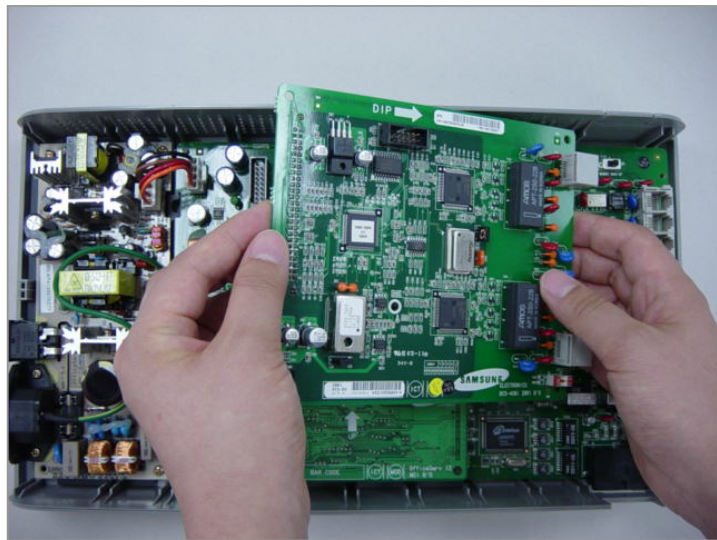


-
- 6) Remove the 3/4TRK board or 2BRI board from the base board.

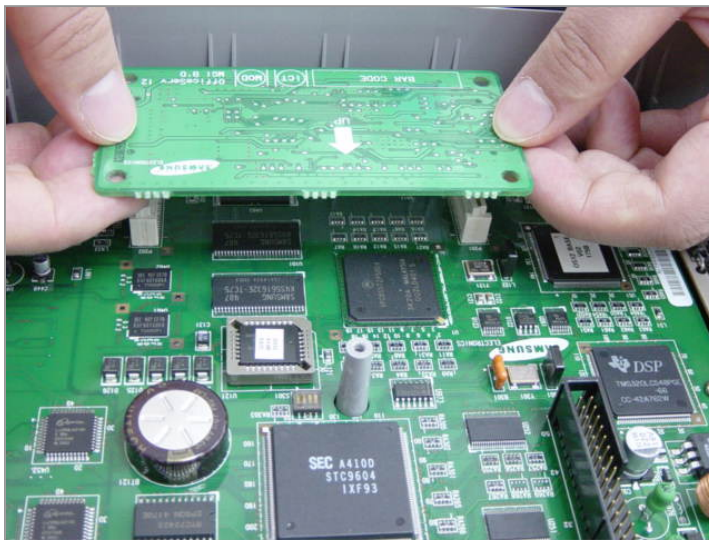


Follow the instructions below before disassembling the OfficeServ 12 system.

Wear wrist straps and ground the straps before handling boards or parts of the OfficeServ 12 system.



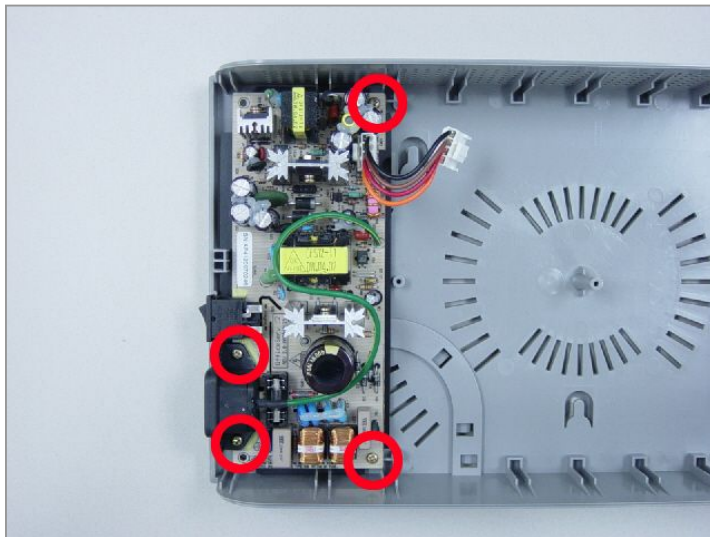
- 7) Remove the MGI board attached to the connectors on both ends of the base board.



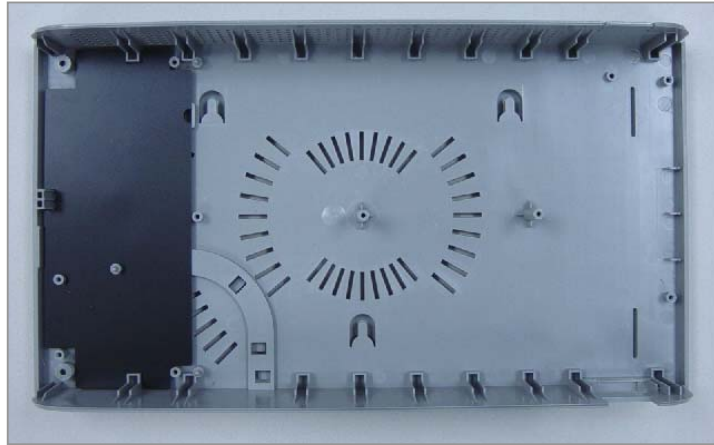
-
- 8) Remove the screw marked below to separate the base board from the system chassis:
Remove the cable from the PSU(Power Supply Unit).



- 9) Remove the 4 screws marked below to separate the PSU.



-
- 10) The system chassis should be emptied as shown below when all boards and PSU are removed:





Troubleshooting

This chapter describes problems that may occur while using the OfficeServ 12 system and solutions for solving those problems.

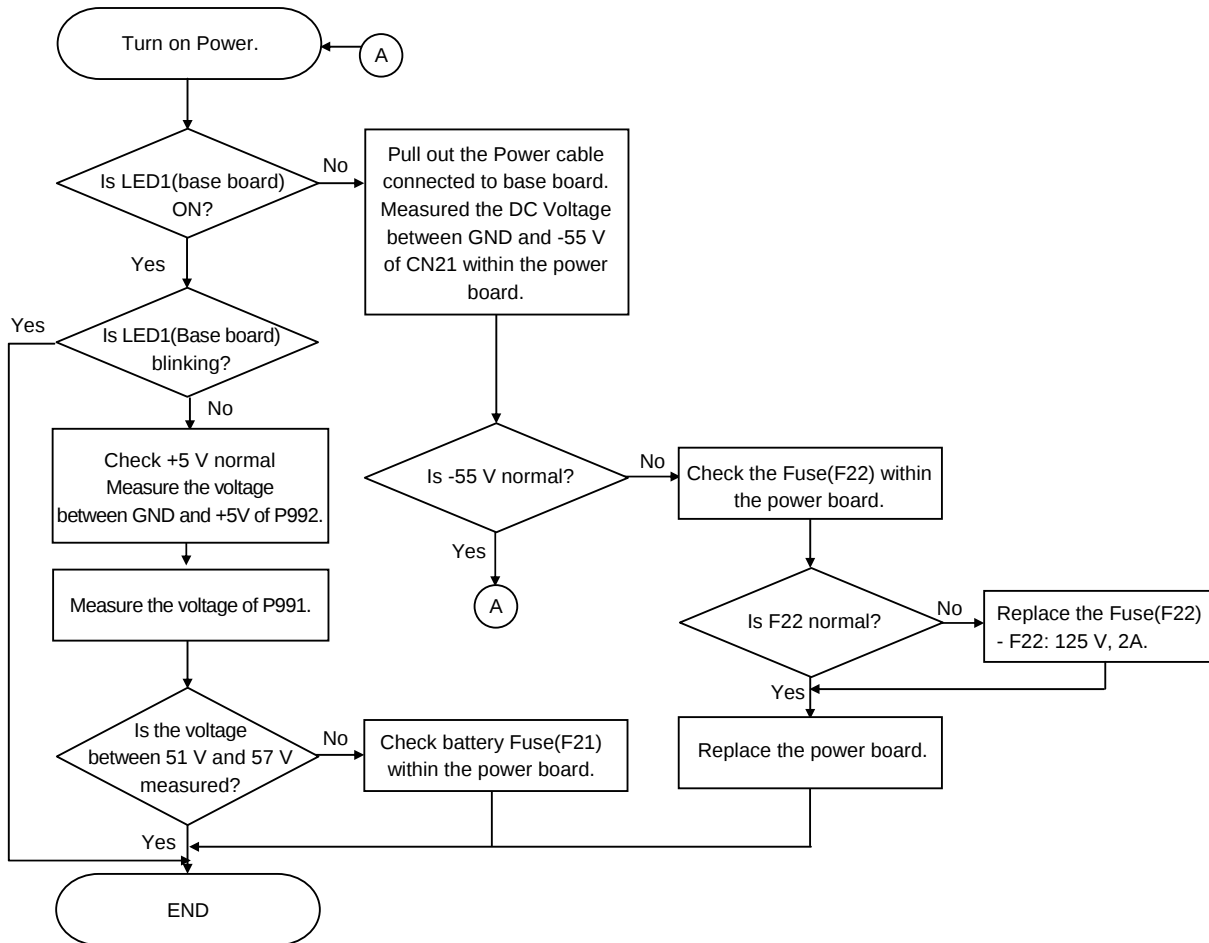
3.1 Power Failures

Failure

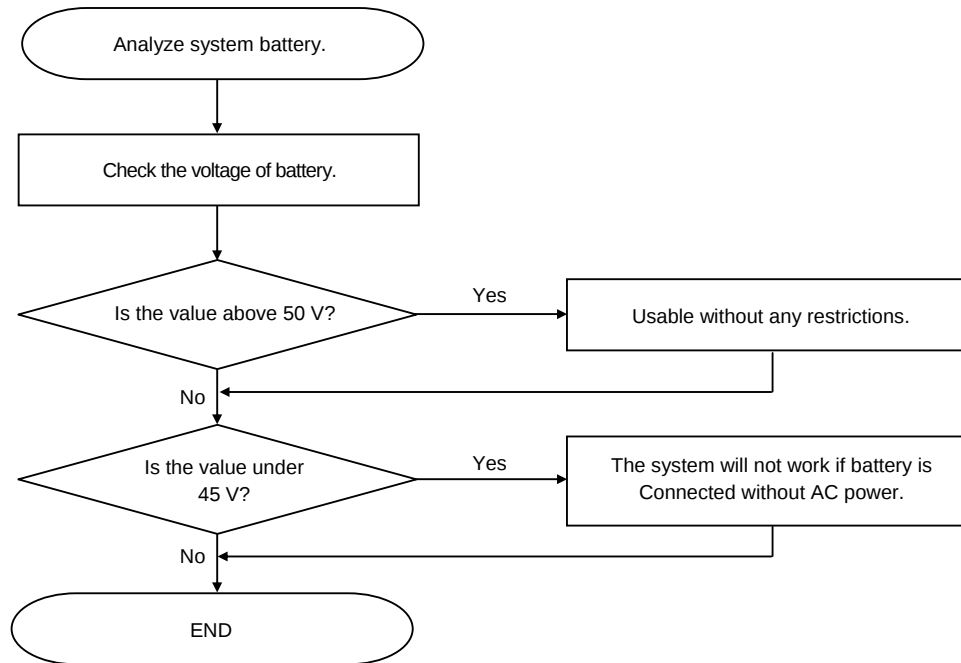
The OfficeServ 12 system is not powered properly.

Troubleshooting

1) Check the Power supply as follows:



2) Check the poor battery backup as follows:



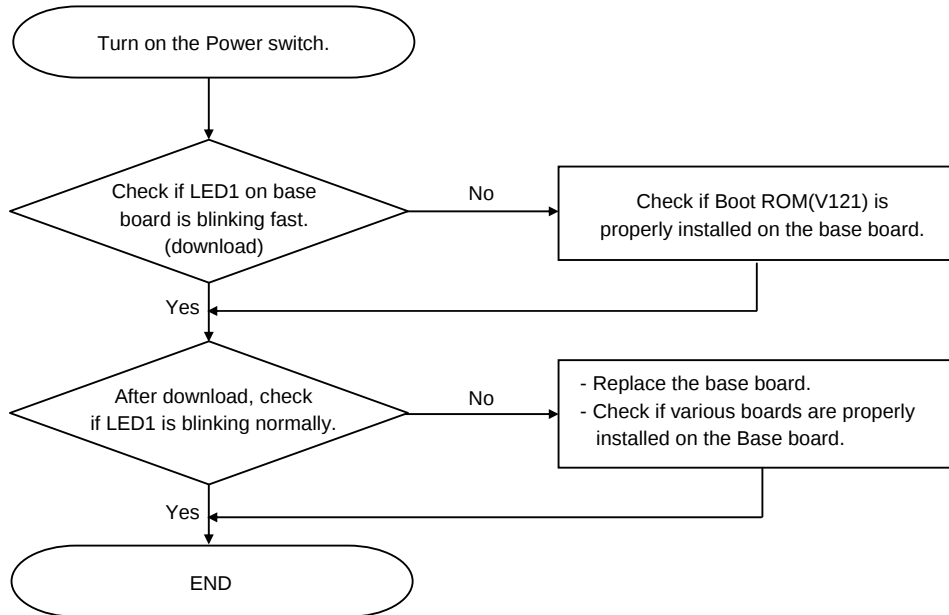
3.2 Base board Failures

Failure

The base board of the OfficeServ 12 system does not operate properly.

Troubleshooting

Checking the base board boot as follows:

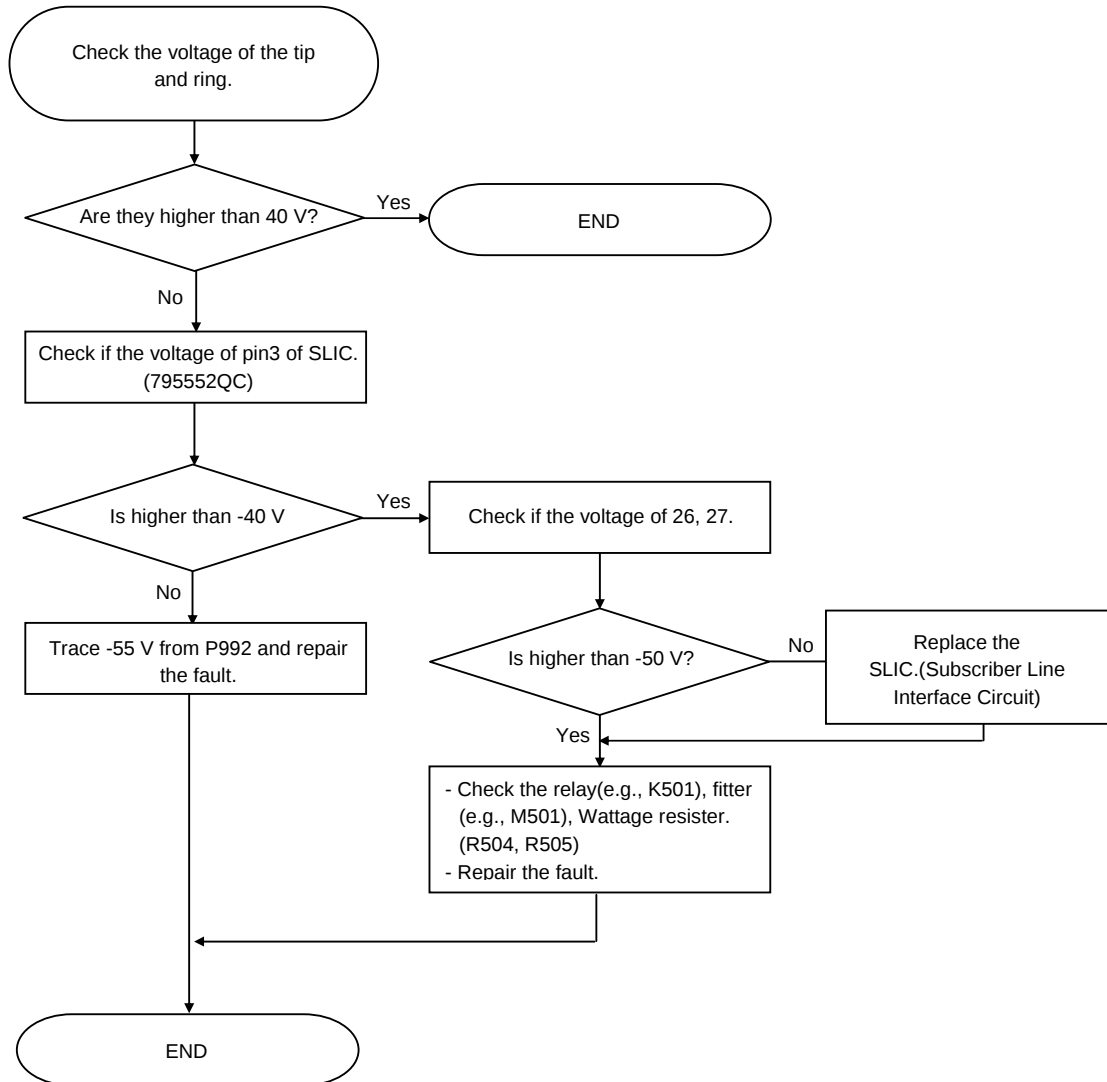


3.3 SLI Failures

Failure 1

When No Power is supplied to the SLI port.

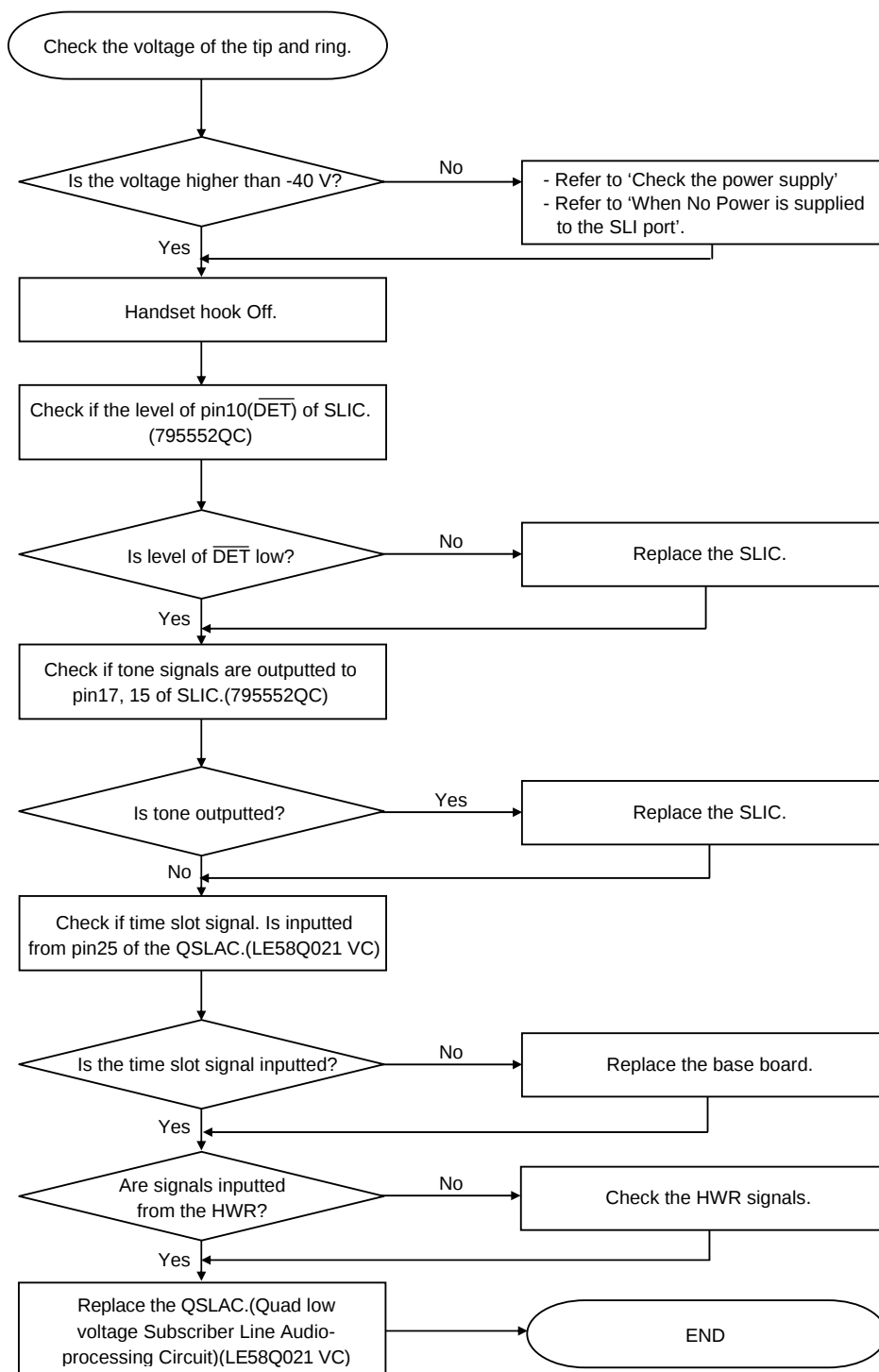
Troubleshooting 1



Failure 2

When No Tone is sent to the SLI port.

Troubleshooting 2



Failure 3

When No Call is connected.

Troubleshooting 3

Follow the troubleshooting procedure of the 'When No Tone is sent to the SLI port.' failure.



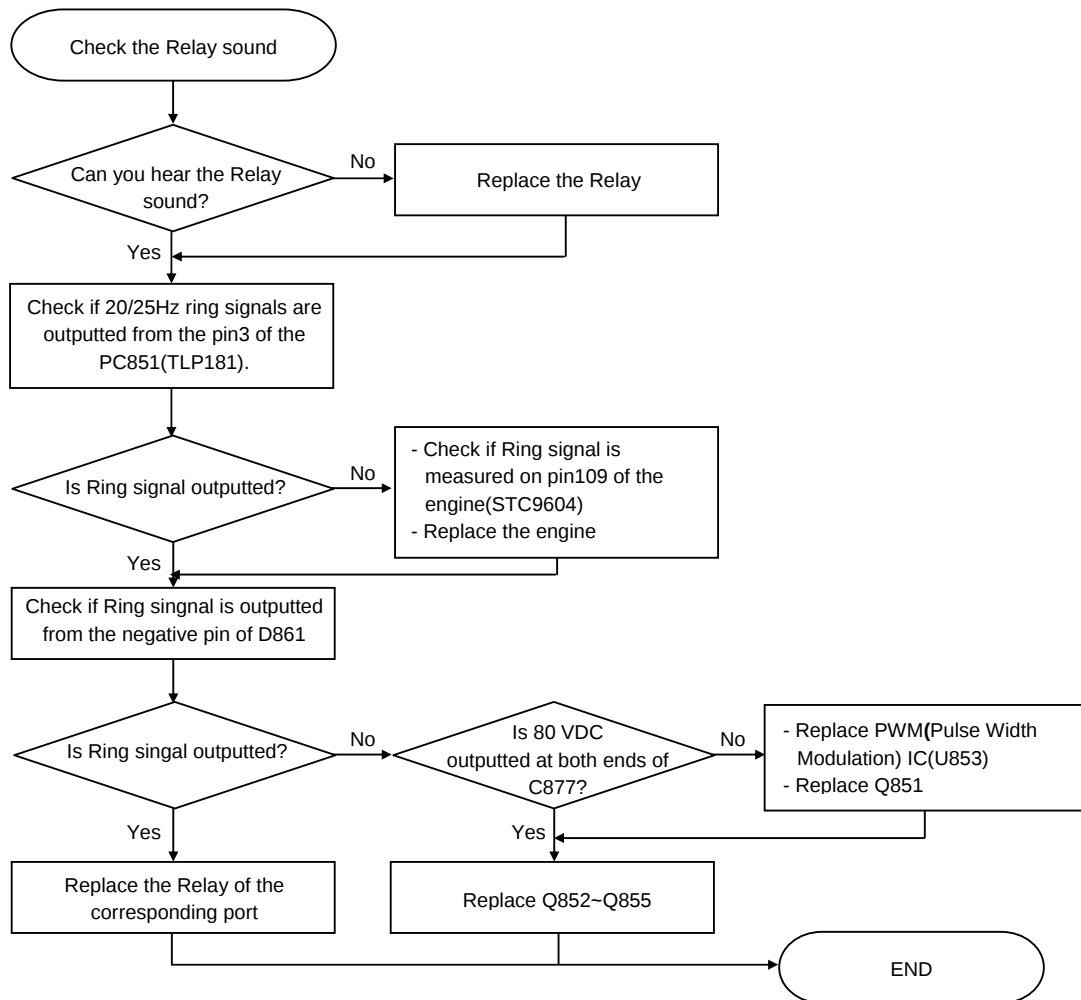
NOTE

This failure does not occur when the 'When No Tone is sent to the SLI port' problem is solved.

Failure 4

When the ring does not go off.

Troubleshooting 4

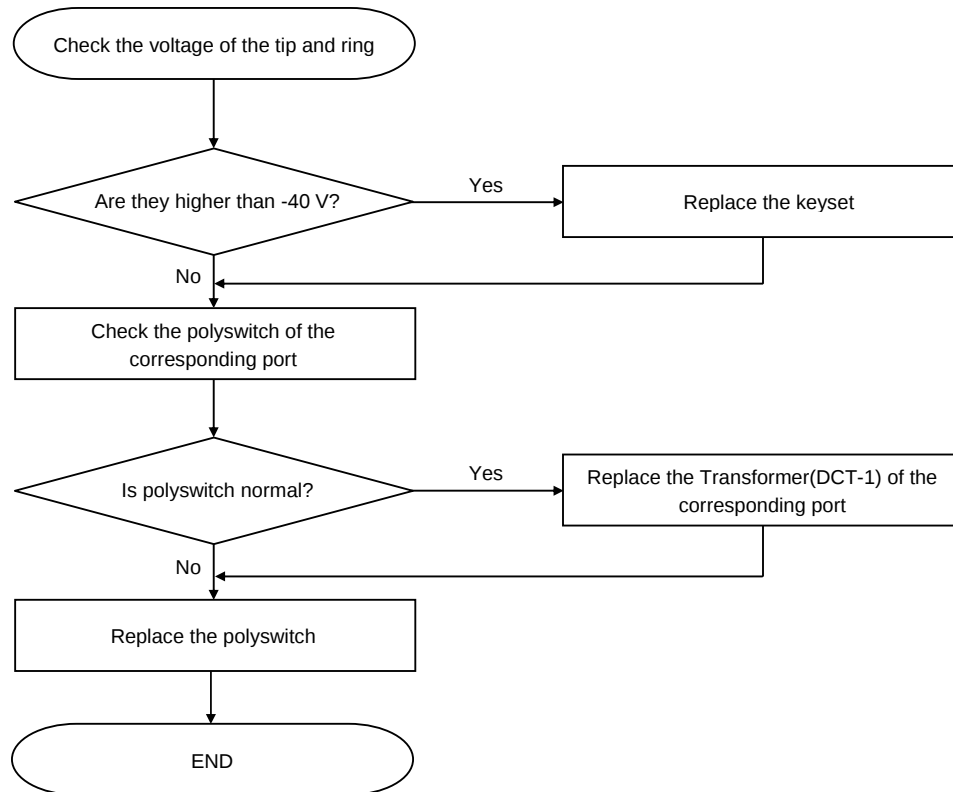


3.4 DLI Failures

Failure 1

When No Power is supplied to the DLI port.

