


10-200 MHz 12 x 12 RF MATRIX mod. 354-02




 ELRAD s.r.l.			
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TITOLO/TITLE			
10-200 MHz 12 x 12 RF MATRIX			

DISEGNI E DOCUMENTI DI PROPRIETA' DI ELRAD srl DIFFUSIONE E RIPRODUZIONE VIETATA A TERMINI DI LEGGE.	CODICE/CODE 354ED2DB.PUB			
	PREPARED A. Benedetti	DATA/DATE	REV.	PAG./PAGE
	APPROVED I. Marini	02/06	B	1/13

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1 - DESCRIPTION

The 12 x 12 RF MATRIX mod. 354-02 is contained in a 19" 9U (400 mm.) sub rack.

The unit is able to switch the 12 input signals on any of the 12 output gates.
Broadcasting service (one input to all outputs) allowed.

All the control functions are microprocessor controlled to improve use ease and avoid operator wrong requirements.

For example it is not possible to connect two inputs to the same output.

On the front panel 144 lighted pushbuttons give the information of the internal RF connections.

A LCD display is also present in the upper part of the front panel to give some model indication and start up messages.

The LCD display also give the indication of incoming remote RS232 control string.

Is it possible to operated the unit by means of the local lighted pushbuttons as well as from remote via an RS232 serial port.

A status request command make it possible to get from remote the complete status of the RF Matrix.

The relevant local/remote pushbutton is available in the right bottom side on the front panel.

Every manual request is indicated by flashing of the lighted relevant pushbutton, it is necessary to push the RUN pushbutton to activate the request.

On the RUN pushbutton is also present the light indicator of the internal microprocessor active function.

For a safe and reliable operation a triple wide range switching supply units are provided in full redundant configuration.

A special mechanical assembly for the internal RF switch I/O modules is realized without coaxial cables for best RF performance.

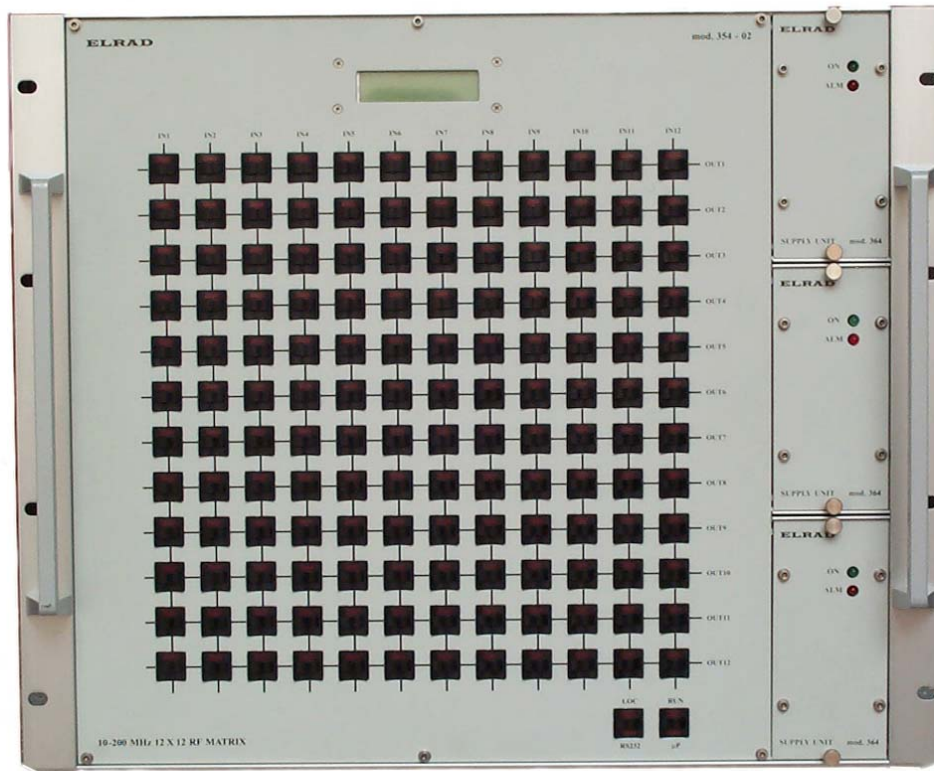
For every input a gain control adjustment (screw in type) is provided for easy plant set up.
A monitor output is available at -6 dB on any input.

On the rear panel all the RF connections are done by means of BNC Female connectors for easy plant configuration or exchangement.



