WARNING

THIS EQUIPMENT *MUST* BE OPERATED WITH A 3-PRONG GROUNDED OUTLET RECEPTACLE. FAILURE TO USE A PROPERLY GROUNDED OUTLET MAY RESULT IN IMPROPER OPERATION OR SAFETY HAZARD!

LIMITED WARRANTY

The Seller warrants that, at the time of shipment, the products manufactured by the Seller are free from defects in material and workmanship. The Seller's obligation under this warranty is limited to replacement or repair of such products which are returned to Marti at its factory, transportation prepaid and properly insured, provided:

a. Notice of the claimed defect is given to Marti within one (1) year [two (2) years for STL systems] from date of original shipment and goods are returned in accordance with Marti instructions.

b. Equipment, accessories, tubes and batteries not manufactured by Marti are subject to only such adjustments as Marti may obtain from the supplier thereof.

c. This warranty does not apply to equipment which has been altered, improperly handled, or damaged in any way.

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This warranty is in lieu of all others, either expressed or implied. No representative is authorized to assume for the Seller any other liability in connection with Seller's products.

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Marti Electronics may make improvements and/or changes in this manual or in the product described herein at any time.

This product could include technical inaccuracies or typographical errors.

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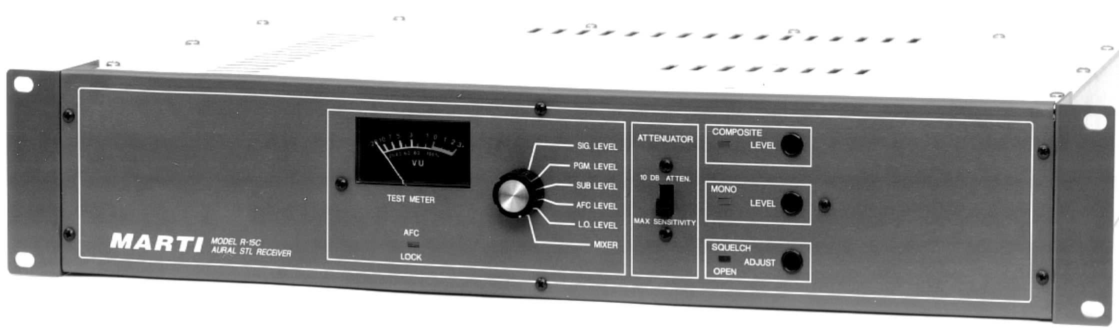
INTRODUCTION



The ***Marti*** **STL-15C Transmitter** with companion **R-15C Receiver**, form a high quality, frequency synthesized, point-to-point, line of sight, radio communications link. These systems are available in frequency bands from 140 MHz to 960 MHz and may be factory configured for operation from various power sources. Depending upon available channel bandwidth, these systems can transmit one of the following:

- **Composite FM Stereo audio with subcarrier***
- **Monophonic audio with two subcarriers**
- **Digital stereo audio (requires external modems)**
- **Multi-channel audio or data (requires external MUX)**
- **Digital data (requires external modems)**

Complex systems can be built from basic STL-15C transmitters and R-15C receivers having multiple relay (repeaters), bi-directional (full duplex), and automatic switching hot standby features.

Composite system specifications

Stereo separation: 55 dB or better 50 Hz - 15 KHz with 250 KHz IF Filter
50 dB with 200 KHz IF Filter

Frequency response: Composite channel ±0.2 dB 30 Hz - 53 KHz
Wide band channel ±0.3 dB 30 Hz - 100 KHz

Distortion: 0.2% or less 30 Hz - 15 KHz (demodulated, de-emphasized, LP filtered left or right channel)

Noise: more than 72 dB below 100% modulation (demodulated, de-emphasized, LP filtered left or right channel)

Emission: 194 KF8E (without subcarrier)
280 KF8E (with 1 subcarrier)
490 KF8E (with 2 subcarriers)

* 940 - 960 MHz system, 500 KHz channels. Narrower bandwidths at reduced specifications.

Monophonic system specifications

Frequency response: ±0.25 dB 30 Hz - 15 KHz

Distortion: 0.2% or less 30 Hz - 15 KHz

Noise: more than 72 dB below 100% modulation (75 µs de-emphasis)

Emission: 194 KF8E (mono channel with subcarrier)

Pre-emphasis Adjustable 0, 25, 50, or 75 microseconds

Model R-15C
Aural STL Receiver

SPECIFICATIONS

Frequency range:	140 - 180 MHz	R-15C/150
	200 - 260 MHz	R-15C/215
	280 - 340 MHz	R-15C/300
	400 - 480 MHz	R-15C/450
	890 - 960 MHz	R-15C/950

Sensitivity:	Composite stereo demodulated, de-emphasized, LP filtered, or monaural 3 microvolts input for 50 dB signal/noise ratio 9 microvolts input for 60 dB signal/noise ratio 75 microvolts input for ultimate signal/noise ratio (typically 75 dB or better
RF Input Impedance and Connector:	50 ohms, type UG-58 (N female)
Selectivity:	IF filter bandwidth is determined by the subcarrier(s) on the system and interference conditions. Minimum necessary bandwidth is selected from options:

Filter	3 dB	60 dB (bandwidth, KHz)
F200	190	450
F250	220	530
F450	280	900

Spurious Response:	-90 dB, 140-480 MHz; -70 dB, 890-960 MHz
Frequency Stability:	± .00025%, -20°C to +50°C
Frequency Synthesizer:	Frequency selected by 16 DIP switches, maximum resolution 12.5 KHz
Monophonic Audio Output:	Balanced 600 ohms, level adjustable -30 dBm to +10 dBm at front panel, transformer isolated and floating (may be strapped for transformerless output) barrier strip terminals. Response 30 Hz - 15 KHz ± 0.25 dB.
Composite Audio Output:	Level adjustable 1.8 v P-P to 3.5 v P-P at front panel, unbalanced BNC connector; composite frequency response 30 Hz - 53 KHz ±0.2 dB.
Subcarrier Outputs:	Two unbalanced outputs, BNC connectors, selectable high pass filtering for monophonic or composite stereo modes. Subcarrier output levels are 2 - 3 v. P-P for 10% subcarrier insertion at the STL-15C transmitter. Subcarrier high pass filter cut-off frequency is 25 KHz in "mono mode" and 80 KHz in "composite mode."
Digital Output:	The J2 "Composite Output" BNC connector can be converted to a "Digital" output by connecting an alternate shielded wire by changing two pins in a cable connector. The "Digital" output is unfiltered, unprocessed baseband having a 3 v. P-P level and a response of 30 Hz - 200 KHz.
Front Panel Controls:	10 dB Attenuator, Composite Level Adjust, Mono Level Adjust, Squelch Adjust, and Meter Switch.

Metering and Indicators:	**Test meter** reads **Signal Level, Program Level** (mono or composite)**, Subcarrier Level, AFC Level, Local Oscillator Level,** and **Mixer Level.** LED's indicate **AFC Lock, Composite Mode, Mono Mode,** and **Squelch Open.**
Automatic Changeover:	Provision for automatic changeover by addition of ARS-2 Automatic Receiver Switcher.
Accessory connector:	15 pin D connector on rear panel provides filtered access to **+13.5 v regulated bus, +18 v unregulated supply**, **Squelch relay contacts.**
Power Requirements:	120/220/240 VAC*, 50/60 Hz, 20 watts or 11 - 14 VDC negative ground or 22 - 28 VDC** negative ground at 600 ma. (900 ma. initial warm-up.
AC Fuse Rating:	For 120 v. use **0.5 Amp fuse** For 220 v. use **0.25 Amp fuse**
Dimensions:	3.5 inches High x 19 inches Wide x 13 inches Deep 8.89 cm High x 48.26 cm Wide x 33.02 cm Deep
Weight:	Net 9 pounds. Domestic packed 13 pounds. Net 4.1 kilograms. Export packed 5.9 kilograms.

UNPACKING & INSPECTING

This equipment was factory tested, inspected, packed, and delivered to the carrier with utmost care. Do not accept shipment from carrier which shows damage or shortage until the carrier's agent endorses a statement of the irregularity on the face of the carrier's receipt. Without documentary evidence, a claim cannot be filed.

Unpack equipment immediately upon receipt and thoroughly inspect for concealed damage. If damage is discovered, stop further unpacking and request immediate inspection by local agent of carrier. A written report of the agent's findings, with his signature is necessary to support claim. Check your shipment against the shipping papers for possible shortage. Do not discard any packing material until all items are accounted for. Small items are often thrown away with packing material. Packing material should be retained until equipment testing is completed. Any equipment returned to the factory should be packed in original cartons, insured, and pre-paid.

INSTALLATION

Install rack-mounted equipment in a well-ventilated, well-grounded, and shielded rack cabinet. Do not locate solid-state equipment in a rack above tube-type equipment which produces high temperatures.

Problems can also be avoided by locating this unit away from other equipment which has transformers that produce strong magnetic fields. These fields can induce hum and noise into the Marti equipment thus reducing performance. Strong radio-frequency (RF) fields should be avoided where possible. Extensive shielding and filtering have been incorporated into this equipment to permit operation in moderate RF environments. All equipment racks, cabinets, etc., should be bonded together by wide copper grounding strap to ensure that all system elements are at RF ground potential.

Receiver connections for Composite Stereo operation

(Refer to Drawing 702-096)

1. The composite signal output of the R-15C Receiver is the BNC jack labeled "**J2 COMPOSITE**". The composite output is connected to the composite signal input of the FM transmitter exciter by a short length of RG-58 coaxial cable.

2. A subcarrier demodulator or remote control (operating above 110 KHz) can be connected to "**J1 SUBCARRIER NO. 1**" and/or **"J3 SUBCARRIER NO. 2"** output BNC jack. The ability of the STL-15C system to transmit subcarriers depends upon the channel bandwidth available. The R-15C receiver IF filter selectivity must be compatible with the available interference free channel bandwidth. Using 50 KHz deviation for 100% modulation, the approximate bandwidth required for various sub carriers follows:

Subcarrier Frequency	Receiver IF Bandwidth (3 dB)
67 KHz	234 KHz
92 KHz	284 KHz
110 KHz	320 KHz

Actual bandwidth may require an additional 10% to 15% to allow for the modulation on the subcarrier itself. With the severe STL channel crowding with resulting interference prevalent around large markets, subcarriers above 110 KHz are not recommended.

3. The accessory connector has several uses such as remote control, automatic switching, and external DC power. Connection instructions are furnished with these accessories.

4. Connect STL receiving antenna coax to "**J6 ANTENNA"**. This requires a type N male connector. A short flexible jumper (20" max.) may be used between J6 and semi-flexible coax. **Marti Part No. 585-017** double shielded, low-loss RG 214/U jumper is recommended.

5. Connect AC line receptacle on back of the receiver to a 115 volt AC power source with special cord set supplied. **USE ONLY 3-PRONG GROUNDED OUTLET RECEPTACLES FOR SAFETY.**

WARNING

This equipment must be operated with a 3-prong, grounded, 115 volt, AC outlet receptacle! Failure to use a properly grounded outlet could result in a safety hazard or faulty equipment performance!

(See next page for receiver connections for monophonic operation.)

R-15C Receiver connections for Monophonic operation

(Refer to Drawing 702-096)

1. Monophonic program audio output is available at "600 ohm balanced" audio output screw terminals, **TB-1**. Use shielded wire. Program audio output level is +10 dBm max, 600 ohms balanced, and isolated from ground. For dual channel stereo, repeat instructions at second receiver. Audio processing requirements will be discussed in the **OPERATION** section of this manual.

2. Connect a remote control or subcarrier demodulator to the jack marked, **"J1".** The subcarrier load may be 600 to 5K ohms impedance, and the output level is approximately one (1) volt RMS. Systems factory supplied with 250 KHz IF bandwidth will carry subcarriers up to 110 KHz. For other subcarrier frequencies or narrow IF bandwidth systems contact the factory. A second subcarrier system can be connected to "**J3**". If a dual channel stereo STL is used, connect one subcarrier generator to "**J1**" or **"J3"** on each channel's transmitter and receiver.

3. The accessory connector has several uses such as automatic switching, and external DC power. Connection instructions are furnished with these accessories.

4. Connect STL receiving antenna coax to, **J6 ANTENNA**. This requires a type N male connector. A short flexible jumper (20" max.) may be used between **J6** and semi-flexible coax. Marti **Part No. 585-017** double shielded, low-loss RG-214/U jumper is recommended.

5. For dual channel stereo, use **Model MTS-1 Receiver Combiner** between **J6** of each receiver. Use a **Part No. 585-017** jumper between the **ANTENNA** connector of the **MTS-1** and the semi-rigid coax. Refer to **Drawing 702-096.**

6. Connect AC line receptacle on back of the receiver to a 115 volt AC power source with special cord set supplied. **USE ONLY 3-PRONG GROUNDED OUTLET RECEPTACLES FOR SAFETY.**

WARNING

This equipment must be operated with a 3-prong, grounded, 115 volt, AC outlet receptacle! Failure to use a properly grounded outlet could result in a safety hazard or faulty equipment performance!

BLOCK DIAGRAM 702-096

ANTENNAS

The following suggestions are offered to help those responsible for antenna installations avoid costly errors in assembly and adjustment. Marti Electronics, Inc. assumes no responsibility for the installation and performance of antenna systems associated with its equipment. The following suggestions are not intended to be a complete step-by-step procedure, simply a listing of some of the most frequently reported errors in antenna system installation.

Antenna Assembly

Follow the manufacturer's instructions carefully. If no instructions were included with the antenna, call or write the antenna manufacturer for instructions. Errors are frequently made in assembly of the RF feed dipole elements which must be installed in the same plan as the reflector grids. In other words, if the reflector grid elements are horizontal, then the feed dipole elements must also be horizontal. Cross polarization of grid and feed dipole will result in total loss of antenna gain!.

Transmission Line Connector Assembly

Do not use RG-58 U or RG-8 U cable for STL station antennas! They have too much loss at VHF and UHF frequencies. Follow the instructions furnished by the manufacturer when cutting coaxial cable. Inspect the cable ends for small metal fragments which can short-circuit the line inside the connector assembly. Check the line for a short-circuit condition after each connector is installed by using an ohmmeter. Pressurized line should be checked for several days under pressure before installation on a tower to ensure that there are no leaks in the line or fittings

Moisture Proofing Coax Connectors and Fittings

Extreme care must be exercised with coaxial cable before and after connectors have been installed to ensure that moisture does not enter the line. Foam dielectric line can take on moisture absorption which is difficult to detect and remedy. Therefore, keep the line dry while in storage with ends tightly capped. Coaxial splices, connectors, and fittings, to be located outside should be made mechanically tight, then coated with a weather-proofing material over at least two layers of vinyl plastic electrical tape. Moisture problems in antenna systems are usually traced back to connectors which have NOT been properly taped. The Marti K-1 Grounding and Weatherproofing Kit is recommended for use in each new antenna installation.