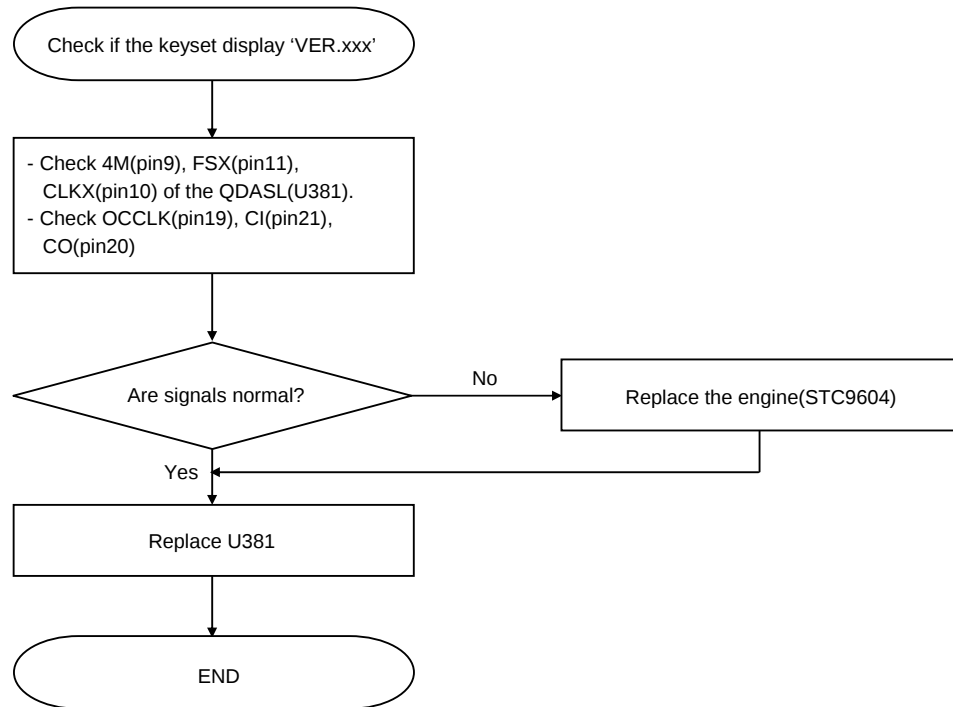
Troubleshooting 1



Failure 2

When DLI port does not work.

Troubleshooting 2

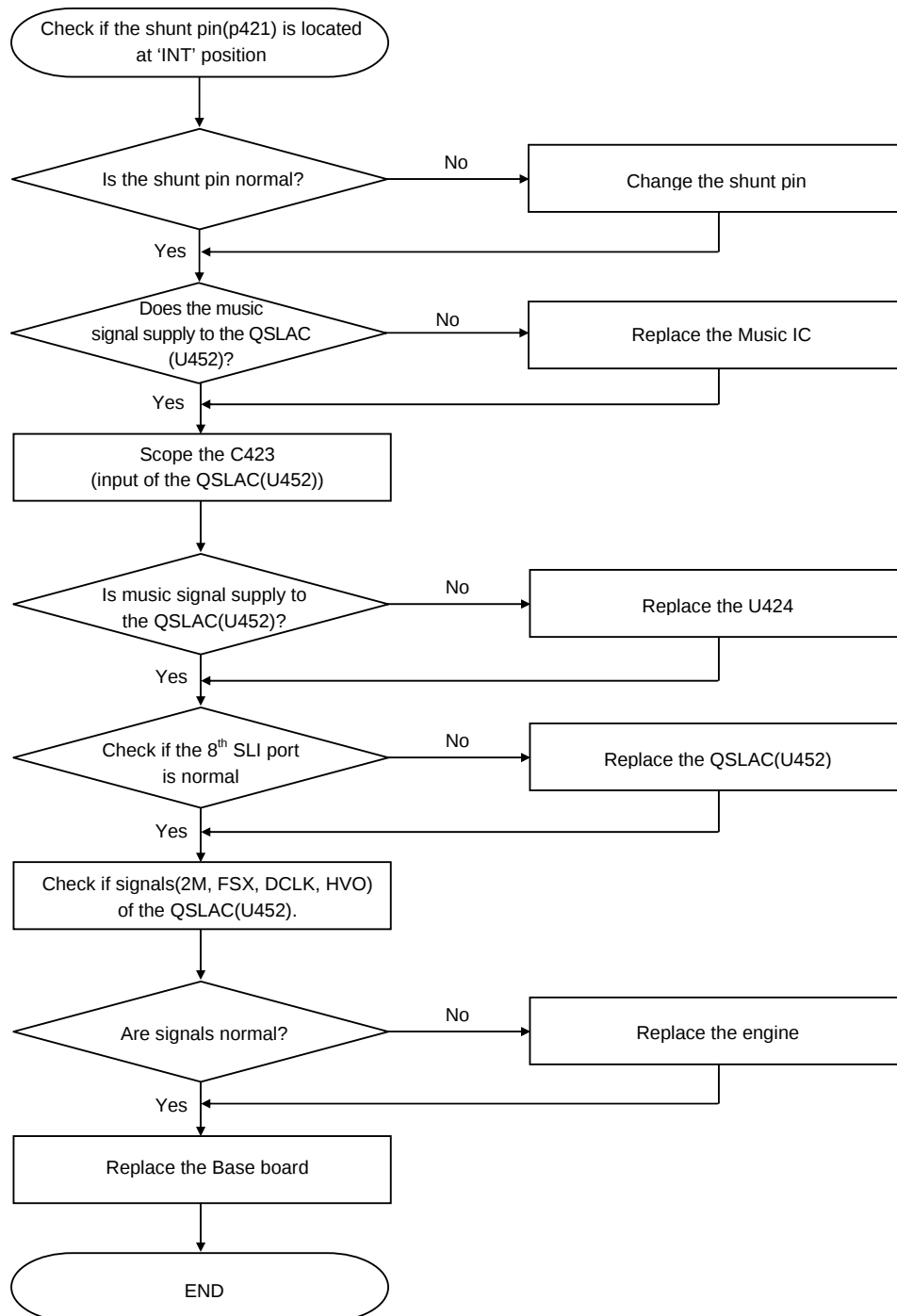


3.5 MISC Failures

Failure 1

When the internal MOH or BGM(Background Music) does not work.

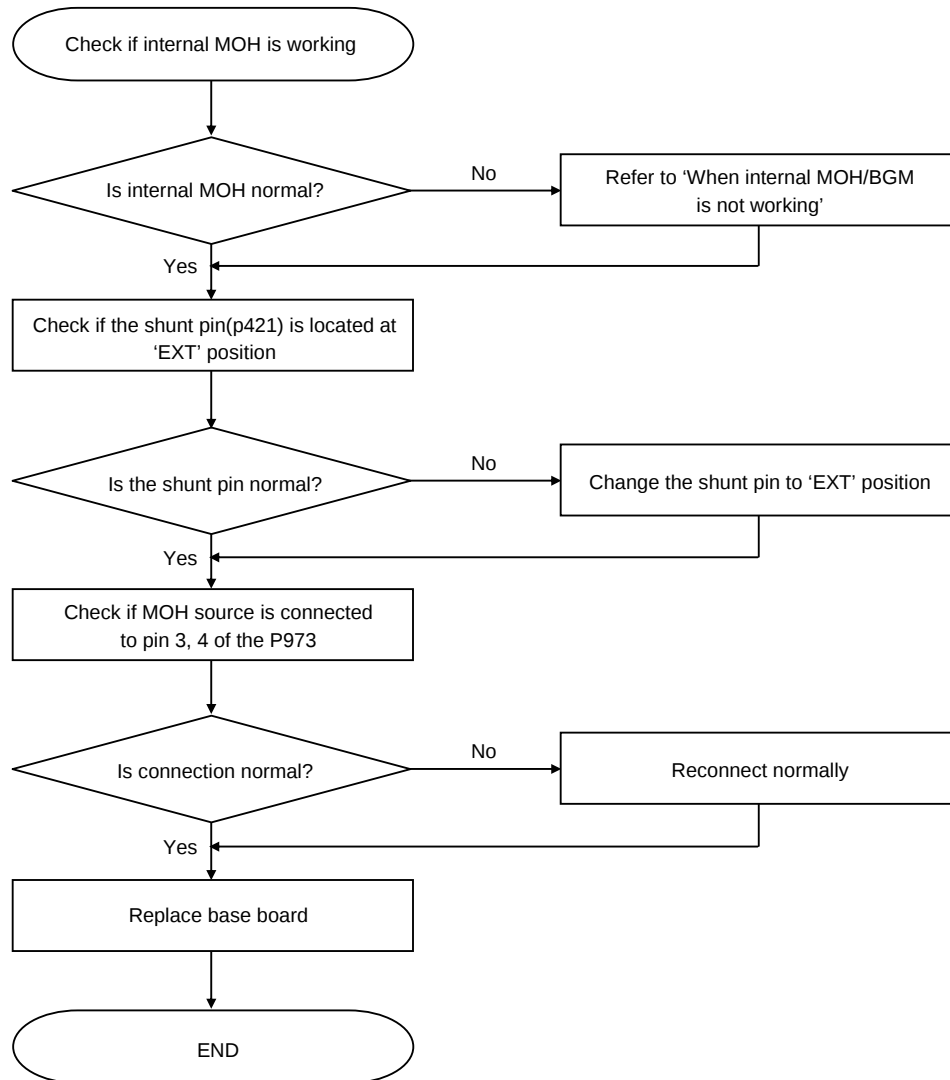
Troubleshooting 1



Failure 2

When the external MOH does not work.

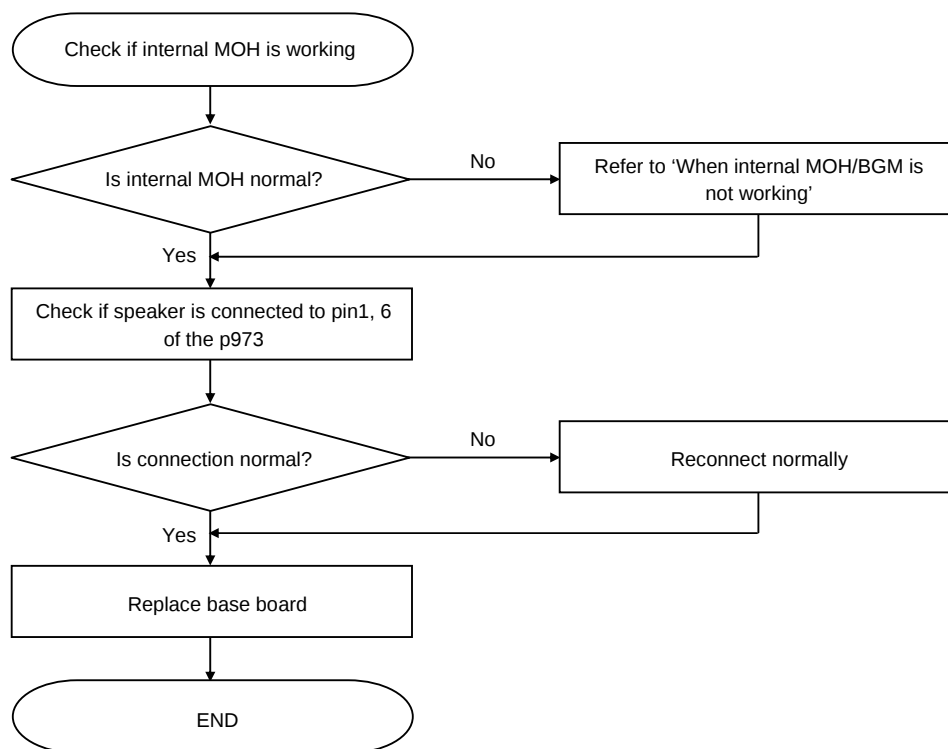
Troubleshooting 2



Failure 3

When the external Paging does not work.

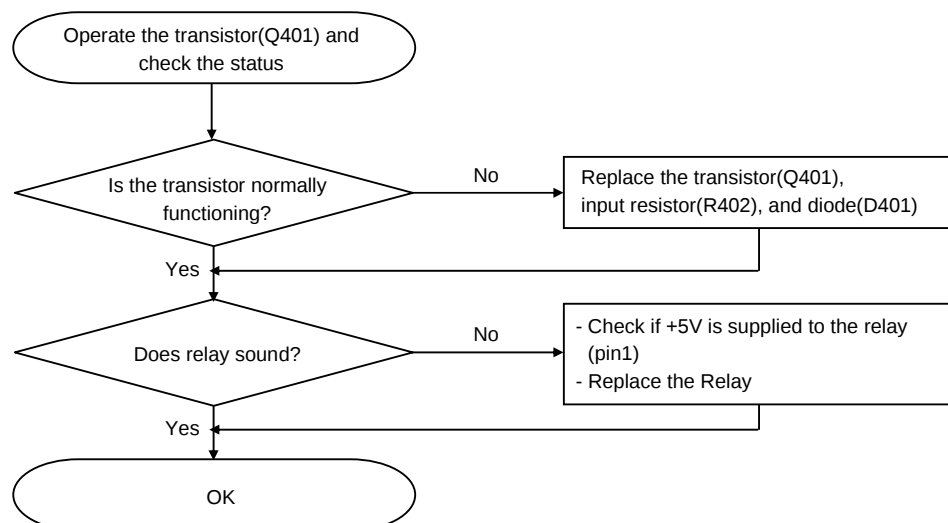
Troubleshooting 3



Failure 4

When the Relay is not controlled.

Troubleshooting 4

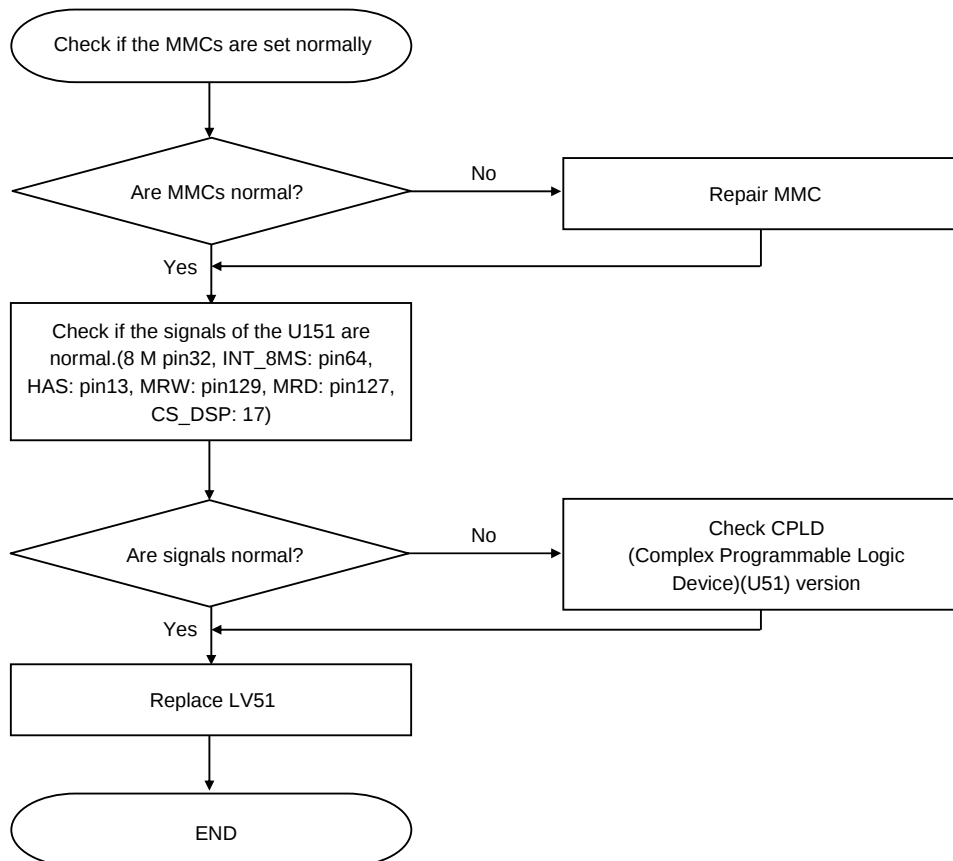


3.6 Caller ID Failures

Failure

When Caller ID does not send and receive.

Troubleshooting

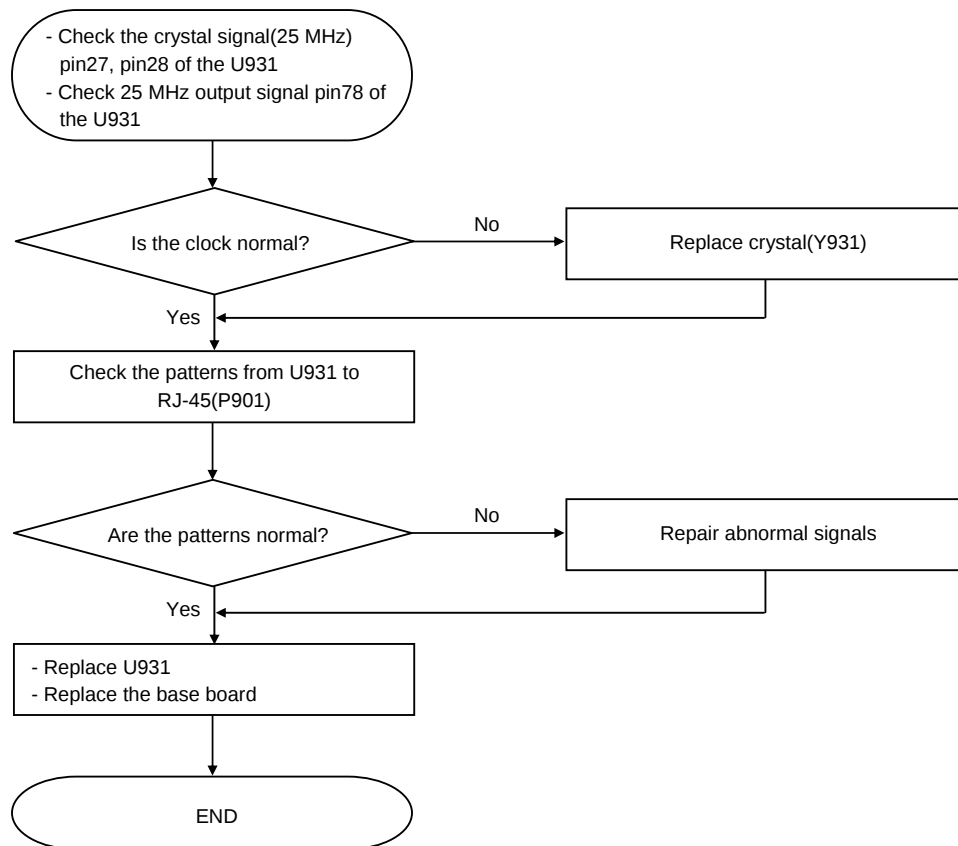


3.7 LAN Failures

Failure

When the LAN does not work.

Troubleshooting

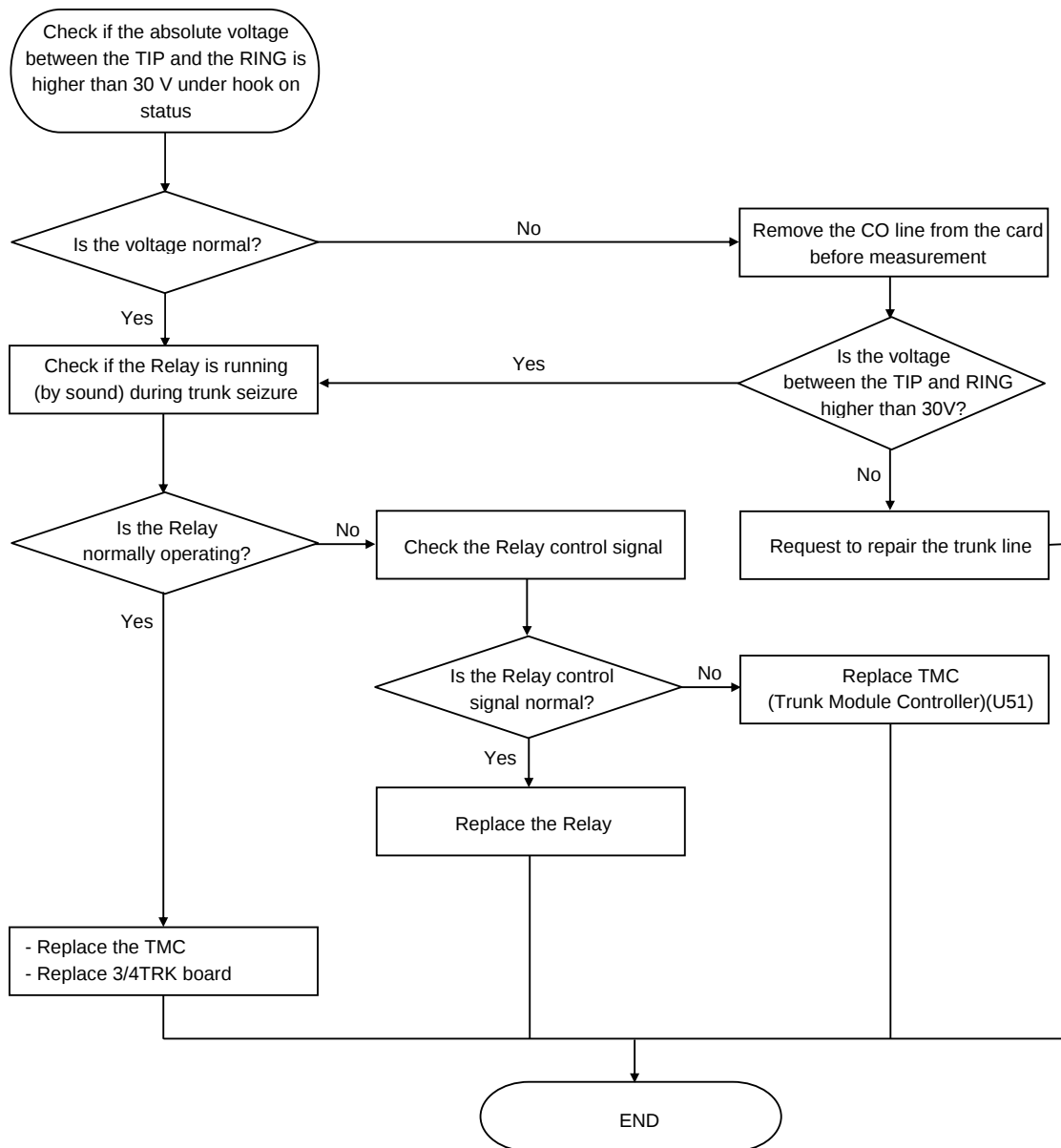


3.8 3/4TRUNK Failures

Failure 1

When No Trunk is recognized.

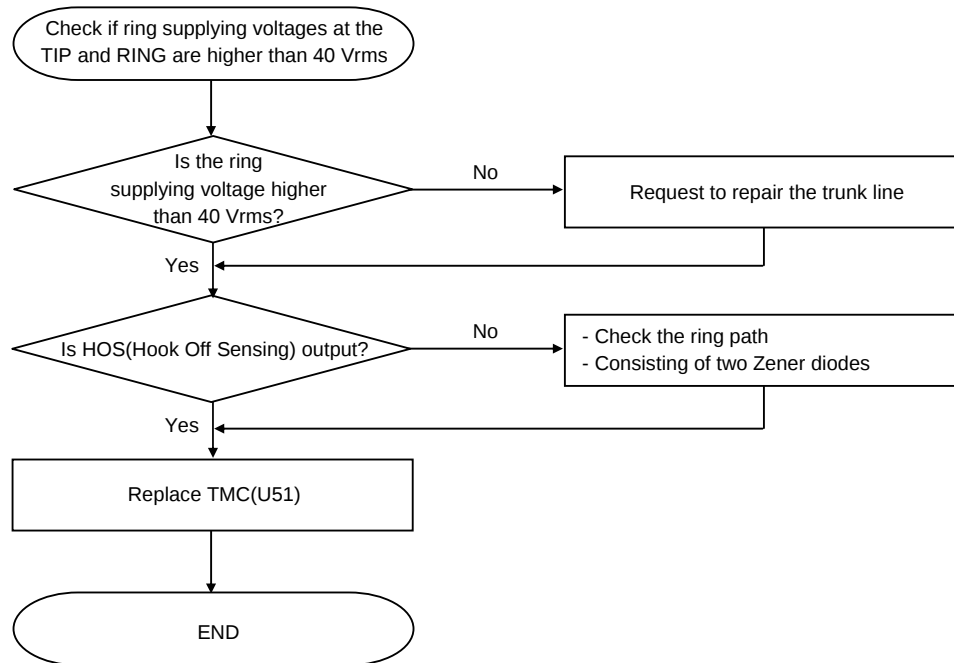
Troubleshooting 1



Failure 2

When Ring is not terminated.

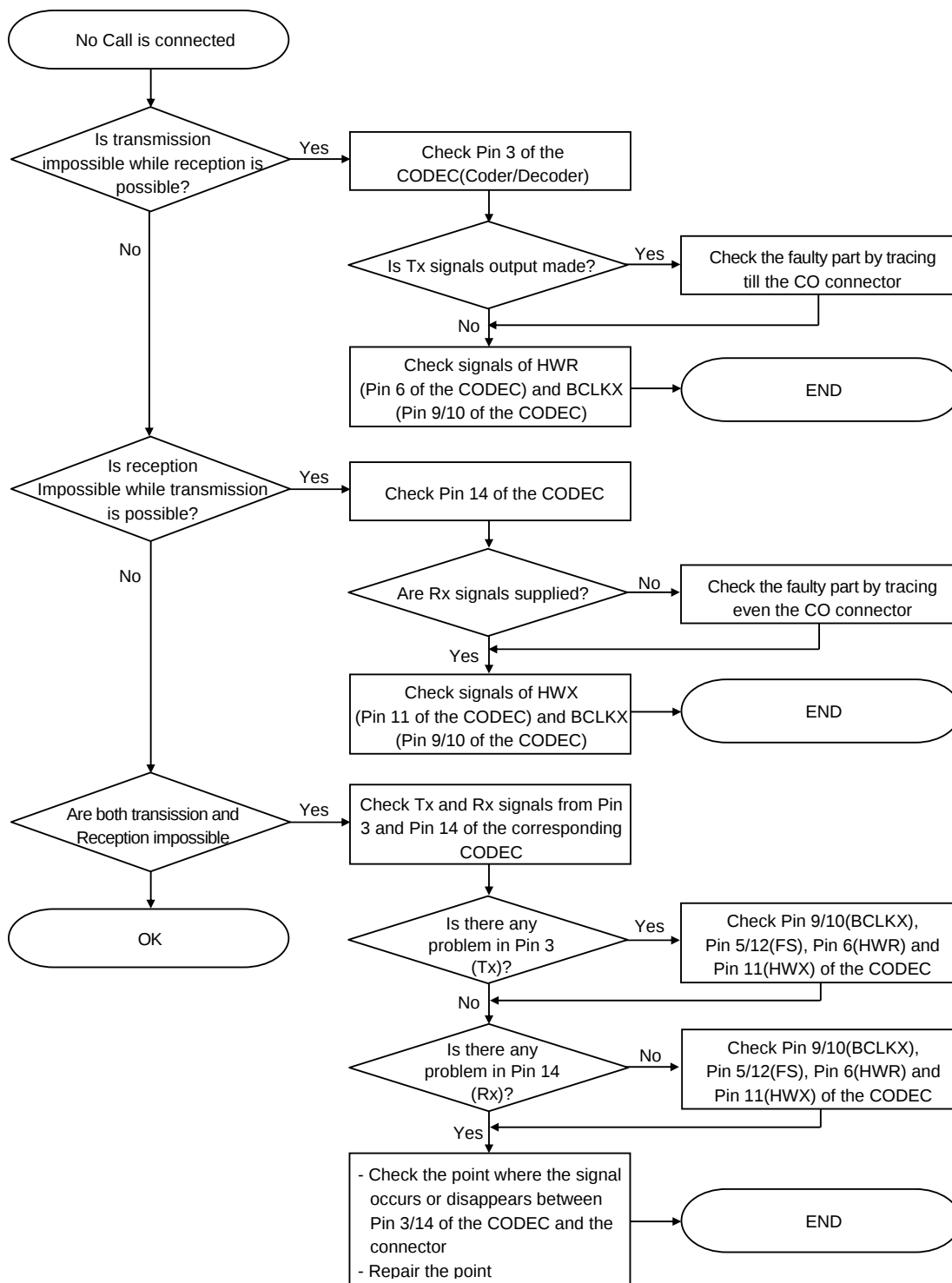
Troubleshooting 2



Failure 3

When No Call is connected.