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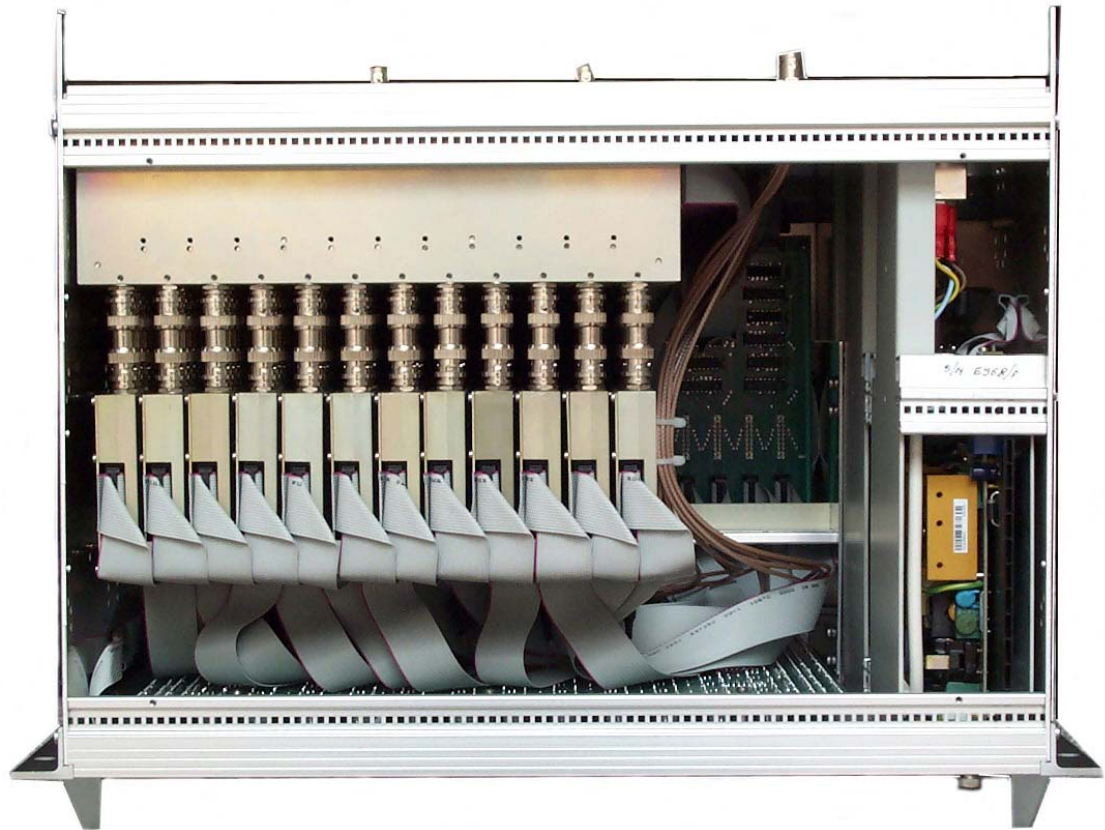
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3 – TECHNICAL CHARACTERISTICS

N° of channels	mod. 354-02 12 inputs/12 inputs
Operating frequency	10 : 200 MHz
Gain /Amplitude response	0 +/- 0,5 dB (mechanically adjust.)
Impedance	50 Ohm
Connectors	BNC Female
Output monitor	- 6 dB (on any input)
VSWR	1.25 max (1.2 typical)
Isolation **	80 dB/100 MHz 70 dB/200 MHz
IP3	+ 33 dBm (total output power)
Intermodulation	- 60 dBc 2 tone + 8 dBm tot. 1 MHz spaced at 70 MHz
Group delay	+/- 1 ns/20 MHz (any I/O combination)
Noise figure	10 dB
Operating temp.	0 : 50 C°
Supply	AC 90-260 Vac 40 400 Hz 50 VA Max
Operation	LOCAL pushbutton + RUN REMOTE RS232 9600,N,8,1
Mechanics	19" 9U (400 mm.) 350 mm. Deep
Colour	RAL 7035

**** NOTE:** Isolation output versus non connected outputs isolation.
Input to input or output to output better then 60 dB at
100 MHz and 55 dB at 200 MHz.



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4 – OPERATING INSTRUCTIONS

- **LOCAL MODE**

To operate in LOCAL MODE press the LOCAL/RS232 pushbutton on the LOW/RIGHT side of the front panel.