Location and Grounding of Coaxial Cable

Keep the STL receiver coaxial cable as far from the broadcast transmitter and its coaxial cable as possible. ***DO NOT STRAP RECEIVER CABLE TO THE MAIN ANTENNA CABLE AT ANY POINT. PLACE THE RECEIVER ANTENNA COAXIAL CABLE ON THE OPPOSITE SIDE OF THE TOWER FROM THE MAIN ANTENNA CABLE***. Maintain maximum separation between these cables at all points, including the distance from tower base to transmitter building as well as inside the building.

System Grounding

It is essential that the STL antenna system be properly grounded for safety and proper operation.

Antenna Installation and Adjustment

The polarization of the transmit and receive antennas of the STL system must be the same! This means that if the transmitting antenna is horizontal, the receiving antenna must also be horizontal. Each antenna should be attached to the tower to allow for final adjustment in azimuth heading and vertical tilt. After visual adjustment of the antennas, the transmitter and receiver can be used to make the final adjustments of the antennas. With the transmitter driving one antenna, the receiver antenna is adjusted for maximum signal (indicated on the receiver) in both horizontal and vertical directivity. **CAUTION:** Antennas have a “major” and several “minor” lobes in their directivity patterns. A common error is to peak the antenna on a minor lobe, resulting in a signal level of only a fraction of the major lobe signal. This error can be avoided only by swinging the antenna through a large angle so that all lobes are evaluated and the major lobe clearly determined. After one antenna is adjusted, the transmitter and receiver locations are reversed, to allow adjustment of the other antenna. If an RF wattmeter is available, each antenna and transmission line can be checked for VSWR when the transmitter is supplying power to it. The VSWR should be less than 1.5 to 1 (1.5:1). **IF THE ANTENNA SYSTEM FAILS TO GIVE**

THE PREDICTED SIGNAL STRENGTH LEVEL, THE FOLLOWING ITEMS SHOULD BE CHECKED:

1. Check for correct assembly of antenna.
2. Check that antennas have same polarity.
3. Check orientation of antennas in both horizontal and vertical directions.
4. Check VSWR of both transmit and receive antennas. VSWR should be less that 1.5:1.
5. Check Fresnel zone clearance along radio path.
6. Check for obstructions in the path such as trees and man-made structures. Do NOT depend on maps or aerial photographs.

CAUTION & WARNING

YOU CAN BE *KILLED* IF AN ANTENNA COMES IN CONTACT WITH ELECTRIC POWER LINES OR EXPOSED ELECTRICAL WIRING. FOR YOUR SAFETY USE EXTREME CAUTION WHEN INSTALLING ANTENNAS. KEEP AWAY FROM POWER LINES.

OPERATION

Control Functions and Panel Indicator Lamps

COMPOSITE LEVEL

When selected by internal jumper plugs, the "**COMPOSITE LEVEL**" lamp will be illuminated. Composite output is adjustable over a range of 1.8 to 3.5 volts P-P.

MONO LEVEL

When selected by internal jumper plugs, the **"MONO LEVEL"** lamp will be illuminated. Balanced 600 ohm mono level is adjustable over a range of -40 to +10 dBm.

SQUELCH ADJUST

The **SQUELCH ADJUST** pot is used to set the minimum level of received signal required to "open" the audio squelch of the receiver. This level is factory set to 4 microvolts, but may be changed if necessary. The squelch should be set to open when receiving the signal from the STL-15C transmitter, and close and remain closed at all times when the transmitter is "OFF". Very sensitive (low level) settings should be avoided to prevent the squelch from opening on noise or other signals.

ATTENUATOR

The RF input sensitivity of the R-15C receiver can be attenuated by placing the **"ATTENUATOR"** switch in "10 dB ATTEN." position. This may be desirable when the received signal is very strong in order to bring the "SIG. LEVEL" meter indication on scale and to make the squelch relay less susceptible to noise and interfering signals. On long transmission paths and fading signal conditions, "MAX SENSITIVITY" setting is required.

AFC LOCK LIGHT

The **AFC LOCK** light should be illuminated at all times the receiver is operating. This indicates the VCO of the frequency synthesizer is locked to the reference oscillator. The receiver squelch relay will not open unless the **AFC LOCK** light is on.

Test Meter

An illuminated **TEST METER** and selector switch are built into the R-15C receiver to permit monitoring of critical parameters. These are:

1. **"SIGNAL LEVEL"** - The received signal strength indication (RSSI) is displayed in relative values on the "VU" scale of the meter when switched to "SIG. LEVEL". Typical RSSI values and conditions are shown in the following table:

Sig. Level Meter Reading	Attenuator Switch Setting	Signal Strength (microvolts)
-7 VU	max sensitivity	5
-3.5 VU	max sensitivity	10
-1 VU	max sensitivity	50
0 VU	max sensitivity	100
+1.5 VU	max sensitivity	250
0 VU	10 dB ATTEN	500

See Receiver Test Report on page 17

2. **"PGM LEVEL"** - The recovered audio level (mono or composite) is displayed on the upper "VU" scale of the meter. This indication may be useful in initial set-up under test tone conditions. "Composite" or "mono" levels may be observed while adjustments are being made. The program level meter is not a peak reading meter and is useful for test tone measurements. Complex program audio will be indicated at about 6 dB below actual peak values. The modulation of the STL link is set at the **"PEAK MODULATION"** bar graph meter of the STL-15C transmitter. "Composite" or "mono" levels out of the R-15C receiver are set for correct modulation of the broadcast transmitter as indicated on the station's modulation monitor.

3. "**SUB LEVEL"** - Received subcarrier level is indicated in this switch position. If 10% subcarrier injection is used at the STL-15C transmitter, a "SUB LEVEL" indication of approximately "0" VU is indicated.

4. "**AFC LEVEL"** - Indicates the AFC error correction voltage in the phase-locked loop. This reading should be "**0 VU**" $\pm$1.5 VU. Level errors greater than $\pm$1.5 VU call for adjustment of VCO center frequency. See section:

5. **"L. O. LEVEL"** - The local oscillator (L.O.) level meter reading is normally -5 VU to -3 VU.

6. **"MIXER"** - The mixer meter reading is normally - 3 VU to +3 VU.

It is prudent to record all meter readings at the time the equipment is initially installed to aid in future trouble shooting.

INTERNALLY SELECTED OPTIONS

The R-15C receiver has several options selected by jumper plugs. Refer to section titled TUNE UP AND ADJUSTMENTS

FREQUENCY PROGRAMMING

The R-15C receiver frequency synthesizer is programmed by 16 switches located on the **R-15C Frequency Synthesizer Board, 800-291**. Refer to section titled **TUNE UP AND ADJUSTMENTS**

SYSTEM PERFORMANCE TESTS

The STL-15C transmitter, R-15 receiver with the associated antenna system can be tested and compared with factory test data included in this manual. The following procedures should be followed in order to obtain reliable and accurate results.

Before audio tests or subcarrier tests are begun check the receiver "SIG. LEVEL" METER for required minimum signal. A conversion from VU to microvolts is given under **OPERATION** in the R-15 receiver manual. For a 950 MHz. system using 50 KHz FM deviation, typical noise levels in *Composite Mode* are:

10 µv	for 50 dB S/N ratio
63 µv	for 60 dB S/N ratio
80 µv	for ultimate S/N ratio

(Demodulated left or right channel de-emphasized and low-pass filtered.)

For the above system with 20% subcarrier injection, the following noise level on the subcarrier (Marti SCG-10 - SCD-10 System) was measured: (no modulation main or sub)

10 µv	for 40 dB Subcarrier S/N ratio
20 µv	for 47 dB Subcarrier S/N ratio
30 µv	for 50 dB Subcarrier S/N ratio
150 µv	for ultimate Subcarrier S/N ratio

With ultimate S/N ratio, main to sub crosstalk should be -40 to -45 dB (using Marti SCG-10 - SCD-10 Subcarrier System).

NOISE (monophonic mode)

Noise measurements should be made first, since high noise levels will influence distortion readings. Also ground loops in the audio oscillator to transmitter connections and distortion analyzer to receiver connections must be resolved before testing begins. The influence of high RF fields upon the test equipment must be determined and corrected before accurate measurements can be made. NOTE: NOISE AND DISTORTION MEASUREMENTS ARE MADE WITH SUBCARRIER AND REMOTE CONTROL INPUT SIGNALS REMOVED. System signal to noise ratio is determined while modulating the transmitter 100% at 400 Hz. A level of +8 dBm across the balanced audio input terminals of TB-1 will produce a reading of 100% modulation on the "PEAK MODULATION" indicator. Set Receiver "MONO LEVEL" pot for +10 dBm output into the distortion analyzer. If the distortion analyzer has a high impedance input, add a 600 ohm load resistor to match the receiver. Establish +10 dBm on the audio voltmeter of the analyzer as the reference level for 100% modulation. Next, remove the audio signal from the transmitter input and measure noise level below reference (100% modulation). This reading should compare with that published under **SYSTEM SPECIFICATIONS** in this manual.

DISTORTION (monophonic mode)

Harmonic distortion is usually measured at 100% modulation and at several frequencies. If pre-emphasis processing is used in the transmitter with corresponding de-emphasis in the receiver, it is normal for available audio level at the receiver to drop with increasing frequency according to the de-emphasis curve selected. At 15 KHz, there is sufficient level to operate most modern distortion analyzers. Distortion levels should be within specifications. If distortion is out of specs, check system noise, check for test equipment ground loops, RFI, and transmitter/receiver operating frequency. If either unit is off frequency, the FM modulation sidebands are not centered within the IF filter bandpass, which can cause audio distortion.

FREQUENCY RESPONSE (monophonic mode)

If the STL-15C System is switched to flat processing, frequency response can be measured as if the signal were being sent over straight wires. If pre-emphasis processing is used (especially 75 µs) allowance must be made in the transmitter audio input level to prevent over-modulation at test frequencies above 400 Hz. The simplest and fastest method is to set the transmitter audio input level for

100% modulation at 400 Hz., then attenuate this level 20 dB. Set receiver output level to -10 dBm as the reference, then sweep the audio band for response. Response should be within the limits listed in **SYSTEM SPECIFICATIONS**.

COMPOSITE (STEREO) SEPARATION, NOISE, DISTORTION AND FREQUENCY RESPONSE. (composite mode)

This procedure consists of feeding a stereo encoder (generator) capable of more than 60 dB separation (50 Hz - 15 KHz) into the composite input of the STL-15C transmitter and connecting a stereo decoder (monitor) to the composite output of the R-15C receiver. The actual test procedure may vary with different decoders (monitors). Therefore the procedure prescribed in the decoder (monitor) instruction manual should be followed.

THEORY OF OPERATION

The Marti R-15C is a synthesized double-conversion superheterodyne receiver. When used with the companion STL-15C transmitter a high quality point-to-point radio link can be assembled for transmission of composite stereo audio, monophonic audio, digital data (by means of modems) or other communications.

Since the general theory of operation of superheterodyne receivers is well known, we will briefly describe the function of each board (subsystem) of the R-15C receiver. Refer to block diagram 702-100 for signal flow, and to the individual schematic diagrams for circuit details.

1st CONVERTER, 800-211, 800-212, 800-213

The received RF signal is applied to the 1st converter module. After passing through a three-section preselector, the signal is coupled to Gate No. 1 of a GaAs dual-gate RF amplifier. The output of this amplifier is impedance matched to Double-Balanced Mixer X-1. The output of the Local Oscillator frequency multipliers is also impedance matched to the local oscillator port of mixer X-1. The third port of the double-balanced mixer X-1 is the converter output. The 1st converter output is in the 70 - 78 MHz range.

SECOND CONVERTER / IF AMP / DETECTOR, 800-293

The 50 ohm output from the 1st converter is connected to J3 of this board by a short coaxial cable. J-FET Q4 raises the impedance for the two-section band pass filter which is tuned to the 70 - 78 MHz output of the first converter. This signal is amplified by dual-gate FET Q5, again filtered by L7/C48 then fed to the gate of Q6. J-FET Q6 is a source follower driving the 50 ohm RF input of double balanced mixer X1. The L.O. drive from **Synthesizer Board, 800-291**, is connected to the L.O. port of mixer X1 via connector J5. The 10.7 MHz frequency difference between the RF and L.O. signals appear at the IF port of mixer X1 which is connected to J4. The 10.7 MHz signal is routed through **IF Bandpass Filter Board, 800-207**, and back to J1 of **Second Converter/IF Amp/ Detector Board, 800-293**, for amplification by Q1 and Q2 with filtering by CF1 and CF2. IC5 combines the functions of IF amplifier/limiter, quadrature detector, and receive signal strength indicator (signal level metering). The wide band output of Q5 appears at Pin 6, and is connected to IC1 - IC4 for pre-processing of the composite, mono, and subcarrier signals, and for level metering.

AUDIO BOARD, 800-294

Audio Board, 800-294 processes composite and mono audio for the R-15C and is programmable (by jumper plugs) for composite stereo or monaural signal processing.

Using “jumper plugs” the user may select “HI-SUB” for subcarrier operation in composite mode or “LO-SUB” for subcarrier operation in mono mode. When changing mode of operation jumper plugs are also provided to switch the front panel LED mode indicators and level metering. **See the NOTE on Schematic, 800-294 to set jumpers properly!**

COMPOSITE PROCESSING:

Composite processing entails low pass filtering, delay equalization, and high pass filtering (for subcarriers). Low pass filtering achieves a flat amplitude response to 57 KHz with a “brick-wall” cut-off using elliptic filters. Group delay, introduced by the low pass filter, is equalized using active all-pass filters and achieves a flat group delay across a frequency band of 50 Hz to 57 KHz. High pass filtering, using elliptic filters, has a “brick-wall” cut-off at 80 KHz. with a flat response beyond 80 KHz. The output, as indicated on schematic 800-294, is labeled “HI-SUB”.

MONO PROCESSING:

Mono processing entails de-emphasis, low pass filtering, amplification, and high pass filtering (for subcarriers). User options provide for selection of 75 μs, 50 μs, 25 μs, or 0 μs de-emphasis. Active Butterworth low pass filtering achieves a flat amplitude response to 15 KHz rolling off sharply above 15 KHz. Active Butterworth high pass filtering provides a sharp roll-off at 25 KHz with flat amplitude response above 25 KHz for subcarriers.

Output of the high pass filters is labeled “LO-SUB” on Schematic, 800-294. See instructions on this schematic for selection of “mode”, de-emphasis, and subcarrier

FREQUENCY SYNTHESIZER, 800-291

The R-15C receiver frequency is synthesized at the second conversion local oscillator frequency, which is 10.7 MHz below (or above) the first converter output frequency. Using the 942 - 952 MHz band as an example, the first converter output would be 69 - 79 MHz. To convert to the second IF frequency of 10.7 MHz, the synthesizer must generate the required frequency in the range of 58.30 to 68.30 MHz (F-10.7). **Programming instructions for the synthesizer are on page 19.**

The frequency synthesizer consists of a Phase-Locked Loop (IC5), a Voltage-Controlled Oscillator (Q2), a Pre-scaler (IC4), a Reference Frequency (Y1), and a Loop Filter (IC2A). The PLL is a programmable device with the reference frequency generated by a crystal oscillator. The loop filter is an active type and the pre-scaler is used to pre-scale the VCO frequency to make it compatible to the PLL. The PLL performs three major functions:

1. compares the phase of the pre-scaled VCO frequency (further processed inside the device) with the frequency of resolution and produces outputs that are used by the loop filter to produce a DC voltage to control the VCO frequency.