Troubleshooting 3

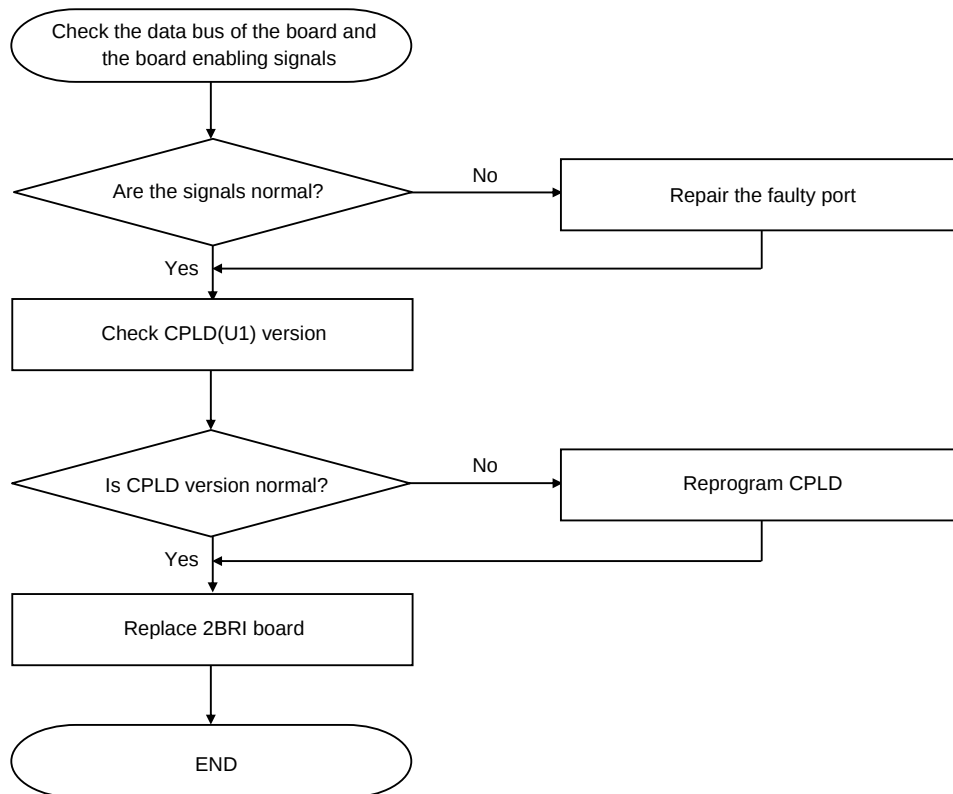


3.9 2BRI Failures

Failure 1

When the 2BRI is not recognized.

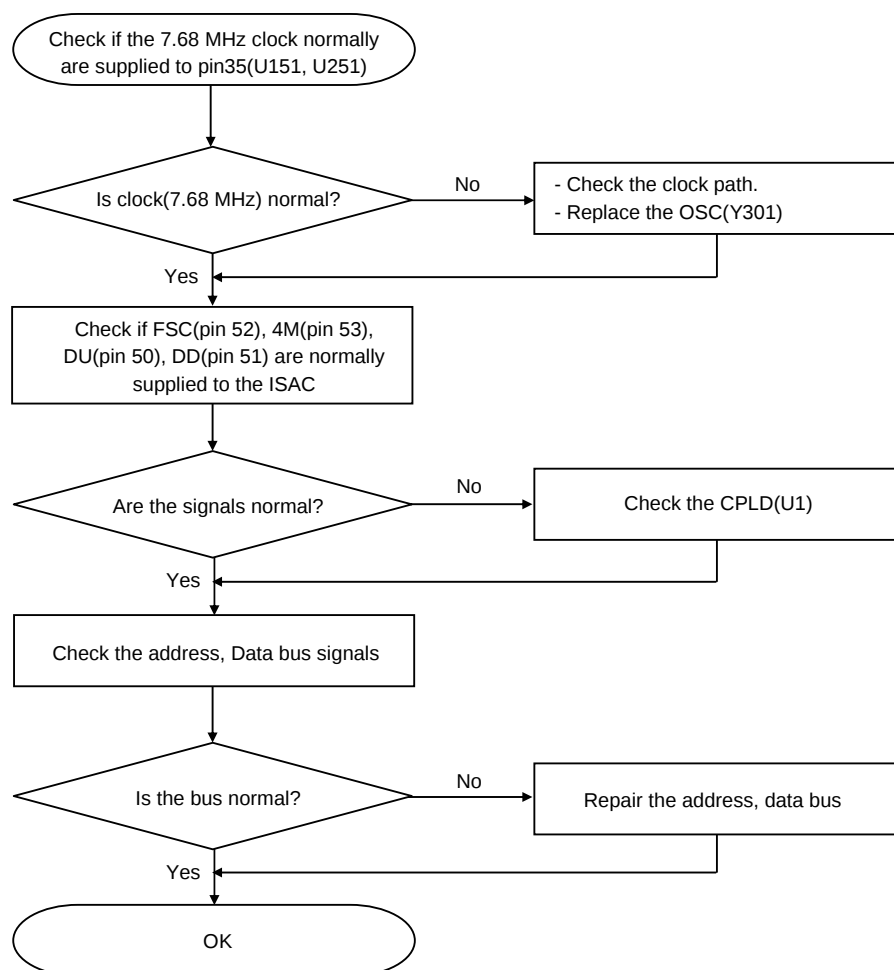
Troubleshooting 1



Failure 2

When the 2BRI functions but No Call is connected.

Troubleshooting 2



NOTE

Abbreviation

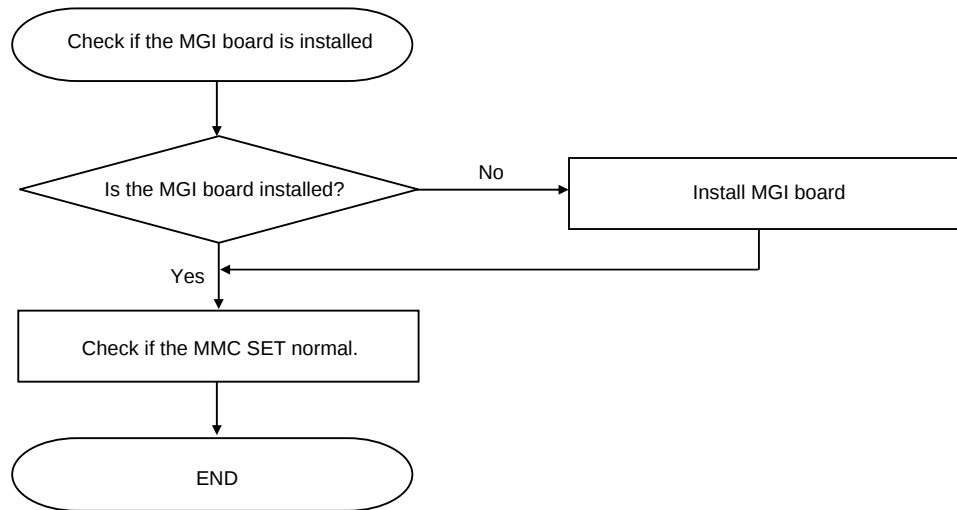
- ISAC: ISDN Subscriber Access Controller
- DU: Data Upstream
- DD: Data Downstream
- FSC: Frame Synchronize
- OSC: Oscillator

3.10 MGI Failures

Failure

When No MGI call is connected.

Troubleshooting



H/W Block Diagrams and Schematic Description

This chapter describes the H/W block diagrams and schematic description of the OfficeServ 12 system.

4.1 H/W Block Diagram

OfficeServ 12 Hardware block diagram is as follows:

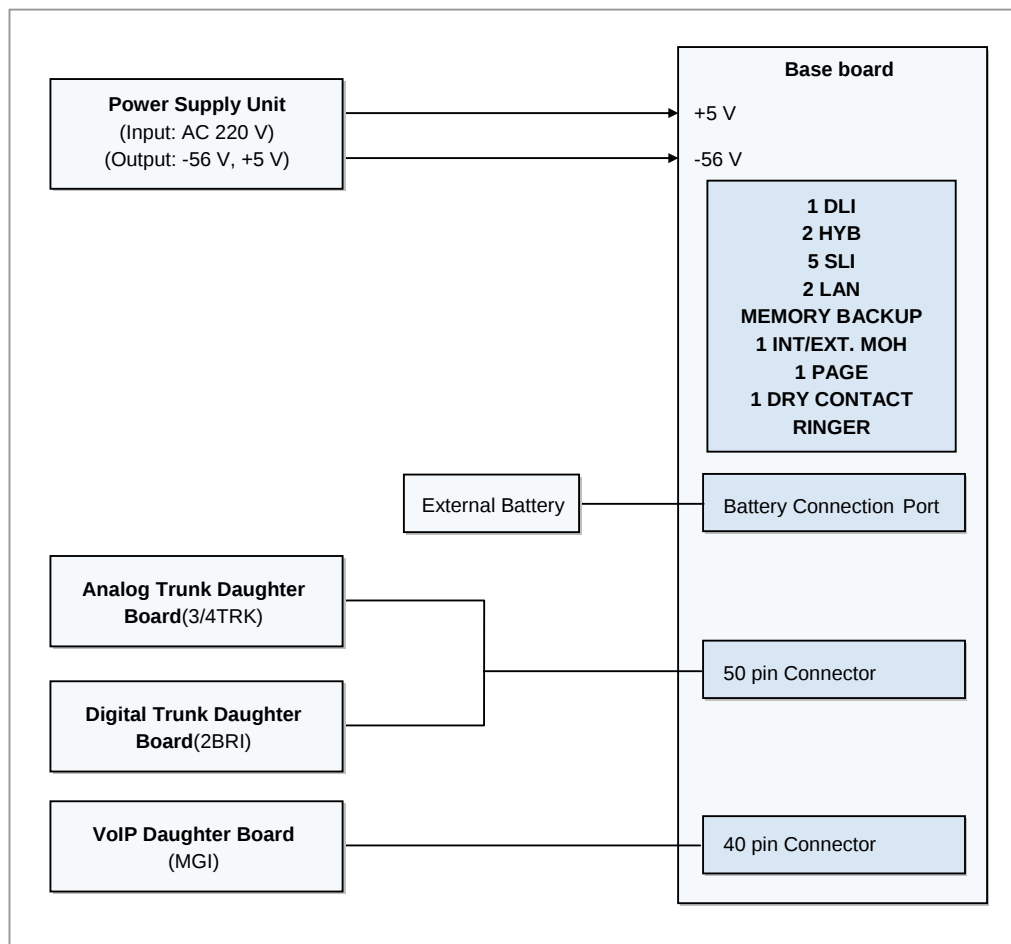


Figure 4.1 H/W Block Diagram

4.2 Schematic Description

This section provides schematic description on each part of the OfficeServ 12 system.

4.2.1 Power Supply Unit

The PSU(Power Supply Unit) consists of the three main blocks described below:

- Circuit supplying -55 VDC(Volts Direct Current), the system's main power
- Circuit supplying +5 VDC used for system control and digital power
- External battery control and interface required for operating the system during a power failure.

The power supply system of OfficeServ 12 is illustrated below:

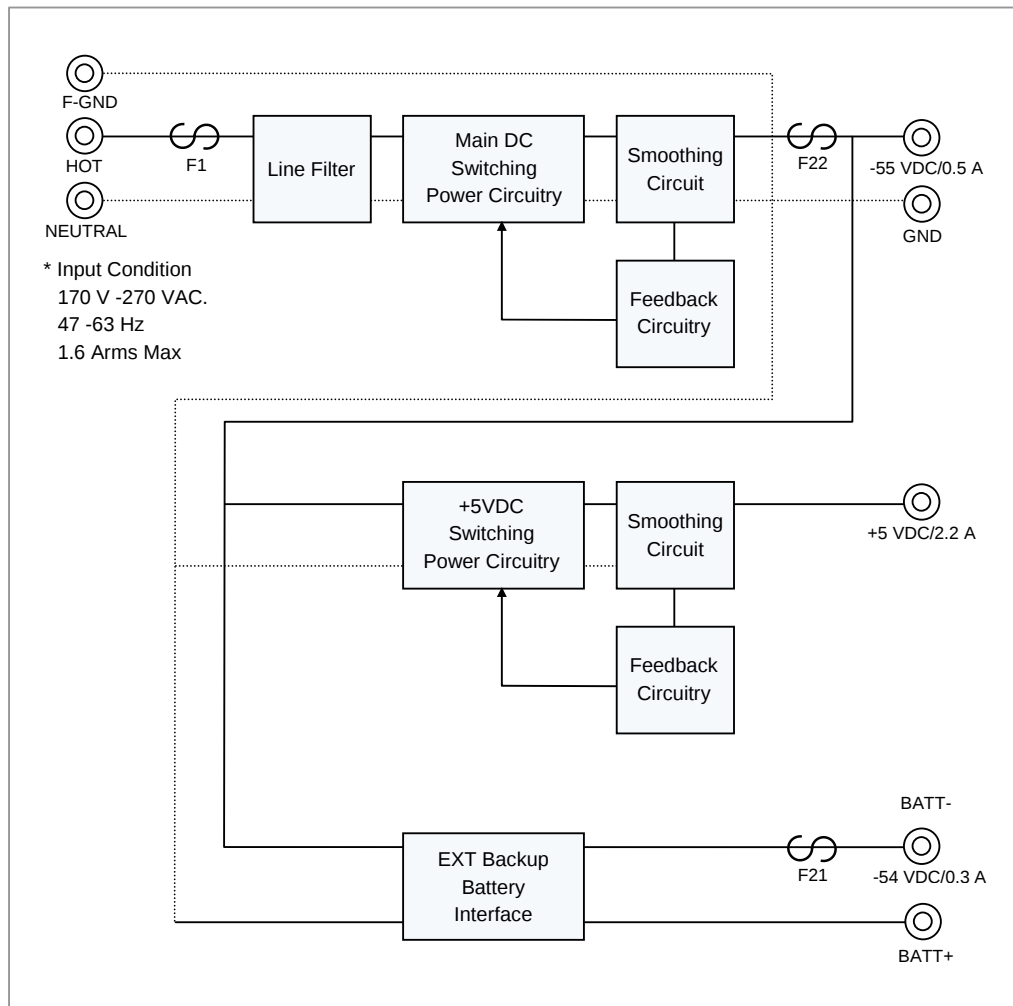


Figure 4.2 Power Supply System

The system receives 220 VAC(Volts Alternating Current) supplied for homes as default, and the PSU converts the 220 VAC to DC(Direct Current) power for the system. The power input part is equipped with a protective device to protect the PSU and system from excessive power. In addition, an F1 fuse is attached to the input line for additional protection.

The following fuses are used:

- AC fuse: F1
- DC fuse: F21, F22

4.2.1.1 Applications of Power

Using the SMPS(Switching Mode Power Supply) technology, the PSU of OfficeServ 12 has weaker noise characteristic than a linear power supply, but offers higher efficiency. Applications of power are as follows:

- -55 VDC: Main system power used for digital and analog phones
- +5 VDC: Power used for digital components including CPU(Central Processing Unit), and as the input power of the -5 VDC of the base board

4.2.1.2 External Battery

In addition to supplying power such as -55 VDC and +5 VDC, the PSU provides an external battery interface. An external battery is used when AC power is not supplied to the system for reasons such as power failure or an emergency situation. Under normal circumstances, the external battery is charged using the DC power of the system. Upon power failure or an emergency, the battery supplies the main DC power to the system, allowing the system to operate normally.



Caution on using battery

DC 48 V(6~40 AH) batteries should be used for OfficeServ 12. If the capacity of the battery is too great, system malfunction may occur. If the capacity is too small, the system may not operate properly during power failures.

Connecting External Battery

Use the battery cable enclosed with the OfficeServ 12 system for connecting the external battery. Connect one end of the battery cable to the external battery port and the other end to the battery port of the base board. Pay attention to the polarity when connecting the cable. If the polarity is inverted, the battery fuse of the PSU will burn out to protect the system.

4.2.2 Base board

Circuits of the OfficeServ 12 base board are configured as shown below:

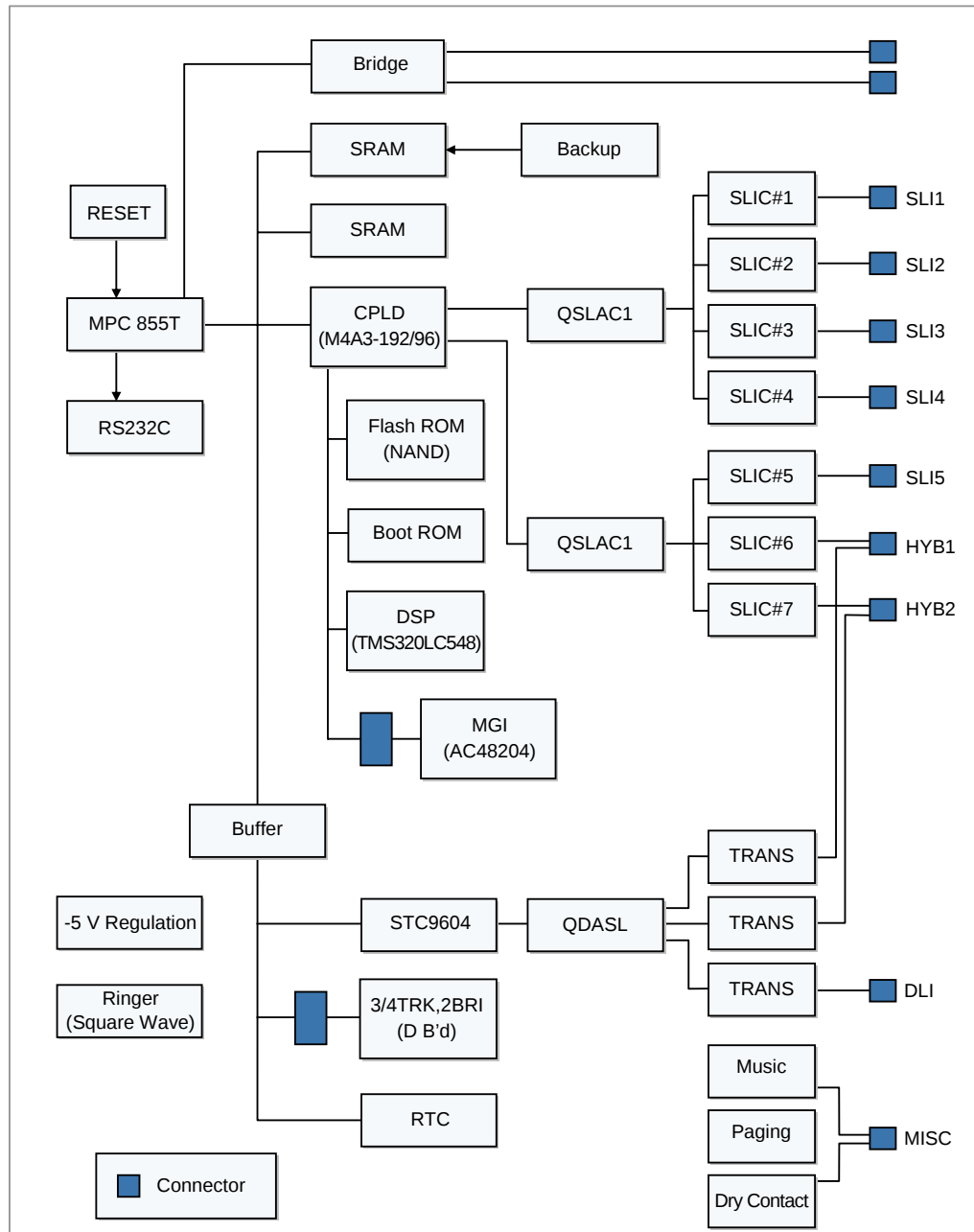


Figure 4.3 Base board Block Diagram

4.2.2.1 CPU

The MPC 855T of Motorola is used as the CPU.

MPC 855T controls the system by performing all related operations including direct control of all far-end circuits, interworking between interfaces, and call processing.

Main Functions of CPU (MPC 855T)

Main functions of the CPU are as follows:

- Embedded MPC8xx core
 - 4 Kbyte data cache and 4-Kbyte instruction cache
 - MMUs
 - Advanced on-chip-emulation debug mode
- Up to 32-bit data bus(dynamic bus sizing for 8, 16, and 32 bits)
- 32 address lines
- Memory controller(eight banks)
 - Four 16 bit timers or two 32 bit timers
- SIU(System Integration Unit)
- Seven external IRQ(Interrupt request lines)
- Four baud-rate generators
- One SCC(Serial Communication Controller)
- Two SMCs(Serial Management Channels)
- Low power support

/TA (/DTACK) Signal Control

Among components controlled by the CPU, some cannot keep up with the CPU because of their slow processing speed. Those components require additional time for processing commands. The OfficeServ 12 system uses the /TA port of MPC 855T to make the CPU wait for the additional time needed. This port usually maintains low status, which allows the CPU to operate without any interruptions. When controlling a component having slow processing speed, the port changes the signal to high status.

The CPU then recognizes the change and maintains the command execution status until the /TA signal returns to normal status.

OfficeServ 12 uses DTACK signals generated from the engine, DSP(Digital Signal Processor), MGI, and 2BRI boards.

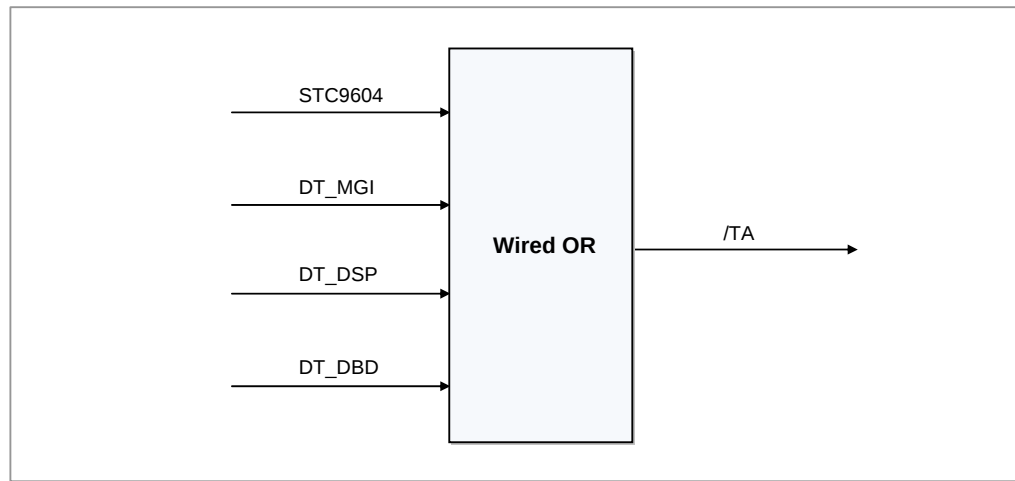


Figure 4.4 /TA (/DTACK) Signal Control

CPU (MPC 855T) Interrupt

The CPU(MPC 855T) has an eight-level interrupt architecture. The priority of each level is determined by the level entering the /IPL0, /IPL1, and /IPL2 ports. Level 7 indicates the highest priority and level 1 indicates the lowest priority. Level 0 indicates that no interrupt is requested.

- IRQ0(Level7): /NMI: Watchdog
- IRQ1(Level6): /INTS_DMC: DLI
- IRQ2(Level5): /INTISAC0: BRI
/INTISAC1: BRI
- IRQ3(Level4): .Interrupt within CPU
- IRQ4(Level3): /INT_QSLAC1: SLI
/INT_QSLAC2: SLI
/HINT: MGI

-
- IRQ5(Level2): Not used
 - IRQ6(Level1): ./INTD_DMC: DLI
/INT_QDASL: DLI
 - IRQ7(Level0): Not Used

4.2.2.2 Engine (STC9604)

STC9604 provides QDMC for DLI, and supports functions such as Time Switch, DTMF(Dual Tone Multi-Frequency) Sender/Receiver, and Conference.

- Device: SEC STC9604
- Memory Size: 1 MByte
- Quantity: 1
- Power: 5 V
- Package: 208P QFP
- Bus Width: 8 Bits

Time Switch

The engine(STC9604) contains a T-switch composed of eight highways, and each highway consists of 32 channels. Thus, the engine can control a total of 256 channels(256x256). The T-switch is the core of a digital PABX and is the most important part of the engine.

Each switch controls gain through 8 steps. Since OfficeServ 12 is a small system, only four out of the eight highways are used.

- HW0: Highway used by the 8SLI channel of the base board and by MFR.
- HW1: Highway used by CID
- HW2: Highway used by the 4DLI channel of the base board
- HW3: Highway used by 3/4TRK or 2BRI
- HW4: Highway used by MGI(4-CH)

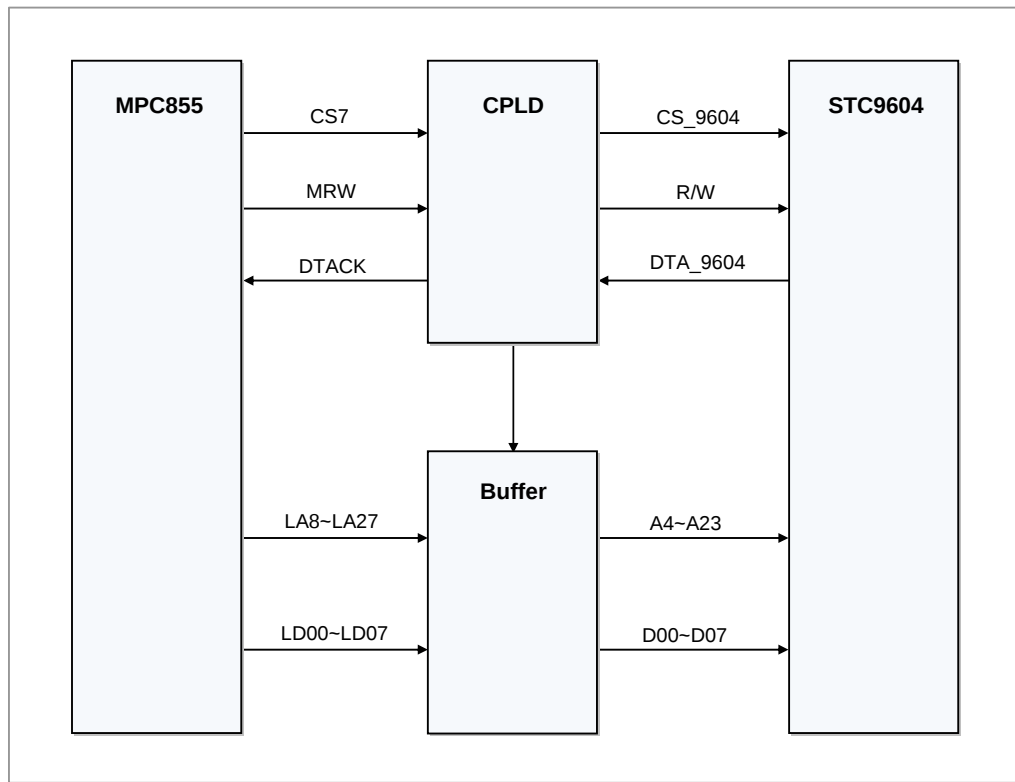


Figure 4.5 Engine (STC9604) Interface

Highway

The system contains a 256x256 channel T-switch. The channels are classified into eight groups, which are referred to as highways. Each highway operates independently and contains 32 voice channels.

Digital Conference

The engine was designed to support 5-way 6-group conference, but OfficeServ 12 currently supports only 5-way 5-group conference.

Tone/DTMF Generator

The engine has a tone/DTMF generator that generates 15 tones and 16 DTMF signals. Tone signals are used for informing internal/external lines of the call progress, and DTMF signals are used for sending phone numbers when making an external call.