Two red leds included in the pushbutton will indicate the selected mode.

Only in local mode the front panel pushbuttons are active.

Is it now possible to connect any of the input vertical column to any of the horizontal line outputs.

The internal microprocessor is able to avoid wrong operation (e.g. two inputs or more on the same outputs line).

The RF Matrix offer the possibility to select a broadcasting service when all the outputs are connected to the same input.

The flashing of the red led included in the pushbuttons indicates the request of connection.

To activate the request it is necessary to press the RUN pushbutton.

All the requested connections are executed and the flashing leds become fix to confirm the status (on = connected).

All the RF connectors are on the back side of the unit with indication labels.

It is important to remark that the matrix configuration is mechanically stored on the front lighted pushbuttons.

In case of mains fail (power down), at the power on, after the start up procedure, the matrix auto set on the requested local configuration.

To avoid memory error from mechanical memorised local status and RS232 remote control, it is suggested to open all the local mechanical pushbuttons request and press the RUN pushbutton before to switch to RS232 REMOTE mode.

In LOCAL/MANUAL mode all the RS232 control string:

SWXYCLOSE CR LF

SWXYOPEN CR LF

are rejected and no ACK answer is sent to the RS232 remote system.

The full status request SWSR CR LF is ever accepted for remote monitoring at all time.



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- **REMOTE OPERATION**

To operate in remote mode select RS232 mode by means of the relevant front pushbutton in the right bottom side of the control panel.

All the control pushbuttons are excluded.

It is important to remark that any action on the local pushbutton in remote operation do not effect the matrix connection but alter the mechanical local memory status.

The unit can be controlled via RS232 at 9600 baud no parity 8 bit 1 stop bit with characters string as follow:

“SWXYCLOSE” or “SWXYOPEN”

where **X** indicated the vertical inputs column.

Y indicated the vertical outputs row.

The control string must be followed by a CR and LF characters.

X,Y range include:

1,2,3,4,5,6,7,8,9, A,B,C characters (HEX 12). All other characters are rejected with a:

ERR: "wrong string" message followed by CR and LF

In case of right control string SWXYCLOSE CR LF the matrix transmit the acknowledge control message:

ACK:SWXYCLOSE0 CR LF where 0 indicated the accepted and executed command or

ACK:SWXYCLOSE1 CR LF where 1 indicated good syntax but not allowed request

In case of right control string SWXYOPEN CR LF the matrix transmit the acknowledge control message:

ACK:SWXYOPEN0 CR LF where 0 indicated the accepted and executed command.



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The RF MATRIX will give an complete status information after the control string:
“SWSR”CR LF.

The string format is:

354-02 SWSR CR LF
 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 CR LF
 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 CR LF
 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0 CR LF
 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0 CR LF
 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0 CR LF
 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0 CR LF
 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0 CR LF
 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0 CR LF
 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0 CR LF
 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0 CR LF
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0 CR LF
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1 CR LF

Where 1 indicated the closed connections.

0 indicated the open connections.

(the above table indicate input 1 to output 1, input 2 to output 2, input 3 to output 3, etc. connection).

Some more controls SWXN CR LF are used in factory for fast diagnostic tests but must not be used during normal operation.

The actual software follows the previous installed in the old 201-01 8 x 8 model.

(Laben Milano specifications).

A delay of 6-10 mSec must be introduced after any character transmitted to the matrix.

This request was due to the VME interface system to avoid double or false controls.

No memory is present on the matrix when in REMOTE/RS232 mode on the switches status.

In case of power down/power on the:

ELRAD srl RF MATRIX 12 x 12 mod. 354-02 CR LF

connection string is transmitted on the RS232 line.

The external control system must reload the requested configuration and verify it with the: SWSR CR LF control string.


It is necessary to remark that the matrix is equipped with double AC supply system to avoid memory status loss for unwanted power down.

AC input line must be normally protected by the plant.