2. controls the pre-scaler by selecting its divisor.

3. generates the frequency of resolution, internally, using the crystal oscillator.

The PLL has 16 programming pins that are used to select a VCO frequency and produce a lock. The program to select a particular VCO frequency is selected by 16 dip switches. An extremely stable crystal oscillator and noiseless loop filter make the synthesizer ultra stable. The output of the phase-locked VCO (Q2) is buffered by IC3, low pass filtered and connected to J1 (L.O. out). A short coaxial cable connects with J5 (L.O. in) of Board, 800-293.

INPUT OUTPUT FILTERS, 800-193A

All input/output circuits connected to ACCESSORY connector J4, as well as the AC line input, have radio-frequency filters.

POWER SUPPLY/ SQUELCH, 800-219A

The power supply consists of a bridge rectifier, D1, D2, D3, D4 filter C5 and regulator IC-3. R8 and R9 set the output voltage and D5 and D6 protect IC-3 from reverse voltage. Zener diode D7 provides a shunt regulated reference voltage for the comparators, IC-2, for instances when the receiver is operated from external unregulated DC supplies.

The signal squelch IC-2B comparator has the signal level metering voltage applied to the appropriate input. Signal squelch comparator IC-2B output is connected to relay driver Q2. The collector of Q2 also operates the “SQUELCH OPEN” LED on the receiver panel. Squelch adjustment is provided by potentiometer R1 located on METER/CONTROL BOARD, 800-295 which divides the comparator reference voltage through R11 and R12.

The signal level voltage is inhibited (shorted to ground) when the frequency synthesizer AFC LOCK light is **NOT** “ON”, thus muting all receiver signal outputs.

Signal level voltage is also connected to meter driver amplifier IC-1. The “SIGNAL LEVEL” position of the test meter is calibrated by R2.

TEST EQUIPMENT

Distortion Analyzer	Krohn-Hite Model 6801
Oscillator	Krohn-Hite Model 4500
Attenuator Set	Hewlett-Packard Model 3500
Frequency Counter	Hewlett-Packard Model 5383A (option 001)
Digital Multimeter	Beckman Model 3030
Analog Multimeter	Triplett Model 630
RF Attenuator	Kay Model 437A (adjustable 0-110 dB)
RF Signal Generator	Marconi Model 2022C
Stereo Monitor	Belar Model FMS-2
Stereo Generator	Aphex Model AX400
Oscilloscope	Tektronix Model 2215

TOOLS FOR ALIGNMENT

Type of Tool	Manufacturer's No.	Marti Part No.
Tuning Tool	GC 9300	930-037
Tuning Tool	GC 9440	930-069
Tuning Tool	Spectrol 8T000	930-100
Tuning Tool	Sprague-Goodman	930-062
Tuning Tool	Johanson 8762	930-096 (yellow)
Tuning Tool	Johanson 8766	930-076 (blue)

The **STL-15C/R-15C Alignment Tool Kit (Marti Part No. 704-175)** containing all the above tools may be obtained from the factory for $19.83.

RECEIVER TEST REPORT

TUNE-UP & ADJUSTMENTS

Refer to Location of Adjustments Drawing No. 702-099 and appropriate schematic diagrams for each module.

This equipment was thoroughly tested and inspected at the factory prior to shipment. The actual equipment performance was recorded on the factory test report (R-15C RECEIVER TEST REPORT) found on page 17. Adjustments should rarely be necessary in the field and should be attempted only by highly trained technicians familiar with this type equipment.. Laboratory grade test equipment is required and is listed under "TEST EQUIPMENT FOR STL-15C TRANSMITTERS and R-15C RECEIVERS" (page 16). For location of adjustments and test points in the R-15C receiver refer to Adjustment Location Diagram, 702-099, on page 30.

1st CONVERTER, 800-211B, 212C, & 213C

1. Set the local oscillator on exact frequency by adjusting L1 while observing the frequency on a 225 MHz counter plugged into J1. See **TABLE 1.** below in order to determine the correct frequency at J1.

NOTE: Unplug the counter from J1 before doing Step 2.

FOR 800-211 CONVERTER ONLY

2. Tune L2 and L4 for maximum negative voltage at TP-1. Use the 3 volt DC scale of a sensitive multimeter. Do NOT tune C7, C8, C13, C14 - they are factory adjustments only!

3. Tune L5 and L6 for maximum voltage at TP-2.

4. Tune C18 for maximum voltage at TP-3.

5. Reduce received signal level at J6 for a 1/3 scale reading on SIG. LEVEL METER. Tune C23, C29, C33, C34, and C35 for maximum signal level.

FOR 800-212C and 800-213C CONVERTERS ONLY

2. Switch METER to "L.O. LEVEL". Tune L5 and L6 for maximum reading. DO NOT TUNE TRIMMER CAPACITORS—THEY ARE FACTORY ADJUSTMENTS ONLY!! (TP-1)

3. Switch METER to "MIXER" and tune L7 and L8 for maximum reading. (TP-2)

4. Switch METER to "SIG. LEVEL", reduce signal level at J6 for a 1/3 scale reading on SIG. LEVEL METER. Tune the three gold capacitors on top of the pre-selector for maximum signal level. On 800-213 board tune C27 and C32 for maximum signal level. On 800-212 board tune L9 for maximum signal level.

I.F. FILTER, 800-207-250

There are no user adjustments on this board.

AUDIO PROCESSING BOARD, 800-293

This module has been thoroughly tested and adjusted at the factory. Only movement of jumper plugs to change between "COMPOSITE MODE", and "MONO MODE", and de-emphasis options should be necessary in the field.

Refer to Drawings 702-099 (page 30) for JP (jumper plug) locations and 800-294 (page 54) for **NOTES** on JP programming.

Monophonic mode:

To select monophonic (single program audio channel) mode, place jumper plugs at positions 2, 4, 5, and 7. The "MONO LEVEL" pot on the front panel is now used to set the mono output level at TB-1.

De-Emphasis: In mono mode the user can select de-emphasis of 0, 25, 50 or 75 microseconds. The U.S. standard is 75 microseconds, the European is 50 microseconds, and some users prefer zero or 25 microseconds for various reasons. ***The emphasis selection must be the same for the transmitter and receiver.***

De-Emphasis (microseconds)	Jumper Plug(s)
0	remove 9 & 10
25	9 only
50	10 only
75	9 & 10

Factory Calibration of De-Emphasis (mono mode)

1. Set pre-emphasis jumper plugs on STL-15C transmitter Processor Board, 800-285 to 75 micro-seconds as shown on Drawing 800-285 of the STL-15C instruction book.

2. Select 75 microseconds on R-15C Board 800-294 by inserting jumper plugs 9 and 10.

3. Modulate transmitter 100% at exactly 15 KHz. Set receiver PGM LEVEL ADJUST for exactly - 7 dBm on an accurate audio voltmeter at terminals TB-1.

4. Lower the audio signal generator frequency to exactly 400 Hz at the exact same level into the STL-15C.

5. The R-15C receiver audio output level meter should read +10 dBm ±0.25 dB. If not, adjust R22 on the receiver Audio Board, 800-294, for exactly +10 dBm output.

Composite Mode:

To select "COMPOSITE" stereo mode, place jumper plugs (JP) at positions 1, 3, 6, and 8. The "COMPOSITE LEVEL" pot on the front panel now controls the composite output at J2.

2nd CONVERTER / IF AMPLIFIER / DETECTOR, 800-293

2nd Converter/Pre-selector: (Adjustments necessary when changing receiver frequency)

1. Place test meter in "SIG LEVEL" position.

2. Adjust the RF input level (J6) for approximately 1/3 scale reading.

3. Adjust C43, C46, and C48 for maximum signal level.

Other adjustments on the 800-293 Board are factory set and do **NOT** require field adjustment.

PROGRAMMING THE FREQUENCY SYNTHESIZER, 800-291

Read "THEORY OF OPERATION" of frequency synthesizer, 800-291 on page 14.

As explained in **THEORY OF OPERATION**, the Frequency Synthesizer, 800-291, generates a stable local oscillator frequency in the range of 58.3 - 68.3 MHz in 12.5 KHz steps for conversion of the first converter output of 69 - 79 MHz to the 10.7 MHz IF frequency. The synthesizer frequency is programmed by positioning 16 "DIP" switches located on Board 800-291 as follows:

FOR 140 - 340 MHz RECEIVERS

1. Calculate the second local oscillator frequency as follows:
   (a) Determine the "frequency range" of the first converter from the R-15C Data Label, from the **TEST REPORT** in the R-15C instruction manual, or by inspection of the 800-212C or 800-213C converter crystal (Y2). This crystal will be marked with center frequency of the range, column two of Table 1.
   (b) Referring to Table 1, page 21, determine the "frequency range" of operation from the left column.
   (c) Using four decimal place accuracy, subtract the receiver **"operating frequency" (F_O)** from the **"upper limit" (F_U)** of the "frequency range".
   (d) Add 58.3000 to this number to determine the L.O. (Local Oscillator) frequency.

FORMULA:

$$\mathbf{L.O. = F_U - F_O + 58.3000}$$

where F_U is the upper limit of the frequency range, F_O is the operating frequency.

EXAMPLE: The Receiver is to operate on 225.225 MHz. On Table 1 we find this is in the range of 220 - 230 MHz. Looking at column two, we see that the 1st. Converter crystal must be 225 MHz. Subtracting 230 - 225.225 gives 4.775; adding this to 58.3000 yields 63.0750.

NOTE: To change operating frequency into a different frequency range, the first converter crystal must be changed to the center frequency of that range (see TABLE 1).

2. Using Frequency Programming Table 2, find 63.0750 in the L.O. column. Then position the 16 "DIP" switches (S1 and S2) as indicated.

<u>FOR 400 - 962 MHz RECEIVERS:</u>

1. Calculate the second local oscillator frequency as follows:

(a) Determine the "frequency range" of the first converter from the R-15C data label, from the TEST REPORT in the R-15C Instruction Manual, or by inspection of crystal (Y2), in the 800-213C/450 or 800-211B/950 Converter. This crystal will be marked with the center frequency of the range, from column two of TABLE 1.

(b) Referring to TABLE 1, page 21, determine the "frequency range" of operation from the left column.

(c) Using four decimal place accuracy, subtract the **lower limit (F_L)** of the "frequency range" from the **receiver operating frequency (F_O)**.

(d) Add 58.3000 to this number to determine the L.O. (Local Oscillator) Frequency.

<u>FORMULA:</u>

$$\mathbf{L.O. = F_O - F_L + 58.3000}$$

where F_L is the lower limit of the frequency range and F_O is the operating frequency.

EXAMPLE: The receiver is to operate on 946.1250 MHz (F_O). Referring to TABLE 1, we find this is in the range of 942 - 952 MHz. From column two, we see that the 1st converter crystal must be 947.0 MHz. Using the above formula, 946.1250 - 942.0000 + 58.3000 = 62.4250.

NOTE: The above formula and example applies to R-15C/950 receivers having serial numbers above 275. R-15C/950 receivers with serial numbers below 275 covered a frequency range of 944 - 952 with a converter center frequency of 948 MHz and a synthesizer resolution of 25 KHz. Programming instructions were supplied with these receivers. Call the factory if you require a copy of these instructions.

2. Using the frequency programming TABLE 2, find 62.4250 in the L.O. column, then position the 16 "DIP" switches (S1 and S2) as indicated.

3. Place "TEST METER" switch in "AFC LEVEL" position. With synthesizer operating and "locked" indicated by the green "AFC LOCK" light, the "AFC LEVEL" should be zero (0) VU $\pm$1.5 VU. If the newly selected frequency differs from the original frequency by several megahertz, the VCO frequency should be adjusted for a "0 VU" AFC level as follows:

(a) Remove cover of the VCO box (located next to J1 on 800-291 board).

(b) Using an insulated adjustment tool such as Marti Part No. 930-100, adjust the variable capacitor C36 (see Drawing 702-099) for the "0 VU" reading. The plates of capacitor C36 should be between 10% - 30% of maximum (fully meshed). If not, set C36 in this position and adjust L6 for "0 VU" on the meter by using an insulated slug tuning tool such as Marti No. 930-069.

(c). Replace box cover being careful to properly engage all shield contact fingers.

4. If desired, the synthesized frequency can be measured at J1 using a frequency counter. The frequency should be the "L.O." frequency corresponding to the "Channel" frequency selected. Any error can be corrected by adjustment of C11 through the hole in the cover of the reference oscillator box cover on Board, 800-291. See Drawing 702-099 for location. Use insulated adjustment tool 730-069 or equivalent.

NOTE: The SQUELCH RELAY of the R-15C receiver will not open until the "AFC LOCK" light is on.

5. When the receiver operating frequency is changed more than 0.1%, the first converter adjustments, as well as C43, C46, and C48, of the pre-selector on Board 800-293 must be "peaked" (tuned for maximum "SIG LEVEL") in order to maintain performance.

TABLE 1.