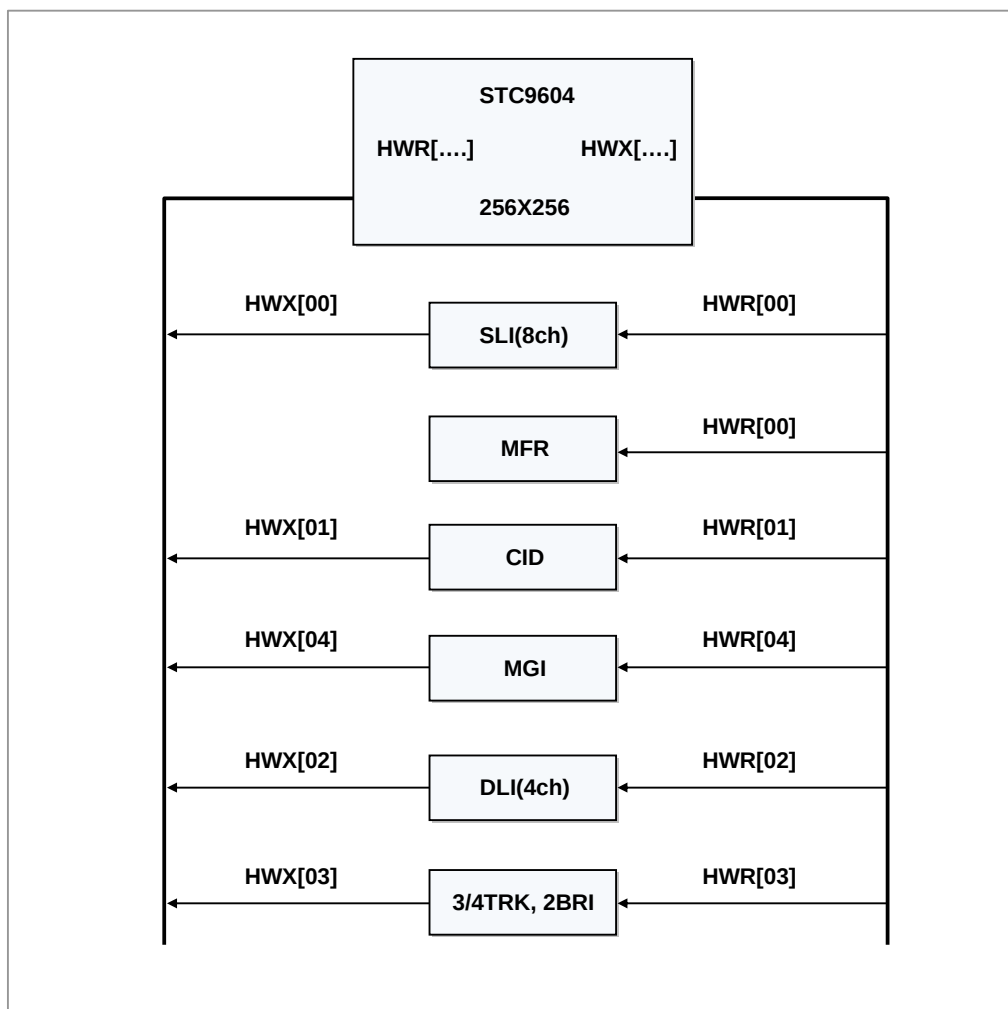


Figure 4.6 Highway Allocation Block Diagram

Tone/DTMF Decoder

The engine has a tone/DTMF decoder that recognizes and decodes tone and DTMF signals among signals received through a trunk line or an intercom line. The DTMF decoder usually decodes DTMF signals received from common phones and trunk lines. The former function is used more frequently. When the key phone system performs the DISA function, the DTMF decoder often receives and processes DTMF signals from trunk lines. Each engine has four decoders, which means that the system can process 4 channels at the same time. Decoded results are stored in corresponding registers of the engine, and can be read by the CPU.

QDMC

The engine contains a QDMC(Quad Digital line interface Module Controller)that can control eight digital key phones. The QDMC is designed to control two QDASLs, and a single QDASL(Quad Digital Adapter for Subscriber Loops) can control four digital key phones.

TMC, DPLL, SIO

OfficeServ 12 does not use the TMC(Trunk Module Controller), DPLL(Digital Phase Locked Loop), and SIO(Serial Input/Output) functions of the engine.

4.2.2.3 Reset

Composed of various circuits, the system may malfunction due to internal or external reasons. Thus, a reset circuit is required to protect sensitive components such as the CPU from electric shock and to protect the system from logical traps. Reset circuits were originally used for protecting the CPU, but are now used for all components that require protection. A WD(Watch-Dog) circuit that enables auto-recovery in case the system falls into an unexpected logical trap.

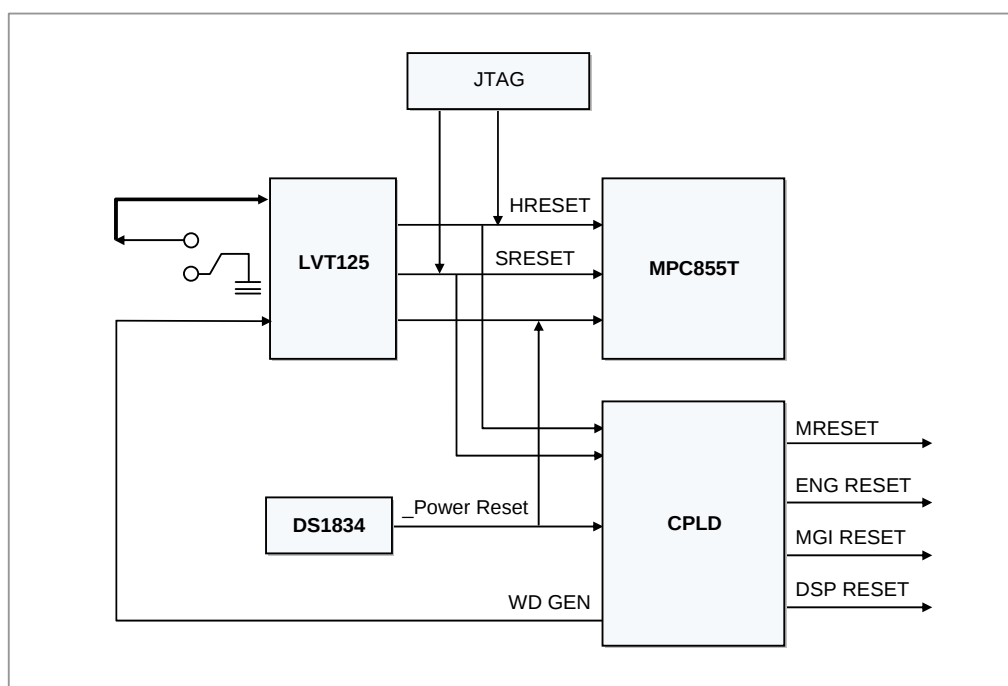


Figure 4.7 Reset Circuit Block Diagram

-
- **PBRESET:** Push button Reset(Tact Switch: Attached on base board)
Yields same result as Power On Reset.
 - **HRESET:** Hard Reset by BDM(Background Debugger Mode)
Watch Dog Reset also yields same result as HRESET.
 - **PORESET:** Power Monitor Reset
Used as internal reset signal of CPLD and Power On Reset(_PORESET) Pin of MPC855T.
 - **SRESET:** Soft Reset by JTAG BDM
 - **WDRESET:** Requests CPU for H/W reset if a programmable trigger signal is not generated within a certain time(1.6 sec), which is recognized as a system error.
WDRESET can either be disabled/enabled by external resistance, or an NMI Interrupt Request can be sent.

4.2.2.4 Memory

The OfficeServ 12 system contains memories such as SRAM, SDRAM, NAND flash memory, and boot ROM.

SRAM

This SRAM(Static Random Access Memory) working memory must be backed up by battery. Characteristics of SRAM are as follows:

- Device: SAMSUNG, K6F8016U6A-EF70
- Memory Capacity: 1 MByte(512 K x 16) x 2
- Quantity: 2
- Power: 3.3 V
- Bus Bandwidth: 16 bits(Interfaces with CPU through 32-bit bus)
- Retention Voltage: Min 1.5 V
- SRAM is used for DB data storage.
- SRAM has a 32-bit bus, and supports 8/16/32 bit access upon S/W request.
- A common address/data bus is shared with the CPU.
- SRAM uses Internal Wait for Wait Control.

SDRAM

This SDRAM(Synchronous Dynamic Random Access Memory) working memory is used for storage, operation, and data memory of programs. Characteristics of SDRAM are as follows:

- Device: SAMSUNG, K4S281632C-TL1L 128M(2 M x 16 x 4 bit) or SAMSUNG, K4S561632 256M(4 M x 16 x 4 bit)
- Memory Capacity: 16 MByte x 2, or 32 MByte x 2
- Quantity: 2
- Power: 3.3 V

-
- Package: 54P, TSOP
 - Bus Bandwidth: 16 bits(Interfaces with CPU through 32-bit bus)
 - All main programs required for system operation are loaded on SDRAM.
 - SDRAM is also used as a space for processing all data used for program processing.
 - SDRAM is addressed in multiplexing mode, which is controlled by internal registers of the CPU.
 - A common address/data bus is shared with the CPU.
 - No Wait is used for SDRAM access.

NAND Flash Memory

The NAND(Not AND) Flash Memory stores system programs and various DB(Database) data, and operates through 8-bit bus interface by default, but can also support 16-bit interface.

- Device: SAMSUNG, K9F2808U0C-YCB0
- Memory Capacity: 16 Mbyte
- Quantity: 1
- Socket: Not Used
- Package: 48P TSOP
- Bus Bandwidth: 8 bits(16 bits will be enabled in the future)
- Power: 3.3 V

Boot ROM

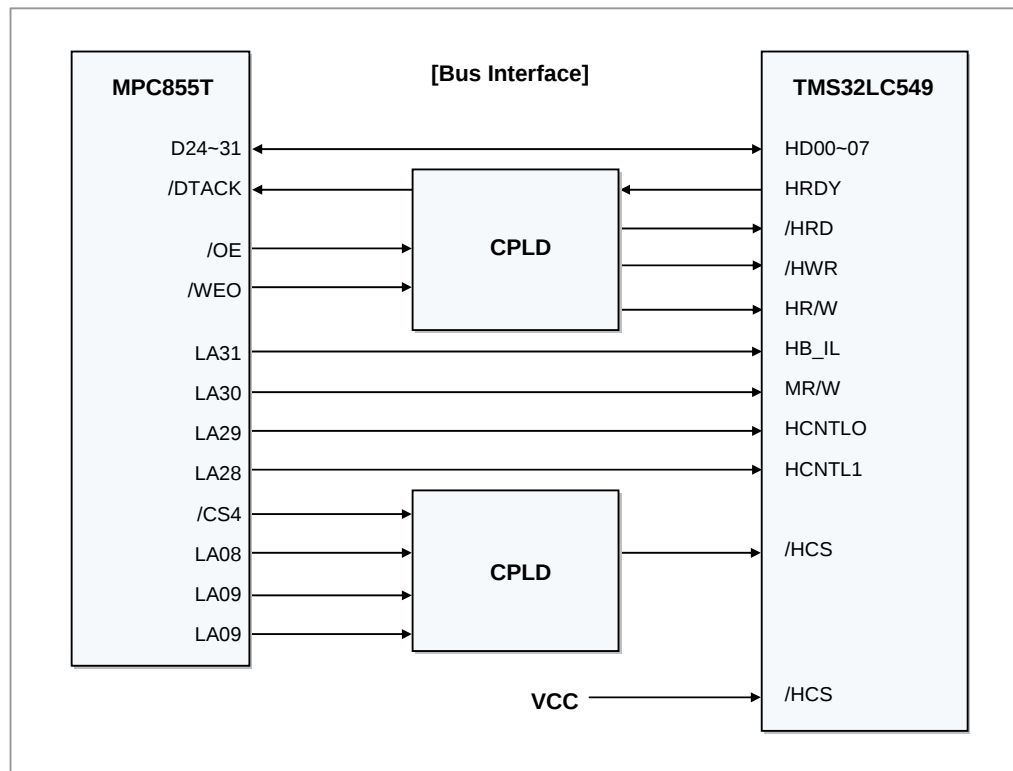
Boot ROM(Read Only Memory) stores booting program and DB data.

- Device: AMD Am29LV040B-120JC
- Memory Capacity: 512 KByte
- Quantity: 1
- Socket: Not used
- Package: 32P PLCC
- Bus Bandwidth: 8 bits
- Boot ROM performs jobs related to system booting.
- Upon system startup, the Boot ROM moves the program saved in Flash ROM to SDRAM and starts the main program.
- Boot ROM moves DB data required for system operation from the Flash ROM to enable setting related parameters.
- Wait Control is determined considering that the Access Time is 120ns, using the internal DTACK method.
- A common data bus is shared with the CPU.

4.2.2.5 DSP

The TMS320LC549 of TI is used as the DSP, which performs transmission and reception of Caller ID.

- Device: TI TMS32LC549
- Memory Size: 4 Byte(HPI(High speed Portable Internet) Interface)
- Quantity: 1
- Power: 3.3 V
- Package: 144P TQFP(Thin Quad Flat Package)
- Bus Width: 8 Bits
- DSP is used for Caller ID Tx/Rx.
- A 8-Bit HPI bus is used for interfacing with the host.



4.2.2.6 CPLD

CPLD(Complex Programmable Logic Device) contains most of the startup logics, part of which serves as data bus. The characteristics of CPLD are as follows:

- Device: Lattice M4A3-192/96-10 VC
- Macro Cell Count: 192
- Quantity: 1
- Power: 3.3 V
- Package: 144P TQFP

4.2.2.7 RTC (Real Time Clock)

OfficeServ 12 is equipped with a clock component(RTC72423) used as a reference for displaying the clock and call records on the LCD(Liquid Crystal Display). Like the data memory, this device must be active even during a power failure and can be backed up by battery. The data memory and clock circuit share a same backup battery.

4.2.2.8 Digital Phone Connection Interface (1DLI, 2HYB)

The base board of OfficeServ 12 provides a single DLI circuit and two HYB(hybrid) circuits, supporting total three lines for connecting digital phones.

Although theoretically any Samsung digital key phone model can be connected since they have the same interface and protocol, but in reality, only those that satisfies the system capacity can be accommodated. Not only key phones but also Door Phone Interface Modules can be used for a key phone interface.

2B + D Technology

The 2B + D technology has been used for configuring the digital phone interface of OfficeServ 12, basically supporting 2 voice channels. The data transfer rate between the main unit and terminals is 192 Kbps, 144 Kbps of which is used for information data and 48 Kbps of which is used for data needed for signal processing and as blank.

Digital Phone Interface Structure

The interface of digital key phones is composed of the DMC(Digital line interface Module Controller) part, QDSAL(Quad Digital Adaptor for Subscriber Loops) part, and the far-end circuit part.

- DMC Part: Located inside the engine(STC9604), the DMC directly controls two QDASL parts and interfaces with the CPU. The DMC part exchanges data with the CPU in bytes through the data bus, and interfaces with a QDASL in bits through a serial communication method. OfficeServ 12 controls a single QDASL.
- QDASL Part: The QDASL part directly controls a key phone through a far-end circuit. The QDASL part creates a single serial signal by multiplexing two voice channels(2 x 64 Kbps) and a data channel(16 Kbps). The QDASL part also demultiplexes a serial signal received from a key phone into two voice channels and a data channel. A single QDASL controls four ports.

- **Far-End Circuit Part:** The far-end circuit part is connected to a digital key phone via cable and is composed of a power supply circuit, data transfer circuit, and a protection circuit. A transformer is used in a key phone interface to send AMI signals while separating the primary and secondary power. The power used for starting a key phone is supplied through the secondary DLT-1 transformer. Since the far-end circuit is directly connection to external cables, it needs a protection circuit and device that will protect the system from external overvoltage and overcurrent. An anti-overvoltage circuit composed of a resistance in the secondary DLT-1, and a Zener diode is used for such purpose.

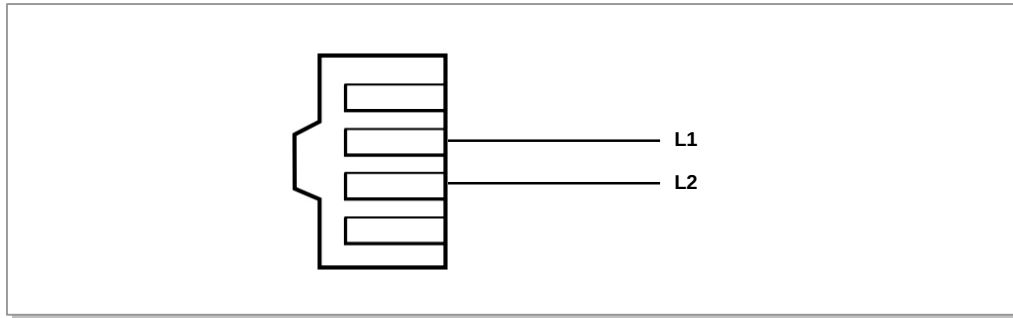


Figure 4.8 DLI Port Wiring Diagram

4.2.2.9 Single Line Phone Connection Interface (5SLI, 2HYB)

The base board of the OfficeServ 12 system has five SLI circuits and two HYB(hybrid) circuits, supporting up to seven analog phones.

Main devices of SLI are configured using QSLAC(Quad Subscriber Line Audio-processing Circuit) and SLIC(Subscriber Line Interface Circuit).

QSLAC

The characteristics of QSLAC are as follows:

- Device: Legirity Le58QL02
- Quantity: 2
- Power: 3.3 V
- Package: 44P TQFP
- u-P Interface: Serial
- Items that can be controlled by program: SLIC Input Impedance
Trans hybrid balance
Tx/Rx gain control
Time slot assigner
A Law/u Law Selectable
- A single QSLAC can control up to four SLICs.

SLIC

The characteristics of SLIC are as follows:

- Device: Legirity Le79555
- Quantity: 7
- Package: 32P QFN
- Control Method: Control through QSLAC
- Items that can be controlled by program: Loop detect, Constant current feeding

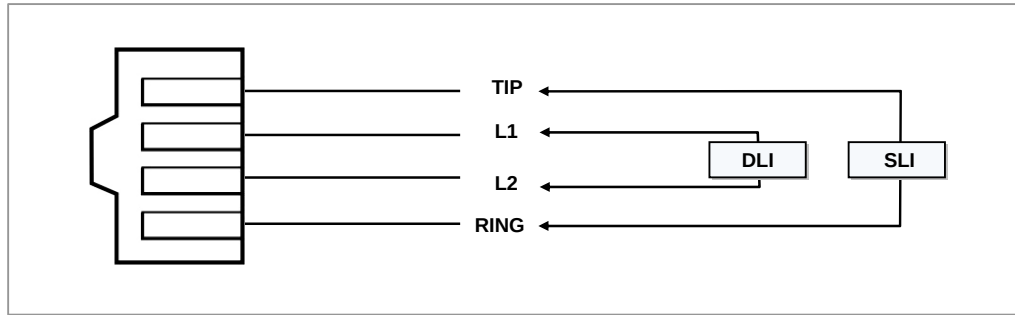


Figure 4.9 Hybrid Port Wiring Diagram

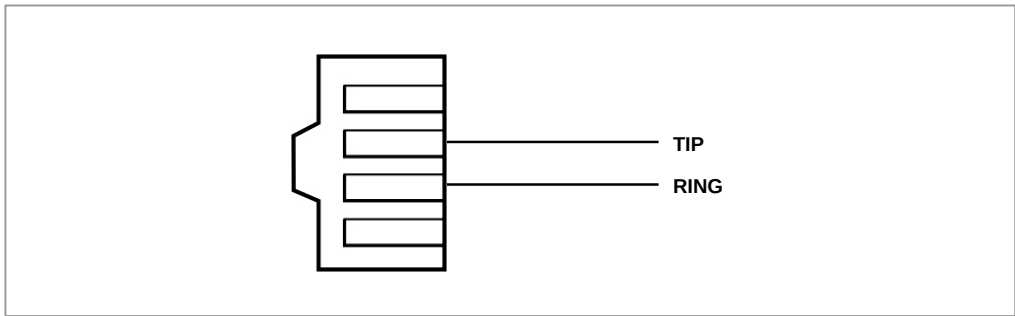


Figure 4.10 SLI Port Wiring Diagram

4.2.2.10 Ethernet/Wireless LAN Interface

A 2+1 port switch is used to support two Ethernet ports connecting to a network or an AP.

- Device: ADMTEK ADM6992
- Quantity: 1
- Power: 3.3 V +2.5 V
- Package: 128P PQFP
- Supports two Ethernet ports



MGI Board

An MGI board must be equipped to support VoIP(Voice Over IP) on Ethernet.

4.2.2.11 Music Source/Paging/Dry Contact Connection Interface (MISC)

The base board of OfficeServ 12 provides a single MISC port.

The functions of MISC are as follows:

- One Music Channel internal or external
 - Internal MOH: Melody chip, which is the default music source
 - External MOH: Music source such as a CD player, a radio, etc
 - The installer can select an internal or external music source by moving the shunt pin selector on the base board
 - The selected music will be applied to stations or to the trunk lines as MOH or Background Music.
 - The encoding part of the fourth port of the second QSLAC is used for MOH.
- One External Paging
 - An external speaker is connected to this port.
 - The decoding part of the fourth port of the second QSLAC is used for MOH.
- One General Purpose Dry Contact
 - The dry contact consists of a relay and it just provides a switch to the outside.
 - The relay cannot switch AC power but can control 24VDC/1A signal at maximum.

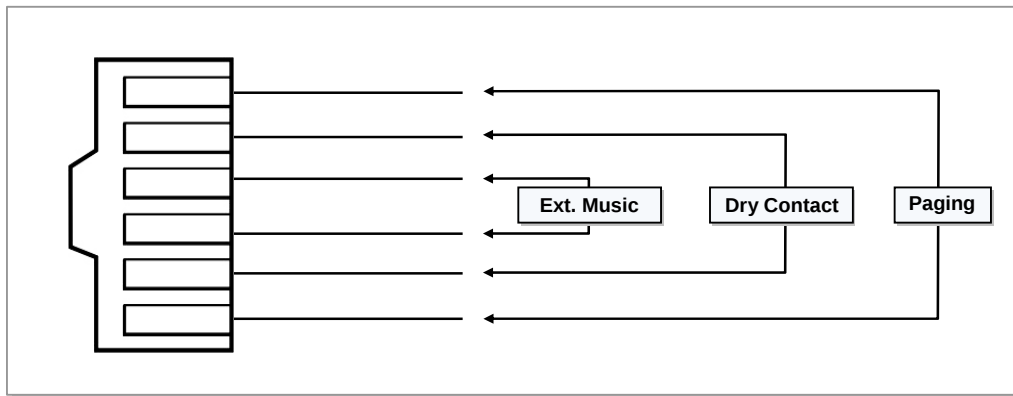


Figure 4.11 Music Source/Paging/Dry Contact Wiring Diagram

4.2.2.12 Battery Backup

The battery switch controls the power supplied when power of SRAM and RTC fails. Setting the backup switch to 'Off' will delete all data and settings of SRAM and RTC. Thus, in order to erase all backup data in SRAM(Static Random Access Memory), leave the switch on 'Off' status for approximately 10 seconds and turn the switch on again. The switch is set to 'Off' during production for system safety.

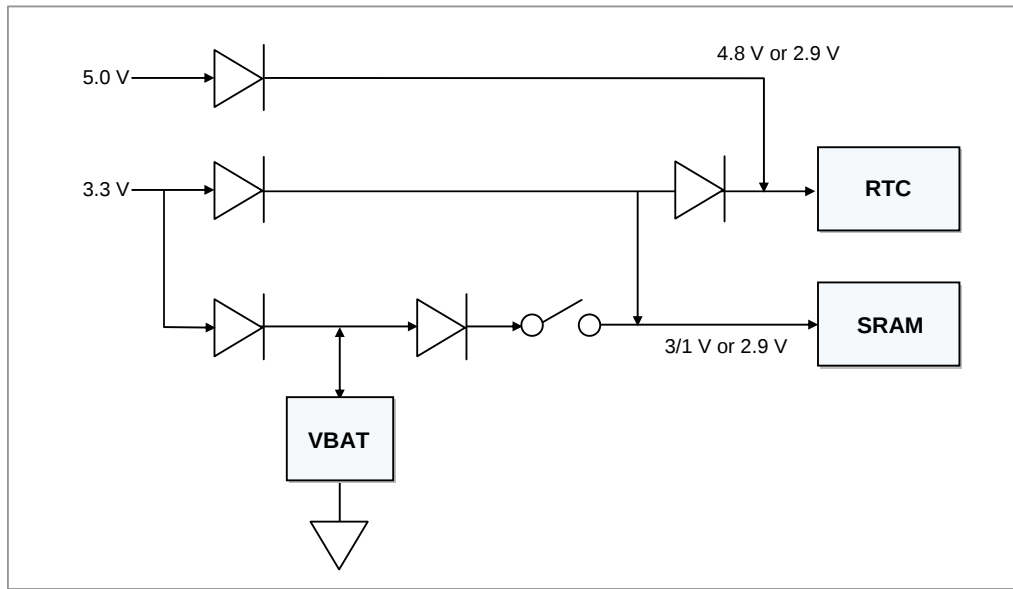


Figure 4.12 Battery Backup

Schottky diodes having 0.2 V Forward Voltage Drop are used, and a 1.0 F super capacitor is used for VBAT(Voltage of Battery).

SRAM runs on approximately 3.1 V when operating on system power, and uses 2.9 V backup battery power for storing data when the system power is off.

RTC runs on approximately 4.8 V when operating on system power, and uses 2.9 V backup battery power for storing data when the system power is off.

In any case, the minimum retention voltage required by devices is satisfied.

4.2.2.13 Trunk/MGI board Connection Connector

The base board of OfficeServ 12 has a 50pin connector for mounting a trunk daughter board(3/4TRK, 2BRI), and two 40pin connectors for mounting a VoIP daughter board(MGI).

4.2.2.14 -5 V Constant-Voltage Supply Circuit

The PSU supplies -55 VDC and +5 VDC, and the constant-voltage supply circuit of the base board supplies -5 VDC. The OfficeServ 12 system receives +5 VDC and generates minus power by using the SMPS(Switching Mode Power Supply) technology. MC34063A is used as the main component. -5 VDC power is mainly used as the minus power of the 3/4TRK board CODEC and the 2:4 hybrid circuit.

4.2.3 3/4TRK, 2BRI Board

An analog trunk board, 3/4TRK, or a digital trunk board, 2BRI, can be equipped on the base board of OfficeServ 12.

4.2.3.1 Analog Trunk Board (3/4TRK)

The blocks of the 3/4TRK board are shown in the figure below:

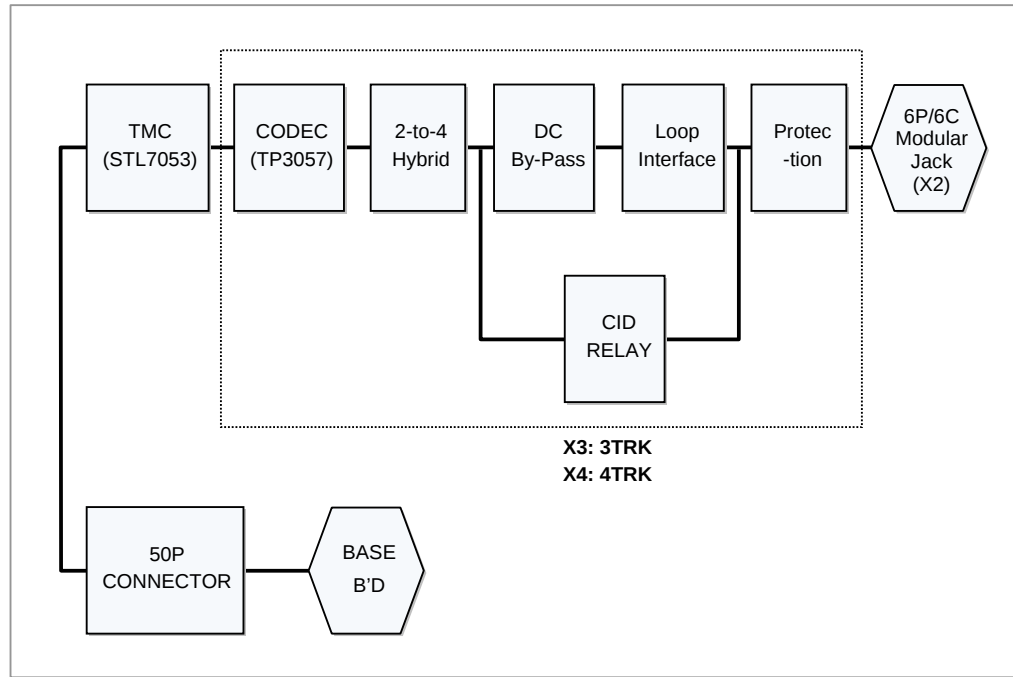


Figure 4.13 Analog Trunk Board (3/4TRK)

2:4 Hybrid Circuit

A highway is a uni-directional transfer path for mass PCM data. Tx path and Rx path are separately configured. When A/D or D/A conversion is performed by CODEC, Tx conversion is performed separately from Rx conversion. Since a pair of copper wires must accommodate Tx and Rx signals in a regular trunk line, a circuit where Tx/Rx signals are combined is required. Four lines are combined to two lines when separated Tx/Rx signals are combined. Therefore, this is called a 2:4 hybrid circuit.