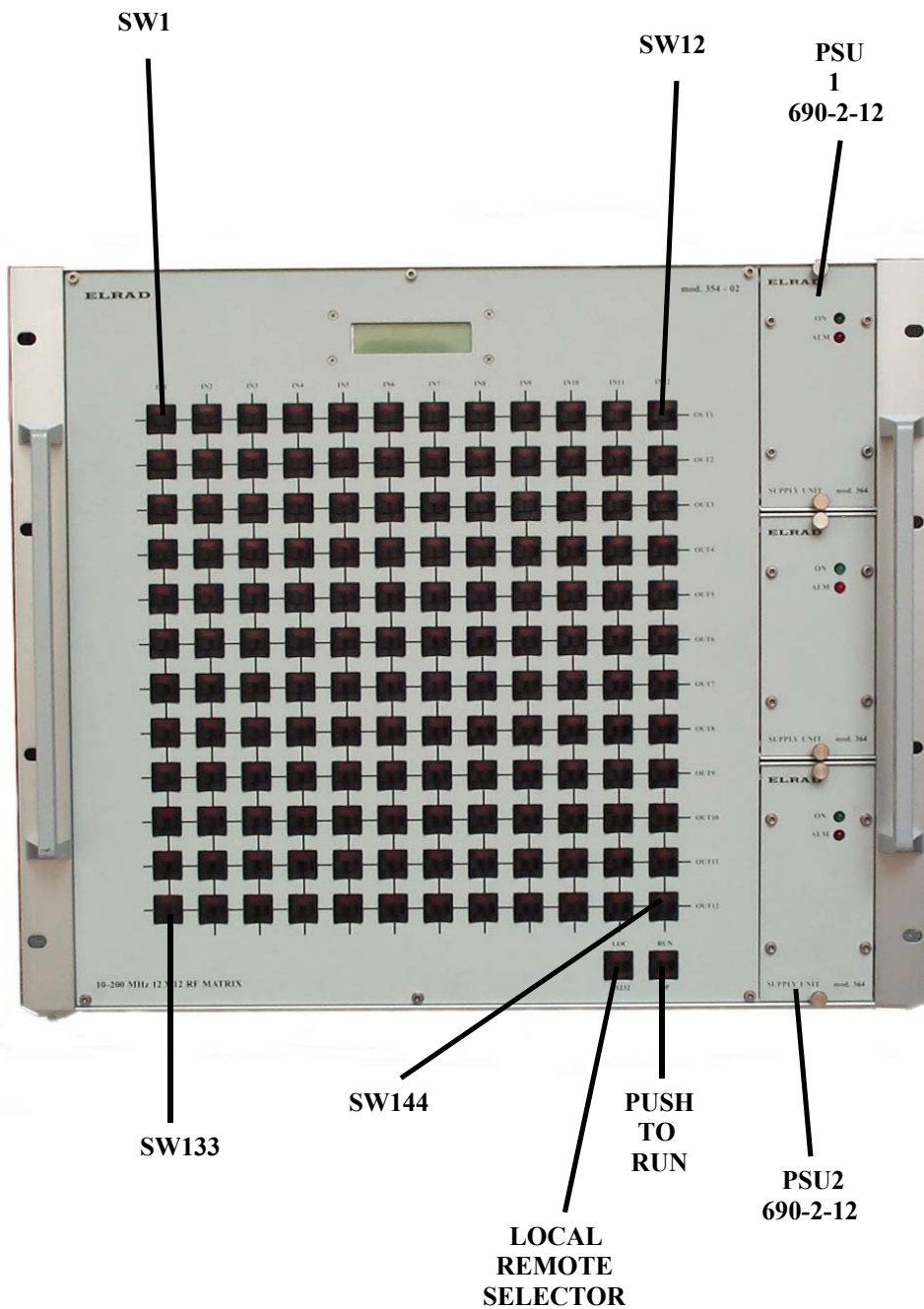
In case of change from RS232 to LOCAL mode by the operator on the front panel, the lighted pushbutton will start flashing according with the last RS232 set up.

The operator to align the mechanical local memory with the RS232 ram memory must press all the flashing pushbutton and than press one time the RUN command.