Frequency Ranges 140 - 962 MHz
with R-15C Receiver 1st Converter Crystal Formulas

Frequency Range (MHz) F_L - F_U	1st Converter Center Frequency	1st Converter Model	Crystal Formula	Measured Frequency at J1	Crystal Frequency (3rd Overtone)
140 -150	145.0	800-212C/150	(F+74)/6	(F+74)/3	36.5000
150 - 160	155.0	800-212C/150	(F+74)/6	(F+74)/3	38.1667
160 - 170	165.0	800-212C/150	(F+74)/6	(F+74)/3	39.8333
170 - 180	175.0	800-212C/150	(F+74)/6	(F+74)/3	41.5000
200 - 210	205.0	800-212C/215	(F+74)/6	(F+74)/2	46.5000
210 - 220	215.0	800-212C/215	(F+74)/6	(F+74)/2	48.1667
220 - 230	225.0	800-212C/215	(F+74)/6	(F+74)/2	49.8333
230 - 240	235.0	800-212C/215	(F+74)/6	(F+74)/2	51.5000
240 - 250	245.0	800-212C/215	(F+74)/6	(F+74)/2	53.1667
250 -260	255.0	800-212C/215	(F+74)/6	(F+74)/2	54.8333
280 - 290	285.0	800-213C/300	(F+74)/8	(F+74)/2	44.8750
290 - 300	295.0	800-213C/300	(F+74)/8	(F+74)/2	46.1250
300 - 310	305.0	800-213C/300	(F+74)/8	(F+74)/2	47.3750
310 - 320	315.0	800-213C/300	(F+74)/8	(F+74)/2	48.6250
320 - 330	325.0	800-213C/300	(F+74)/8	(F+74)/2	49.8750
330 - 340	335.0	800-213C/300	(F+74)/8	(F+74)/2	51.1250
400 - 410	405.0	800-213C/450	(F-74)/8	(F-74)/2	41.3750
410 - 420	415.0	800-213C/450	(F-74)/8	(F-74)/2	42.6250
420 - 430	425.0	800-213C/450	(F-74)/8	(F-74)/2	43.8750
430 - 440	435.0	800-213C/450	(F-74)/8	(F-74)/2	45.1250
440 - 450	445.0	800-213C/450	(F-74)/8	(F-74)/2	46.3750
450 - 460	455.0	800-213C/450	(F-74)/8	(F-74)/2	47.6250
460 - 470	465.0	800-213C/450	(F-74)/8	(F-74)/2	48.8750
470 - 480	475.0	800-213C/450	(F-74)/8	(F-74)/2	50.1250
832 - 842	837.0	800-211B/950	(F-74)/16	(F-74)/4	47.6875
842 - 852	847.0	800-211B/950	(F-74)/16	(F-74)/4	48.3125
852 - 862	857.0	800-211B/950	(F-74)/16	(F-74)/4	48.9375
862 - 872	867.0	800-211B/950	(F-74)/16	(F-74)/4	49.4625
872 - 882	877.0	800-211B/950	(F-74)/16	(F-74)/4	50.1875
882 - 892	887.0	800-211B/950	(F-74)/16	(F-74)/4	50.8125
892 - 902	897.0	800-211B/950	(F-74)/16	(F-74)/4	51.4375
902 - 912	907.0	800-211B/950	(F-74)/16	(F-74)/4	52.0625
912 - 922	917.0	800-211B/950	(F-74)/16	(F-74)/4	52.6875
922 - 932	927.0	800-211B/950	(F-74)/16	(F-74)/4	53.3125
932 - 942	937.0	800-211B/950	(F-74)/16	(F-74)/4	53.9375
942 - 952	947.0	800-211B/950	(F-74)/16	(F-74)/4	54.5625
944 - 952 See NOTE	948.0	800-211B/950	(F-74)/16	(F-74)/4	54.6250
952 - 962	957.0	800-211B/950	(F-74)/16	(F-74)/4	55.1875

NOTE: For receivers below serial number 275

TABLE 2.

R-15C Receiver Frequency Programming DIP Switch Settings (12.5 KHz steps for 10 MHz range)

L.O.	DIP Switch S1	DIP Switch S2
Freq. MHz.	1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16
68.3000	0 1 0 1 0 0 1 1	0 1 0 1 0 0 0 0
68.2875	0 1 0 1 0 0 0 1	0 1 0 1 0 1 1 1
68.2750	0 1 0 1 0 0 0 1	0 1 0 1 0 1 1 0
68.2625	0 1 0 1 0 0 0 1	0 1 0 1 0 0 1 1
68.2500	0 1 0 1 0 0 0 1	0 1 0 1 0 0 1 0
68.2375	0 1 0 1 0 0 0 1	0 1 0 1 0 1 0 1
68.2250	0 1 0 1 0 0 0 1	0 1 0 1 0 1 0 0
68.2125	0 1 0 1 0 0 0 1	0 1 0 1 0 0 0 1
68.2000	0 1 0 1 0 0 0 1	0 1 0 1 0 0 0 0
68.1875	0 0 0 1 0 0 1 1	0 1 0 1 0 1 1 1
68.1750	0 0 0 1 0 0 1 1	0 1 0 1 0 1 1 0
68.1625	0 0 0 1 0 0 1 1	0 1 0 1 0 0 1 1
68.1500	0 0 0 1 0 0 1 1	0 1 0 1 0 0 1 0
68.1375	0 0 0 1 0 0 1 1	0 1 0 1 0 1 0 1
68.1250	0 0 0 1 0 0 1 1	0 1 0 1 0 1 0 0
68.1125	0 0 0 1 0 0 1 1	0 1 0 1 0 0 0 1
68.1000	0 0 0 1 0 0 1 1	0 1 0 1 0 0 0 0
68.0875	0 0 0 1 0 0 0 1	0 1 0 1 0 1 1 1
68.0750	0 0 0 1 0 0 0 1	0 1 0 1 0 1 1 0
68.0625	0 0 0 1 0 0 0 1	0 1 0 1 0 0 1 1
68.0500	0 0 0 1 0 0 0 1	0 1 0 1 0 0 1 0
68.0375	0 0 0 1 0 0 0 1	0 1 0 1 0 1 0 1
68.0250	0 0 0 1 0 0 0 1	0 1 0 1 0 1 0 0
68.0125	0 0 0 1 0 0 0 1	0 1 0 1 0 0 0 1
68.0000	0 0 0 1 0 0 0 1	0 1 0 1 0 0 0 0
67.9875	0 1 1 0 0 0 1 1	0 1 0 1 0 1 1 1
67.9750	0 1 1 0 0 0 1 1	0 1 0 1 0 1 1 0
67.9625	0 1 1 0 0 0 1 1	0 1 0 1 0 0 1 1
67.9500	0 1 1 0 0 0 1 1	0 1 0 1 0 0 1 0
67.9375	0 1 1 0 0 0 1 1	0 1 0 1 0 1 0 1
67.9250	0 1 1 0 0 0 1 1	0 1 0 1 0 1 0 0
67.9125	0 1 1 0 0 0 1 1	0 1 0 1 0 0 0 1
67.9000	0 1 1 0 0 0 1 1	0 1 0 1 0 0 0 0
67.8875	0 1 1 0 0 0 0 1	0 1 0 1 0 1 1 1
67.8750	0 1 1 0 0 0 0 1	0 1 0 1 0 1 1 0
67.8625	0 1 1 0 0 0 0 1	0 1 0 1 0 0 1 1
67.8500	0 1 1 0 0 0 0 1	0 1 0 1 0 0 1 0
67.8375	0 1 1 0 0 0 0 1	0 1 0 1 0 1 0 1
67.8250	0 1 1 0 0 0 0 1	0 1 0 1 0 1 0 0
67.8125	0 1 1 0 0 0 0 1	0 1 0 1 0 0 0 1
67.8000	0 1 1 0 0 0 0 1	0 1 0 1 0 0 0 0
67.7875	0 0 1 0 0 0 1 1	0 1 0 1 0 1 1 1
67.7750	0 0 1 0 0 0 1 1	0 1 0 1 0 1 1 0
67.7625	0 0 1 0 0 0 1 1	0 1 0 1 0 0 1 1
67.7500	0 0 1 0 0 0 1 1	0 1 0 1 0 0 1 0
67.7375	0 0 1 0 0 0 1 1	0 1 0 1 0 1 0 1
67.7250	0 0 1 0 0 0 1 1	0 1 0 1 0 1 0 0
67.7125	0 0 1 0 0 0 1 1	0 1 0 1 0 0 0 1
67.7000	0 0 1 0 0 0 1 1	0 1 0 1 0 0 0 0
67.6875	0 0 1 0 0 0 0 1	0 1 0 1 0 1 1 1
67.6750	0 0 1 0 0 0 0 1	0 1 0 1 0 1 1 0
67.6625	0 0 1 0 0 0 0 1	0 1 0 1 0 0 1 1
67.6500	0 0 1 0 0 0 0 1	0 1 0 1 0 0 1 0
67.6375	0 0 1 0 0 0 0 1	0 1 0 1 0 1 0 1
67.6250	0 0 1 0 0 0 0 1	0 1 0 1 0 1 0 0
67.6125	0 0 1 0 0 0 0 1	0 1 0 1 0 0 0 1
67.6000	0 0 1 0 0 0 0 1	0 1 0 1 0 0 0 0
67.5875	0 1 0 0 0 0 1 1	0 1 0 1 0 1 1 1
67.5750	0 1 0 0 0 0 1 1	0 1 0 1 0 1 1 0
67.5625	0 1 0 0 0 0 1 1	0 1 0 1 0 0 1 1
67.5500	0 1 0 0 0 0 1 1	0 1 0 1 0 0 1 0
67.5375	0 1 0 0 0 0 1 1	0 1 0 1 0 1 0 1
67.5250	0 1 0 0 0 0 1 1	0 1 0 1 0 1 0 0
67.5125	0 1 0 0 0 0 1 1	0 1 0 1 0 0 0 1
67.5000	0 1 0 0 0 0 1 1	0 1 0 1 0 0 0 0
67.4875	0 1 0 0 0 0 0 1	0 1 0 1 0 1 1 1
67.4750	0 1 0 0 0 0 0 1	0 1 0 1 0 1 1 0
67.4625	0 1 0 0 0 0 0 1	0 1 0 1 0 0 1 1
67.4500	0 1 0 0 0 0 0 1	0 1 0 1 0 0 1 0
67.4375	0 1 0 0 0 0 0 1	0 1 0 1 0 1 0 1
67.4250	0 1 0 0 0 0 0 1	0 1 0 1 0 1 0 0
67.4125	0 1 0 0 0 0 0 1	0 1 0 1 0 0 0 1
67.4000	0 1 0 0 0 0 0 1	0 1 0 1 0 0 0 0
67.3875	0 0 0 0 0 0 1 1	0 1 0 1 0 1 1 1
67.3750	0 0 0 0 0 0 1 1	0 1 0 1 0 1 1 0
67.3625	0 0 0 0 0 0 1 1	0 1 0 1 0 0 1 1
67.3500	0 0 0 0 0 0 1 1	0 1 0 1 0 0 1 0
67.3375	0 0 0 0 0 0 1 1	0 1 0 1 0 1 0 1
67.3250	0 0 0 0 0 0 1 1	0 1 0 1 0 1 0 0
67.3125	0 0 0 0 0 0 1 1	0 1 0 1 0 0 0 1

L.O.	DIP Switch S1	DIP Switch S2
Freq. MHz.	1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16
67.3000	0 0 0 0 0 0 1 1	0 1 0 1 0 0 0 0
67.2875	0 0 0 0 0 0 0 1	0 1 0 1 0 1 1 1
67.2750	0 0 0 0 0 0 0 1	0 1 0 1 0 1 1 0
67.2625	0 0 0 0 0 0 0 1	0 1 0 1 0 0 1 1
67.2500	0 0 0 0 0 0 0 1	0 1 0 1 0 0 1 0
67.2375	0 0 0 0 0 0 0 1	0 1 0 1 0 1 0 1
67.2250	0 0 0 0 0 0 0 1	0 1 0 1 0 1 0 0
67.2125	0 0 0 0 0 0 0 1	0 1 0 1 0 0 0 1
67.2000	0 0 0 0 0 0 0 1	0 1 0 1 0 0 0 0
67.1875	0 1 1 1 1 0 1 0	0 1 0 1 0 1 1 1
67.1750	0 1 1 1 1 0 1 0	0 1 0 1 0 1 1 0
67.1625	0 1 1 1 1 0 1 0	0 1 0 1 0 0 1 1
67.1500	0 1 1 1 1 0 1 0	0 1 0 1 0 0 1 0
67.1375	0 1 1 1 1 0 1 0	0 1 0 1 0 1 0 1
67.1250	0 1 1 1 1 0 1 0	0 1 0 1 0 1 0 0
67.1125	0 1 1 1 1 0 1 0	0 1 0 1 0 0 0 1
67.1000	0 1 1 1 1 0 1 0	0 1 0 1 0 0 0 0
67.0875	0 1 1 1 1 0 0 0	0 1 0 1 0 1 1 1
67.0750	0 1 1 1 1 0 0 0	0 1 0 1 0 1 1 0
67.0625	0 1 1 1 1 0 0 0	0 1 0 1 0 0 1 1
67.0500	0 1 1 1 1 0 0 0	0 1 0 1 0 0 1 0
67.0375	0 1 1 1 1 0 0 0	0 1 0 1 0 1 0 1
67.0250	0 1 1 1 1 0 0 0	0 1 0 1 0 1 0 0
67.0125	0 1 1 1 1 0 0 0	0 1 0 1 0 0 0 1
67.0000	0 1 1 1 1 0 0 0	0 1 0 1 0 0 0 0
66.9875	0 0 1 1 1 0 1 0	0 1 0 1 0 1 1 1
66.9750	0 0 1 1 1 0 1 0	0 1 0 1 0 1 1 0
66.9625	0 0 1 1 1 0 1 0	0 1 0 1 0 0 1 1
66.9500	0 0 1 1 1 0 1 0	0 1 0 1 0 0 1 0
66.9375	0 0 1 1 1 0 1 0	0 1 0 1 0 1 0 1
66.9250	0 0 1 1 1 0 1 0	0 1 0 1 0 1 0 0
66.9125	0 0 1 1 1 0 1 0	0 1 0 1 0 0 0 1

66.9000	0 0 1 1 1 0 1 0	0 1 0 1 0 0 0 0
66.8875	0 0 1 1 1 0 0 0	0 1 0 1 0 1 1 1
66.8750	0 0 1 1 1 0 0 0	0 1 0 1 0 1 1 0
66.8625	0 0 1 1 1 0 0 0	0 1 0 1 0 0 1 1
66.8500	0 0 1 1 1 0 0 0	0 1 0 1 0 0 1 0
66.8375	0 0 1 1 1 0 0 0	0 1 0 1 0 1 0 1
66.8250	0 0 1 1 1 0 0 0	0 1 0 1 0 1 0 0
66.8125	0 0 1 1 1 0 0 0	0 1 0 1 0 0 0 1
66.8000	0 0 1 1 1 0 0 0	0 1 0 1 0 0 0 0
66.7875	0 1 0 1 1 0 1 0	0 1 0 1 0 1 1 1
66.7750	0 1 0 1 1 0 1 0	0 1 0 1 0 1 1 0
66.7625	0 1 0 1 1 0 1 0	0 1 0 1 0 0 1 1
66.7500	0 1 0 1 1 0 1 0	0 1 0 1 0 0 1 0
66.7375	0 1 0 1 1 0 1 0	0 1 0 1 0 1 0 1
66.7250	0 1 0 1 1 0 1 0	0 1 0 1 0 1 0 0
66.7125	0 1 0 1 1 0 1 0	0 1 0 1 0 0 0 1
66.7000	0 1 0 1 1 0 1 0	0 1 0 1 0 0 0 0
66.6875	0 1 0 1 1 0 0 0	0 1 0 1 0 1 1 1
66.6750	0 1 0 1 1 0 0 0	0 1 0 1 0 1 1 0
66.6625	0 1 0 1 1 0 0 0	0 1 0 1 0 0 1 1
66.6500	0 1 0 1 1 0 0 0	0 1 0 1 0 0 1 0
66.6375	0 1 0 1 1 0 0 0	0 1 0 1 0 1 0 1
66.6250	0 1 0 1 1 0 0 0	0 1 0 1 0 1 0 0
66.6125	0 1 0 1 1 0 0 0	0 1 0 1 0 0 0 1
66.6000	0 1 0 1 1 0 0 0	0 1 0 1 0 0 0 0
66.5875	0 0 0 1 1 0 1 0	0 1 0 1 0 1 1 1
66.5750	0 0 0 1 1 0 1 0	0 1 0 1 0 1 1 0
66.5625	0 0 0 1 1 0 1 0	0 1 0 1 0 0 1 1
66.5500	0 0 0 1 1 0 1 0	0 1 0 1 0 0 1 0
66.5375	0 0 0 1 1 0 1 0	0 1 0 1 0 1 0 1
66.5250	0 0 0 1 1 0 1 0	0 1 0 1 0 1 0 0
66.5125	0 0 0 1 1 0 1 0	0 1 0 1 0 0 0 1
66.5000	0 0 0 1 1 0 1 0	0 1 0 1 0 0 0 0
66.4875	0 0 0 1 1 0 0 0	0 1 0 1 0 1 1 1
66.4750	0 0 0 1 1 0 0 0	0 1 0 1 0 1 1 0
66.4625	0 0 0 1 1 0 0 0	0 1 0 1 0 0 1 1
66.4500	0 0 0 1 1 0 0 0	0 1 0 1 0 0 1 0
66.4375	0 0 0 1 1 0 0 0	0 1 0 1 0 1 0 1
66.4250	0 0 0 1 1 0 0 0	0 1 0 1 0 1 0 0
66.4125	0 0 0 1 1 0 0 0	0 1 0 1 0 0 0 1
66.4000	0 0 0 1 1 0 0 0	0 1 0 1 0 0 0 0
66.3875	0 1 1 0 1 0 1 0	0 1 0 1 0 1 1 1
66.3750	0 1 1 0 1 0 1 0	0 1 0 1 0 1 1 0
66.3625	0 1 1 0 1 0 1 0	0 1 0 1 0 0 1 1
66.3500	0 1 1 0 1 0 1 0	0 1 0 1 0 0 1 0
66.3375	0 1 1 0 1 0 1 0	0 1 0 1 0 1 0 1
66.3250	0 1 1 0 1 0 1 0	0 1 0 1 0 1 0 0
66.3125	0 1 1 0 1 0 1 0	0 1 0 1 0 0 0 1