Transformer

This is one of the important elements of a regular trunk interface. A transformer separates the primary power source from the secondary power source.

DC Loop Circuit

The primary part of a regular trunk interface has a circuit that forms a DC loop. The circuit consumes DC to supply much current and passes AC signals by minimizing the loss.

The switch then detects the DC loop. This is called the loop-start method since communication starts once the DC loop is formed.

Calling Signal/Loop Detection Signal

A calling signal is entered only when a loop is not formed. (This may not be applicable depending on the ring trip characteristics of the switch.) The calling signal is transmitted to the DC loop circuit through the condenser, resistance, and Zener diode. The signal is transmitted to the secondary part through an optical device (e.g., TLP121GB, Opto-coupler), and CPU loads the signal through TMC. An optical device is used to separate the power of the primary part from that of the secondary part.

Loop Relay

A calling signal is transmitted to a loop relay through the condenser, resistance, and Zener diode. This relay is used to form or disconnect a loop, and inter-works with the aforementioned DC loop circuit. If a relay is connected, a loop will be generated. If a relay is disconnected, a loop will be disconnected. The contact of a relay is opened or closed to transmit a pulse signal for sending a phone number. A relay operates at a voltage of +5 V, and is controlled by the CPU through TMC.

MPD/PRS Interface

A regular trunk interface can detect MPD (Metering Pulse Detection)/PRS (Polarity Reverse Signal) signals. These services can be provided whenever required by connecting a corresponding hybrid component to the socket located on the board. The hybrid component for detecting MPD or PRS is shared with the DCS (Digital Communication System) system component. Since each port has only one socket, one of the two elements must be selected.

4.2.3.2 Digital Trunk Board (2BRI)

The blocks of the 2BRI board are shown in the figure below:

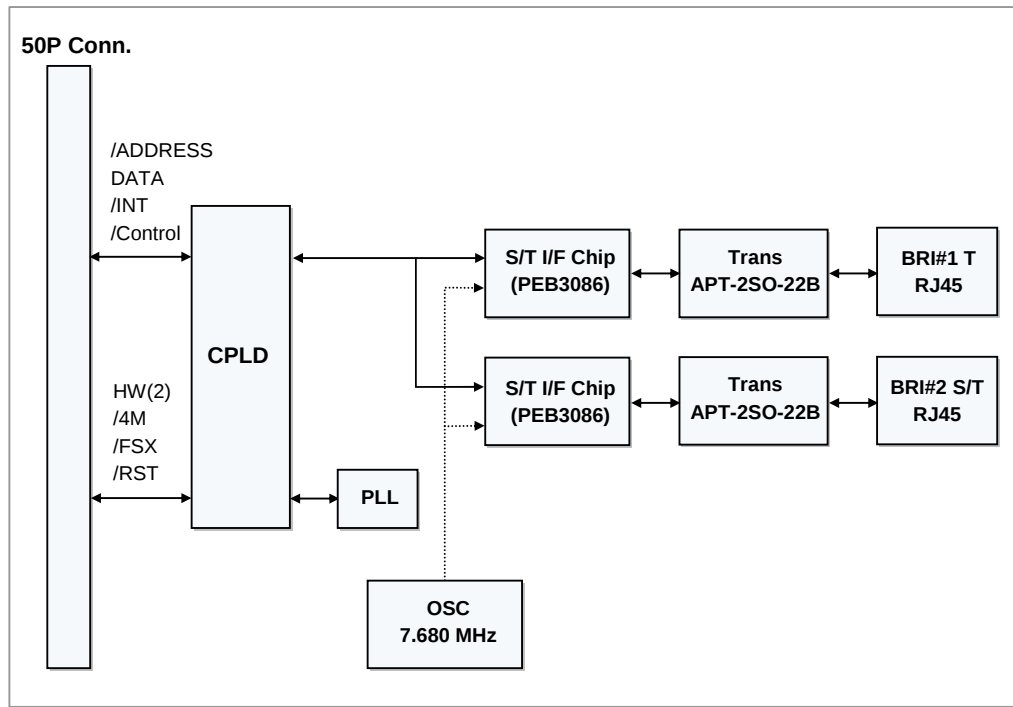


Figure 4.14 2BRI Block Diagram

The 2BRI board provides four-channel ISDN(Integrated Services Digital Network) trunk interfaces. In addition, the 2'nd BRI interfaces are equipped with connections for a T-mode or S-mode.

The board has several parts of circuits, i.e., interface with the base board, Analog PLL(Phase Locked Loop), S/T Interface chips, isolation transformers, and primary interfaces for ISDN trunk lines. The 2BRI board has one connector, two RJ-45 modular jacks, and one 50-pin DIN connector for connecting to the base board. Two RJ-45 modular jack connectors are for the external connections to ISDN lines.

Features

- Full duplex 2B + D S/T interface transceiver according to CCITT(Consultative Committee on International Telegraphy and Telephony) I.430
- Conversion of the frame structure between the S/T interface and IOM(ISDN Oriented Modular)
- Receive timing recovery according to selected operating mode
- D-channel access
- Activation and deactivation procedures, with automatic wake-up from power-down state

PEB 3086 (ISDN Subscriber Access Controller ISAC)

The PEB 3086 ISAC implements the four-wire S/T interface used to link voice/data terminals to ISDN. The PEB 3086 combines the functions of the S-Bus Interface Circuit and the ISDN Communications Controller on one chip. The component switches B and D channels between the S/T and the IOM interfaces, the latter being a standard backplane interface for the ISDN basic access.

The device provides all electrical and logical functions of the S/T interface, such as; activation/deactivation, mode dependent timing recovery and D channel access and priority control. The HDLC(High-level Data Link Control procedure) packets of the ISDN D channel are handled by ISAC-S, which interfaces them to the associated microcontroller. In one of its operating modes the device offers high-level support of layer-2 functions of the LAPD(Link Access Procedure on D channel) protocol. It operates from a single +3.3 V supply and features a power-down state with very low power consumption.

Analog PLL

Analog PLL contains a circuit that locks 8 KHz sync signal generated by the 2BRI board, and generates 4 MHz clock and /FOI for use as a reference clock for implementing Multi-ISDN.

4.2.4 MGI Board

A MGI daughter board can be equipped on the base board of OfficeServ 12.

The MGI board converts voice to data, which is exchanged through a data network.

The MGI board provides up to four channels, and supports voice CODEC of G.729, G.723, G.726, and G.711.

The blocks of the MGI board are shown in the figure below:

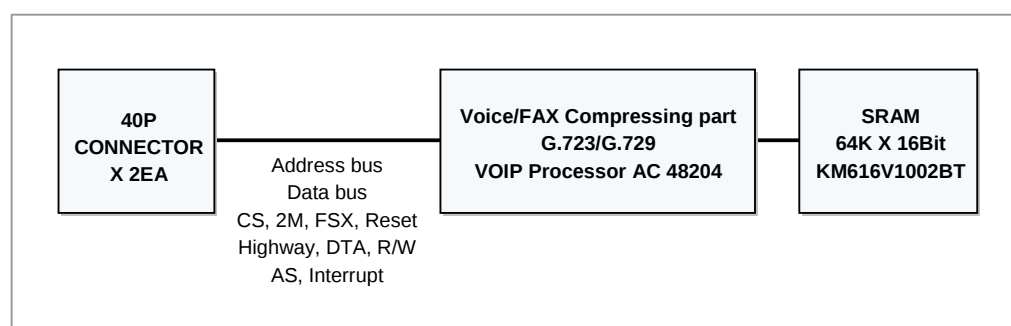


Figure 4.15 MGI Block Diagram

- Device: Audio Codes AC 48204
- Memory Size: 4 Byte(HPI Interface)
- Quantity: 1
- Power: 3.3 V
- Package: 144P TQFP
- Bus Bandwidth: 8 Bits

CODEC AC 48204

The characteristics of the MGI board CODEC are as follows:

- Interface between CODEC and the host is implemented by using EPLD(Erasable Programming Logic Device).
- CODEC of AudioCodes Co., Ltd. is used.
- Each chip supports four independent voice and FAX channels.
- The H.323 vocoder that can be configured by users is used.
- ‘Soft’, field-upgradeable functionality
- Robust BFI(Bad Frame Interpolation)
- G.165/G.168 Adaptive Echo Canceller
- Toll quality voice that decreases the bit rate to average 3.2 Kbps by making use of silence suppression
- TIA 464A DTMF detection or generation
- MF(Multi-Frequency) detection or generation
- Parallel host processor interface
- Host programmable tone signal
- Configurable PCM interface: PCM highway or parallel interface
- On-chip PCM highway interface(Allocates a host configurable time slot and interfaces with one of the selectable G.711 μ -law/A-law PCM interfaces.)
- Gain control

4.2.5 Ring Generator

The ring generator transmits ring signals of 80 Vrms and 20/25 Hz to regular phone lines. The ring waveform of a ring generator is a square wave. If required, a sine wave ringer module can be equipped.



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Exploded View and Parts List

This chapter describes the exploded view and parts list of the OfficeServ 12 system.

5.1 Exploded View

The exploded view of the OfficeServ 12 system is as follows:

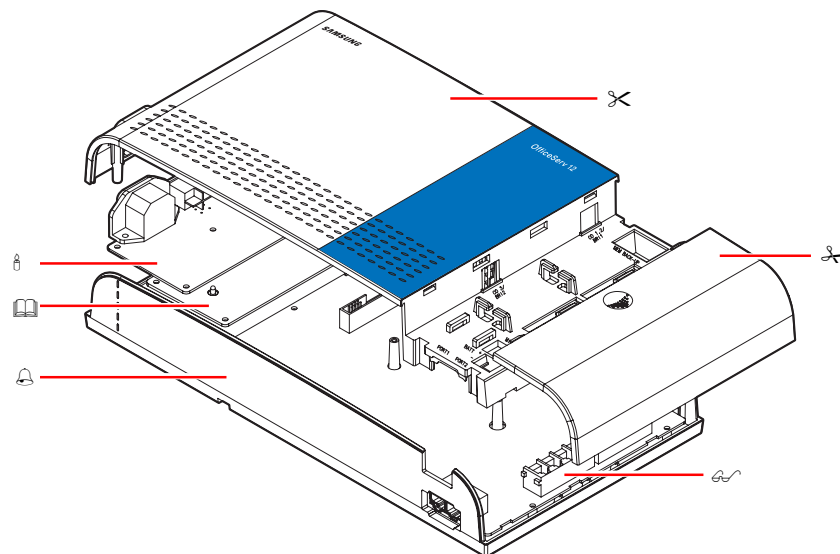


Figure 5.1 Exploded View of OfficeServ 12

Item	Part Name	Part Number	Quantity
✂	CABINET TOP	GA72-00024B	1
✂	CABINET DOOR	GA72-00025C	1
📖	MAIN PCB	-	1
🔔	CABINET BOTTOM	GA72-00026A	1
📖	INSULATION SHEET	GA72-00101A	1
🔔	POWER	GA44-00013A	1

5.2 Parts List

The parts list of the OfficeServ 12 system is as follows:

5.2.1 Base Board

Part No.	Location	Quantity	Part Name	Specification
0401-000116	D851-D855	5	DIODE-SWITCHING	MMSD914T1, 100 V, 200MA, SOD-123, TP
0401-001099	D121, D381	2	DIODE-SWITCHING	1N4148WS, 75 V, 150 mA, SOD-323, TP
0401-001099	D401, D421, D422	3	DIODE-SWITCHING	1N4148WS, 75 V, 150 mA, SOD-323, TP
0401-001099	D423	1	DIODE-SWITCHING	1N4148WS, 75 V, 150 mA, SOD-323, TP
0401-001134	D501, D502, D551, D552	4	DIODE-SWITCHING	BAV23C, 250 V, 400 MA, SOT-23, TP
0401-001134	D601, D602, D651, D652	4	DIODE-SWITCHING	BAV23C, 250 V, 400 MA, SOT-23, TP
0401-001134	D701, D702, D751, D752	4	DIODE-SWITCHING	BAV23C, 250 V, 400 MA, SOT-23, TP
0401-001134	D801, D802	2	DIODE-SWITCHING	BAV23C, 250 V, 400 MA, SOT-23, TP
0402-000309	D861	1	DIODE-RECTIFIER	1SR154-400, 400 V, 1 A, SOD-106, TP
0402-001056	D122-D126, D971	6	DIODE-RECTIFIER	MBRS140, 40 V, 1 A, CASE403A, TP
0403-001164	ZD856-ZD859	4	DIODE-ZENER	MMSZ5232B, 5.32-5.88 V, 500 MW, SOD-123, TP
0403-001396	ZD851	1	DIODE-ZENER	MMSZ5263B, 5 %, 500 MW, SOD-123, TP
0403-001416	ZD351, ZD352, ZD361, ZD362	4	DIODE-ZENER	MMSZ5227B, 3.42-3.78 V, 500 MW, SOD-123, TP
0403-001416	ZD371, ZD372, ZD421, ZD422	4	DIODE-ZENER	MMSZ5227B, 3.42-3.78 V, 500 MW, SOD-123, TP
0406-001070	D901, D902, D916, D917	4	DIODE-TVS	LC03-6, 6.8/-V, 750 W, SO-8
0501-000477	Q401	1	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0505-001477	Q854, Q855	2	FET-SILICON	SFR9220, P, 200 V, 3.1 A, 1.5 ohm, 30 W, D-PAK
0505-001478	Q851, Q852, Q853	3	FET-SILICON	FQU5N40, N, 400 V, 3.4 A, 1.6 ohm, 45 W, I-PAK
0601-000005	LED1	1	LED	SMD, GRN, 3 × 2 MM, 570 NM, 3 × 2 MM

(Continued)

Part No.	Location	Quantity	Part Name	Specification
0604-001002	PC851, PC852, PC853	3	PHOTO-COUPLER	TR, 100-600 %, 200 mW, SOP-4, TP
0801-001090	U973	1	IC-CMOS LOGIC	74HC14, SCHMITT INVERTER, SOP, 14, 150 MIL
0801-002162	U251, U252	2	IC-CMOS LOGIC	74FCT164245, TRANSLATOR, TSSOP, 48, 240 MIL
0802-001099	U123, U261	2	IC-BICMOS LOGIC	74LVTH125, BUFFER, TSSOP, 14, 173 MIL, QUAD
0902-001701	U1	1	IC- MICROPROCESSOR	XPC855T, 50 MHZ, 32BIT, BGA, 357P, TR, PLASTIC
0904-001310	U151	1	IC-DSP	TMS320LC549, 16BIT, TQFP, 144P, 20 × 20 MM, 80 MHZ
0909-000105	U124	1	IC-REAL TIME CLOCK	RTC72423, 4BIT, SOP, 24P, 16.3 × 7.9 MM, 32.768 KHZ
1006-001140	U411	1	IC-LINE TRANSCIEVER	3232, SSOP, 16 P, 212 MIL, DUAL, TP, PLASTIC
1103-001289	U932	1	IC-EEPROM	93C46, 128x8/64x16, SOP, 8P, 5 × 4 mm, 2.7/5.5 V
1105-001351	U101, U102	2	IC-DRAM	K4S561632A, 4 M × 16 × 4 BIT, TSOP, 54P, 400 MI
1106-001428	U461, U462	2	IC-SRAM	K6F8016U6, 512KX16 BIT, TBGA, 48P, 7 × 6 MM
1107-001118	U121	1	IC-FLASH MEMORY	29LV040, 512Kx8, PLCC, 32P, 11.4 × 13.9 mm
1107-001473	U463	1	IC-FLASH MEMORY	9F2808U0C, 16Mx8, TSOP, 48P, 18.4 × 12.4 mm
1201-000197	U422	1	IC-OP AMP	MC34072, SOP, TP, 8P, 150 MIL, DUAL, 100 V/MV
1203-000302	U853	1	IC-PWM CONTROLLER	3842B, SOP, 14P, 150 MIL, PLASTIC, 3
1203-000404	U971	1	IC-DC/DC CONVERTER	34063, SOP, 8P, 150 MIL, PLASTIC, 1.0/1.3 V
1203-001213	U852	1	IC-VOL. REFERENCE	431A, SOP, 8P, 150 MIL, PLASTIC, 37 V
1203-001549	U972	1	IC-POSI.FIXED REG.	1585, DD, 3P, PLASTIC, 3.235/3.3
1203-001559	U122	1	IC-RESET	DS1834A, SOIC, 8P, 150 MIL, PLASTIC
1203-002482	U934	1	IC-POSI.FIXED REG.	SOT-223, 4P, 137MIL, PLASTIC, 2.5
1204-002075	U424	1	IC-MELODY	M994T-05L, TO-92, 3P, 4.6 × 4.6MM, PLASTIC

(Continued)

Part No.	Location	Quantity	Part Name	Specification
1205-002314	U501, U551, U601, U651	4	IC-SLIC	LE79555-2QC, QFN, 32P, 8 × 8 MM, PLASTIC
1205-002314	U701, U751, U801	3	IC-SLIC	LE79555-2QC, QFN, 32P, 8 × 8 MM, PLASTIC
1205-002345	U451, U452	2	IC-SLIC	LE58QL021VC, TQFP, 44P, 10 × 10 MM
1205-002464	U931	1	IC-ETHERNET SWITCH	ADM6992-AD, PQFP, 128P, 20 × 14 MM, PLASTIC
1301-001479	U51	1	IC-CPLD	4A3, TQFP, 144P, 20 × 20 mm, 10 nS, 3.3, 10 %
1404-000126	PS351, PS361, PS371	3	THERMISTOR -PTC	4.85 ohm, 60 V, 5mm
1405-000130	V501, V551, V601, V651	4	VARISTOR	270 V, 1200 A, 9 × 4.6 mm, TP
1405-000130	V701, V751, V801, V851	4	VARISTOR	270 V, 1200 A, 9 × 4.6 mm, TP
1405-000171	V351, V361, V371	3	VARISTOR	82 V, 1200 A, 9 × 6 mm, TP
1405-000171	V421, V422	2	VARISTOR	82 V, 1200 A, 9 × 6 mm, TP
1405-000171	V502, V552, V602, V652	4	VARISTOR	82 V, 1200 A, 9 × 6 mm, TP
1405-000171	V702, V752, V802	3	VARISTOR	82 V, 1200 A, 9 × 6 mm, TP
2003-000147	R897, R898	2	R-METAL OXIDE	100 ohm, 5 %, 2 W, AA, TP, 6 × 16 mm
2007-000040	R401	1	R-CHIP	150 ohm, 1 %, 1/10 W, TP, 1608
2007-000043	R182, R183, R202, R204	4	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000043	R402	1	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000043	R41, R42, R136-R140	7	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000043	R871-R873, R933-R940	11	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000043	R975, R991- R993	4	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000045	R453, R454, R891	3	R-CHIP	3.32 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R1, R3, R21- R26, R29	9	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R101, R102, R121-R125	7	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R151-R164, R166, R167	16	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2007-000052	R169, R171-R173	4	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R251	1	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R252-R255, R321-R329	13	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R331, R332, R343	3	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R421, R428, R430, R431	4	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R439, R443, R866, R867	4	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R51-R55, R57-R69	18	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R70, R71	2	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R75, R76, R95	3	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R941-R944, R954	5	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000060	R131, R132, R440, R441	4	R-CHIP	100 Kohm, 1 %, 1/10 W, TP, 1608
2007-000060	R851-R859	9	R-CHIP	100 Kohm, 1 %, 1/10 W, TP, 1608
2007-000066	R427, R876, R877	3	R-CHIP	20 Kohm, 1 %, 1/10 W, TP, 1608
2007-000066	R881, R882	2	R-CHIP	20 Kohm, 1 %, 1/10 W, TP, 1608
2007-000070	R13, R17, R959-R962, R974	7	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-000070	R461-R468	8	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-000070	R911-R914, R926-R929	8	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-000208	R964	1	R-CHIP	1.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000231	R536, R586, R636, R686	4	R-CHIP	1.3 Kohm, 1 %, 1/10 W, TP, 1608
2007-000231	R736, R786, R836	3	R-CHIP	1.3 Kohm, 1 %, 1/10 W, TP, 1608
2007-000287	R142, R143, R191-R194	6	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000287	R351, R361, R371	3	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000287	R444-R446, R448, R450	5	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000475	R149, R207	2	R-CHIP	1 Mohm, 1 %, 1/10 W, TP, 1608
2007-000483	R971-R973	3	R-CHIP	1 ohm, 5 %, 1/8 W, TP, 2012
2007-000502	R352, R362, R372	3	R-CHIP	2.2 ohm, 5 %, 1/8 W, TP, 2012
2007-000502	R353, R363, R373	3	R-CHIP	2.2 ohm, 5 %, 1/8 W, TP, 2012
2007-000669	R261, R262, R341, R342	4	R-CHIP	2 Kohm, 1 %, 1/10 W, TP, 1608
2007-000669	R344-R348, R386-R389	9	R-CHIP	2 Kohm, 1 %, 1/10 W, TP, 1608
2007-000669	R72-R74, R965	4	R-CHIP	2 Kohm, 1 %, 1/10 W, TP, 1608
2007-000841	R976	1	R-CHIP	3 Kohm, 1 %, 1/8 W, TP, 2012
2007-000954	R504, R505, R554, R555	4	R-CHIP	49.9 OHM, 1 %, 1 W, TP, 6432
2007-000954	R604, R605, R654, R655	4	R-CHIP	49.9 OHM, 1 %, 1 W, TP, 6432
2007-000954	R704, R705, R754, R755	4	R-CHIP	49.9 OHM, 1 %, 1 W, TP, 6432
2007-000954	R804, R805	2	R-CHIP	49.9 OHM, 1 %, 1 W, TP, 6432
2007-001164	R211, R212, R915, R930	4	R-CHIP	75 ohm, 1 %, 1/10 W, TP, 1608
2007-002443	R516, R517, R566, R567	4	R-CHIP	3.6 Mohm, 5 %, 1/10 W, TP, 1608
2007-002443	R616, R617, R666, R667	4	R-CHIP	3.6 Mohm, 5 %, 1/10 W, TP, 1608
2007-002443	R716, R717, R766, R767	4	R-CHIP	3.6 Mohm, 5 %, 1/10 W, TP, 1608
2007-002443	R816, R817	2	R-CHIP	3.6 Mohm, 5 %, 1/10 W, TP, 1608

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2007-002451	R511, R512, R561, R562	4	R-CHIP	4.3 Mohm, 5 %, 1/10 W, TP, 1608
2007-002451	R611, R612, R661, R662	4	R-CHIP	4.3 Mohm, 5 %, 1/10 W, TP, 1608
2007-002451	R711, R712, R761, R762	4	R-CHIP	4.3 Mohm, 5 %, 1/10 W, TP, 1608
2007-002451	R811, R812	2	R-CHIP	4.3 Mohm, 5 %, 1/10 W, TP, 1608
2007-002901	R887	1	R-CHIP	12.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-002910	R541, R591, R641, R691	4	R-CHIP	30.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-002910	R741, R791, R841	3	R-CHIP	30.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-002910	R861-R863	3	R-CHIP	30.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-002918	R436, R442	2	R-CHIP	51.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-002918	R437, R449	2	R-CHIP	51.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-002987	R81-R83	3	R-CHIP	4.75 Kohm, 1 %, 1/10 W, TP, 1608
2007-007226	R103, R105, R107, R141	4	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R18-R20, R48, R90, R96-R99	9	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R184, R185, R205, R256, R257	5	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R2, R4-R12, R14-R16, R28	14	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R301, R302, R304-R313, R315-R320	18	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R381-R383, R451, R452	5	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R901-R910, R916-R925	20	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R956, R957, R995-R999, R888	8	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007226	R958	1	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-007443	R886	1	R-CHIP	3.01 Kohm, 1 %, 1/10 W, TP, 1608
2007-007454	R91, R92	2	R-CHIP	332 ohm, 1 %, 1/10 W, TP, 1608
2007-007519	R526, R527, R576, R577	4	R-CHIP	80.6 Kohm, 1 %, 1/10 W, TP, 1608
2007-007519	R626, R627, R676, R677	4	R-CHIP	80.6 Kohm, 1 %, 1/10 W, TP, 1608
2007-007519	R726, R727, R776, R777	4	R-CHIP	80.6 Kohm, 1 %, 1/10 W, TP, 1608
2007-007519	R826, R827	2	R-CHIP	80.6 Kohm, 1 %, 1/10 W, TP, 1608
2007-007768	R521, R522, R571, R572	4	R-CHIP	13 Kohm, 1 %, 1/10 W, TP, 1608
2007-007768	R621, R622, R671, R672	4	R-CHIP	13 Kohm, 1 %, 1/10 W, TP, 1608
2007-007768	R721, R722, R771, R772	4	R-CHIP	13 Kohm, 1 %, 1/10 W, TP, 1608
2007-007768	R821, R822	2	R-CHIP	13 Kohm, 1 %, 1/10 W, TP, 1608
2007-007776	R434	1	R-CHIP	604 ohm, 1 %, 1/10 W, TP, 1608
2007-007835	R531, R581, R631, R681	4	R-CHIP	88.7 Kohm, 1 %, 1/10 W, TP, 1608
2007-007835	R731, R781, R831	3	R-CHIP	88.7 Kohm, 1 %, 1/10 W, TP, 1608
2007-007851	R532, R582, R632, R682	4	R-CHIP	6.49 Kohm, 1 %, 1/10 W, TP, 1608
2007-007851	R732, R782, R832	3	R-CHIP	6.49 Kohm, 1 %, 1/10 W, TP, 1608
2007-008122	R146-R148	3	R-CHIP	22.1 OHM, 1 %, 1/10 W, TP, 1608
2007-008141	R889, R890	2	R-CHIP	3 ohm, 1 %, 1/10 W, TP, 1608

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2007-008681	R501-R503, R551-R553	6	R-CHIP	1.2 KOHM, 5 %, 1 W, TP, 6432
2007-008681	R601-R603, R651-R653	6	R-CHIP	1.2 KOHM, 5 %, 1 W, TP, 6432
2007-008681	R701-R703, R751-R753	6	R-CHIP	1.2 KOHM, 5 %, 1 W, TP, 6432
2007-008681	R801-R803	3	R-CHIP	1.2 KOHM, 5 %, 1 W, TP, 6432
2011-000664	RA121, RA122, RA261-RA267	9	R-NET	2.7 Kohm, 5 %, 1/16 W, L, CHIP, 8 P, TP
2011-000664	RA301, RA302, RA305	3	R-NET	2.7 Kohm, 5 %, 1/16 W, L, CHIP, 8 P, TP
2011-000881	RA31, RA32	2	R-NET	33 ohm, 5 %, 1/16 W, L, CHIP, 8 P, TP
2011-001011	RA21, RA61-RA66, RA303	8	R-NET	10 Kohm, 5 %, 1/16 W, L, CHIP, 8 P, TP
2011-001194	RA1-RA17, RA51-RA59	26	R-NET	51 ohm, 5 %, 1/16 W, L, CHIP, 8 P, TP
2011-001194	RA251-RA257, RA931, RA932	9	R-NET	51 ohm, 5 %, 1/16 W, L, CHIP, 8 P, TP
2203-000206	C975-C977	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000236	C310, C381	2	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, 1608
2203-000236	C51, C302, C303, C306, C307	5	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, 1608
2203-000236	C994-C997	4	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, 1608
2203-000257	C311, C312, C436	3	C-CER, CHIP	10 NF, 10 %, 50 V, X7R, 1608
2203-000257	C903, C904, C918, C919, C936	5	C-CER, CHIP	10 NF, 10 %, 50 V, X7R, 1608
2203-000426	C52, C53	2	C-CER, CHIP	0.018 NF, 5 %, 50 V, C0G, 1608
2203-000576	C532, C582, C632, C682	4	C-CER, CHIP	220 NF, 10 %, 50 V, X7R, TP, 3216
2203-000576	C732, C782, C832	3	C-CER, CHIP	220 NF, 10 %, 50 V, X7R, TP, 3216
2203-000626	C951, C952	2	C-CER, CHIP	0.022 NF, 5 %, 50 V, C0G, TP, 1608
2203-000838	C1	1	C-CER, CHIP	0.39 NF, 5 %, 50 V, C0G, TP, 1608
2203-000888	C856, C857	2	C-CER, CHIP	4.7 NF, 10 %, 50 V, X7R, TP, 1608
2203-000998	C141	1	C-CER, CHIP	0.047 NF, 5 %, 50 V, C0G, TP, 1608
2203-000998	C316	1	C-CER, CHIP	0.047 NF, 5 %, 50 V, C0G, TP, 1608