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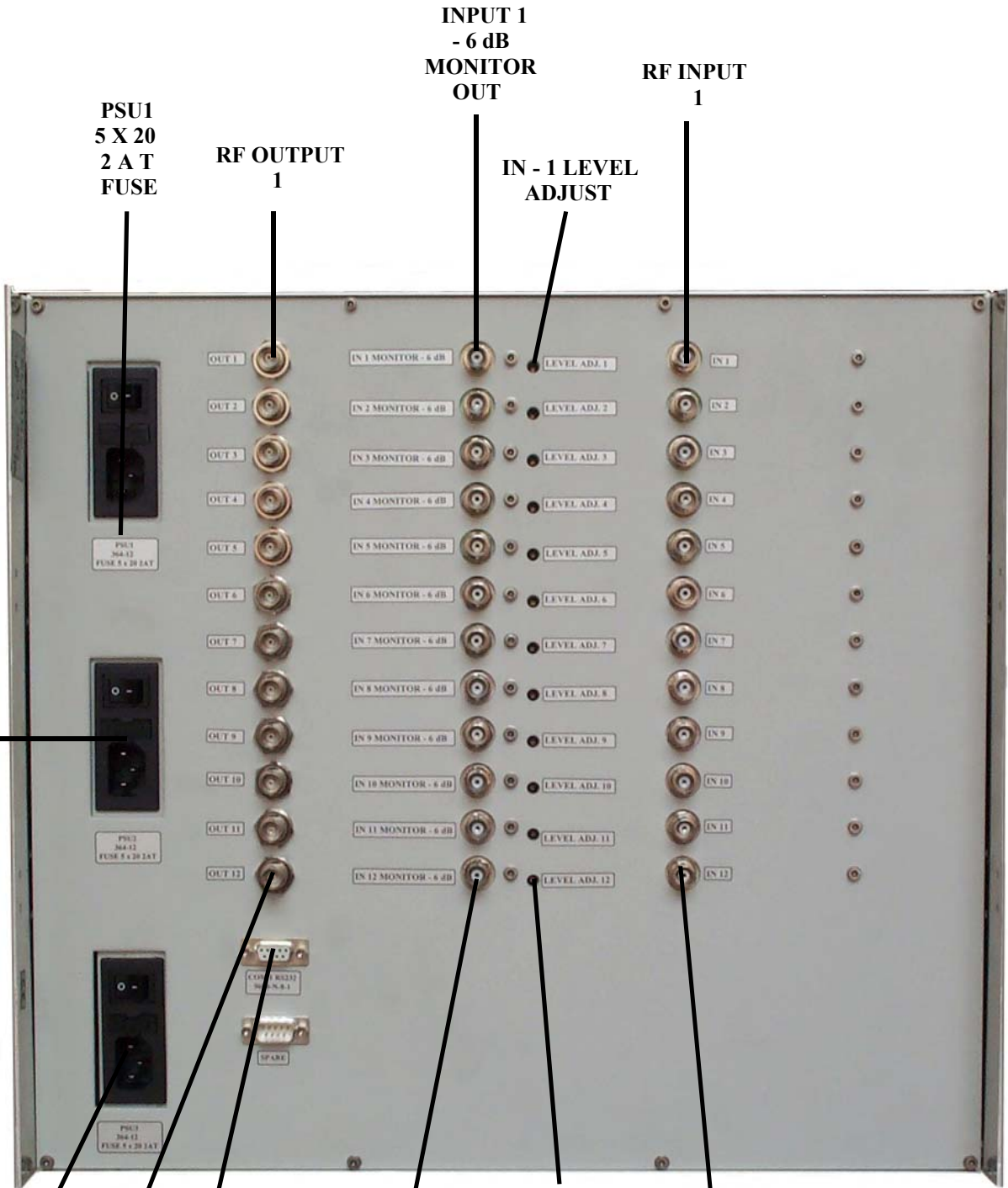
12 X 12 RF MATRIX FRONT VIEW