L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
66.3000	0 1 1 0 1 0 1 0	0 1 0 1 0 0 0 0
66.2875	0 1 1 0 1 0 0 0	0 1 0 1 0 1 1 1
66.2750	0 1 1 0 1 0 0 0	0 1 0 1 0 1 1 0
66.2625	0 1 1 0 1 0 0 0	0 1 0 1 0 0 1 1
66.2500	0 1 1 0 1 0 0 0	0 1 0 1 0 0 1 0
66.2375	0 1 1 0 1 0 0 0	0 1 0 1 0 1 0 1
66.2250	0 1 1 0 1 0 0 0	0 1 0 1 0 1 0 0
66.2125	0 1 1 0 1 0 0 0	0 1 0 1 0 0 0 1
66.2000	0 1 1 0 1 0 0 0	0 1 0 1 0 0 0 0
66.1875	0 0 1 0 1 0 1 0	0 1 0 1 0 1 1 1
66.1750	0 0 1 0 1 0 1 0	0 1 0 1 0 1 1 0
66.1625	0 0 1 0 1 0 1 0	0 1 0 1 0 0 1 1
66.1500	0 0 1 0 1 0 1 0	0 1 0 1 0 0 1 0
66.1375	0 0 1 0 1 0 1 0	0 1 0 1 0 1 0 1
66.1250	0 0 1 0 1 0 1 0	0 1 0 1 0 1 0 0
66.1125	0 0 1 0 1 0 1 0	0 1 0 1 0 0 0 1
66.1000	0 0 1 0 1 0 1 0	0 1 0 1 0 0 0 0
66.0875	0 0 1 0 1 0 0 0	0 1 0 1 0 1 1 1
66.0750	0 0 1 0 1 0 0 0	0 1 0 1 0 1 1 0
66.0625	0 0 1 0 1 0 0 0	0 1 0 1 0 0 1 1
66.0500	0 0 1 0 1 0 0 0	0 1 0 1 0 0 1 0
66.0375	0 0 1 0 1 0 0 0	0 1 0 1 0 1 0 1
66.0250	0 0 1 0 1 0 0 0	0 1 0 1 0 1 0 0
66.0125	0 0 1 0 1 0 0 0	0 1 0 1 0 0 0 1
66.0000	0 0 1 0 1 0 0 0	0 1 0 1 0 0 0 0
65.9875	0 1 0 0 1 0 1 0	0 1 0 1 0 1 1 1
65.9750	0 1 0 0 1 0 1 0	0 1 0 1 0 1 1 0
65.9625	0 1 0 0 1 0 1 0	0 1 0 1 0 0 1 1
65.9500	0 1 0 0 1 0 1 0	0 1 0 1 0 0 1 0
65.9375	0 1 0 0 1 0 1 0	0 1 0 1 0 1 0 1
65.9250	0 1 0 0 1 0 1 0	0 1 0 1 0 1 0 0
65.9125	0 1 0 0 1 0 1 0	0 1 0 1 0 0 0 1
65.9000	0 1 0 0 1 0 1 0	0 1 0 1 0 0 0 0
65.8875	0 1 0 0 1 0 0 0	0 1 0 1 0 1 1 1
65.8750	0 1 0 0 1 0 0 0	0 1 0 1 0 1 1 0
65.8625	0 1 0 0 1 0 0 0	0 1 0 1 0 0 1 1
65.8500	0 1 0 0 1 0 0 0	0 1 0 1 0 0 1 0
65.8375	0 1 0 0 1 0 0 0	0 1 0 1 0 1 0 1
65.8250	0 1 0 0 1 0 0 0	0 1 0 1 0 1 0 0
65.8125	0 1 0 0 1 0 0 0	0 1 0 1 0 0 0 1
65.8000	0 1 0 0 1 0 0 0	0 1 0 1 0 0 0 0
65.7875	0 0 0 0 1 0 1 0	0 1 0 1 0 1 1 1
65.7750	0 0 0 0 1 0 1 0	0 1 0 1 0 1 1 0
65.7625	0 0 0 0 1 0 1 0	0 1 0 1 0 0 1 1
65.7500	0 0 0 0 1 0 1 0	0 1 0 1 0 0 1 0
65.7375	0 0 0 0 1 0 1 0	0 1 0 1 0 1 0 1
65.7250	0 0 0 0 1 0 1 0	0 1 0 1 0 1 0 0
65.7125	0 0 0 0 1 0 1 0	0 1 0 1 0 0 0 1
65.7000	0 0 0 0 1 0 1 0	0 1 0 1 0 0 0 0
65.6875	0 0 0 0 1 0 0 0	0 1 0 1 0 1 1 1
65.6750	0 0 0 0 1 0 0 0	0 1 0 1 0 1 1 0
65.6625	0 0 0 0 1 0 0 0	0 1 0 1 0 0 1 1
65.6500	0 0 0 0 1 0 0 0	0 1 0 1 0 0 1 0
65.6375	0 0 0 0 1 0 0 0	0 1 0 1 0 1 0 1
65.6250	0 0 0 0 1 0 0 0	0 1 0 1 0 1 0 0
65.6125	0 0 0 0 1 0 0 0	0 1 0 1 0 0 0 1
65.6000	0 0 0 0 1 0 0 0	0 1 0 1 0 0 0 0
65.5875	0 1 1 1 0 0 1 0	0 1 0 1 0 1 1 1
65.5750	0 1 1 1 0 0 1 0	0 1 0 1 0 1 1 0
65.5625	0 1 1 1 0 0 1 0	0 1 0 1 0 0 1 1
65.5500	0 1 1 1 0 0 1 0	0 1 0 1 0 0 1 0
65.5375	0 1 1 1 0 0 1 0	0 1 0 1 0 1 0 1
65.5250	0 1 1 1 0 0 1 0	0 1 0 1 0 1 0 0
65.5125	0 1 1 1 0 0 1 0	0 1 0 1 0 0 0 1
65.5000	0 1 1 1 0 0 1 0	0 1 0 1 0 0 0 0
65.4875	0 1 1 1 0 0 0 0	0 1 0 1 0 1 1 1
65.4750	0 1 1 1 0 0 0 0	0 1 0 1 0 1 1 0
65.4625	0 1 1 1 0 0 0 0	0 1 0 1 0 0 1 1
65.4500	0 1 1 1 0 0 0 0	0 1 0 1 0 0 1 0
65.4375	0 1 1 1 0 0 0 0	0 1 0 1 0 1 0 1
65.4250	0 1 1 1 0 0 0 0	0 1 0 1 0 1 0 0
65.4125	0 1 1 1 0 0 0 0	0 1 0 1 0 0 0 1
65.4000	0 1 1 1 0 0 0 0	0 1 0 1 0 0 0 0
65.3875	0 0 1 1 0 0 1 0	0 1 0 1 0 1 1 1
65.3750	0 0 1 1 0 0 1 0	0 1 0 1 0 1 1 0
65.3625	0 0 1 1 0 0 1 0	0 1 0 1 0 0 1 1
65.3500	0 0 1 1 0 0 1 0	0 1 0 1 0 0 1 0
65.3375	0 0 1 1 0 0 1 0	0 1 0 1 0 1 0 1
65.3250	0 0 1 1 0 0 1 0	0 1 0 1 0 1 0 0
65.3125	0 0 1 1 0 0 1 0	0 1 0 1 0 0 0 1

L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
65.3000	0 0 1 1 0 0 1 0	0 1 0 1 0 0 0 0
65.2875	0 0 1 1 0 0 0 0	0 1 0 1 0 1 1 1
65.2750	0 0 1 1 0 0 0 0	0 1 0 1 0 1 1 0
65.2625	0 0 1 1 0 0 0 0	0 1 0 1 0 0 1 1
65.2500	0 0 1 1 0 0 0 0	0 1 0 1 0 0 1 0
65.2375	0 0 1 1 0 0 0 0	0 1 0 1 0 1 0 1
65.2250	0 0 1 1 0 0 0 0	0 1 0 1 0 1 0 0
65.2125	0 0 1 1 0 0 0 0	0 1 0 1 0 0 0 1
65.2000	0 0 1 1 0 0 0 0	0 1 0 1 0 0 0 0
65.1875	0 1 0 1 0 0 1 0	0 1 0 1 0 1 1 1
65.1750	0 1 0 1 0 0 1 0	0 1 0 1 0 1 1 0
65.1625	0 1 0 1 0 0 1 0	0 1 0 1 0 0 1 1
65.1500	0 1 0 1 0 0 1 0	0 1 0 1 0 0 1 0
65.1375	0 1 0 1 0 0 1 0	0 1 0 1 0 1 0 1
65.1250	0 1 0 1 0 0 1 0	0 1 0 1 0 1 0 0
65.1125	0 1 0 1 0 0 1 0	0 1 0 1 0 0 0 1
65.1000	0 1 0 1 0 0 1 0	0 1 0 1 0 0 0 0
65.0875	0 1 0 1 0 0 0 0	0 1 0 1 0 1 1 1
65.0750	0 1 0 1 0 0 0 0	0 1 0 1 0 1 1 0
65.0625	0 1 0 1 0 0 0 0	0 1 0 1 0 0 1 1
65.0500	0 1 0 1 0 0 0 0	0 1 0 1 0 0 1 0
65.0375	0 1 0 1 0 0 0 0	0 1 0 1 0 1 0 1
65.0250	0 1 0 1 0 0 0 0	0 1 0 1 0 1 0 0
65.0125	0 1 0 1 0 0 0 0	0 1 0 1 0 0 0 1
65.0000	0 1 0 1 0 0 0 0	0 1 0 1 0 0 0 0
64.9875	0 0 0 1 0 0 1 0	0 1 0 1 0 1 1 1
64.9750	0 0 0 1 0 0 1 0	0 1 0 1 0 1 1 0
64.9625	0 0 0 1 0 0 1 0	0 1 0 1 0 0 1 1
64.9500	0 0 0 1 0 0 1 0	0 1 0 1 0 0 1 0
64.9375	0 0 0 1 0 0 1 0	0 1 0 1 0 1 0 1
64.9250	0 0 0 1 0 0 1 0	0 1 0 1 0 1 0 0
64.9125	0 0 0 1 0 0 1 0	0 1 0 1 0 0 0 1
64.9000	0 0 0 1 0 0 1 0	0 1 0 1 0 0 0 0
64.8875	0 0 0 1 0 0 0 0	0 1 0 1 0 1 1 1
64.8750	0 0 0 1 0 0 0 0	0 1 0 1 0 1 1 0
64.8625	0 0 0 1 0 0 0 0	0 1 0 1 0 0 1 1
64.8500	0 0 0 1 0 0 0 0	0 1 0 1 0 0 1 0
64.8375	0 0 0 1 0 0 0 0	0 1 0 1 0 1 0 1
64.8250	0 0 0 1 0 0 0 0	0 1 0 1 0 1 0 0
64.8125	0 0 0 1 0 0 0 0	0 1 0 1 0 0 0 1
64.8000	0 0 0 1 0 0 0 0	0 1 0 1 0 0 0 0
64.7875	0 1 1 0 0 0 1 0	0 1 0 1 0 1 1 1
64.7750	0 1 1 0 0 0 1 0	0 1 0 1 0 1 1 0
64.7625	0 1 1 0 0 0 1 0	0 1 0 1 0 0 1 1
64.7500	0 1 1 0 0 0 1 0	0 1 0 1 0 0 1 0
64.7375	0 1 1 0 0 0 1 0	0 1 0 1 0 1 0 1
64.7250	0 1 1 0 0 0 1 0	0 1 0 1 0 1 0 0
64.7125	0 1 1 0 0 0 1 0	0 1 0 1 0 0 0 1
64.7000	0 1 1 0 0 0 1 0	0 1 0 1 0 0 0 0
64.6875	0 1 1 0 0 0 0 0	0 1 0 1 0 1 1 1
64.6750	0 1 1 0 0 0 0 0	0 1 0 1 0 1 1 0
64.6625	0 1 1 0 0 0 0 0	0 1 0 1 0 0 1 1
64.6500	0 1 1 0 0 0 0 0	0 1 0 1 0 0 1 0
64.6375	0 1 1 0 0 0 0 0	0 1 0 1 0 1 0 1
64.6250	0 1 1 0 0 0 0 0	0 1 0 1 0 1 0 0
64.6125	0 1 1 0 0 0 0 0	0 1 0 1 0 0 0 1
64.6000	0 1 1 0 0 0 0 0	0 1 0 1 0 0 0 0
64.5875	0 0 1 0 0 0 1 0	0 1 0 1 0 1 1 1
64.5750	0 0 1 0 0 0 1 0	0 1 0 1 0 1 1 0
64.5625	0 0 1 0 0 0 1 0	0 1 0 1 0 0 1 1
64.5500	0 0 1 0 0 0 1 0	0 1 0 1 0 0 1 0
64.5375	0 0 1 0 0 0 1 0	0 1 0 1 0 1 0 1
64.5250	0 0 1 0 0 0 1 0	0 1 0 1 0 1 0 0
64.5125	0 0 1 0 0 0 1 0	0 1 0 1 0 0 0 1
64.5000	0 0 1 0 0 0 1 0	0 1 0 1 0 0 0 0
64.4875	0 0 1 0 0 0 0 0	0 1 0 1 0 1 1 1
64.4750	0 0 1 0 0 0 0 0	0 1 0 1 0 1 1 0
64.4625	0 0 1 0 0 0 0 0	0 1 0 1 0 0 1 1
64.4500	0 0 1 0 0 0 0 0	0 1 0 1 0 0 1 0
64.4375	0 0 1 0 0 0 0 0	0 1 0 1 0 1 0 1
64.4250	0 0 1 0 0 0 0 0	0 1 0 1 0 1 0 0
64.4125	0 0 1 0 0 0 0 0	0 1 0 1 0 0 0 1
64.4000	0 0 1 0 0 0 0 0	0 1 0 1 0 0 0 0
64.3875	0 1 0 0 0 0 1 0	0 1 0 1 0 1 1 1
64.3750	0 1 0 0 0 0 1 0	0 1 0 1 0 1 1 0
64.3625	0 1 0 0 0 0 1 0	0 1 0 1 0 0 1 1
64.3500	0 1 0 0 0 0 1 0	0 1 0 1 0 0 1 0
64.3375	0 1 0 0 0 0 1 0	0 1 0 1 0 1 0 1
64.3250	0 1 0 0 0 0 1 0	0 1 0 1 0 1 0 0
64.3125	0 1 0 0 0 0 1 0	0 1 0 1 0 0 0 1