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2203-001386	C501-C506, C551-C556	12	C-CER, CHIP	100 NF, 10 %, 100 V, X7R, TP, 3216, 3.2
2203-001386	C601-C606, C651-C656	12	C-CER, CHIP	100 NF, 10 %, 100 V, X7R, TP, 3216, 3.2
2203-001386	C701-C706, C751-C756	12	C-CER, CHIP	100 NF, 10 %, 100 V, X7R, TP, 3216, 3.2
2203-001386	C801-C806	6	C-CER, CHIP	100 NF, 10 %, 100 V, X7R, TP, 3216, 3.2
2203-001607	C979	1	C-CER, CHIP	0.22 NF, 5 %, 50 V, NP0, 1608
2203-001656	C866	1	C-CER, CHIP	0.47 NF, 5 %, 50 V, NP0, TP, 1608
2203-001697	C531, C581, C631, C681	4	C-CER, CHIP	0.082 NF, 5 %, 50 V, NP0, 1608
2203-001697	C731, C781, C831	3	C-CER, CHIP	0.082 NF, 5 %, 50 V, NP0, 1608
2203-002080	C533, C583, C633, C683	4	C-CER, CHIP	0.56 NF, 5 %, 50 V, C0G, TP, 1608
2203-002080	C733, C783, C833	3	C-CER, CHIP	0.56 NF, 5 %, 50 V, C0G, TP, 1608
2203-003027	C424, C441	2	C-CER, CHIP	0.82 NF, 5 %, 50 V, NP0, TP, 1608
2203-005144	C121-C123	3	C-CER, CHIP	1000 NF, 10 %, 10 V, X7R, TP, 2012
2203-005144	C351, C352, C361, C362	4	C-CER, CHIP	1000 NF, 10 %, 10 V, X7R, TP, 2012
2203-005144	C371, C372, C421, C422, R447	5	C-CER, CHIP	1000 NF, 10 %, 10 V, X7R, TP, 2012
2203-005221	C516, C517, C566, C567	4	C-CER, CHIP	15 NF, 10 %, 50 V, X7R, TP, 1608
2203-005221	C616, C617, C666, C667	4	C-CER, CHIP	15 NF, 10 %, 50 V, X7R, TP, 1608
2203-005221	C716, C717, C766, C767	4	C-CER, CHIP	15 NF, 10 %, 50 V, X7R, TP, 1608
2203-005221	C816, C817	2	C-CER, CHIP	15 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC1-BC29, BC51-BC54	33	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC101-BC106, BC121- BC127	13	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC151-BC156, BC251- BC255	11	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2203-005249	BC301-BC308, BC381, BC382	10	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC423, BC451-BC454	5	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC461-BC466	6	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC501, BC551, BC601, BC651	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC701, BC751, BC801	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	BC931-BC943	13	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C313, C315	2	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C353, C363, C373	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C411-C414, C423	5	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C420	1	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C431, C451, C452	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C511, C512, C561, C562	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C611, C612, C661, C662	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C711, C712, C761, C762	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C811, C812, C851-C853	5	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C905, C920, C978	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005249	C931, C937, C971-C973	5	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2203-005457	C855	1	C-CER, CHIP	1 NF, 10 %, 2 KV, X7R, TP, 4520
2203-005457	C901, C915, C916, C930	4	C-CER, CHIP	1 NF, 10 %, 2 KV, X7R, TP, 4520
2203-005565	C854	1	C-CER, CHIP	1 NF, 5 %, 50 V, NP0, TP, 1608
2203-005687	C521, C522, C571, C572	4	C-CER, CHIP	2.2 NF, 10 %, 500 V, X7R, TP, 3216

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2203-005687	C621, C622, C671, C672	4	C-CER, CHIP	2.2 NF, 10 %, 500 V, X7R, TP, 3216
2203-005687	C721, C722, C771, C772	4	C-CER, CHIP	2.2 NF, 10 %, 500 V, X7R, TP, 3216
2203-005687	C821, C822	2	C-CER, CHIP	2.2 NF, 10 %, 500 V, X7R, TP, 3216
2203-006115	C526, C527, C576, C577	4	C-CER, CHIP	470 NF, 20 %, 250 V, X7R, TP, 4532
2203-006115	C626, C627, C676, C677	4	C-CER, CHIP	470 NF, 20 %, 250 V, X7R, TP, 4532
2203-006115	C726, C727, C776, C777	4	C-CER, CHIP	470 NF, 20 %, 250 V, X7R, TP, 4532
2203-006115	C826, C827	2	C-CER, CHIP	470 NF, 20 %, 250 V, X7R, TP, 4532
2301-001470	C401	1	C-FILM, LEAD-PEF	100 NF, 10 %, 250 V, TP, 7.2 × 5 × 10 MM, 5
2305-000385	C886	1	C-FILM, LEAD-PEF	470 NF, 10 %, 250 V, BK, 18 × 6 × 12, 15
2305-000413	C354, C364, C374	3	C-FILM, LEAD-PEF	470 NF, 5 %, 63 V, TP, 7.2 × 4.5 × 9.5 mm,
2401-000625	C876, C877	2	C-AL	2.2 uF, 20 %, 160 V, GP, TP, 6.3 × 11, 5
2401-003914	C872, C980, C981	3	C-AL	100UF, 20 %, 100V, GP, TP, 10 × 16 MM, 5
2402-000130	C450	1	C-AL, SMD	2.2 uF, 20 %, 50 V, GP, TP, 4.3 × 4.3 × 5.
2402-000204	C448	1	C-AL, SMD	10 UF, 20 %, 16 V, WT, TP, 4.3 × 4.3 × 5.4
2402-001033	C984	1	C-AL, SMD	220 uF, 20 %, 16 V, GP, TP, 8.3 × 8.3 × 10
2402-001070	C983	1	C-AL, SMD	470 uF, 20 %, 16 V, GP, TP, 10 × 10.2,
2402-001073	C873	1	C-AL, SMD	220 uF, 20 %, 35 V, GP, TP, 10 × 10 × 10
2404-001037	C131	1	C-TA, CHIP	10 uF, 10 %, 16 V, TP, 3528
2404-001074	C941, C991	2	C-TA, CHIP	10 uF, 10 %, 10 V, GP, TP, 3216
2404-001289	C992	1	C-TA, CHIP	47 UF, 10 %, 10 V, GP, TP, 3528
2409-001034	BT121	1	C-EDL	1300000UF, 5.5 V, BK, 21 × 7.5 MM, 5
2601-001056	T901, T916	2	TRANS-SMD, PULSE	350 UH, 1:1, 1:1, 12.7 × 6.73 × 5.97 MM, TP
2702-001112	L122, L301	2	INDUCTOR-RADIAL	60 uH, 35 %, 7.5 × 8.0 mm

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Part No.	Location	Quantity	Part Name	Specification
2703-002639	L501, L551, L601, L651	4	INDUCTOR-SMD	1000 UH, 20 %, 5.2 × 5.2 × 1.8 MM
2703-002639	L701, L751, L801	3	INDUCTOR-SMD	1000 UH, 20 %, 5.2 × 5.2 × 1.8 MM
2801-004058	Y931	1	CRYSTAL-SMD	25 MHZ, 30 PPM, SMD, 20 PF, 500 HM, TP
2804-001325	Y121	1	OSCILLATOR- CLOCK	50 MHZ, 50 ppm, 10 TTL, 15 pF, TP, 3.3 V, 40 mA
2804-001496	Y301	1	OSCILLATOR- CLOCK	16.384 MHz, 50 ppm, 10 TTL, 15 pF, TP
2901-000195	B301	1	FILTER-EMI ON BOARD	50 V, 1 A, 330 pF, 7.5 × 2.5 × 6.2 mm, TP
3301-001120	L51, L121, L905	3	BEAD-SMD	30 OHM, 2012, 3000, TP, 0.015
3301-001120	L920, L931, L932, L981	4	BEAD-SMD	30 OHM, 2012, 3000, TP, 0.015
3301-001308	L123	1	BEAD-SMD	10 OHM, 1608, 500, TP, 0.15
3404-001008	S121	1	SWITCH-TACT	15 V, 50 MA, 160 GF, 6 × 6 × 5 MM, SPST
3407-001067	S301	1	SWITCH-SMD	6 V, 100 MA, SLIDE
3408-000308	S122	1	SWITCH-SLIDE	30 V, 200 mA, DPDT
3501-001258	K501, K551, K601, K651	4	RELAY-MINIATURE	5 V, 100 MW, 1000 MA, 2FORMC, 3 MS, 3 MS
3501-001258	K701, K751, K801, K401	4	RELAY-MINIATURE	5 V, 100 MW, 1000 MA, 2FORMC, 3 MS, 3 MS
3704-000249	U121	1	SOCKET-IC	32 P, PLCC, SN, 1.27 mm
3710-000001	P421	1	CONNECTOR- SHUNT	2 P, 1R, 2.54 MM, AUF
3710-001659	P201, P202	2	CONNECTOR- SOCKET	40 P, 2R, 0.8 MM, SMD-S, AUF, NTR
3711-000178	P991	1	CONNECTOR- HEADER	1WALL, 2P, 1R, 3.96 MM, STRAIGHT, SN, WHT
3711-000240	P992	1	CONNECTOR- HEADER	1WALL, 4P, 1R, 3.96 MM, STRAIGHT, SN, WHT
3711-001465	P411, P421	2	CONNECTOR- HEADER	NOWALL, 3P, 1R, 2.54 MM, STRAIGHT, AUF
3711-003272	P51, P121	2	CONNECTOR- HEADER	BOX, 10P, 2R, 2.54 MM, STRAIGHT, AUF, BLK
3711-003552	P981	1	CONNECTOR- HEADER	BOX, 50P, 2R, 2.54 MM, STRAIGHT, AUF, BLK
3722-000575	P973	1	JACK-MODULAR	6P/6C, INVERTED, N, ANGLE, N, AU30U
3722-001564	P971, P972	2	JACK-MODULAR	6P/4C 4, INVERTED, N, STRAIGHT
3722-002157	P901	1	JACK-MODULAR	8P/8C, STANDARD, N, ANGLE,

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Part No.	Location	Quantity	Part Name	Specification
EC26-20501A	T441, T442	2	TRANS AF	INFOREX, 800 mH
EC27-30514A	L972, L974, L975	3	COIL RF	INFOREX, 35 UH, 40T
EN13-10502A	U381	1	IC ASIC	DECT, TP3404, PLCC, 28P
GA13-10579A	U301	1	IC ASIC	DCS COMPACT, STC9604, QFP, 208
GA26-10053A	T351, T361, T371	3	TRANS PULSE	DGP 360, 144//72.5/72T, 5 mH
GA26-30073A	T851	1	TRANS POWER	DCS, -48 V/13 V/85 V, 877 uH/100 uH
JF27-20050A	L971	1	COIL AF	KP32, 300 UH, 0.35O HM, 80T

5.2.2 3TRK Board (MPD Type, With CID)

Part No.	Location	Quantity	Part Name	Specification
0401-000133	D101-D104, D201-D204	8	DIODE- SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D301-D304	4	DIODE- SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0402-001047	BD101, BD201, BD301	3	DIODE-BRIDGE	DF04S, 400 V, 1 A, SMD-4, ST
0403-000308	ZD103, ZD203, ZD303	3	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500MW, LL-34, TP
0403-000308	ZD104, ZD204, ZD304	3	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500MW, LL-34, TP
0403-000549	ZD101, ZD201, ZD301	3	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500MW, LL-34, TP
0403-000549	ZD102, ZD202, ZD302	3	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500MW, LL-34, TP
0406-000147	TVS101, TVS201, TVS301	3	DIODE-TVS	DSSA-P0640SA, 56V/-72 V, DO-21
0501-000477	Q101, Q201, Q301	3	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q102, Q202, Q302	3	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q104, Q204, Q304	3	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0502-000465	Q103, Q203, Q303	3	TR-POWER	KTD2058, NPN, 25000 mW, TO-220IS, ST
0604-001002	U101, U201, U301	3	PHOTO- COUPLER	TR, 100-600%, 200mW, SOP-4, TP
0801-000702	U52, U53	2	IC-CMOS LOGIC	74HC125, BUFFER, SOP, 14, 150 MIL, QUAD, T
1201-000005	U151, U251, U351	3	IC-OP AMP	MC3403, SOP, TP, 14P, 150 MIL, QUAD, 200 V/MV

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Part No.	Location	Quantity	Part Name	Specification
1205-000394	U11, U21, U31	3	IC-CODEC FILTER	TP3057WM, SOP, 16P, PLASTIC, 5.2
2003-002007	R101, R201, R301	3	R-METAL OXIDE(S)	4.7 Kohm, 5 %, 2 W, AF, TP, 3.9 × 10mm
2003-002066	R102, R202, R302	3	R-METAL OXIDE(S)	20 ohm, 5 %, 1 W, AF, TP, 2.5 × 6.5
2003-002169	R103, R203, R303	3	R-METAL OXIDE	27 ohm, 5 %, 1 W, AF, TP, 4.3 × 12 mm
2003-002169	R104, R204, R304	3	R-METAL OXIDE	27 ohm, 5 %, 1 W, AF, TP, 4.3 × 12 mm
2007-000029	JP301, JP302	2	R-CHIP	0 ohm, 5 %, 1/8 W, TP, 2012
2007-000029	R63, R64	2	R-CHIP	0 ohm, 5 %, 1/8 W, TP, 2012
2007-000070	L2, L3	2	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-000277	R165, R265, R365	3	R-CHIP	100 Kohm, 1 %, 1/8 W, TP, 2012
2007-000277	R166, R266, R366	3	R-CHIP	100 Kohm, 1 %, 1/8 W, TP, 2012
2007-000277	R89	1	R-CHIP	100 Kohm, 1 %, 1/8 W, TP, 2012
2007-000286	R115, R215, R315	3	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000286	R119, R219, R319	3	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000286	R120, R220, R320	3	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000286	R61, R62, R67-R70, R76-R83	14	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000287	L4-L8	5	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000297	R117, R217, R317	3	R-CHIP	10 Kohm, 1 %, 1/8 W, TP, 2012
2007-000307	R11-R13, R21-R23	6	R-CHIP	10 ohm, 1 %, 1/8 W, TP, 2012
2007-000307	R112, R212, R312	3	R-CHIP	10 ohm, 1 %, 1/8 W, TP, 2012
2007-000307	R31-R33	3	R-CHIP	10 ohm, 1 %, 1/8 W, TP, 2012
2007-000378	R155, R255, R355	3	R-CHIP	13 Kohm, 1 %, 1/8 W, TP, 2012
2007-000392	R118, R218, R318	3	R-CHIP	150 Kohm, 1 %, 1/8 W, TP, 2012
2007-000454	R164, R264, R364	3	R-CHIP	18 Kohm, 1 %, 1/8 W, TP, 2012
2007-000465	R153, R253, R353	3	R-CHIP	1 Kohm, 1 %, 1/8 W, TP, 2012
2007-000465	R157, R257, R357	3	R-CHIP	1 Kohm, 1 %, 1/8 W, TP, 2012
2007-000465	R54, R56	2	R-CHIP	1 Kohm, 1 %, 1/8 W, TP, 2012
2007-000474	R90	1	R-CHIP	1 Mohm, 1 %, 1/8 W, TP, 2012
2007-000490	R51-R53	3	R-CHIP	2.2 Kohm, 1 %, 1/8 W, TP, 2012
2007-000515	R156, R256, R356	3	R-CHIP	2.7 Kohm, 1 %, 1/8 W, TP, 2012
2007-000639	R152, R252, R352	3	R-CHIP	270 ohm, 1 %, 1/8 W, TP, 2012
2007-000827	R158, R258, R358	3	R-CHIP	39 Kohm, 1 %, 1/8 W, TP, 2012
2007-000827	R161, R261, R361	3	R-CHIP	39 Kohm, 1 %, 1/8 W, TP, 2012
2007-000827	R167, R267, R367	3	R-CHIP	39 Kohm, 1 %, 1/8 W, TP, 2012
2007-000849	R124, R224, R351	3	R-CHIP	3 ohm, 5 %, 1/8 W, TP, 2012
2007-000849	R91, R92	2	R-CHIP	3 ohm, 5 %, 1/8 W, TP, 2012
2007-000868	R111, R211, R311	3	R-CHIP	4.7 Kohm, 1 %, 1/8 W, TP, 2012
2007-000868	R123, R223, R323	3	R-CHIP	4.7 Kohm, 1 %, 1/8 W, TP, 2012

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Part No.	Location	Quantity	Part Name	Specification
2007-000909	R159, R259, R359	3	R-CHIP	43 Kohm, 1 %, 1/8 W, TP, 2012
2007-001067	R114, R214, R314	3	R-CHIP	6.8 Kohm, 1 %, 1/8 W, TP, 2012
2007-001124	R163, R263, R363	3	R-CHIP	68 Kohm, 1 %, 1/8 W, TP, 2012
2007-001195	R113, R213, R313	3	R-CHIP	820 Kohm, 5 %, 1/8 W, TP, 2012
2007-001671	R168, R268, R368	3	R-CHIP	75 Kohm, 1 %, 1/8 W, TP, 2012
2007-007584	R162, R262, R362	3	R-CHIP	73.2 Kohm, 1 %, 1/8 W, TP, 2012
2201-000545	C102, C202, C302	3	C-CERAMIC, DISC	4.7 NF, 20 %, 400 V, Y5U, 16 × 7 MM, 7.5
2201-000545	C103, C203, C303	3	C-CERAMIC, DISC	4.7 NF, 20 %, 400 V, Y5U, 16 × 7 MM, 7.5
2203-000130	C154, C254, C354	3	C-CER, CHIP	1.2 NF, 5 %, 50 V, C0G, TP, 2012
2203-000206	BC11, BC21, BC31	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC12, BC22, BC32	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC151, BC251, BC351	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC152, BC252, BC352	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC51-BC56	6	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C111, C211, C311	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C152, C252, C352	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C153, C253, C353	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C51-C54	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000239	C61-C67	7	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, TP, 2012
2203-000408	C159, C259, C359	3	C-CER, CHIP	0.18 NF, 5 %, 50 V, C0G, TP, 2012
2203-000595	C157, C257, C357	3	C-CER, CHIP	0.22 NF, 5 %, 50 V, C0G, TP, 2012
2203-000938	C160, C260, C360	3	C-CER, CHIP	0.47 NF, 5 %, 50 V, C0G, TP, 2012
2203-001058	C156, C256, C356	3	C-CER, CHIP	0.56 NF, 5 %, 50 V, C0G, TP, 2012
2203-001132	C158, C258, C358	3	C-CER, CHIP	0.68 NF, 5 %, 50 V, NP0, TP, 2012
2203-001391	C151, C251, C351	3	C-CER, CHIP	150 NF, 10 %, 25 V, X7R, TP, 2012
2305-001054	C101, C201, C301	3	C-FILM, LEAD-PEF	820 NF, 10 %, 250 V, TP, 18 × 7.5 × 13.5
2401-003298	C104, C204, C304	3	C-AL	100 uF, 20 %, 63 V, GP, TP, 8 × 11.5, 5
2402-000170	C11, C12, C31	3	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3 × 4.3 × 5.4,
2402-000170	C161, C261, C361	3	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3 × 4.3 × 5.4,
2402-001033	C98, C99	2	C-AL, SMD	220 uF, 20 %, 16 V, GP, TP, 8.3 × 8.3 × 10
2402-001034	C105, C205, C305	3	C-AL, SMD	22 UF, 20 %, 35 V, GP, TP, 6.6 × 6.6 × 5.4
2402-001042	C57, C58	2	C-AL, SMD	100 uF, 20 %, 16 V, GP, TP, 6.6 × 6.6 × 5.4 mm
2703-000202	L1	1	INDUCTOR- SMD	33 uH, 10 %, 3225
3301-000344	B51, B52	2	BEAD-RADIAL	200 ohm, 3.5 × 0.6 × 6.5 mm, 7000 mA, TP

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Part No.	Location	Quantity	Part Name	Specification
3501-001035	K101, K201, K301	3	RELAY-MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K103, K203, K303	3	RELAY-MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K202	1	RELAY-MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3703-000176	P1	1	CONNECTOR-BACK PANEL	50 P, 2R, FEMALE, STRAIGHT, AUF
3704-001001	P101, P201, P301	3	SOCKET-IC	8 P, SIP, SN, 2.54mm
3722-000250	P2, P3	2	JACK-MODULAR	6P/6C, INVERTED, N, ANGLE, STANDARD
4715-000127	V101, V102, V103	3	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V201, V202, V203	3	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V301, V302, V303	3	SURGE ABSORBER	300 V, 15 %, 500 A
GA13-00004A	U51	1	IC ASIC-TMC	STL7053E, IDCS500 PREMIUM, 60 PIN
GA26-00003A	T101, T201, T301	3	TRANS AF-5692B	5692B, DCS-408, 2P:3P, 800 MH, 1.3 DB

5.2.3 3TRK Board (PRS Type, With CID)

Part No.	Location	Quantity	Part Name	Specification
0401-000133	D101-D104, D201-D204	8	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D301-D304	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0402-001047	BD101, BD201, BD301	3	DIODE-BRIDGE	DF04S, 400 V, 1A, SMD-4, ST
0403-000308	ZD103, ZD203, ZD303	3	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500 MW, LL-34, TP
0403-000308	ZD104, ZD204, ZD304	3	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500 MW, LL-34, TP
0403-000549	ZD101, ZD201, ZD301	3	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500 MW, LL-34, TP
0403-000549	ZD102, ZD202, ZD302	3	DIODE-ZENER	RLZJ24B, 23.61-24.92V, 500MW, LL-34, TP
0406-000147	TVS101, TVS201, TVS301	3	DIODE-TVS	DSSA-P0640SA, 56 V/-72 V, DO-21
0501-000477	Q101, Q201, Q301	3	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q102, Q202, Q302	3	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q104, Q204, Q304	3	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0502-000465	Q103, Q203, Q303	3	TR-POWER	KTD2058, NPN, 25000 mW, TO-220IS, ST, 100-200
0604-001002	U101, U201, U301	3	PHOTO-COUPLER	TR, 100-600 %, 200 mW, SOP-4, TP
0801-000702	U52, U53	2	IC-CMOS LOGIC	74HC125, BUFFER, SOP, 14, 150 MIL, QUAD, TP
1201-000005	U151, U251, U351	3	IC-OP AMP	MC3403, SOP, TP, 14P, 150MIL, QUAD, 200 V/MV
1205-000394	U11, U21, U31	3	IC-CODEC FILTER	TP3057 WM, SOP, 16P, PLASTIC, 5.2
2003-002007	R101, R201, R301	3	R-METAL OXIDE(S)	4.7 Kohm, 5 %, 2W, AF, TP, 3.9 × 10 mm
2003-002066	R102, R202, R302	3	R-METAL OXIDE(S)	20ohm, 5 %, 1 W, AF, TP, 2.5 × 6.5
2003-002169	R103, R203, R303	3	R-METAL OXIDE	27 ohm, 5 %, 1 W, AF, TP, 4.3 × 12 mm
2003-002169	R104, R204, R304	3	R-METAL OXIDE	27 ohm, 5 %, 1 W, AF, TP, 4.3 × 12 mm
2007-000029	JP301, JP302	2	R-CHIP	0 ohm, 5 %, 1/8 W, TP, 2012
2007-000029	R121, R221, R321	3	R-CHIP	0 ohm, 5 %, 1/8 W, TP, 2012

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2007-000029	R122, R222, R322	3	R-CHIP	0 ohm, 5 %, 1/8 W, TP, 2012
2007-000029	R63, R64	2	R-CHIP	0 ohm, 5 %, 1/8 W, TP, 2012
2007-000070	L2, L3	2	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-000277	R165, R265, R365	3	R-CHIP	100 Kohm, 1 %, 1/8 W, TP, 2012
2007-000277	R166, R266, R366	3	R-CHIP	100 Kohm, 1 %, 1/8 W, TP, 2012
2007-000277	R89	1	R-CHIP	100 Kohm, 1 %, 1/8 W, TP, 2012
2007-000286	R115, R215, R315	3	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000286	R119, R219, R319	3	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000286	R120, R220, R320	3	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000286	R61, R62, R67-R70, R76-R83	14	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000287	L4-L8	5	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000297	R117, R217, R317	3	R-CHIP	10K ohm, 1 %, 1/8 W, TP, 2012
2007-000307	R11-R13, R21-R23	6	R-CHIP	10 ohm, 1 %, 1/8 W, TP, 2012
2007-000307	R112, R212, R312	3	R-CHIP	10 ohm, 1 %, 1/8 W, TP, 2012
2007-000307	R31-R33	3	R-CHIP	10 ohm, 1 %, 1/8 W, TP, 2012
2007-000378	R155, R255, R355	3	R-CHIP	13 Kohm, 1 %, 1/8 W, TP, 2012
2007-000392	R118, R218, R318	3	R-CHIP	150 Kohm, 1 %, 1/8 W, TP, 2012
2007-000454	R164, R264, R364	3	R-CHIP	18 Kohm, 1 %, 1/8 W, TP, 2012
2007-000465	R153, R253, R353	3	R-CHIP	1 Kohm, 1 %, 1/8 W, TP, 2012
2007-000465	R157, R257, R357	3	R-CHIP	1 Kohm, 1 %, 1/8 W, TP, 2012
2007-000465	R54, R56	2	R-CHIP	1 Kohm, 1 %, 1/8 W, TP, 2012
2007-000474	R90	1	R-CHIP	1 Mohm, 1 %, 1/8 W, TP, 2012
2007-000490	R51-R53	3	R-CHIP	2.2 Kohm, 1 %, 1/8 W, TP, 2012
2007-000515	R156, R256, R356	3	R-CHIP	2.7 Kohm, 1 %, 1/8 W, TP, 2012
2007-000639	R152, R252, R352	3	R-CHIP	270 ohm, 1 %, 1/8 W, TP, 2012
2007-000827	R158, R258, R358	3	R-CHIP	39 Kohm, 1 %, 1/8 W, TP, 2012
2007-000827	R161, R261, R361	3	R-CHIP	39 Kohm, 1 %, 1/8 W, TP, 2012
2007-000827	R167, R267, R367	3	R-CHIP	39 Kohm, 1 %, 1/8 W, TP, 2012
2007-000849	R124, R224, R351	3	R-CHIP	3 ohm, 5 %, 1/8 W, TP, 2012
2007-000849	R91, R92	2	R-CHIP	3 ohm, 5 %, 1/8 W, TP, 2012
2007-000868	R111, R211, R311	3	R-CHIP	4.7 Kohm, 1 %, 1/8 W, TP, 2012
2007-000868	R123, R223, R323	3	R-CHIP	4.7 Kohm, 1 %, 1/8 W, TP, 2012
2007-000909	R159, R259, R359	3	R-CHIP	43 Kohm, 1 %, 1/8 W, TP, 2012
2007-001067	R114, R214, R314	3	R-CHIP	6.8 Kohm, 1 %, 1/8 W, TP, 2012
2007-001124	R163, R263, R363	3	R-CHIP	68 Kohm, 1 %, 1/8 W, TP, 2012
2007-001195	R113, R213, R313	3	R-CHIP	820 Kohm, 5 %, 1/8 W, TP, 2012
2007-001671	R168, R268, R368	3	R-CHIP	75 Kohm, 1 %, 1/8 W, TP, 2012
2007-007584	R162, R262, R362	3	R-CHIP	73.2 Kohm, 1 %, 1/8 W, TP, 2012
2203-000130	C154, C254, C354	3	C-CER, CHIP	1.2 NF, 5 %, 50 V, COG, TP, 2012