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PSU2
5 X 20
2 A T
FUSE



PSU3
5 X 20
2 A T
FUSE

RS232
9600,N,8,1
CONTROL
PORT

INPUT 12
- 6 dB
MONITOR
OUT

IN - 12 LEVEL
ADJUST

RF INPUT
12

RF OUTPUT



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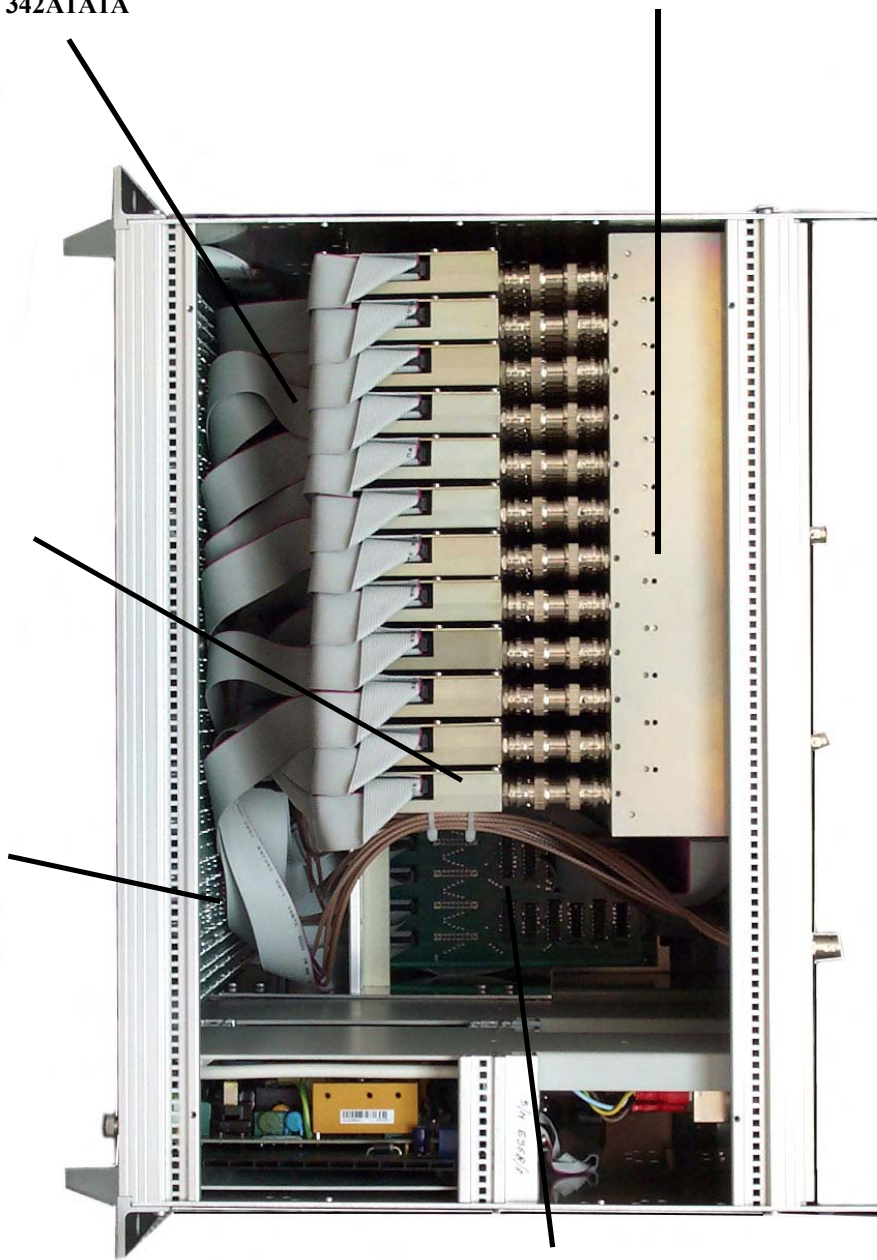
CPU BOARD
RS232
78C10
342A1A1A

N° 12
INPUT BOARD
354E4A8A

N° 12
OUTPUT BOARD
354E7A8A

KEYBOARD
201-1-3-A

INTERFACE
DRIVER UNIT
(UPPER COLUMN)
(LOWER ROW)
354E2A8A



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5 – ANNEX LIST

TASTIERA RF MATRIX 12 X 12

SCHEMATIC DIAGRAM	354E5A8A.SCH
SCHEMATIC DIAGRAM	354E5B8A.SCH
SCHEMATIC DIAGRAM	354E5C8A.SCH
SCHEMATIC DIAGRAM	354E5D8A.SCH
SCHEMATIC DIAGRAM	354E5E8A.SCH
SCHEMATIC DIAGRAM	354E5F8A.SCH
MOUNTING DIAGRAM	354E5A8A.PCB

RF MATRIX INPUT BOARD 12X12

SCHEMATIC DIAGRAM	354E4A8A.SCH
MOUNTING DIAGRAM	354E4A8A.PCB

RF MATRIX OUTPUT BOARD 12X12

SCHEMATIC DIAGRAM	354E7A8A.SCH
MOUNTING DIAGRAM	354E7A8A.PCB

RS232 CONTROL BOARD CPU 78C10

SCHEMATIC DIAGRAM	342A1A1A.SCH
MOUNTING DIAGRAM	342A1A1A.PCB

RF MATRIX INTERFACE/DRIVER UNIT

SCHEMATIC DIAGRAM	354E2A8A.SCH
SCHEMATIC DIAGRAM	354E2B8A.SCH
MOUNTING DIAGRAM	354E2A8A.PCB



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