L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
64.3000	0 1 0 0 0 0 1 0	0 1 0 1 0 0 0 0
64.2875	0 1 0 0 0 0 0 0	0 1 0 1 0 1 1 1
64.2750	0 1 0 0 0 0 0 0	0 1 0 1 0 1 1 0
64.2625	0 1 0 0 0 0 0 0	0 1 0 1 0 0 1 1
64.2500	0 1 0 0 0 0 0 0	0 1 0 1 0 0 1 0
64.2375	0 1 0 0 0 0 0 0	0 1 0 1 0 1 0 1
64.2250	0 1 0 0 0 0 0 0	0 1 0 1 0 1 0 0
64.2125	0 1 0 0 0 0 0 0	0 1 0 1 0 0 0 1
64.2000	0 1 0 0 0 0 0 0	0 1 0 1 0 0 0 0
64.1875	0 0 0 0 0 0 1 0	0 1 0 1 0 1 1 1
64.1750	0 0 0 0 0 0 1 0	0 1 0 1 0 1 1 0
64.1625	0 0 0 0 0 0 1 0	0 1 0 1 0 0 1 1
64.1500	0 0 0 0 0 0 1 0	0 1 0 1 0 0 1 0
64.1375	0 0 0 0 0 0 1 0	0 1 0 1 0 1 0 1
64.1250	0 0 0 0 0 0 1 0	0 1 0 1 0 1 0 0
64.1125	0 0 0 0 0 0 1 0	0 1 0 1 0 0 0 1
64.1000	0 0 0 0 0 0 1 0	0 1 0 1 0 0 0 0
64.0875	0 0 0 0 0 0 0 0	0 1 0 1 0 1 1 1
64.0750	0 0 0 0 0 0 0 0	0 1 0 1 0 1 1 0
64.0625	0 0 0 0 0 0 0 0	0 1 0 1 0 0 1 1
64.0500	0 0 0 0 0 0 0 0	0 1 0 1 0 0 1 0
64.0375	0 0 0 0 0 0 0 0	0 1 0 1 0 1 0 1
64.0250	0 0 0 0 0 0 0 0	0 1 0 1 0 1 0 0
64.0125	0 0 0 0 0 0 0 0	0 1 0 1 0 0 0 1
64.0000	0 0 0 0 0 0 0 0	0 1 0 1 0 0 0 0
63.9875	0 1 1 1 1 0 1 1	1 0 0 1 0 1 1 1
63.9750	0 1 1 1 1 0 1 1	1 0 0 1 0 1 1 0
63.9625	0 1 1 1 1 0 1 1	1 0 0 1 0 0 1 1
63.9500	0 1 1 1 1 0 1 1	1 0 0 1 0 0 1 0
63.9375	0 1 1 1 1 0 1 1	1 0 0 1 0 1 0 1
63.9250	0 1 1 1 1 0 1 1	1 0 0 1 0 1 0 0
63.9125	0 1 1 1 1 0 1 1	1 0 0 1 0 0 0 1
63.9000	0 1 1 1 1 0 1 1	1 0 0 1 0 0 0 0
63.8875	0 1 1 1 1 0 0 1	1 0 0 1 0 1 1 1
63.8750	0 1 1 1 1 0 0 1	1 0 0 1 0 1 1 0
63.8625	0 1 1 1 1 0 0 1	1 0 0 1 0 0 1 1
63.8500	0 1 1 1 1 0 0 1	1 0 0 1 0 0 1 0
63.8375	0 1 1 1 1 0 0 1	1 0 0 1 0 1 0 1
63.8250	0 1 1 1 1 0 0 1	1 0 0 1 0 1 0 0
63.8125	0 1 1 1 1 0 0 1	1 0 0 1 0 0 0 1
63.8000	0 1 1 1 1 0 0 1	1 0 0 1 0 0 0 0
63.7875	0 0 1 1 1 0 1 1	1 0 0 1 0 1 1 1
63.7750	0 0 1 1 1 0 1 1	1 0 0 1 0 1 1 0
63.7625	0 0 1 1 1 0 1 1	1 0 0 1 0 0 1 1

63.7500	0 0 1 1 1 0 1 1	1 0 0 1 0 0 1 0
63.7375	0 0 1 1 1 0 1 1	1 0 0 1 0 1 0 1
63.7250	0 0 1 1 1 0 1 1	1 0 0 1 0 1 0 0
63.7125	0 0 1 1 1 0 1 1	1 0 0 1 0 0 0 1
63.7000	0 0 1 1 1 0 1 1	1 0 0 1 0 0 0 0
63.6875	0 0 1 1 1 0 0 1	1 0 0 1 0 1 1 1
63.6750	0 0 1 1 1 0 0 1	1 0 0 1 0 1 1 0
63.6625	0 0 1 1 1 0 0 1	1 0 0 1 0 0 1 1
63.6500	0 0 1 1 1 0 0 1	1 0 0 1 0 0 1 0
63.6375	0 0 1 1 1 0 0 1	1 0 0 1 0 1 0 1
63.6250	0 0 1 1 1 0 0 1	1 0 0 1 0 1 0 0
63.6125	0 0 1 1 1 0 0 1	1 0 0 1 0 0 0 1
63.6000	0 0 1 1 1 0 0 1	1 0 0 1 0 0 0 0
63.5875	0 1 0 1 1 0 1 1	1 0 0 1 0 1 1 1
63.5750	0 1 0 1 1 0 1 1	1 0 0 1 0 1 1 0
63.5625	0 1 0 1 1 0 1 1	1 0 0 1 0 0 1 1
63.5500	0 1 0 1 1 0 1 1	1 0 0 1 0 0 1 0
63.5375	0 1 0 1 1 0 1 1	1 0 0 1 0 1 0 1
63.5250	0 1 0 1 1 0 1 1	1 0 0 1 0 1 0 0
63.5125	0 1 0 1 1 0 1 1	1 0 0 1 0 0 0 1
63.5000	0 1 0 1 1 0 1 1	1 0 0 1 0 0 0 0
63.4875	0 1 0 1 1 0 0 1	1 0 0 1 0 1 1 1
63.4750	0 1 0 1 1 0 0 1	1 0 0 1 0 1 1 0
63.4625	0 1 0 1 1 0 0 1	1 0 0 1 0 0 1 1
63.4500	0 1 0 1 1 0 0 1	1 0 0 1 0 0 1 0
63.4375	0 1 0 1 1 0 0 1	1 0 0 1 0 1 0 1
63.4250	0 1 0 1 1 0 0 1	1 0 0 1 0 1 0 0
63.4125	0 1 0 1 1 0 0 1	1 0 0 1 0 0 0 1
63.4000	0 1 0 1 1 0 0 1	1 0 0 1 0 0 0 0
63.3875	0 0 0 1 1 0 1 1	1 0 0 1 0 1 1 1
63.3750	0 0 0 1 1 0 1 1	1 0 0 1 0 1 1 0
63.3625	0 0 0 1 1 0 1 1	1 0 0 1 0 0 1 1
63.3500	0 0 0 1 1 0 1 1	1 0 0 1 0 0 1 0
63.3375	0 0 0 1 1 0 1 1	1 0 0 1 0 1 0 1
63.3250	0 0 0 1 1 0 1 1	1 0 0 1 0 1 0 0
63.3125	0 0 0 1 1 0 1 1	1 0 0 1 0 0 0 1
L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
63.3000	0 0 0 1 1 0 1 1	1 0 0 1 0 0 0 0
63.2875	0 0 0 1 1 0 0 1	1 0 0 1 0 1 1 1
63.2750	0 0 0 1 1 0 0 1	1 0 0 1 0 1 1 0
63.2625	0 0 0 1 1 0 0 1	1 0 0 1 0 0 1 1
63.2500	0 0 0 1 1 0 0 1	1 0 0 1 0 0 1 0
63.2375	0 0 0 1 1 0 0 1	1 0 0 1 0 1 0 1
63.2250	0 0 0 1 1 0 0 1	1 0 0 1 0 1 0 0
63.2125	0 0 0 1 1 0 0 1	1 0 0 1 0 0 0 1
63.2000	0 0 0 1 1 0 0 1	1 0 0 1 0 0 0 0
63.1875	0 1 1 0 1 0 1 1	1 0 0 1 0 1 1 1
63.1750	0 1 1 0 1 0 1 1	1 0 0 1 0 1 1 0
63.1625	0 1 1 0 1 0 1 1	1 0 0 1 0 0 1 1
63.1500	0 1 1 0 1 0 1 1	1 0 0 1 0 0 1 0
63.1375	0 1 1 0 1 0 1 1	1 0 0 1 0 1 0 1
63.1250	0 1 1 0 1 0 1 1	1 0 0 1 0 1 0 0
63.1125	0 1 1 0 1 0 1 1	1 0 0 1 0 0 0 1
63.1000	0 1 1 0 1 0 1 1	1 0 0 1 0 0 0 0
63.0875	0 1 1 0 1 0 0 1	1 0 0 1 0 1 1 1
63.0750	0 1 1 0 1 0 0 1	1 0 0 1 0 1 1 0
63.0625	0 1 1 0 1 0 0 1	1 0 0 1 0 0 1 1
63.0500	0 1 1 0 1 0 0 1	1 0 0 1 0 0 1 0
63.0375	0 1 1 0 1 0 0 1	1 0 0 1 0 1 0 1
63.0250	0 1 1 0 1 0 0 1	1 0 0 1 0 1 0 0
63.0125	0 1 1 0 1 0 0 1	1 0 0 1 0 0 0 1
63.0000	0 1 1 0 1 0 0 1	1 0 0 1 0 0 0 0
62.9875	0 0 1 0 1 0 1 1	1 0 0 1 0 1 1 1

62.9750	0 0 1 0 1 0 1 1	1 0 0 1 0 1 1 0
62.9625	0 0 1 0 1 0 1 1	1 0 0 1 0 0 1 1
62.9500	0 0 1 0 1 0 1 1	1 0 0 1 0 0 1 0
62.9375	0 0 1 0 1 0 1 1	1 0 0 1 0 1 0 1
62.9250	0 0 1 0 1 0 1 1	1 0 0 1 0 1 0 0
62.9125	0 0 1 0 1 0 1 1	1 0 0 1 0 0 0 1
62.9000	0 0 1 0 1 0 1 1	1 0 0 1 0 0 0 0
62.8875	0 0 1 0 1 0 0 1	1 0 0 1 0 1 1 1
62.8750	0 0 1 0 1 0 0 1	1 0 0 1 0 1 1 0
62.8625	0 0 1 0 1 0 0 1	1 0 0 1 0 0 1 1
62.8500	0 0 1 0 1 0 0 1	1 0 0 1 0 0 1 0
62.8375	0 0 1 0 1 0 0 1	1 0 0 1 0 1 0 1
62.8250	0 0 1 0 1 0 0 1	1 0 0 1 0 1 0 0
62.8125	0 0 1 0 1 0 0 1	1 0 0 1 0 0 0 1
62.8000	0 0 1 0 1 0 0 1	1 0 0 1 0 0 0 0
62.7875	0 1 0 0 1 0 1 1	1 0 0 1 0 1 1 1
62.7750	0 1 0 0 1 0 1 1	1 0 0 1 0 1 1 0
62.7625	0 1 0 0 1 0 1 1	1 0 0 1 0 0 1 1
62.7500	0 1 0 0 1 0 1 1	1 0 0 1 0 0 1 0
62.7375	0 1 0 0 1 0 1 1	1 0 0 1 0 1 0 1
62.7250	0 1 0 0 1 0 1 1	1 0 0 1 0 1 0 0
62.7125	0 1 0 0 1 0 1 1	1 0 0 1 0 0 0 1
62.7000	0 1 0 0 1 0 1 1	1 0 0 1 0 0 0 0
62.6875	0 1 0 0 1 0 0 1	1 0 0 1 0 1 1 1
62.6750	0 1 0 0 1 0 0 1	1 0 0 1 0 1 1 0
62.6625	0 1 0 0 1 0 0 1	1 0 0 1 0 0 1 1
62.6500	0 1 0 0 1 0 0 1	1 0 0 1 0 0 1 0
62.6375	0 1 0 0 1 0 0 1	1 0 0 1 0 1 0 1
62.6250	0 1 0 0 1 0 0 1	1 0 0 1 0 1 0 0
62.6125	0 1 0 0 1 0 0 1	1 0 0 1 0 0 0 1
62.6000	0 1 0 0 1 0 0 1	1 0 0 1 0 0 0 0
62.5875	0 0 0 0 1 0 1 1	1 0 0 1 0 1 1 1
62.5750	0 0 0 0 1 0 1 1	1 0 0 1 0 1 1 0
62.5625	0 0 0 0 1 0 1 1	1 0 0 1 0 0 1 1
62.5500	0 0 0 0 1 0 1 1	1 0 0 1 0 0 1 0
62.5375	0 0 0 0 1 0 1 1	1 0 0 1 0 1 0 1
62.5250	0 0 0 0 1 0 1 1	1 0 0 1 0 1 0 0
62.5125	0 0 0 0 1 0 1 1	1 0 0 1 0 0 0 1
62.5000	0 0 0 0 1 0 1 1	1 0 0 1 0 0 0 0
62.4875	0 0 0 0 1 0 0 1	1 0 0 1 0 1 1 1
62.4750	0 0 0 0 1 0 0 1	1 0 0 1 0 1 1 0
62.4625	0 0 0 0 1 0 0 1	1 0 0 1 0 0 1 1
62.4500	0 0 0 0 1 0 0 1	1 0 0 1 0 0 1 0
62.4375	0 0 0 0 1 0 0 1	1 0 0 1 0 1 0 1
62.4250	0 0 0 0 1 0 0 1	1 0 0 1 0 1 0 0
62.4125	0 0 0 0 1 0 0 1	1 0 0 1 0 0 0 1
62.4000	0 0 0 0 1 0 0 1	1 0 0 1 0 0 0 0
62.3875	0 1 1 1 0 0 1 1	1 0 0 1 0 1 1 1
62.3750	0 1 1 1 0 0 1 1	1 0 0 1 0 1 1 0
62.3625	0 1 1 1 0 0 1 1	1 0 0 1 0 0 1 1
62.3500	0 1 1 1 0 0 1 1	1 0 0 1 0 0 1 0
62.3375	0 1 1 1 0 0 1 1	1 0 0 1 0 1 0 1
62.3250	0 1 1 1 0 0 1 1	1 0 0 1 0 1 0 0
62.3125	0 1 1 1 0 0 1 1	1 0 0 1 0 0 0 1
L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
62.3000	0 1 1 1 0 0 1 1	1 0 0 1 0 0 0 0
62.2875	0 1 1 1 0 0 0 1	1 0 0 1 0 1 1 1
62.2750	0 1 1 1 0 0 0 1	1 0 0 1 0 1 1 0
62.2625	0 1 1 1 0 0 0 1	1 0 0 1 0 0 1 1
62.2500	0 1 1 1 0 0 0 1	1 0 0 1 0 0 1 0
62.2375	0 1 1 1 0 0 0 1	1 0 0 1 0 1 0 1
62.2250	0 1 1 1 0 0 0 1	1 0 0 1 0 1 0 0
62.2125	0 1 1 1 0 0 0 1	1 0 0 1 0 0 0 1