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2203-000206	BC11, BC21, BC31	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC12, BC22, BC32	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC151, BC251, BC351	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC152, BC252, BC352	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC51-BC56	6	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C111, C211, C311	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C152, C252, C352	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C153, C253, C353	3	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C51-C54	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000239	C61-C67	7	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, TP, 2012
2203-000408	C159, C259, C359	3	C-CER, CHIP	0.18 NF, 5 %, 50 V, C0G, TP, 2012
2203-000595	C157, C257, C357	3	C-CER, CHIP	0.22 NF, 5 %, 50 V, C0G, TP, 2012
2203-000938	C160, C260, C360	3	C-CER, CHIP	0.47 NF, 5 %, 50 V, C0G, TP, 2012
2203-001058	C156, C256, C356	3	C-CER, CHIP	0.56 NF, 5 %, 50 V, C0G, TP, 2012
2203-001132	C158, C258, C358	3	C-CER, CHIP	0.68 NF, 5 %, 50 V, NP0, TP, 2012
2203-001391	C151, C251, C351	3	C-CER, CHIP	150 NF, 10 %, 25 V, X7R, TP, 2012
2305-001054	C101, C201, C301	3	C-FILM, LEAD-PEF	820 NF, 10 %, 250 V, TP, 18 × 7.5 × 13.5,
2401-003298	C104, C204, C304	3	C-AL	100 uF, 20 %, 63 V, GP, TP, 8 × 11.5, 5
2402-000170	C11, C12, C31	3	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3 × 4.3 × 5.4
2402-000170	C161, C261, C361	3	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3 × 4.3 × 5.4
2402-001033	C98, C99	2	C-AL, SMD	220 uF, 20 %, 16 V, GP, TP, 8.3 × 8.3 × 10
2402-001034	C105, C205, C305	3	C-AL, SMD	22 UF, 20 %, 35 V, GP, TP, 6.6 × 6.6 × 5.4
2402-001042	C57, C58	2	C-AL, SMD	100 uF, 20 %, 16 V, GP, TP, 6.6 × 6.6 × 5.4 mm
2703-000202	L1	1	INDUCTOR- SMD	33 uH, 10 %, 3225
3301-000344	B51, B52	2	BEAD- RADIAL	200 ohm, 3.5 × 0.6 × 6.5 mm, 7000 mA, TP
3501-001035	K101, K201, K301	3	RELAY- MINIATURE	5VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K103, K203, K303	3	RELAY- MINIATURE	5VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K202	1	RELAY- MINIATURE	5VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3703-000176	P1	1	CONNECTOR -BACK PANEL	50 P, 2R, FEMALE, STRAIGHT, AUF
3704-001001	P101, P201, P301	3	SOCKET-IC	8 P, SIP, SN, 2.54 mm

(Continued)

Part No.	Location	Quantity	Part Name	Specification
3722-000250	P2, P3	2	JACK-MODULAR	6P/6C, INVERTED, N, ANGLE, STANDAR
4715-000127	V101, V102, V103	3	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V201, V202, V203	3	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V301, V302, V303	3	SURGE ABSORBER	300 V, 1 5%, 500 A
GA13-00004A	U51	1	IC ASIC-TMC	STL7053E, IDCS500 PREMIUM, 60 PIN
GA26-00003A	T101, T201, T301	3	TRANS AF-5692B	5692B, DCS-408, 2P:3P, 800 MH, 1.3 DB

5.2.4 4TRK Board (MPD Type, Without CID)

Part No.	Location	Quantity	Part Name	Specification
0401-000133	D101, D201, D301, D401	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D102, D202, D302, D402	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D103, D203, D303, D403	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D104, D204, D304, D404	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0402-001047	BD101, BD201, BD301, BD401	4	DIODE-BRIDGE	DF04S, 400 V, 1A, SMD-4, ST
0403-000308	ZD103, ZD203, ZD303, ZD403	4	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500 MW, LL-34, TP
0403-000308	ZD104, ZD204, ZD304, ZD404	4	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500 MW, LL-34,TP
0403-000549	ZD101, ZD201, ZD301, ZD401	4	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500 MW, LL-34,TP
0403-000549	ZD102, ZD202, ZD302, ZD402	4	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500 MW, LL-34,TP
0406-000147	TVS101, TVS201, TVS301, TVS401	4	DIODE-TVS	DSSA-P0640SA, 56V/-72 V, DO-21
0501-000477	Q101, Q201, Q301, Q401	4	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q102, Q202, Q302, Q402	4	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q104, Q204, Q304, Q404	4	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0502-000465	Q103, Q203, Q303, Q403	4	TR-POWER	KTD2058, NPN, 25000 mW, TO-220IS, ST, 100-200

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Part No.	Location	Quantity	Part Name	Specification
0604-001002	U101, U201, U301, U401	4	PHOTO-COUPLER	TR, 100-600%, 200 mW, SOP-4, TP
0801-000702	U52, U53	2	IC-CMOS LOGIC	74HC125, BUFFER, SOP, 14, 150 MIL, QUAD, TP
1201-000005	U151, U251, U351, U451	4	IC-OP AMP	MC3403, SOP, TP, 14P, 150 MIL, QUAD, 200 V/MV
1205-000394	U11, U21, U31, U41	4	IC-CODEC FILTER	TP3057 WM, SOP, 16P, PLASTIC, 5.2
2003-002007	R101, R201, R301, R401	4	R-METAL OXIDE(S)	4.7 Kohm, 5%, 2W, AF, TP, 3.9 x 10 mm
2003-002066	R102, R202, R302, R402	4	R-METAL OXIDE(S)	20 ohm, 5%, 1W, AF, TP, 2.5 X 6.5
2003-002169	R103, R203, R303, R403	4	R-METAL OXIDE	27 ohm, 5%, 1W, AF, TP, 4.3 x 12 mm
2003-002169	R104, R204, R304, R404	4	R-METAL OXIDE	27 ohm, 5%, 1W, AF, TP, 4.3 x 12 mm
2007-000029	R63, R64	2	R-CHIP	0 ohm, 5%, 1/8W, TP, 2012
2007-000070	L2, L3	2	R-CHIP	0 ohm, 5%, 1/10W, TP, 1608
2007-000277	R165, R265, R365, R465	4	R-CHIP	100 Kohm, 1%, 1/8W, TP, 2012
2007-000277	R166, R266, R366, R466	4	R-CHIP	100 Kohm, 1%, 1/8W, TP, 2012
2007-000277	R89	1	R-CHIP	100 Kohm, 1%, 1/8W, TP, 2012
2007-000286	R115, R215, R315, R415	4	R-CHIP	100 ohm, 1%, 1/8W, TP, 2012
2007-000286	R119, R219, R319, R419	4	R-CHIP	100 ohm, 1%, 1/8W, TP, 2012
2007-000286	R120, R220, R320, R420	4	R-CHIP	100 ohm, 1%, 1/8W, TP, 2012
2007-000286	R61, R62, R67-R70, R76-R83	14	R-CHIP	100 ohm, 1%, 1/8W, TP, 2012
2007-000287	L4-L8	5	R-CHIP	100 OHM, 1%, 1/10W, TP, 1608
2007-000297	R117, R217, R317, R417	4	R-CHIP	10 Kohm, 1%, 1/8W, TP, 2012
2007-000307	R11-R13, R21-R23	6	R-CHIP	10 ohm, 1%, 1/8W, TP, 2012
2007-000307	R112, R212, R312, R412	4	R-CHIP	10 ohm, 1%, 1/8W, TP, 2012
2007-000307	R31-R33, R41-R43	6	R-CHIP	10 ohm, 1%, 1/8W, TP, 2012
2007-000378	R155, R255, R355, R455	4	R-CHIP	13 Kohm, 1%, 1/8W, TP, 2012
2007-000392	R118, R218, R318, R418	4	R-CHIP	150 Kohm, 1%, 1/8W, TP, 2012

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Part No.	Location	Quantity	Part Name	Specification
2007-000454	R164, R264, R364, R464	4	R-CHIP	18 Kohm, 1 %, 1/8W, TP, 2012
2007-000465	R153, R253, R353, R453	4	R-CHIP	1 Kohm, 1 %, 1/8W, TP, 2012
2007-000465	R157, R257, R357, R457	4	R-CHIP	1 Kohm, 1 %, 1/8W, TP, 2012
2007-000465	R54, R56	2	R-CHIP	1 Kohm, 1 %, 1/8W, TP, 2012
2007-000474	R90	1	R-CHIP	1 Mohm, 1 %, 1/8W, TP, 2012
2007-000490	R51-R53	3	R-CHIP	2.2 Kohm, 1 %, 1/8W, TP, 2012
2007-000515	R156, R256, R356, R456	4	R-CHIP	2.7 Kohm, 1 %, 1/8W, TP, 2012
2007-000639	R152, R252, R352, R452	4	R-CHIP	270 ohm, 1 %, 1/8W, TP, 2012
2007-000827	R158, R258, R358, R458	4	R-CHIP	39 Kohm, 1 %, 1/8W, TP, 2012
2007-000827	R161, R261, R361, R461	4	R-CHIP	39 Kohm, 1 %, 1/8W, TP, 2012
2007-000827	R167, R267, R367, R467	4	R-CHIP	39 Kohm, 1 %, 1/8W, TP, 2012
2007-000849	R124, R224, R351, R451	4	R-CHIP	3 ohm, 5 %, 1/8W, TP, 2012
2007-000849	R91, R92	2	R-CHIP	3 ohm, 5 %, 1/8W, TP, 2012
2007-000868	R111, R211, R311, R411	4	R-CHIP	4.7 Kohm, 1 %, 1/8W, TP, 2012
2007-000868	R123, R223, R323, R423	4	R-CHIP	4.7 Kohm, 1 %, 1/8W, TP, 2012
2007-000909	R159, R259, R359, R459	4	R-CHIP	43 Kohm, 1 %, 1/8W, TP, 2012
2007-001067	R114, R214, R314, R414	4	R-CHIP	6.8 Kohm, 1 %, 1/8W, TP, 2012
2007-001124	R163, R263, R363, R463	4	R-CHIP	68 Kohm, 1 %, 1/8W, TP, 2012
2007-001195	R113, R213, R313, R413	4	R-CHIP	820 Kohm, 5 %, 1/8W, TP, 2012
2007-001671	R168, R268, R368, R468	4	R-CHIP	75 Kohm, 1 %, 1/8W, TP, 2012
2007-007584	R162, R262, R362, R462	4	R-CHIP	73.2 Kohm, 1 %, 1/8W, TP, 2012
2201-000545	C102, C202, C302, C402	4	C-CERAMIC, DISC	4.7NF, 20 %, 400V, Y5U, 16X7 MM, 7.5
2201-000545	C103, C203, C303, C403	4	C-CERAMIC, DISC	4.7NF, 20 %, 400V, Y5U, 16X7 MM, 7.5

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Part No.	Location	Quantity	Part Name	Specification
2203-000130	C154, C254, C354, C454	4	C-CER, CHIP	1.2 NF, 5 %, 50 V, C0G, TP, 2012
2203-000206	BC11, BC21, BC31, BC41	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC12, BC22, BC32, BC42	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC151, BC251, BC351, BC451	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC152, BC252, BC352, BC452	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC51-BC56	6	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C111, C211, C311, C411	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C152, C252, C352, C452	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C153, C253, C353, C453	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C51-C54	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000239	C61-C67	7	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, TP, 2012
2203-000408	C159, C259, C359, C459	4	C-CER, CHIP	0.18 NF, 5 %, 50 V, C0G, TP, 2012
2203-000595	C157, C257, C357, C457	4	C-CER, CHIP	0.22 NF, 5 %, 50 V, C0G, TP, 2012
2203-000938	C160, C260, C360, C460	4	C-CER, CHIP	0.47 NF, 5 %, 50 V, C0G, TP, 2012
2203-001058	C156, C256, C356, C456	4	C-CER, CHIP	0.56 NF, 5 %, 50 V, C0G, TP, 2012
2203-001132	C158, C258, C358, C458	4	C-CER, CHIP	0.68 NF, 5 %, 50 V, NP0, TP, 2012
2203-001391	C151, C251, C351, C451	4	C-CER, CHIP	150 NF, 10 %, 25 V, X7R, TP, 2012
2305-001054	C101, C201, C301, C401	4	C-FILM, LEAD-PEF	820 NF, 10 %, 250 V, TP, 18x7.5x13.5,
2401-003298	C104, C204, C304, C404	4	C-AL	100 uF, 20 %, 63 V, GP, TP, 8x11.5, 5
2402-000170	C11, C12, C31, C32	4	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3x4.3x5.4,
2402-000170	C161, C261, C361, C461	4	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3x4.3x5.4,
2402-001033	C98, C99	2	C-AL, SMD	220 uF, 20 %, 16 V, GP, TP, 8.3x8.3x10
2402-001034	C105, C205, C305, C405	4	C-AL, SMD	22 uF, 20 %, 35 V, GP, TP, 6.6X6.6X5.4 mm
2402-001042	C57, C58	2	C-AL, SMD	100 uF, 20 %, 16 V, GP, TP, 6.6x6.6x5.4 mm

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2703-000202	L1	1	INDUCTOR-SMD	33 uH, 10 %, 3225
3301-000344	B51, B52	2	BEAD-RADIAL	200 ohm, 3.5x0.6x6.5 mm, 7000 mA,
3501-001035	K101, K201, K301, K401	4	RELAY-MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4MS, 4MS
3501-001035	K103, K203, K303, K403	4	RELAY-MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K202, K302	2	RELAY-MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3703-000176	P1	1	CONNECTOR-BACK PANEL	50P, 2R, FEMALE, STRAIGHT, AUF
3704-001001	P101, P201, P301, P401	4	SOCKET-IC	8P, SIP, SN, 2.54 mm
3722-000250	P2, P3	2	JACK-MODULAR	6P/6C, INVERTED, N, ANGLE, STANDARD
4715-000127	V101, V201, V301, V401	4	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V102, V202, V302, V402	4	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V103, V203, V303, V403	4	SURGE ABSORBER	300 V, 15 %, 500 A
GA13-00004A	U51	1	IC ASIC-TMC	STL7053E, IDCS500 PREMIUM, 60 PIN
GA26-00003A	T101, T201, T301, T401	4	TRANS AF-5692B	5692B, DCS-408, 2P : 3P, 800MH, 1.3DB

5.2.5 4TRK Board (PRS Type, Without CID)

Part No.	Location	Quantity	Part Name	Specification
0401-000133	D101, D201, D301, D401	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D102, D202, D302, D402	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D103, D203, D303, D403	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0401-000133	D104, D204, D304, D404	4	DIODE-SWITCHING	RLS4148, 75 V, 150 MA, LL-34, TP
0402-001047	BD101, BD201, BD301, BD401	4	DIODE-BRIDGE	DF04S, 400 V, 1A, SMD-4, ST
0403-000308	ZD103, ZD203, ZD303, ZD403	4	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500 MW, LL-34, TP
0403-000308	ZD104, ZD204, ZD304, ZD404	4	DIODE-ZENER	RLZ3.6A, 3.455-3.695 V, 500 MW, LL-34, TP
0403-000549	ZD101, ZD201, ZD301, ZD401	4	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500 MW, LL-34, TP
0403-000549	ZD102, ZD202, ZD302, ZD402	4	DIODE-ZENER	RLZJ24B, 23.61-24.92 V, 500 MW, LL-34, TP
0406-000147	TVS101, TVS201, TVS301, TVS401	4	DIODE-TVS	DSSA-P0640SA, 56 V/-72 V, DO-21
0501-000477	Q101, Q201, Q301, Q401	4	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q102, Q202, Q302, Q402	4	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0501-000477	Q104, Q204, Q304, Q404	4	TR-SMALL SIGNAL	MMBT5550, NPN, 300 MW, SOT-23, TP, 20-250
0502-000465	Q103, Q203, Q303, Q403	4	TR-POWER	KTD2058, NPN, 25000 mW, TO-220IS, ST, 100-200
0604-001002	U101, U201, U301, U401	4	PHOTO-COUPLER	TR, 100-600 %, 200 mW, SOP-4, TP
0801-000702	U52, U53	2	IC-CMOS LOGIC	74HC125, BUFFER, SOP, 14, 150 MIL, QUAD, TP
1201-000005	U151, U251, U351, U451	4	IC-OP AMP	MC3403, SOP, TP, 14P, 150 MIL, QUAD, 200V/MV
1205-000394	U11, U21, U31, U41	4	IC-CODEC FILTER	TP3057 WM, SOP, 16P, PLASTIC, 5.2
2003-002007	R101, R201, R301, R401	4	R-METAL OXIDE(S)	4.7 Kohm, 5 %, 2W, AF, TP, 3.9x10 mm
2003-002066	R102, R202, R302, R402	4	R-METAL OXIDE(S)	20 ohm, 5 %, 1W, AF, TP, 2.5X6.5 mm
2003-002169	R103, R203, R303, R403	4	R-METAL OXIDE	27 ohm, 5 %, 1W, AF, TP, 4.3x12 mm

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2003-002169	R104, R204, R304, R404	4	R-METAL OXIDE	27 ohm, 5 %, 1W, AF, TP, 4.3x12 mm
2007-000029	R63, R64	2	R-CHIP	0 ohm, 5 %, 1/8W, TP, 2012
2007-000033	R121, R221, R321, R421	4	R-CHIP	0 ohm, 5 %, 1/4W, TP, 3216
2007-000033	R122, R222, R322, R422	4	R-CHIP	0 ohm, 5 %, 1/4W, TP, 3216
2007-000070	L2, L3	2	R-CHIP	0 ohm, 5 %, 1/10W, TP, 1608
2007-000277	R165, R265, R365, R465	4	R-CHIP	100 Kohm, 1 %, 1/8W, TP, 2012
2007-000277	R166, R266, R366, R466	4	R-CHIP	100 Kohm, 1 %, 1/8W, TP, 2012
2007-000277	R89	1	R-CHIP	100 Kohm, 1 %, 1/8W, TP, 2012
2007-000286	R115, R215, R315, R415	4	R-CHIP	100 ohm, 1 %, 1/8W, TP, 2012
2007-000286	R119, R219, R319, R419	4	R-CHIP	100 ohm, 1 %, 1/8W, TP, 2012
2007-000286	R120, R220, R320, R420	4	R-CHIP	100 ohm, 1 %, 1/8W, TP, 2012
2007-000286	R61, R62, R67-R70, R76-R83	14	R-CHIP	100 ohm, 1 %, 1/8W, TP, 2012
2007-000287	L4-L8	5	R-CHIP	100 OHM, 1 %, 1/10W, TP, 1608
2007-000297	R117, R217, R317, R417	4	R-CHIP	10 Kohm, 1 %, 1/8W, TP, 2012
2007-000307	R11-R13, R21-R23	6	R-CHIP	10 ohm, 1 %, 1/8W, TP, 2012
2007-000307	R112, R212, R312, R412	4	R-CHIP	10 ohm, 1 %, 1/8W, TP, 2012
2007-000307	R31-R33, R41-R43	6	R-CHIP	10 ohm, 1 %, 1/8W, TP, 2012
2007-000378	R155, R255, R355, R455	4	R-CHIP	13 Kohm, 1 %, 1/8W, TP, 2012
2007-000392	R118, R218, R318, R418	4	R-CHIP	150 Kohm, 1 %, 1/8W, TP, 2012
2007-000454	R164, R264, R364, R464	4	R-CHIP	18 Kohm, 1 %, 1/8W, TP, 2012
2007-000465	R153, R253, R353, R453	4	R-CHIP	1 Kohm, 1 %, 1/8W, TP, 2012
2007-000465	R157, R257, R357, R457	4	R-CHIP	1 Kohm, 1 %, 1/8W, TP, 2012
2007-000465	R54, R56	2	R-CHIP	1 Kohm, 1 %, 1/8W, TP, 2012
2007-000474	R90	1	R-CHIP	1 Mohm, 1 %, 1/8W, TP, 2012
2007-000490	R51-R53	3	R-CHIP	2.2 Kohm, 1 %, 1/8W, TP, 2012
2007-000515	R156, R256, R356, R456	4	R-CHIP	2.7 Kohm, 1 %, 1/8W, TP, 2012

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Part No.	Location	Quantity	Part Name	Specification
2007-000639	R152, R252, R352, R452	4	R-CHIP	270 ohm, 1 %, 1/8W, TP, 2012
2007-000827	R158, R258, R358, R458	4	R-CHIP	39 Kohm, 1 %, 1/8W, TP, 2012
2007-000827	R161, R261, R361, R461	4	R-CHIP	39 Kohm, 1 %, 1/8W, TP, 2012
2007-000827	R167, R267, R367, R467	4	R-CHIP	39 Kohm, 1 %, 1/8W, TP, 2012
2007-000849	R124, R224, R351, R451	4	R-CHIP	3 ohm, 5 %, 1/8W, TP, 2012
2007-000849	R91, R92	2	R-CHIP	3 ohm, 5 %, 1/8W, TP, 2012
2007-000868	R111, R211, R311, R411	4	R-CHIP	4.7 Kohm, 1 %, 1/8W, TP, 2012
2007-000868	R123, R223, R323, R423	4	R-CHIP	4.7 Kohm, 1 %, 1/8W, TP, 2012
2007-000909	R159, R259, R359, R459	4	R-CHIP	43 Kohm, 1 %, 1/8W, TP, 2012
2007-001067	R114, R214, R314, R414	4	R-CHIP	6.8 Kohm, 1 %, 1/8W, TP, 2012
2007-001124	R163, R263, R363, R463	4	R-CHIP	68 Kohm, 1 %, 1/8W, TP, 2012
2007-001195	R113, R213, R313, R413	4	R-CHIP	820 Kohm, 5 %, 1/8W, TP, 2012
2007-001671	R168, R268, R368, R468	4	R-CHIP	75 Kohm, 1 %, 1/8W, TP, 2012
2007-007584	R162, R262, R362, R462	4	R-CHIP	73.2 Kohm, 1 %, 1/8W, TP, 2012
2203-000130	C154, C254, C354, C454	4	C-CER, CHIP	1.2 NF, 5 %, 50V, C0G, TP, 2012
2203-000206	BC11, BC21, BC31, BC41	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	BC12, BC22, BC32, BC42	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	BC151, BC251, BC351, BC451	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	BC152, BC252, BC352, BC452	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	BC51-BC56	6	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	C111, C211, C311, C411	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	C152, C252, C352, C452	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012
2203-000206	C153, C253, C353, C453	4	C-CER, CHIP	100 NF, 10 %, 50V, X7R, 2012

(Continued)

Part No.	Location	Quantity	Part Name	Specification
2203-000206	C51-C54	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000239	C61-C67	7	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, TP, 2012
2203-000408	C159, C259, C359, C459	4	C-CER, CHIP	0.18 NF, 5 %, 50 V, C0G, TP, 2012
2203-000595	C157, C257, C357, C457	4	C-CER, CHIP	0.22 NF, 5 %, 50 V, C0G, TP, 2012
2203-000938	C160, C260, C360, C460	4	C-CER, CHIP	0.47 NF, 5 %, 50 V, C0G, TP, 2012
2203-001058	C156, C256, C356, C456	4	C-CER, CHIP	0.56 NF, 5 %, 50 V, C0G, TP, 2012
2203-001132	C158, C258, C358, C458	4	C-CER, CHIP	0.68 NF, 5 %, 50 V, NP0, TP, 2012
2203-001391	C151, C251, C351, C451	4	C-CER, CHIP	150 NF, 10 %, 25 V, X7R, TP, 2012
2305-001054	C101, C201, C301, C401	4	C-FILM, LEAD-PEF	820 NF, 10 %, 250 V, TP, 18x7.5x13.5,
2401-003298	C104, C204, C304, C404	4	C-AL	100 uF, 20 %, 63 V, GP, TP, 8x11.5, 5
2402-000170	C11, C12, C31, C32	4	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3x4.3x5.4,
2402-000170	C161, C261, C361, C461	4	C-AL, SMD	1 uF, 20 %, 50 V, GP, TP, 4.3x4.3x5.4,
2402-001033	C98, C99	2	C-AL, SMD	220 uF, 20 %, 16 V, GP, TP, 8.3x8.3x10
2402-001034	C105, C205, C305, C405	4	C-AL, SMD	22 UF, 20 %, 35 V, GP, TP, 6.6X6.6X5.4
2402-001042	C57, C58	2	C-AL, SMD	100 uF, 20 %, 16 V, GP, TP, 6.6x6.6x5.4 mm
2703-000202	L1	1	INDUCTOR- SMD	33 uH, 10 %, 3225
3301-000344	B51, B52	2	BEAD-RADIAL	200 ohm, 3.5x0.6x6.5 mm, 7000 mA,
3501-001035	K101, K201, K301, K401	4	RELAY- MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K103, K203, K303, K403	4	RELAY- MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3501-001035	K202, K302	2	RELAY- MINIATURE	5 VDC, 140 MW, 2000 MA, 2FORMC, 4 MS, 4 MS
3703-000176	P1	1	CONNECTOR- BACK PANEL	50P, 2R, FEMALE, STRAIGHT, AUF
3704-001001	P101, P201, P301, P401	4	SOCKET-IC	8P, SIP, SN, 2.54 mm
3722-000250	P2, P3	2	JACK- MODULAR	6P/6C, INVERTED, N, ANGLE, STANDARD
4715-000127	V101, V201, V301, V401	4	SURGE ABSORBER	300 V, 15%, 500 A

(Continued)

Part No.	Location	Quantity	Part Name	Specification
4715-000127	V102, V202, V302, V402	4	SURGE ABSORBER	300 V, 15 %, 500 A
4715-000127	V103, V203, V303, V403	4	SURGE ABSORBER	300 V, 15 %, 500 A
GA13-00004A	U51	1	IC ASIC-TMC	STL7053E, IDCS500 PREMIUM, 60 PIN
GA26-00003A	T101, T201, T301, T401	4	TRANS AF-5692B	5692B, DCS-408, 2P:3P, 800 MH, 1.3DB

5.2.6 2BRI Board

Part No.	Location	Quantity	Part Name	Specification
0401-001106	D113, D213	2	DIODE-SWITCHING	MMBD4148CC, 75 V, 200 MA, SOT-23, TP
0403-001407	ZD111-ZD114, ZD121-ZD124	8	DIODE-ZENER	MMSZ5242B, 11.4-12.6 V, 500 MW, SOD-123, TP
0403-001407	ZD211-ZD214, ZD221-ZD224	8	DIODE-ZENER	MMSZ5242B, 11.4-12.6 V, 500 MW, SOD-123, TP
0801-000696	U2	1	IC-CMOS LOGIC	74HC245, TRANSCEIVER, SOP, 20, 300 MIL
0801-000703	U11	1	IC-CMOS LOGIC	74HC126, BUFFER, SOP, 14, 150 MIL, QUAD, TP
1201-000309	U51, U52	2	IC-OP AMP	CA3140, SOP, ST, 8P, 150 MIL, SINGLE, 100 V/MV
1203-001543	U81	1	IC-POS.FIXED REG.	78R33, TO-220, 4P, 400 MIL, PLASTIC
1205-002283	U151, U251	2	IC-SAC	PEB3086H, MQFP, 64P, 14 × 14 MM, PLASTIC, 3.3 V
1301-001407	U1	1	IC-EPLD	M4A5-128/64, TQFP, 100P, 14 × 14 mm, 10 nS
1405-000141	V113, V123, V213, V223	4	VARISTOR	390 V, 1200 A, 9 × 5.4 mm, TP
1405-000171	V111, V112, V121, V122	4	VARISTOR	82 V, 1200 A, 9 × 6 mm, TP
1405-000171	V211, V212, V221, V222	4	VARISTOR	82 V, 1200 A, 9 × 6 mm, TP
2007-000043	R60	1	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000045	R151-R153, R251-R253	6	R-CHIP	3.32 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R161-R163, R261-R263	6	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R21-R27	7	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000060	R72	1	R-CHIP	100 Kohm, 1 %, 1/10 W, TP, 1608