62.2000	0 1 1 1 0 0 0 1	1 0 0 1 0 0 0 0
62.1875	0 0 1 1 0 0 1 1	1 0 0 1 0 1 1 1
62.1750	0 0 1 1 0 0 1 1	1 0 0 1 0 1 1 0
62.1625	0 0 1 1 0 0 1 1	1 0 0 1 0 0 1 1
62.1500	0 0 1 1 0 0 1 1	1 0 0 1 0 0 1 0
62.1375	0 0 1 1 0 0 1 1	1 0 0 1 0 1 0 1
62.1250	0 0 1 1 0 0 1 1	1 0 0 1 0 1 0 0
62.1125	0 0 1 1 0 0 1 1	1 0 0 1 0 0 0 1
62.1000	0 0 1 1 0 0 1 1	1 0 0 1 0 0 0 0
62.0875	0 0 1 1 0 0 0 1	1 0 0 1 0 1 1 1
62.0750	0 0 1 1 0 0 0 1	1 0 0 1 0 1 1 0
62.0625	0 0 1 1 0 0 0 1	1 0 0 1 0 0 1 1
62.0500	0 0 1 1 0 0 0 1	1 0 0 1 0 0 1 0
62.0375	0 0 1 1 0 0 0 1	1 0 0 1 0 1 0 1
62.0250	0 0 1 1 0 0 0 1	1 0 0 1 0 1 0 0
62.0125	0 0 1 1 0 0 0 1	1 0 0 1 0 0 0 1
62.0000	0 0 1 1 0 0 0 1	1 0 0 1 0 0 0 0
61.9875	0 1 0 1 0 0 1 1	1 0 0 1 0 1 1 1
61.9750	0 1 0 1 0 0 1 1	1 0 0 1 0 1 1 0
61.9625	0 1 0 1 0 0 1 1	1 0 0 1 0 0 1 1
61.9500	0 1 0 1 0 0 1 1	1 0 0 1 0 0 1 0
61.9375	0 1 0 1 0 0 1 1	1 0 0 1 0 1 0 1
61.9250	0 1 0 1 0 0 1 1	1 0 0 1 0 1 0 0
61.9125	0 1 0 1 0 0 1 1	1 0 0 1 0 0 0 1
61.9000	0 1 0 1 0 0 1 1	1 0 0 1 0 0 0 0
61.8875	0 1 0 1 0 0 0 1	1 0 0 1 0 1 1 1
61.8750	0 1 0 1 0 0 0 1	1 0 0 1 0 1 1 0
61.8625	0 1 0 1 0 0 0 1	1 0 0 1 0 0 1 1
61.8500	0 1 0 1 0 0 0 1	1 0 0 1 0 0 1 0
61.8375	0 1 0 1 0 0 0 1	1 0 0 1 0 1 0 1
61.8250	0 1 0 1 0 0 0 1	1 0 0 1 0 1 0 0
61.8125	0 1 0 1 0 0 0 1	1 0 0 1 0 0 0 1
61.8000	0 1 0 1 0 0 0 1	1 0 0 1 0 0 0 0
61.7875	0 0 0 1 0 0 1 1	1 0 0 1 0 1 1 1
61.7750	0 0 0 1 0 0 1 1	1 0 0 1 0 1 1 0
61.7625	0 0 0 1 0 0 1 1	1 0 0 1 0 0 1 1
61.7500	0 0 0 1 0 0 1 1	1 0 0 1 0 0 1 0
61.7375	0 0 0 1 0 0 1 1	1 0 0 1 0 1 0 1
61.7250	0 0 0 1 0 0 1 1	1 0 0 1 0 1 0 0
61.7125	0 0 0 1 0 0 1 1	1 0 0 1 0 0 0 1
61.7000	0 0 0 1 0 0 1 1	1 0 0 1 0 0 0 0
61.6875	0 0 0 1 0 0 0 1	1 0 0 1 0 1 1 1
61.6750	0 0 0 1 0 0 0 1	1 0 0 1 0 1 1 0
61.6625	0 0 0 1 0 0 0 1	1 0 0 1 0 0 1 1
61.6500	0 0 0 1 0 0 0 1	1 0 0 1 0 0 1 0
61.6375	0 0 0 1 0 0 0 1	1 0 0 1 0 1 0 1
61.6250	0 0 0 1 0 0 0 1	1 0 0 1 0 1 0 0
61.6125	0 0 0 1 0 0 0 1	1 0 0 1 0 0 0 1
61.6000	0 0 0 1 0 0 0 1	1 0 0 1 0 0 0 0
61.5875	0 1 1 0 0 0 1 1	1 0 0 1 0 1 1 1
61.5750	0 1 1 0 0 0 1 1	1 0 0 1 0 1 1 0
61.5625	0 1 1 0 0 0 1 1	1 0 0 1 0 0 1 1
61.5500	0 1 1 0 0 0 1 1	1 0 0 1 0 0 1 0
61.5375	0 1 1 0 0 0 1 1	1 0 0 1 0 1 0 1
61.5250	0 1 1 0 0 0 1 1	1 0 0 1 0 1 0 0
61.5125	0 1 1 0 0 0 1 1	1 0 0 1 0 0 0 1
61.5000	0 1 1 0 0 0 1 1	1 0 0 1 0 0 0 0
61.4875	0 1 1 0 0 0 0 1	1 0 0 1 0 1 1 1
61.4750	0 1 1 0 0 0 0 1	1 0 0 1 0 1 1 0
61.4625	0 1 1 0 0 0 0 1	1 0 0 1 0 0 1 1
61.4500	0 1 1 0 0 0 0 1	1 0 0 1 0 0 1 0
61.4375	0 1 1 0 0 0 0 1	1 0 0 1 0 1 0 1
61.4250	0 1 1 0 0 0 0 1	1 0 0 1 0 1 0 0
61.4125	0 1 1 0 0 0 0 1	1 0 0 1 0 0 0 1
61.4000	0 1 1 0 0 0 0 1	1 0 0 1 0 0 0 0
61.3875	0 0 1 0 0 0 1 1	1 0 0 1 0 1 1 1
61.3750	0 0 1 0 0 0 1 1	1 0 0 1 0 1 1 0
61.3625	0 0 1 0 0 0 1 1	1 0 0 1 0 0 1 1
61.3500	0 0 1 0 0 0 1 1	1 0 0 1 0 0 1 0
61.3375	0 0 1 0 0 0 1 1	1 0 0 1 0 1 0 1
61.3250	0 0 1 0 0 0 1 1	1 0 0 1 0 1 0 0
61.3125	0 0 1 0 0 0 1 1	1 0 0 1 0 0 0 1

L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
61.3000	0 0 1 0 0 0 1 1	1 0 0 1 0 0 0 0
61.2875	0 0 1 0 0 0 0 1	1 0 0 1 0 1 1 1
61.2750	0 0 1 0 0 0 0 1	1 0 0 1 0 1 1 0
61.2625	0 0 1 0 0 0 0 1	1 0 0 1 0 0 1 1
61.2500	0 0 1 0 0 0 0 1	1 0 0 1 0 0 1 0
61.2375	0 0 1 0 0 0 0 1	1 0 0 1 0 1 0 1
61.2250	0 0 1 0 0 0 0 1	1 0 0 1 0 1 0 0
61.2125	0 0 1 0 0 0 0 1	1 0 0 1 0 0 0 1
61.2000	0 0 1 0 0 0 0 1	1 0 0 1 0 0 0 0
61.1875	0 1 0 0 0 0 1 1	1 0 0 1 0 1 1 1
61.1750	0 1 0 0 0 0 1 1	1 0 0 1 0 1 1 0
61.1625	0 1 0 0 0 0 1 1	1 0 0 1 0 0 1 1
61.1500	0 1 0 0 0 0 1 1	1 0 0 1 0 0 1 0
61.1375	0 1 0 0 0 0 1 1	1 0 0 1 0 1 0 1
61.1250	0 1 0 0 0 0 1 1	1 0 0 1 0 1 0 0
61.1125	0 1 0 0 0 0 1 1	1 0 0 1 0 0 0 1
61.1000	0 1 0 0 0 0 1 1	1 0 0 1 0 0 0 0
61.0875	0 1 0 0 0 0 0 1	1 0 0 1 0 1 1 1
61.0750	0 1 0 0 0 0 0 1	1 0 0 1 0 1 1 0
61.0625	0 1 0 0 0 0 0 1	1 0 0 1 0 0 1 1
61.0500	0 1 0 0 0 0 0 1	1 0 0 1 0 0 1 0
61.0375	0 1 0 0 0 0 0 1	1 0 0 1 0 1 0 1
61.0250	0 1 0 0 0 0 0 1	1 0 0 1 0 1 0 0
61.0125	0 1 0 0 0 0 0 1	1 0 0 1 0 0 0 1
61.0000	0 1 0 0 0 0 0 1	1 0 0 1 0 0 0 0
60.9875	0 0 0 0 0 0 1 1	1 0 0 1 0 1 1 1
60.9750	0 0 0 0 0 0 1 1	1 0 0 1 0 1 1 0
60.9625	0 0 0 0 0 0 1 1	1 0 0 1 0 0 1 1
60.9500	0 0 0 0 0 0 1 1	1 0 0 1 0 0 1 0
60.9375	0 0 0 0 0 0 1 1	1 0 0 1 0 1 0 1
60.9250	0 0 0 0 0 0 1 1	1 0 0 1 0 1 0 0
60.9125	0 0 0 0 0 0 1 1	1 0 0 1 0 0 0 1
60.9000	0 0 0 0 0 0 1 1	1 0 0 1 0 0 0 0
60.8875	0 0 0 0 0 0 0 1	1 0 0 1 0 1 1 1
60.8750	0 0 0 0 0 0 0 1	1 0 0 1 0 1 1 0
60.8625	0 0 0 0 0 0 0 1	1 0 0 1 0 0 1 1
60.8500	0 0 0 0 0 0 0 1	1 0 0 1 0 0 1 0
60.8375	0 0 0 0 0 0 0 1	1 0 0 1 0 1 0 1
60.8250	0 0 0 0 0 0 0 1	1 0 0 1 0 1 0 0
60.8125	0 0 0 0 0 0 0 1	1 0 0 1 0 0 0 1
60.8000	0 0 0 0 0 0 0 1	1 0 0 1 0 0 0 0
60.7875	0 1 1 1 1 0 1 0	1 0 0 1 0 1 1 1
60.7750	0 1 1 1 1 0 1 0	1 0 0 1 0 1 1 0
60.7625	0 1 1 1 1 0 1 0	1 0 0 1 0 0 1 1
60.7500	0 1 1 1 1 0 1 0	1 0 0 1 0 0 1 0
60.7375	0 1 1 1 1 0 1 0	1 0 0 1 0 1 0 1
60.7250	0 1 1 1 1 0 1 0	1 0 0 1 0 1 0 0
60.7125	0 1 1 1 1 0 1 0	1 0 0 1 0 0 0 1
60.7000	0 1 1 1 1 0 1 0	1 0 0 1 0 0 0 0
60.6875	0 1 1 1 1 0 0 0	1 0 0 1 0 1 1 1
60.6750	0 1 1 1 1 0 0 0	1 0 0 1 0 1 1 0
60.6625	0 1 1 1 1 0 0 0	1 0 0 1 0 0 1 1
60.6500	0 1 1 1 1 0 0 0	1 0 0 1 0 0 1 0
60.6375	0 1 1 1 1 0 0 0	1 0 0 1 0 1 0 1
60.6250	0 1 1 1 1 0 0 0	1 0 0 1 0 1 0 0