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Part No.	Location	Quantity	Part Name	Specification
2007-000070	R113, R114, R213, R214	4	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-000286	TM201, TM202	2	R-CHIP	100 ohm, 1 %, 1/8 W, TP, 2012
2007-000287	R1-R6, R9-R12, R71, R74, R91-R98	20	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000287	R172-R180, R272-R280	18	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000287	R301	1	R-CHIP	100 OHM, 1 %, 1/10 W, TP, 1608
2007-000475	R53-R55, R73	4	R-CHIP	1 Mohm, 1 %, 1/10 W, TP, 1608
2007-002899	R111, R112, R211, R212	4	R-CHIP	10 ohm, 1 %, 1/10 W, TP, 1608
2007-002902	R59	1	R-CHIP	162 Kohm, 1 %, 1/10 W, TP, 1608
2007-002910	R51, R52, R56	3	R-CHIP	30.1 Kohm, 1 %, 1/10 W, TP, 1608
2007-007238	R123, R124, R223, R224	4	R-CHIP	8.25 Kohm, 1 %, 1/10 W, TP, 1608
2007-007296	R58	1	R-CHIP	1.21 Kohm, 1 %, 1/10 W, TP, 1608
2007-007342	R121, R122, R221, R222	4	R-CHIP	1.82 Kohm, 1 %, 1/10 W, TP, 1608
2007-008091	R31, R32, R33, R34	4	R-CHIP	4.32 Kohm, 1 %, 1/10 W, TP, 1608
2007-008122	R41	1	R-CHIP	22.1 OHM, 1 %, 1/10 W, TP, 1608
2007-008141	R81, R82	2	R-CHIP	3 ohm, 1 %, 1/10 W, TP, 1608
2007-008148	R57	1	R-CHIP	121 Kohm, 1 %, 1/10 W, TP, 1608
2011-000151	RA3, RA4	2	R-NET	100 OHM, 5 %, 1/16 W, L, CHIP, 8P, TP, 3216
2203-000206	BC1-BC6, BC11, BC22	8	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC101-BC105, BC201-BC205	10	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	BC51, BC52, BC61, BC62	4	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000206	C51, C52, C53, C81-C83	6	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, 2012
2203-000236	C1-C3, C5, C6, C10	6	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, 1608
2203-000236	C161-C168, C261-C268	16	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, 1608
2203-000236	C71, C91, C92, C302, C303	5	C-CER, CHIP	0.1 NF, 5 %, 50 V, C0G, 1608
2203-000257	C55, C72, C301	3	C-CER, CHIP	10 NF, 10 %, 50 V, X7R, 1608
2203-000384	C121, C122, C221, C222	4	C-CER, CHIP	0.015 NF, 5 %, 50 V, C0G, TP, 1608

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Part No.	Location	Quantity	Part Name	Specification
2203-000998	C151-C153, C251-253	6	C-CER, CHIP	0.047 NF, 5 %, 50 V, COG, TP, 1608
2203-002793	C54	1	C-CER, CHIP	1000 NF, +80-20 %, 25 V, Y5 V, 2012
2402-001033	C93	1	C-AL, SMD	220 uF, 20 %, 16 V, GP, TP, 8.3 × 8.3 × 10
2402-001042	C84, C85, C86	3	C-AL, SMD	100 uF, 20 %, 16 V, GP, TP, 6.6 × 6.6 × 5.4 mm
2702-001112	L51, L301	2	INDUCTOR- RADIAL	60 uH, 35 %, 7.5 × 8.0 mm
2804-000315	Y301	1	OSCILLATOR- CLOCK	7.68 MHz, 50 ppm, 10 TTL, BK, 5 V, 40 mA
2806-000138	Y51	1	OSCILLATOR- VCXO	8.192 MHZ, 20 PPM, 2 TTL, BK, 5 V, 20 MA
2901-000195	B301	1	FILTER-EMI ON BOARD	50 V, 1 A, 330 pF, 7.5 × 2.5 × 6.2 mm, TP
3301-000292	L111, L112, L121, L122	4	BEAD-RADIAL	100 ohm, 3.5 × 0.6 × 6.5 mm, 7000 mA, TP
3301-000292	L211, L212, L221, L222	4	BEAD-RADIAL	100 ohm, 3.5 × 0.6 × 6.5 mm, 7000 mA, TP
3301-000344	B51	1	BEAD-RADIAL	200 ohm, 3.5 × 0.6 × 6.5 mm, 7000 mA, TP
3301-000373	L1-L8	8	BEAD-SMD	220 OHM, 1608, 200, TP, 307 OHM/346 MHZ
3407-000119	S201	1	SWITCH-DIP	24 V, 300 mA, SLIDE
3703-000176	P71	1	CONNECTOR- BACK PANEL	50P, 2R, FEMALE, STRAIGHT, AUF
3711-003272	P1	1	CONNECTOR- HEADER	BOX, 10P, 2R, 2.54 MM, STRAIGHT, AUF, BLK
3722-000212	P72, P73	2	JACK- MODULAR	8P/8C, INVERTED, N, ANGLE, STANDARD
GA26-00004A	T101, T201	2	TRANS PULSE	APT-2S0-22B, COMPACT II, 10P

5.2.7 MGI Board

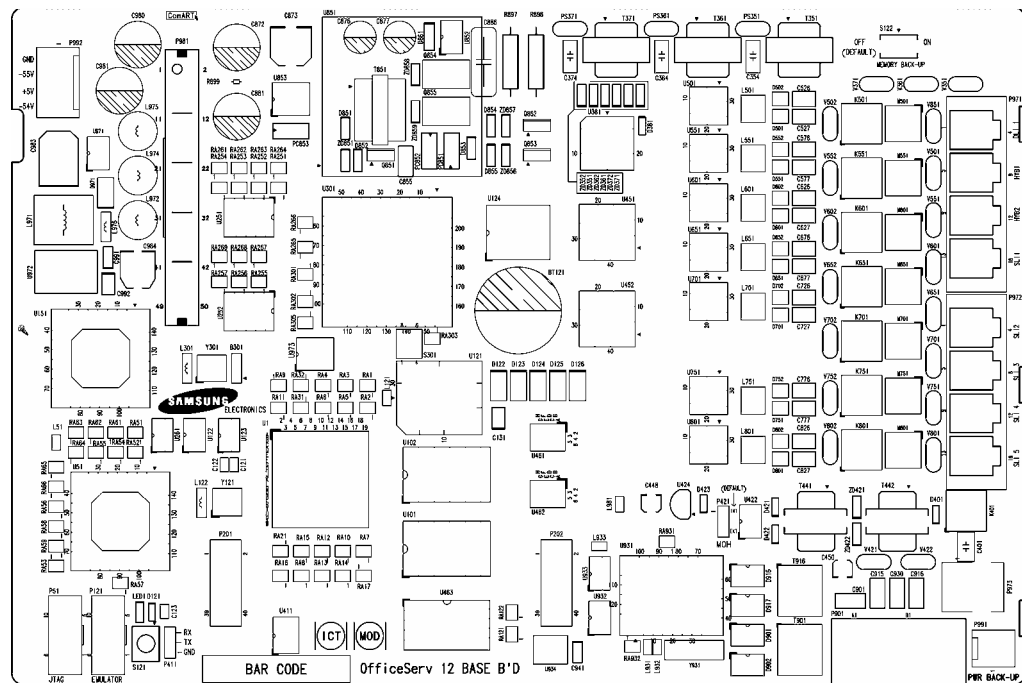
Part No.	Location	Quantity	Part Name	Specification
0801-002325	U4	1	IC-CMOS LOGIC	74LCX04, INVERTER, TSSOP, 14, 173 MIL
1106-001469	U2	1	IC-SRAM	GA71116ATP-8, 64KX16BIT, TSOP, 44P, 400 MIL
1203-002267	U3	1	IC-POSI.FIXED REG.	3.3 V, TO-263-5, 400MIL, PLASTIC
1204-002202	U1	1	IC-AUDIO CONTROLLER	AC48204E6-C, TQFP, 144P, 20 × 20 MM, PLASTIC
2007-000043	R48, R49	2	R-CHIP	1 Kohm, 1 %, 1/10 W, TP, 1608
2007-000052	R36-R45, R47, R50	12	R-CHIP	10 Kohm, 1 %, 1/10 W, TP, 1608
2007-000060	R46	1	R-CHIP	100 Kohm, 1 %, 1/10 W, TP, 1608
2007-000070	R1, R3, R6-R14, R52, R61-R67	19	R-CHIP	0 ohm, 5 %, 1/10 W, TP, 1608
2007-007226	R21-R26, R28, R30	8	R-CHIP	49.9 ohm, 1 %, 1/10 W, TP, 1608
2007-008122	R51	1	R-CHIP	22.1 OHM, 1 %, 1/10 W, TP, 1608
2203-000998	C11, C12	2	C-CER, CHIP	0.047 NF, 5 %, 50 V, C0G, TP, 1608
2203-005249	BC1-BC16	16	C-CER, CHIP	100 NF, 10 %, 50 V, X7R, TP, 1608
2404-000227	C1, C2	2	C-TA, CHIP	4.7 uF, 10 %, 10 V, TP, 3216
2804-001499	Y1	1	OSCILLATOR-CLOCK	20 MHz, 50 ppm, 10TTL, 15pF, TP, 3.3 V, 40 mA
3301-001120	L2, L3	2	BEAD-SMD	30 OHM, 2012, 3000, TP, 0.015
3711-004744	P1, P2	2	CONNECTOR-HEADER	BOX, 40P, 2R, 0.8 MM, SMD-S, AU30U, NTR



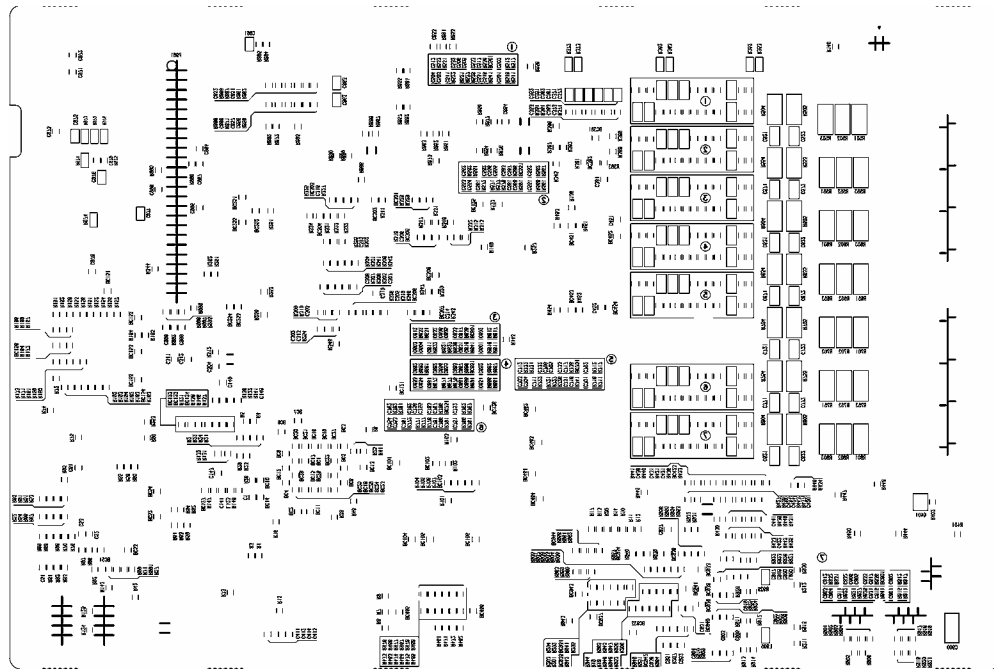
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A.1 Base board

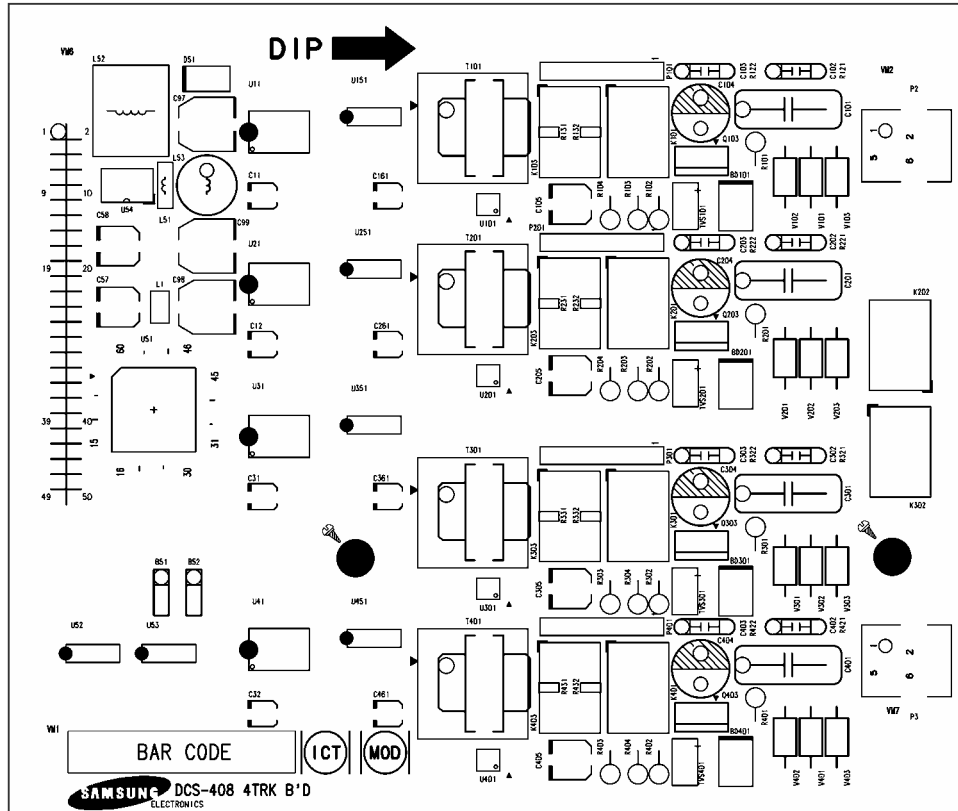
A.1.1 Component Side



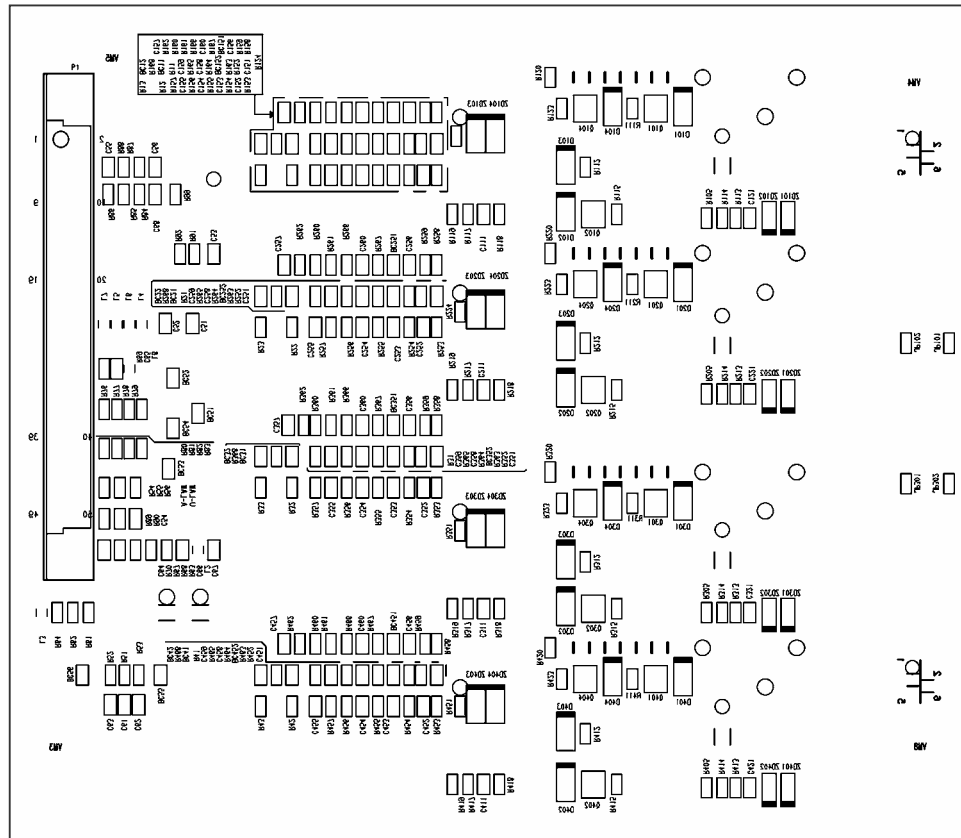
A.1.2 Solder Side



A.2.1 Component Side

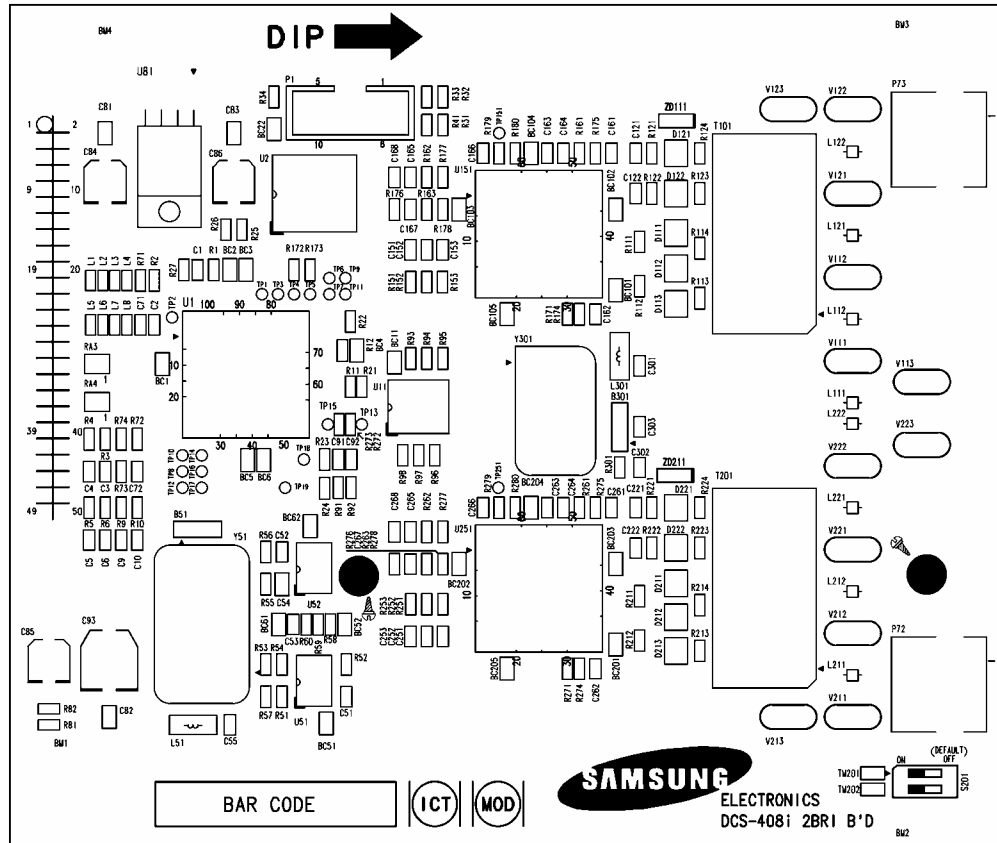


A.2.2 Solder Side

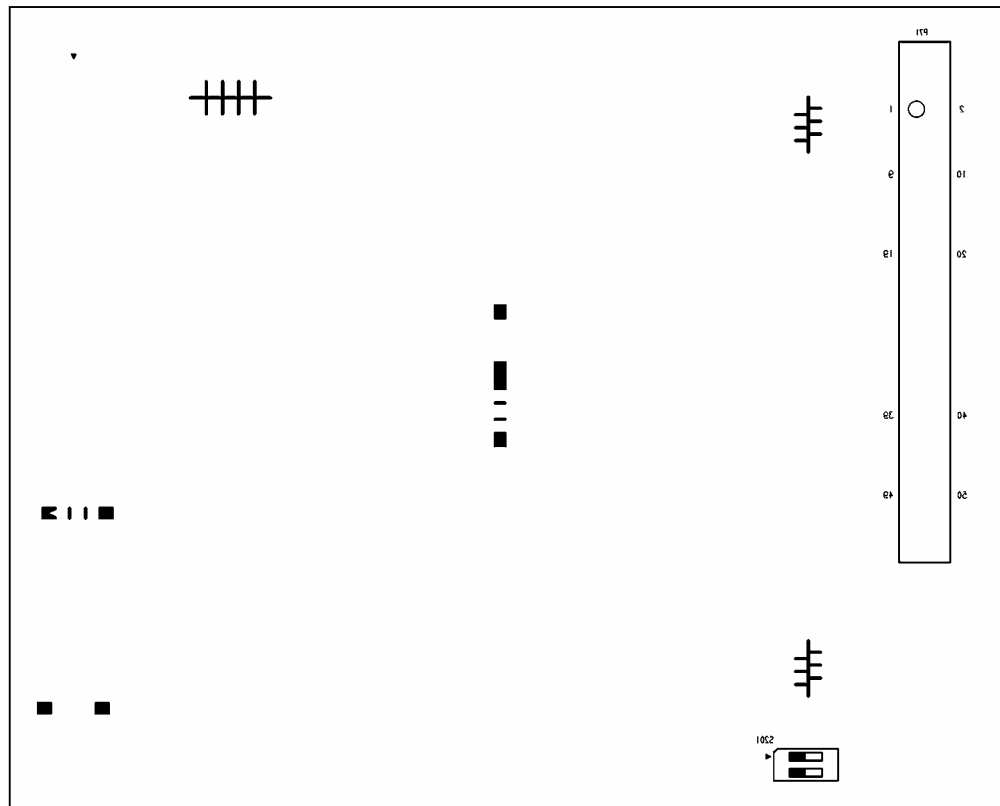


A.3 2BRI Board

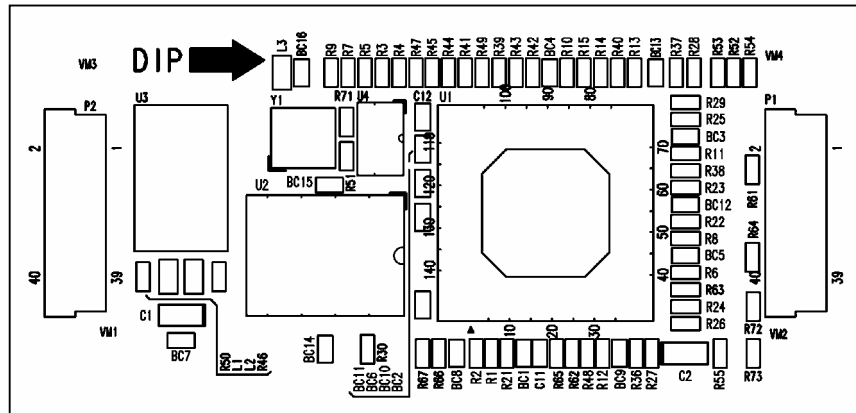
A.3.1 Component Side



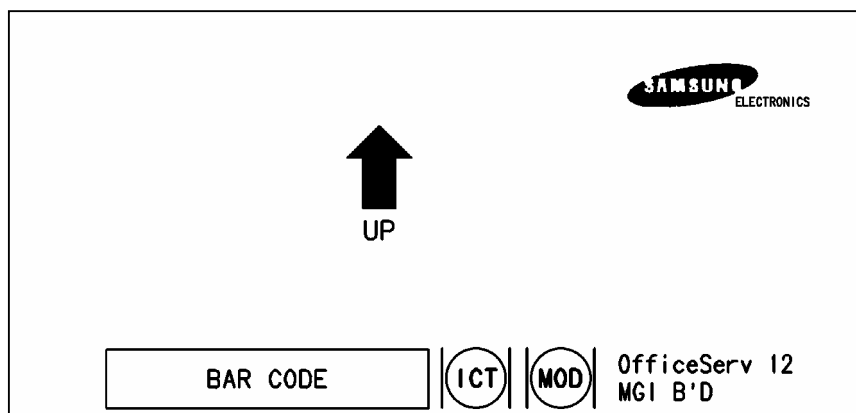
A.3.2 Solder Side



A.4.1 Component Side



A.4.2 Solder Side





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ABBREVIATION

A

AA	Auto Attendant
AC	Alternating Current
A/D	Analog to Digital
AOM	Add On Module
AP	Access Point

B

BDM	Background Debugger Mode
BRI	Basic Rate Interface

C

CA	Call Agent
CID	Caller ID
CO	Central Office
CODEC	Coder/Decoder
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit

D

D/A	Digital to Analog
DC	Direct Current
DCS	Digital Communication System
DD	Data Downstream
DGP	Digital Phone
DID	Direct Inward Dialing
DISA	Direct Inward System Access
DLI	Digital Line Interface
DMC	Digital line interface Module Controller
DND	Do Not Disturb
DPIM	Door Phone Interface Module
DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DTMF	Dual Tone Multi-Frequency
DU	Data Upstream

F

FSC	Frame Synchronize
-----	-------------------

G

GK	GateKeeper
GND	Ground

H

HDLC	High-level Data Link Control procedure
HPI	High speed Portable Internet
HYB	Hybrid

I

IC	Integrated Circuit
ID	Identification
IP	Internet Protocol
ISAC	ISDN Subscriber Adapter Controller
ISDN	Integrated Services Digital Network
ITP	IP Telephone

K

KDB	Keypad Daughter Board
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L

LAN	Local Area Network
LAPD	Link Access Procedure on D channel
LCD	Liquid Crystal Display
LCP	Local Control Processor
LCR	Least Cost Routing
LED	Light Emitting Diode

M

MCP	Main Control Processor
MF	Multi-Frequency
MGI	Media Gateway Interface
MISC	Miscellaneous
MMC	Man Machine Command
MOH	Music On Hold
MP	Metering Pulse
MPC	Main Processing Unit
MPD	Metering Pulse Detection

N

NAND	Not AND
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O

OHVA	Off-Hook Voice Announcement
OSC	Oscillator

P

PBX	Private Branch eXchange
PCM	Pulse Code Modulation
PCMMC	PC based Man Machine Communication
PLL	Phase Loop Lock
PRI	Primary Rate Interface
PRS	Polarity Reverse Signal
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit
PWM	Pulse Width Modulation

Q

Q-SIG	Q-Signaling
QDMC	Quad digital line Module Controller
QDSAL	Quad Digital Adaptor for Subscriber Loops
QoS	Quality of Service
QSLAC	Quad low voltage Subscriber Line Audio-processing Circuit

R

RAS	Registration, Admissions and Status signaling
ROM	Read Only Memory
RTC	Real Time Clock

S

SCC	Serial Communication Controller
SDRAM	Synchronous Dynamic Random Access Memory
SIO	Serial Input and Output
SLI	Single Line Interface
SLIC	Subscriber Line Interface Circuit
SMC	Serial Management Channel
SMDR	Station Message Detail Recording
SMPS	Switching Mode Power Supply
SOHO	Small Office Home Office
SRAM	Static Random Access Memory

T

TMC	Trunk Module Controller
TQFP	Thin Quad Flat Package
TRK	Trunk

U

UA	User Agent, or Universal Answer
UCD	Uniform Call Distribution

V

VAC	Alternating Current
VBAT	Voltage of Battery
VDC	Volts Direct Current
VoIP	Voice over Internet Protocol
VMS	Voice Mail System

W

WD	Watch-Dog
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Network
WLI	Wireless LAN Interface

OfficeServ 12 Service Manual

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