60.6125	0 1 1 1 1 0 0 0	1 0 0 1 0 0 0 1
60.6000	0 1 1 1 1 0 0 0	1 0 0 1 0 0 0 0
60.5875	0 0 1 1 1 0 1 0	1 0 0 1 0 1 1 1
60.5750	0 0 1 1 1 0 1 0	1 0 0 1 0 1 1 0
60.5625	0 0 1 1 1 0 1 0	1 0 0 1 0 0 1 1
60.5500	0 0 1 1 1 0 1 0	1 0 0 1 0 0 1 0
60.5375	0 0 1 1 1 0 1 0	1 0 0 1 0 1 0 1
60.5250	0 0 1 1 1 0 1 0	1 0 0 1 0 1 0 0
60.5125	0 0 1 1 1 0 1 0	1 0 0 1 0 0 0 1
60.5000	0 0 1 1 1 0 1 0	1 0 0 1 0 0 0 0
60.4875	0 0 1 1 1 0 0 0	1 0 0 1 0 1 1 1
60.4750	0 0 1 1 1 0 0 0	1 0 0 1 0 1 1 0
60.4625	0 0 1 1 1 0 0 0	1 0 0 1 0 0 1 1
60.4500	0 0 1 1 1 0 0 0	1 0 0 1 0 0 1 0
60.4375	0 0 1 1 1 0 0 0	1 0 0 1 0 1 0 1
60.4250	0 0 1 1 1 0 0 0	1 0 0 1 0 1 0 0
60.4125	0 0 1 1 1 0 0 0	1 0 0 1 0 0 0 1
60.4000	0 0 1 1 1 0 0 0	1 0 0 1 0 0 0 0
60.3875	0 1 0 1 1 0 1 0	1 0 0 1 0 1 1 1
60.3750	0 1 0 1 1 0 1 0	1 0 0 1 0 1 1 0
60.3625	0 1 0 1 1 0 1 0	1 0 0 1 0 0 1 1
60.3500	0 1 0 1 1 0 1 0	1 0 0 1 0 0 1 0
60.3375	0 1 0 1 1 0 1 0	1 0 0 1 0 1 0 1
60.3250	0 1 0 1 1 0 1 0	1 0 0 1 0 1 0 0
60.3125	0 1 0 1 1 0 1 0	1 0 0 1 0 0 0 1
L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
60.3000	0 1 0 1 1 0 1 0	1 0 0 1 0 0 0 0
60.2875	0 1 0 1 1 0 0 0	1 0 0 1 0 1 1 1
60.2750	0 1 0 1 1 0 0 0	1 0 0 1 0 1 1 0
60.2625	0 1 0 1 1 0 0 0	1 0 0 1 0 0 1 1
60.2500	0 1 0 1 1 0 0 0	1 0 0 1 0 0 1 0
60.2375	0 1 0 1 1 0 0 0	1 0 0 1 0 1 0 1
60.2250	0 1 0 1 1 0 0 0	1 0 0 1 0 1 0 0
60.2125	0 1 0 1 1 0 0 0	1 0 0 1 0 0 0 1
60.2000	0 1 0 1 1 0 0 0	1 0 0 1 0 0 0 0
60.1875	0 0 0 1 1 0 1 0	1 0 0 1 0 1 1 1
60.1750	0 0 0 1 1 0 1 0	1 0 0 1 0 1 1 0
60.1625	0 0 0 1 1 0 1 0	1 0 0 1 0 0 1 1
60.1500	0 0 0 1 1 0 1 0	1 0 0 1 0 0 1 0
60.1375	0 0 0 1 1 0 1 0	1 0 0 1 0 1 0 1
60.1250	0 0 0 1 1 0 1 0	1 0 0 1 0 1 0 0
60.1125	0 0 0 1 1 0 1 0	1 0 0 1 0 0 0 1
60.1000	0 0 0 1 1 0 1 0	1 0 0 1 0 0 0 0
60.0875	0 0 0 1 1 0 0 0	1 0 0 1 0 1 1 1
60.0750	0 0 0 1 1 0 0 0	1 0 0 1 0 1 1 0
60.0625	0 0 0 1 1 0 0 0	1 0 0 1 0 0 1 1
60.0500	0 0 0 1 1 0 0 0	1 0 0 1 0 0 1 0
60.0375	0 0 0 1 1 0 0 0	1 0 0 1 0 1 0 1
60.0250	0 0 0 1 1 0 0 0	1 0 0 1 0 1 0 0
60.0125	0 0 0 1 1 0 0 0	1 0 0 1 0 0 0 1
60.0000	0 0 0 1 1 0 0 0	1 0 0 1 0 0 0 0
59.9875	0 1 1 0 1 0 1 0	1 0 0 1 0 1 1 1
59.9750	0 1 1 0 1 0 1 0	1 0 0 1 0 1 1 0
59.9625	0 1 1 0 1 0 1 0	1 0 0 1 0 0 1 1
59.9500	0 1 1 0 1 0 1 0	1 0 0 1 0 0 1 0
59.9375	0 1 1 0 1 0 1 0	1 0 0 1 0 1 0 1
59.9250	0 1 1 0 1 0 1 0	1 0 0 1 0 1 0 0
59.9125	0 1 1 0 1 0 1 0	1 0 0 1 0 0 0 1
59.9000	0 1 1 0 1 0 1 0	1 0 0 1 0 0 0 0
59.8875	0 1 1 0 1 0 0 0	1 0 0 1 0 1 1 1
59.8750	0 1 1 0 1 0 0 0	1 0 0 1 0 1 1 0
59.8625	0 1 1 0 1 0 0 0	1 0 0 1 0 0 1 1
59.8500	0 1 1 0 1 0 0 0	1 0 0 1 0 0 1 0

59.8375	0 1 1 0 1 0 0 0	1 0 0 1 0 1 0 1
59.8250	0 1 1 0 1 0 0 0	1 0 0 1 0 1 0 0
59.8125	0 1 1 0 1 0 0 0	1 0 0 1 0 0 0 1
59.8000	0 1 1 0 1 0 0 0	1 0 0 1 0 0 0 0
59.7875	0 0 1 0 1 0 1 0	1 0 0 1 0 1 1 1
59.7750	0 0 1 0 1 0 1 0	1 0 0 1 0 1 1 0
59.7625	0 0 1 0 1 0 1 0	1 0 0 1 0 0 1 1
59.7500	0 0 1 0 1 0 1 0	1 0 0 1 0 0 1 0
59.7375	0 0 1 0 1 0 1 0	1 0 0 1 0 1 0 1
59.7250	0 0 1 0 1 0 1 0	1 0 0 1 0 1 0 0
59.7125	0 0 1 0 1 0 1 0	1 0 0 1 0 0 0 1
59.7000	0 0 1 0 1 0 1 0	1 0 0 1 0 0 0 0
59.6875	0 0 1 0 1 0 0 0	1 0 0 1 0 1 1 1
59.6750	0 0 1 0 1 0 0 0	1 0 0 1 0 1 1 0
59.6625	0 0 1 0 1 0 0 0	1 0 0 1 0 0 1 1
59.6500	0 0 1 0 1 0 0 0	1 0 0 1 0 0 1 0
59.6375	0 0 1 0 1 0 0 0	1 0 0 1 0 1 0 1
59.6250	0 0 1 0 1 0 0 0	1 0 0 1 0 1 0 0
59.6125	0 0 1 0 1 0 0 0	1 0 0 1 0 0 0 1
59.6000	0 0 1 0 1 0 0 0	1 0 0 1 0 0 0 0
59.5875	0 1 0 0 1 0 1 0	1 0 0 1 0 1 1 1
59.5750	0 1 0 0 1 0 1 0	1 0 0 1 0 1 1 0
59.5625	0 1 0 0 1 0 1 0	1 0 0 1 0 0 1 1
59.5500	0 1 0 0 1 0 1 0	1 0 0 1 0 0 1 0
59.5375	0 1 0 0 1 0 1 0	1 0 0 1 0 1 0 1
59.5250	0 1 0 0 1 0 1 0	1 0 0 1 0 1 0 0
59.5125	0 1 0 0 1 0 1 0	1 0 0 1 0 0 0 1
59.5000	0 1 0 0 1 0 1 0	1 0 0 1 0 0 0 0
59.4875	0 1 0 0 1 0 0 0	1 0 0 1 0 1 1 1
59.4750	0 1 0 0 1 0 0 0	1 0 0 1 0 1 1 0
59.4625	0 1 0 0 1 0 0 0	1 0 0 1 0 0 1 1
59.4500	0 1 0 0 1 0 0 0	1 0 0 1 0 0 1 0
59.4375	0 1 0 0 1 0 0 0	1 0 0 1 0 1 0 1
59.4250	0 1 0 0 1 0 0 0	1 0 0 1 0 1 0 0
59.4125	0 1 0 0 1 0 0 0	1 0 0 1 0 0 0 1
59.4000	0 1 0 0 1 0 0 0	1 0 0 1 0 0 0 0
59.3875	0 0 0 0 1 0 1 0	1 0 0 1 0 1 1 1
59.3750	0 0 0 0 1 0 1 0	1 0 0 1 0 1 1 0
59.3625	0 0 0 0 1 0 1 0	1 0 0 1 0 0 1 1
59.3500	0 0 0 0 1 0 1 0	1 0 0 1 0 0 1 0
59.3375	0 0 0 0 1 0 1 0	1 0 0 1 0 1 0 1
59.3250	0 0 0 0 1 0 1 0	1 0 0 1 0 1 0 0
59.3125	0 0 0 0 1 0 1 0	1 0 0 1 0 0 0 1
L.O. Freq. MHz.	DIP Switch S1 1 2 3 4 5 6 7 8	DIP Switch S2 9 10 11 12 13 14 15 16
59.3000	0 0 0 0 1 0 1 0	1 0 0 1 0 0 0 0
59.2875	0 0 0 0 1 0 0 0	1 0 0 1 0 1 1 1
59.2750	0 0 0 0 1 0 0 0	1 0 0 1 0 1 1 0
59.2625	0 0 0 0 1 0 0 0	1 0 0 1 0 0 1 1
59.2500	0 0 0 0 1 0 0 0	1 0 0 1 0 0 1 0
59.2375	0 0 0 0 1 0 0 0	1 0 0 1 0 1 0 1
59.2250	0 0 0 0 1 0 0 0	1 0 0 1 0 1 0 0
59.2125	0 0 0 0 1 0 0 0	1 0 0 1 0 0 0 1
59.2000	0 0 0 0 1 0 0 0	1 0 0 1 0 0 0 0
59.1875	0 1 1 1 0 0 1 0	1 0 0 1 0 1 1 1
59.1750	0 1 1 1 0 0 1 0	1 0 0 1 0 1 1 0
59.1625	0 1 1 1 0 0 1 0	1 0 0 1 0 0 1 1
59.1500	0 1 1 1 0 0 1 0	1 0 0 1 0 0 1 0
59.1375	0 1 1 1 0 0 1 0	1 0 0 1 0 1 0 1
59.1250	0 1 1 1 0 0 1 0	1 0 0 1 0 1 0 0
59.1125	0 1 1 1 0 0 1 0	1 0 0 1 0 0 0 1
59.1000	0 1 1 1 0 0 1 0	1 0 0 1 0 0 0 0
59.0875	0 1 1 1 0 0 0 0	1 0 0 1 0 1 1 1
59.0750	0 1 1 1 0 0 0 0	1 0 0 1 0 1 1 0

59.0625	0 1 1 1 0 0 0 0	1 0 0 1 0 0 1 1
59.0500	0 1 1 1 0 0 0 0	1 0 0 1 0 0 1 0
59.0375	0 1 1 1 0 0 0 0	1 0 0 1 0 1 0 1
59.0250	0 1 1 1 0 0 0 0	1 0 0 1 0 1 0 0
59.0125	0 1 1 1 0 0 0 0	1 0 0 1 0 0 0 1
59.0000	0 1 1 1 0 0 0 0	1 0 0 1 0 0 0 0
58.9875	0 0 1 1 0 0 1 0	1 0 0 1 0 1 1 1
58.9750	0 0 1 1 0 0 1 0	1 0 0 1 0 1 1 0
58.9625	0 0 1 1 0 0 1 0	1 0 0 1 0 0 1 1
58.9500	0 0 1 1 0 0 1 0	1 0 0 1 0 0 1 0
58.9375	0 0 1 1 0 0 1 0	1 0 0 1 0 1 0 1
58.9250	0 0 1 1 0 0 1 0	1 0 0 1 0 1 0 0
58.9125	0 0 1 1 0 0 1 0	1 0 0 1 0 0 0 1
58.9000	0 0 1 1 0 0 1 0	1 0 0 1 0 0 0 0
58.8875	0 0 1 1 0 0 0 0	1 0 0 1 0 1 1 1
58.8750	0 0 1 1 0 0 0 0	1 0 0 1 0 1 1 0
58.8625	0 0 1 1 0 0 0 0	1 0 0 1 0 0 1 1
58.8500	0 0 1 1 0 0 0 0	1 0 0 1 0 0 1 0
58.8375	0 0 1 1 0 0 0 0	1 0 0 1 0 1 0 1
58.8250	0 0 1 1 0 0 0 0	1 0 0 1 0 1 0 0
58.8125	0 0 1 1 0 0 0 0	1 0 0 1 0 0 0 1
58.8000	0 0 1 1 0 0 0 0	1 0 0 1 0 0 0 0
58.7875	0 1 0 1 0 0 1 0	1 0 0 1 0 1 1 1
58.7750	0 1 0 1 0 0 1 0	1 0 0 1 0 1 1 0
58.7625	0 1 0 1 0 0 1 0	1 0 0 1 0 0 1 1
58.7500	0 1 0 1 0 0 1 0	1 0 0 1 0 0 1 0
58.7375	0 1 0 1 0 0 1 0	1 0 0 1 0 1 0 1
58.7250	0 1 0 1 0 0 1 0	1 0 0 1 0 1 0 0
58.7125	0 1 0 1 0 0 1 0	1 0 0 1 0 0 0 1
58.7000	0 1 0 1 0 0 1 0	1 0 0 1 0 0 0 0
58.6875	0 1 0 1 0 0 0 0	1 0 0 1 0 1 1 1
58.6750	0 1 0 1 0 0 0 0	1 0 0 1 0 1 1 0
58.6625	0 1 0 1 0 0 0 0	1 0 0 1 0 0 1 1
58.6500	0 1 0 1 0 0 0 0	1 0 0 1 0 0 1 0
58.6375	0 1 0 1 0 0 0 0	1 0 0 1 0 1 0 1
58.6250	0 1 0 1 0 0 0 0	1 0 0 1 0 1 0 0
58.6125	0 1 0 1 0 0 0 0	1 0 0 1 0 0 0 1
58.6000	0 1 0 1 0 0 0 0	1 0 0 1 0 0 0 0
58.5875	0 0 0 1 0 0 1 0	1 0 0 1 0 1 1 1
58.5750	0 0 0 1 0 0 1 0	1 0 0 1 0 1 1 0
58.5625	0 0 0 1 0 0 1 0	1 0 0 1 0 0 1 1
58.5500	0 0 0 1 0 0 1 0	1 0 0 1 0 0 1 0
58.5375	0 0 0 1 0 0 1 0	1 0 0 1 0 1 0 1
58.5250	0 0 0 1 0 0 1 0	1 0 0 1 0 1 0 0
58.5125	0 0 0 1 0 0 1 0	1 0 0 1 0 0 0 1
58.5000	0 0 0 1 0 0 1 0	1 0 0 1 0 0 0 0
58.4875	0 0 0 1 0 0 0 0	1 0 0 1 0 1 1 1
58.4750	0 0 0 1 0 0 0 0	1 0 0 1 0 1 1 0
58.4625	0 0 0 1 0 0 0 0	1 0 0 1 0 0 1 1
58.4500	0 0 0 1 0 0 0 0	1 0 0 1 0 0 1 0
58.4375	0 0 0 1 0 0 0 0	1 0 0 1 0 1 0 1
58.4250	0 0 0 1 0 0 0 0	1 0 0 1 0 1 0 0
58.4125	0 0 0 1 0 0 0 0	1 0 0 1 0 0 0 1
58.4000	0 0 0 1 0 0 0 0	1 0 0 1 0 0 0 0
58.3875	0 1 1 0 0 0 1 0	1 0 0 1 0 1 1 1
58.3750	0 1 1 0 0 0 1 0	1 0 0 1 0 1 1 0
58.3625	0 1 1 0 0 0 1 0	1 0 0 1 0 0 1 1
58.3500	0 1 1 0 0 0 1 0	1 0 0 1 0 0 1 0
58.3375	0 1 1 0 0 0 1 0	1 0 0 1 0 1 0 1
58.3250	0 1 1 0 0 0 1 0	1 0 0 1 0 1 0 0
58.3125	0 1 1 0 0 0 1 0	1 0 0 1 0 0 0 1
58.3000	0 1 1 0 0 0 1 0	1 0 0 1 0 0 0 0
L.O.	DIP Switch S1	DIP Switch S2
Freq. MHz.	1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16